

# Appendix H

## Soil and Surface Water Management Sub-plan

STW-JHC-PLN-00-EN-002-000005

Western Harbour Tunnel Stage 3A

24 October 2022

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## Document control

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## Glossary/Abbreviations

Abbreviation	Expanded text
AHD	Australian Height Datum
ASS	Acid Sulfate Soils
BOM	The Australian Bureau of Meteorology
CSSI	Critical State Significant Infrastructure, as described in Schedule 1 of the Minister's Conditions of Approval (SSI #8863), the carrying out of which is approved under the terms of this approval
CEMP	Construction Environmental Management Plan
Construction	Has the same definition as Schedule 1 of the Minister's Conditions of Approval (SSI #8863)
DPE	New South Wales Department of Planning and Environment (formerly Department of Planning, Industry and Environment)
DPE Water	New South Wales Department of Planning and Environment (Water)
DPIE	NSW Department of Planning, Industry and Environment (now known as the Department of Planning and Environment)
EESG	Environment, Energy and Science Group of the Department of Planning, Industry and Environmental (formerly known as NSW Office of Environmental and Heritage)
EI	Rainfall Erosivity Factor erosion index
EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
EPA	New South Wales Environment Protection Authority
EPL	Environment Protection Licence under the POEO Act
Environmental Representative (ER)	The Environmental Representative(s) for the CSSI approved by the Planning Secretary
ERM	Environmental Resources Management Australia Pty Ltd
JHCPB	John Holland CPB Contractors (the Contractor)
LGA	Local Government Area
Minister, the	NSW Minister for Planning and Homes (formerly the Minister for Planning and Public Spaces)
MCoA	Minister's Conditions of Approval

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Abbreviation	Expanded text
Non-compliance	Failure to comply with the requirements of Project approval or any applicable licence, permit or legal requirements
Non-conformance	Failure to conform to the requirements of Project system documentation including the CEMP or supporting documentation
ESCP	Erosion and Sediment Control Plan(s) – referred to on this Project as a Site Environment Plan (SEP)
PIRMP	Pollution Incident Response Management Plan
Planning Approval Documents	Approval documentation as listed under Condition A1 of the MCoA
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
Project, the	Western Harbour Tunnel Project Stage 3A
REMMs	Revised Environmental Management Measures
Roads and Maritime	Roads and Maritime Services (now Transport for New South Wales)
RtS	Response to Submissions Report
SDS	Safety Data Sheet
SEP	Site Environment Plan
SMART	Specific, Measurable, Achievable, Realistic, and Timely principles
SSWMP	Soil and Surface Water Management Sub-plan (this Sub-Plan)
SWMP	Surface Water Monitoring Program
Staging Report	The latest Staging Report prepared under Condition A10 and submitted to the Secretary for information
TfNSW	Transport for New South Wales (formerly Roads and Maritime)
WFU	Warringah Freeway Upgrade
WHT	Western Harbour Tunnel
WHT3	The White Bay construction support site
WHT12	The Western Harbour Tunnel cut and cover structure at Rozelle

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# 1 Introduction

## 1.1 Context

This Soil and Surface Water Management Plan (SSWMP or Plan) forms part of the Construction Environmental Management Plan (CEMP) for Stage 3A of the Western Harbour Tunnel project (the Project), a component of the Western Harbour Tunnel and Warringah Freeway Upgrade project.

This SSWMP has been prepared for the Project to address the relevant requirements of the Minister's Conditions of Approval (MCoA) for the Western Harbour Tunnel and Warringah Freeway Upgrade project (SSI #8863), the Western Harbour Tunnel and Warringah Freeway Upgrade Environmental Impact Statement dated January 2020 (the EIS), the Western Harbour Tunnel and Warringah Freeway Upgrade Response to Submissions report dated September 2020 (the RtS) and applicable guidelines and legislation.

This Plan describes how the Project will to manage potential soil and surface water impacts during the construction of Stage 3A (for further details on staging refer to the Staging Report). Other construction stages, and operational soil and surface water impacts and management measures are not included within this SSWMP.

## 1.2 Background and project description

The Western Harbour Tunnel and Warringah Freeway Upgrade project comprises a new motorway tunnel connection across Sydney Harbour, and an upgrade of the Warringah Freeway to integrate the new motorway infrastructure with the existing road network and to enable future connection to the proposed Beaches Link and Gore Hill Freeway Connection project.

The Western Harbour Tunnel (WHT) will connect the approved M4-M5 Link in Rozelle to the Warringah Freeway at North Sydney/Cammeray.

As per the Staging Report the Western Harbour Tunnel and Warringah Freeway Upgrade project is being constructed in three stages. The Project (Stage 3A) includes the following key features:

- A portion of the twin mainline tunnels connecting the M4-M5 at Rozelle to the Warringah Freeway, near Cammeray, of about 2 kilometres long and commencing from the stub tunnels at the M4-M5 Link in Rozelle and terminating underground at Birchgrove
- Ventilation cavern and tunnel excavation in Rozelle
- Limited in tunnel operational infrastructure including road pavement and drainage to enable Stage 3B works.

The construction of the Project will be supported by two surface based ancillary facilities, located at the Western Harbour Tunnel cut and cover structure in Rozelle (WHT12) and at White Bay in Rozelle (WHT3). Figure 1-1 below details the Stage 3A construction works and ancillary facilities.



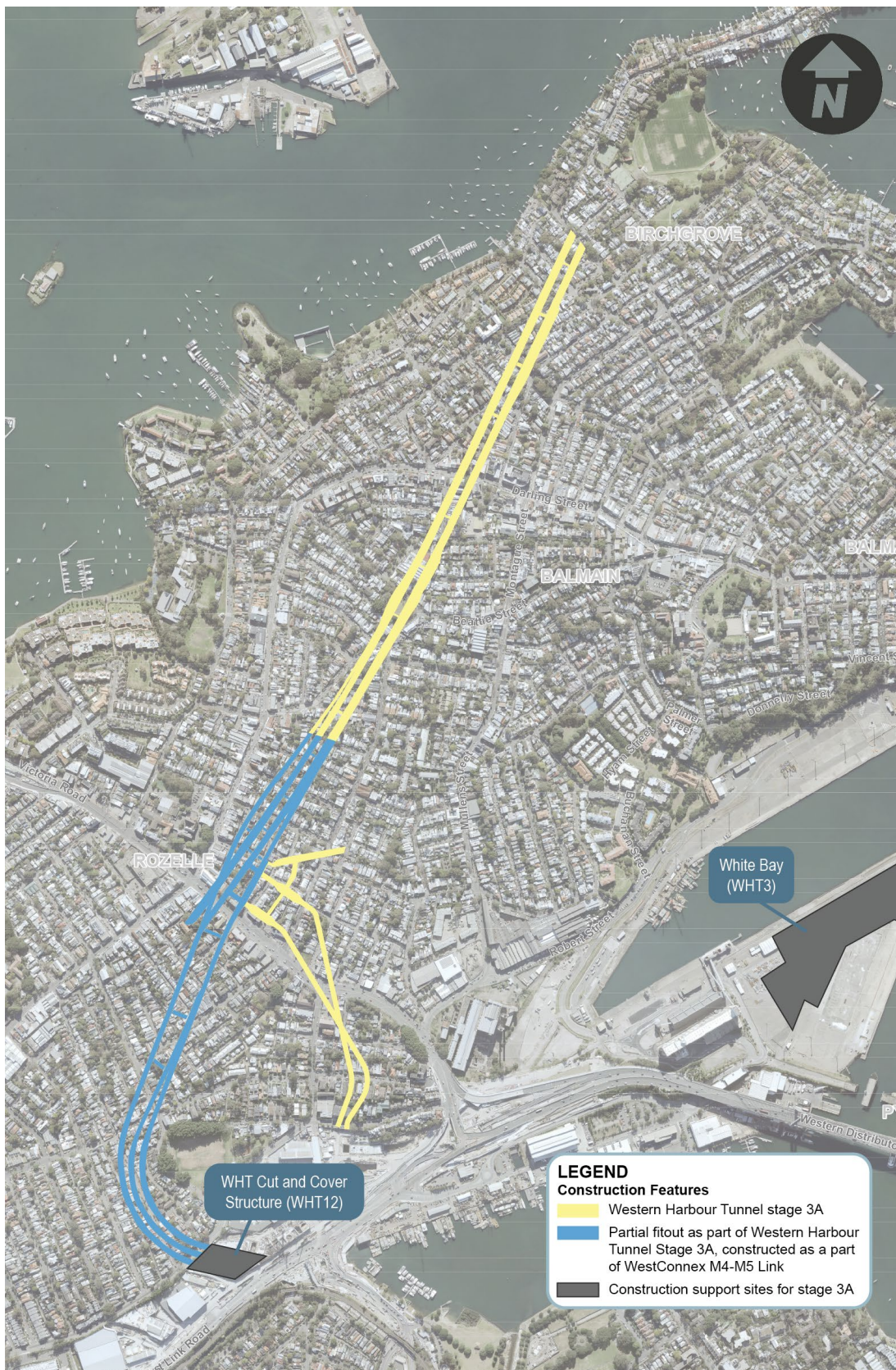


Figure 1-1 Overview of the Project's construction support sites

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The EIS was prepared to assess the impacts of construction and operation of the Western Harbour Tunnel and Warringah Freeway Upgrade project.

A Response to Submissions report dated September 2020 (the RtS) was prepared in response to submissions received on the EIS. The EIS environmental management measures were revised and included in Part D of the RtS report.

The Western Harbour Tunnel and Warringah Freeway Upgrade project was declared to be Critical State Significant Infrastructure (CSSI) by the then Minister for Planning and Public Space on 9 November 2020 and approved by the then Minister for Planning and Public Spaces on 21 January 2021.

The administration of provisions under the *NSW Environmental Planning and Assessment Act 1979* including the Western Harbour Tunnel and Warringah Freeway Upgrade project's planning consent (SSI#8863) is now under the portfolio of the NSW Minister for Planning and Homes (the Minister).

Impacts specific to the Project will be managed through the implementation of mitigation and management measures described in this SSWAMP.

The Project description is provided in Section 1.2 of the Project CEMP.

### 1.3 Purpose and scope of this Sub-plan

This Sub-plan has been prepared to address the requirements of the Minister's Conditions of Approval (MCoA) for the Western Harbour Tunnel and Warringah Freeway Upgrade project (SSI #8863), the Western Harbour Tunnel and Warringah Freeway Upgrade Environmental Impact Statement dated January 2020 (the EIS), the Western Harbour Tunnel and Warringah Freeway Upgrade Response to Submissions Report dated September 2020 (the RtS) and applicable guidance and legislation.

The scope of this Sub-plan is to describe how the Project will manage soils and surface water resources during construction. Operational impacts and measures do not fall within the scope of this Sub-plan and, therefore, are not discussed in this Sub-plan.

### 1.4 Environmental management systems overview

This SSWMP forms part of the Project's CEMP which is the overarching document in the environmental management system for the Project. Details on the CEMP and Project's environmental management system are provided in Section 1.5 of the CEMP.

### 1.5 Interface with other environmental documents

This Sub-plan is one of several plans and documents established to manage potential impacts associated with construction of the Project. The key documents that interface with this Sub-plan are outlined in Table 1-1.

Table 1-1 Key interfaces with this Sub-plan

Plan	Interface
Construction Environmental Management Plan (CEMP) for the Project	<ul style="list-style-type: none"><li>• The CEMP provides details on:<ul style="list-style-type: none"><li>– Overall Project staging, interactions between the CEMP and other plans, and management of cumulative impacts</li><li>– A framework for how construction will be managed</li><li>– Procedures, processes and management systems that apply in relation to construction activities</li></ul></li></ul>

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Plan	Interface
	<ul style="list-style-type: none"> <li>– Environmental planning and controls for construction including environmental risk assessment, regulatory requirements, protection measures and sustainability requirements.</li> </ul>
Surface Water Monitoring Program (SWMP)	<ul style="list-style-type: none"> <li>• Provides details of ongoing surface water monitoring required throughout Project construction to compare actual construction impacts to predicted impacts.</li> </ul>
Water Reuse Strategy	<ul style="list-style-type: none"> <li>• Details how water (including groundwater) encountered during construction is to be reused if practicable.</li> </ul>
Groundwater Management Plan (GMP)	<ul style="list-style-type: none"> <li>• Details the requirements for management and mitigation measures for the discharges of treated water from the wastewater treatment plants during Construction.</li> </ul>
Community Communication Strategy (CCS) and Complaints Management System	<ul style="list-style-type: none"> <li>• Details how community and stakeholder engagement will be managed and how communication about construction of the Project will be facilitated with the community as well as relevant councils and agencies</li> <li>• Specifies the process for receiving, addressing, resolving and recording complaints as well as outlines the process required in the event of escalation of a complaint to the independent mediator.</li> </ul>

## 2 Purpose and objectives

### 2.1 Purpose

The purpose of this SSWMP is to describe how the Project will manage soil and surface water during construction.

This SSWMP has been prepared to address the commitments made in the documents listed in condition A1 of the MCoA with regard to the Project's management of soil and surface water.

### 2.2 Objectives

The key objective of this SSWMP is to ensure that all avoidance, mitigation and management measures relevant to the protection of soils and surface water quality are implemented appropriately during the construction of the Project.

To achieve these objectives, JHCPB will undertake the following:

- Ensure appropriate controls and procedures are implemented during construction activities to address potential soil and surface water impacts along the Project corridor, as well as manage risks from analysis of relevant construction activities as per MCoA C2(d)(ii)
- Ensure appropriate measures are implemented to address the relevant MCoA outlined in Table 3-1 and the safeguards detailed in the RtS, as outlined in Table 3-2.
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 3.1 of this Plan.

Furthermore, JHCPB will meet the performance outcomes from the EIS as required by MCoA C2(d)(i), as identified in Table 2-1 below.

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Table 2-1 Performance outcomes identified in the EIS relevant to this Plan

Performance outcome	How performance outcome will be addressed	Records	Source
<p><b>Water – Hydrology</b></p> <p>Long term impacts on surface water and groundwater hydrology (including drawdown, flow rates and volumes) are minimised.</p> <p>The environmental values of nearby, connected and affected water sources, groundwater and dependent ecological systems including estuarine and marine water (if applicable) are maintained (where values are achieved) or improved and maintained (where values are not achieved).</p> <p>Sustainable use of water resources.</p>	<p>In respect to water (hydrology), the project has been developed such that:</p> <ul style="list-style-type: none"> <li>• Design and construction of the tunnels would minimise groundwater inflow</li> <li>• Opportunities for reuse of treated water during construction has been considered throughout project development</li> <li>• The environmental values of nearby, connected and affected water sources would be improved and/or maintained.</li> </ul>	<p>Weekly inspection records</p> <p>Sustainability quarterly reporting</p>	<p>EIS – Chapter 28 (Table 28-4)</p>
<p><b>Water – Quality</b></p> <p>The project is designed, constructed and operated to protect the NSW Water Quality Objectives where they are currently being achieved, and contribute towards achievement of the Water Quality Objectives over time where they are currently not being achieved, including downstream of the project, to the extent of the project impact including estuarine and marine waters (if applicable)</p>	<p>In respect to water (quality), the project has been developed such that it:</p> <ul style="list-style-type: none"> <li>• Would operate under water quality discharge criteria with consideration of NSW Water Quality Objectives</li> <li>• Would effectively treat water to meet water quality discharge criteria.</li> </ul>	<p>Surface water monitoring program</p> <p>Permit to discharge water</p> <p>Weekly inspection records</p>	<p>EIS – Chapter 28 (Table 28-4)</p>

Performance outcome	How performance outcome will be addressed	Records	Source
<b>Soils</b> The environmental values of land, including soils, subsoils and landforms, are protected. Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to acid sulfate soils and site contamination.	In respect to soils, the project has been developed such that: <ul style="list-style-type: none"> <li>Erosion and sediment controls would be implemented in accordance with Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom 2004) and Volume 2D (DECC 2008), commonly referred to as the ‘Blue Book’</li> <li>Acid sulfate soils would be managed in accordance with good practice measures</li> <li>Contamination would be managed to protect environmental values and human health.</li> </ul>	Site environment plans (SEP)  Unexpected Finds Procedure for Contamination	EIS – Chapter 28 (Table 28-4)

## 2.3 Targets

The following targets have been established for the management of soil and surface water impacts during construction activities:

- Meet the requirements of the documents listed in condition A1 of the MCoA and any other relevant environmental requirements highlighted in Section 3 of this Plan
- Meet Infrastructure Sustainability Council (ISC) requirements
- Ensure that environmental values of nearby, connected and affected water sources are improved and/or maintained
- Ensure that construction support sites and construction sites are laid out such that surface water flows are not significantly impeded
- Ensure that erosion and sediment controls are implemented and comply with Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom 2004) and Volume 2D (DECC 2008).

## 3 Environmental requirements

### 3.1 Relevant legislation and guidelines

#### 3.1.1 Legislation

The main legislation and government policy requirements relevant to this Sub-plan include:

- Water Act 1912 and Water Management Act 2000
- Protection of the Environment Operations Act 1997
- Waste Avoidance and Resource Recovery Act 2001.

Other relevant legislation to this Sub-plan is included in Appendix A1 of the CEMP.

#### 3.1.2 Additional approvals, licences, permits and requirements

An Environment Protection Licence (EPL) will be obtained for the Project. Refer to Section 3.2 of the CEMP for other relevant approvals, licences, permits or requirements.

#### 3.1.3 Guidelines and standards

The main guidelines, specifications and policy documents relevant to this Sub-plan include:

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000)
- Australian and New Zealand Environment and Conservation Council and Volume 2A Installation of Services (DECCW 2008a) Volume 2C Unsealed Roads (DECCW 2008b) Agriculture and Resource Management Council of Australia and New Zealand (ANZECC): National Water Quality Management Strategy, Paper No. 4, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 1, The Guidelines (ANZECC 2000)
- Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCAZ) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2018
- Managing Urban Stormwater: Soils and Construction. Landcom, (4th Edition) March 2004 (reprinted 2006) Volume 1, and NSW Department of Environment, Climate Change and Water, 2008. Volume 2D, (commonly referred to as the “Blue Book”)
- RMS QA Specification G36 – Environmental Protection (Management System) (2017)
- RMS QA Specification G38 – Soil and Water Management (Soil and Surface Water Management Plan) (2017)
- RMS Management of Wastes on Roads and Maritime Services Land (2014)
- Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (2004)
- RTA’s Code of Practice for Water Management –Road Development and Management (1999)
- Environmental Best Management Practice Guideline for Concreting Contractors, DEC (2004).

## 3.2 Minister's Conditions of Approval

The MCoA relevant to this Plan are listed in Table 3-1 below. A reference is included to indicate where the condition is addressed in this Plan or other Project management documents.

Table 3-1 Minister's conditions of approval relevant to this SSWMP

MCoA	Condition requirements	Document reference	How addressed
<b>General</b>			
A5	<p>Where the terms of this approval require a document or monitoring program to be prepared or a review to be undertaken in consultation with identified parties, evidence of the consultation undertaken must be submitted to the Planning Secretary with the document. The evidence must include:</p> <ul style="list-style-type: none"> <li>(a) documentation of the engagement with the party identified in the condition of approval that has occurred before submitting the document for approval;</li> <li>(b) a log of the dates of engagement or attempted engagement with the identified party;</li> <li>(c) documentation of the follow-up with the identified party where engagement has not occurred to confirm that they do not wish to engage or have not attempted to engage after repeated invitations;</li> <li>(d) outline of the issues raised by the identified party and how they have been addressed; and</li> <li>(e) a description of the outstanding issues raised by the identified party and the reasons why they have not been addressed.</li> </ul>	<p>Section 4.1 Section 4.2 Appendix H1 – SWMP</p>	<p>This Sub-plan has been prepared in consultation with relevant agencies identified in condition C4(e) of the MCoA.</p> <p>A summary of consultation is included in Section 4.</p>
<b>Construction Environmental Management Plan</b>			
C4	CEMP Sub-plans must be prepared in consultation with the relevant government agencies identified for each CEMP Sub-plan. Details of all information requested by an agency during consultation must be provided to the Planning Secretary as part of any submission of the relevant CEMP Sub-	<p>Section 4.1 Section 4.2</p>	This Sub-plan has been prepared in consultation with

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MCoA	Condition requirements	Document reference	How addressed						
	<p>plan, including copies of all correspondence from those agencies as required by Condition A5.</p> <table><tr><td></td><td>Required CEMP Sub-plan</td><td>Relevant government agencies to be consulted for each CEMP Sub-plan</td></tr><tr><td>(e)</td><td>Soil and surface water</td><td>DPIE Water, EESG, EPA, Sydney Water (if Sydney Water's assets are affected) and relevant council(s)</td></tr></table>		Required CEMP Sub-plan	Relevant government agencies to be consulted for each CEMP Sub-plan	(e)	Soil and surface water	DPIE Water, EESG, EPA, Sydney Water (if Sydney Water's assets are affected) and relevant council(s)		<p>the relevant agencies identified in this condition.</p> <p>A summary of consultation is included in Section 4.</p>
	Required CEMP Sub-plan	Relevant government agencies to be consulted for each CEMP Sub-plan							
(e)	Soil and surface water	DPIE Water, EESG, EPA, Sydney Water (if Sydney Water's assets are affected) and relevant council(s)							
C5	<p>The CEMP Sub-plans must state how:</p> <p>(a) the environmental performance outcomes identified in the documents listed in Condition A1 will be achieved;</p> <p>(b) the mitigation measures identified in the documents listed in Condition A1 will be implemented;</p> <p>(c) the relevant terms of this approval will be complied with; and</p> <p>(d) issues requiring management during construction (including cumulative impacts), as identified through ongoing environmental risk analysis, will be managed through SMART principles.</p>	<p>(a) Section 2.3</p> <p>(b) Section 3.3 and 7</p> <p>(c) Section 3.2, 3.3 and 7</p> <p>(d) Section 6.2 and 7</p> <p>Section 3.2.1 of the CEMP (Environmental Risk Assessment Workshop)</p> <p>Section 5 of the SWMP (Appendix H1)</p>	<p>Soil and surface water issues requiring management during construction of the Project have been identified through the documents listed in condition A1 of the MCoA, and through the Environmental Risk Assessment Workshop. These issues, including cumulative impacts, have been detailed in Appendix A2 of the CEMP.</p> <p>Environmental risk analysis will be ongoing and regularly reviewed in accordance with Section 3.2.1 of the CEMP.</p>						

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MCoA	Condition requirements	Document reference	How addressed
			<p>Soil and surface water impacts are detailed in Section 6.2.</p> <p>Management and mitigation measures are included in Section 7.</p>
C9	The CEMP Sub-plans must be submitted to the Planning Secretary for approval along with, or subsequent to, the submission of the CEMP but in any event, no later than one month before construction.	Section 2.2 of the CEMP	Construction will not commence until the CEMP and all CEMP Sub-plans have been approved by the Secretary. The CEMP and relevant Sub-plans will be implemented for the duration of construction.
C10	Construction must not commence until the CEMP and all CEMP Sub-plans have been approved, unless otherwise agreed by the Planning Secretary. The CEMP and CEMP Sub-plans, as approved by the Planning Secretary, including any minor amendments approved by the ER must be implemented for the duration of construction. Where construction of the CSSI is staged, construction of a stage must not commence until the CEMP and sub-plans for that stage have been endorsed by the ER and approved by the Planning Secretary.	Section 2.2 of the CEMP	Construction of the Project will not commence until the CEMP and all Sub-plans as per the Staging Report have approved, unless it is otherwise agreed by the Secretary. The CEMP and CEMP Sub-plans will be implemented for the duration of construction.
<b>Construction monitoring programs</b>			
C11	The following Construction Monitoring Programs must be prepared in consultation with the relevant government agencies identified for each to	Section 2.3 of the SWMP (Appendix H1)	The SWMP has been prepared in accordance with this condition and describes how the Project propose to

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MCoA	Condition requirements		Document reference	How addressed
	compare actual performance of construction of the CSSI against the performance predicted in the documents listed in Condition A1 or in the CEMP:			monitor surface water quality during construction of the Project. The monitoring program will be provided to DPE Water and EPA.
		Required Construction Monitoring Program	Relevant government agencies to be consulted for each Construction Monitoring Program	
	(c)	Surface Water Monitoring Program	DPIE Water, (Sydney Water if any Sydney Water assets are impacted), EPA	
C12	<p>Each Construction Monitoring Program must provide:</p> <p>(a) details of baseline data available;</p> <p>(b) details of baseline data to be obtained and when;</p> <p>(c) details of all monitoring of the Project to be undertaken;</p> <p>(d) the parameters of the Project to be monitored;</p> <p>(e) the frequency of monitoring to be undertaken;</p> <p>(f) the location of monitoring;</p> <p>(g) the reporting of monitoring results and analysis results against relevant criteria;</p> <p>(h) details of the methods that will be used to analyse the monitoring data;</p> <p>(i) procedures to identify and implement additional mitigation measures where the results of the monitoring indicate unacceptable project impacts;</p> <p>(j) a consideration of SMART principles;</p> <p>(k) any consultation to be undertaken in relation to the monitoring programs; and</p>		<p>SWMP (Appendix H1) details the following requirements:</p> <ul style="list-style-type: none"> <li>• Section 2 Consultation</li> <li>• Section 3 Baseline data</li> <li>• Section 4 Monitoring methodology</li> <li>• Section 5 Monitoring and reporting requirements</li> <li>• Section 6 Review and improvement requirements.</li> </ul>	The SWMP (Appendix H1) details the requirements to meet conditions C12 and C14 of the MCoA in relation to monitoring, reporting and review.

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MCoA	Condition requirements	Document reference	How addressed
	(l) any specific requirements as required by Conditions C13 to C16.		
C17	The Construction Monitoring Programs must be developed in consultation with relevant government agencies as identified in Condition C11. Details of all information requested by an agency during consultation must be provided to the Planning Secretary as part of any submission of the relevant Construction Monitoring Programs, including copies of all correspondence from those agencies as required by Condition A5.	Section 2.3 of the SWMP (Appendix H1) and Section 4 of this Sub-plan	The SWMP has been prepared in accordance with this condition and describes how the Project proposes to monitor surface water quality during construction of the Project.
C18	The Construction Monitoring Programs must be endorsed by the ER and then submitted to the Planning Secretary for approval at least one month before the commencement of construction.	Section 1.3 of the SWMP (Appendix H1)	The SWMP will be endorsed by the ER.  The SWMP will be submitted to DPE as part of the Soil and Surface Water Management Plan, for approval no later than one month prior to the commencement of construction activities.
C19	Unless otherwise agreed with the Planning Secretary, construction must not commence until all of the relevant Construction Monitoring Programs have been approved by the Planning Secretary, and all relevant baseline data for the specific construction activity has been collected.	Section 1.3 of the SWMP (Appendix H1), Section 3.9 of the CEMP	Construction will not commence until the CEMP and Sub-plans, including relevant construction monitoring programs have been approved by the Secretary.
C20	The Construction Monitoring Programs, as approved by the Planning Secretary including any minor amendments approved by the ER must be implemented for the duration of construction and for any longer period set out in the	Section 3.9 of the CEMP	The SWMP will be implemented for the duration

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MCoA	Condition requirements	Document reference	How addressed
	monitoring program or specified by the Planning Secretary, whichever is the greater.	Section 1.3 of the SWMP (Appendix H1)	of construction as detailed in Section 1.3 of the SWMP.
C21	<p>The results of the Construction Monitoring Programs must be submitted to the Planning Secretary, and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program.</p> <p><i>Note: Where a relevant CEMP Sub-plan exists, the relevant Construction Monitoring Program may be incorporated into that CEMP Sub-plan.</i></p>	<p>Section 3.9 of the CEMP</p> <p>Section 5.5 of the SWMP (Appendix H1)</p>	Section 5.5 of the SWMP details the reporting requirements and the frequency required for this reporting.
<b>Soils</b>			
E114	Prior to the commencement of any work, erosion and sediment controls must be installed and maintained, as a minimum, in accordance with the publication Managing Urban Stormwater: Soils & Construction (4th edition, Landcom 2004) commonly referred to as the 'Blue Book'.	<p>Site Environment Plans (SEP)</p> <p>Table 7-1 (SWMM04-06)</p>	<p>Construction activities will be predominantly limited to within the established Western Harbour Tunnel cut and cover structure construction support site (WHT12). Construction activities associated with the Project that could cause erosion and sediment impacts are limited given the negligible amount of surface soil disturbance that would be undertaken during construction.</p> <p>Notwithstanding, SEPs will be established and implemented on an ongoing basis to manage potential erosion and sediment</p>

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MCoA	Condition requirements	Document reference	How addressed
			issues. Controls will be established and maintained in accordance with the Blue Book.
E123	An Unexpected Finds Procedure for Contamination must be prepared before the commencement of work and must be followed should unexpected contamination or asbestos (or suspected contamination) be excavated or otherwise discovered. The procedure must include details of who will be responsible for implementing the unexpected finds procedure and the roles and responsibilities of all parties involved. The procedure must be submitted to the Planning Secretary for information.	Appendix H2 (Unexpected Finds Procedure for Contamination)	The Unexpected Finds Procedure for Contamination has been prepared in accordance with this condition.  The procedure will be submitted to the Planning Secretary for information.
E124	The Unexpected Finds Procedure for Contamination must be implemented throughout construction.	Appendix H2 (Unexpected Finds Procedure for Contamination)	The Unexpected Finds Procedure for Contamination will be implemented throughout construction.
E210	If construction stage stormwater discharges are proposed, a water pollution impact assessment will be required to inform licensing consistent with section 45 of the POEO Act. Any such assessment must be prepared in consultation with the EPA and be consistent with the National Water Quality Guidelines, with a level of detail commensurate with the potential water pollution risk.	Section 6.2	Construction stage stormwater discharges will be managed under the Project EPL. This licence will be obtained with regard to relevant legislation and the requirements of condition E210, including a water pollution impact assessment (Discharge Impact Assessment). The Discharge Impact Assessment forms part of the process undertaken to obtain an EPL from the EPA.

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### 3.3 Revised Environmental Management Measures

Relevant Revised Environmental Management Measures (REMMs), as identified in Part D of the RtS, are listed in Table 3-2 below. Table 3-2 also includes references to required outcomes, the timing of when and how the commitment applies and where it has been addressed in the SSWMP.

Table 3-2 Environmental management measures relevant to this SSWMP

REMM	Measure	Timing	Document reference	How addressed
<b>Geology, soils and groundwater</b>				
SG5	Erosion and sediment measures will be implemented at all work sites in accordance with the principles and requirements in Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom, 2004) and Volume 2D (NSW Department of Environment and Climate Change, 2008), commonly referred to as the 'Blue Book'.	Construction	Site Environment Plans (SEP) Table 7-1 (SWMM04-06)	Construction activities will be predominantly limited to within the established Western Harbour Tunnel cut and cover structure construction support site (WHT12). Construction activities associated with the Project that could cause erosion and sediment impacts are limited given the negligible amount of surface soil disturbance that would be undertaken during construction.  Notwithstanding, SEPs will be established in accordance with the Blue Book and implemented on an ongoing basis to manage potential erosion and sediment issues.

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REMM	Measure	Timing	Document reference	How addressed
SG23	Emergency Spill procedures will be developed to avoid and manage accidental spillages of fuels, chemicals, and fluids to minimise the risk of human health impacts and contamination of groundwater.	Construction	Appendix H3 (Spill Control Procedure) Table 7-1 (SWMM12-15) Section 6.2.2	Spill Control Procedure will be developed and maintained on the Project IMS.
<b>Hydrodynamics and water quality</b>				
WQ1	<p>Erosion and sediment measures will be implemented at all work sites and surface road upgrades in accordance with the principles and requirements in <i>Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom, 2004)</i>, <i>Managing Urban Stormwater: Volume 2D Main Road Construction</i> (NSW Department of Environment and Climate Change, 2008) and relevant guidelines, procedures and specifications of Transport for NSW.</p> <p>A soil conservation specialist will be engaged by both Transport for NSW and the Contractor for the duration of construction of the Project to provide advice regarding erosion and sediment control including review of Erosion and Sediment Control Plans (ESCPs or SEPs).</p>	Construction	Site Environment Plans (SEPs) Table 7-1 (SWMM04-06)	The Project's environmental team will review and advise on changes required to the SEP as the Project develops. The advice of the soil conservationist will be obtained as required.

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REMM	Measure	Timing	Document reference	How addressed
WQ2	Emergency spill procedures will be developed to avoid and manage accidental spillages of fuels, chemicals or fluids during construction.	Construction	Section 4.3 of the CEMP  Appendix H3 (Spill Control Procedure)	A Spill Control Procedure will be developed to manage spills and spill response on the Project, as required by Part 5.7 of the <i>Protection of the Environment Operations Act 1997</i> (NSW) (POEO Act). This is included as Appendix H3 of this sub-plan
WQ4	<p>A freshwater quality monitoring program for the construction of the project will be developed and implemented, with consideration of the freshwater monitoring being carried out for the M4-M5 Link and Beaches Link and Gore Hill Freeway Connection projects.</p> <p>The program will be developed in consultation with the Environment Protection Authority, Department of Planning, Industry and Environment (Regions, Agriculture and Resources), Department of Planning, Industry and Environment (Water), and relevant councils.</p> <p>Sampling locations and monitoring methodology will be in accordance with the <i>Guideline for Construction Water Quality Monitoring</i> (RTA 2003) and ANZG (2018).</p> <p>If exceedances of the criteria established under the freshwater monitoring program are detected, a management response will be triggered. This response will be documented within the construction freshwater quality monitoring program.</p>	Construction	Appendix H1 (Surface Water Monitoring Program)	The Surface Water Monitoring Program (Appendix H1) has been developed to meet this requirement.
<b>Flooding</b>				

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REMM	Measure	Timing	Document reference	How addressed
F3	Entries to tunnel excavations, including cut and cover sections of tunnel, will be protected against frequent flooding by locating openings outside flood prone areas, and/or the provision of local bunding and flood protection barriers.	Established prior to Construction	Section 5	N/A - the Western Harbour Tunnel cut and cover structure at Rozelle (WHT12) was established by the M4-M5 Link Rozelle Interchange project. The Western Harbour Tunnel cut and cover at Rozelle (WHT12) is a fully paved site which slopes away from City West Link. The site also has fully constructed drainage.
F4	The flood standard adopted at each tunnel entry during construction will be developed taking into consideration the duration of construction, the magnitude of inflows and the potential risks to personal safety and the project works.	Established prior to Construction	Section 5	N/A - the Western Harbour Tunnel cut and cover structure at Rozelle was established by the M4-M5 Link Rozelle Interchange project. The Western Harbour Tunnel cut and cover at Rozelle (WHT12) is a fully paved site which slopes away from City West Link. The site also has fully constructed drainage.
<b>Hazards and risks</b>				
HR1	Dangerous goods and hazardous materials will be stored in accordance with supplier's instructions and relevant legislation, Australian Standards, and applicable guidelines and may include bulk storage tanks, chemical storage cabinets/containers or impervious bunds.	Construction	Site Environmental Plan (SEP) Table 7-1 (SWMM04-06, 16-18)	Hazardous materials will be stored in accordance with the supplier instructions, relevant legislation, and Australian Standards. The Project's Site

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REMM	Measure	Timing	Document reference	How addressed
				Environment Plan (SEP) will capture this information.

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## **4 Consultation**

### **4.1 Consultation for preparation of this Plan**

This SSWMP has been developed and finalised in consultation with relevant government agencies in accordance with Condition C4(f) of the MCoA. Consultation with each agency, including responses received and how issues raised have been addressed in the development of this Plan are summarised in Table 4-1.

### **4.2 Ongoing consultation**

Any ongoing consultation with agencies, where required, will be undertaken in accordance with Section 7 of this Plan. Community feedback and complaints relating to soil and surface water will be managed in accordance with the Community Communication Strategy and Complaints Management System.



Table 4-1 Summary of consultation undertaken for the development of this Plan

Agency	Date	Response information	Key issues	Where addressed / how addressed	Outstanding issues / why not addressed
SSWMP (this Plan)					
DPE Water	<p>27/7/2022 – email correspondence to DPE Water introducing project and offering a project briefing.</p> <p>27/7/2022 – formal submission of SSWMP via email.</p> <p>27/7/2022 – formal submission of SSWMP via Planning Portal.</p>	<p>28/7/2022 – email received from DPE Water that a briefing was not necessary.</p> <p>29/7/2022 – written correspondence received via the Planning Portal that the agency has no comments on the plan.</p>	NA	NA	NA
EESG	27/7/2022 – phone call to EESG representative. No answer however a detailed voicemail was left.	19/8/2022 – written response received from EESG on the SSWMP, with comments for clarification. EESG	Whites Creek naturalisation works outside Stage 3A	Section 5.2 of the SSWMP provides clarity on the naturalisation of Whites Creek by Sydney Water.	NA

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	<p>27/7/2022 – email correspondence to EESG introducing the project and offering a project briefing. A formal submission of the SSWMP was included.</p> <p>27/7/2022 – formal submission of the SSWMP via email.</p> <p>18/8/2022 – follow up email to determine whether EESG had any comments on the submitted plan.</p>	noted their desire for no further consultation.	ERSED control monitoring	Table 7.1 of SSWMP has been updated to further detail inspection requirements	
EPA	<p>6/7/2022 - Call to Stuart Clark advising of imminent submission of management plans for consultation. A briefing on the Project scope was offered and ultimately accepted by the EPA officer.</p> <p>18/7/22 Call to Michael Simpson, message left, to discuss management</p>	17/8/2022 – Email response received from EPA. No comments provided.	NA	NA	NA

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	<p>plan consultation and to set a date for a briefing.</p> <p>27/7/2022 – Formal submission of SSWMP to EPA via email.</p> <p>27/7/2022 – Formal submission of SSWMP to EPA via Planning Portal.</p> <p>28/7/2022 – Project briefing presented to representatives of the EPA to outline Stage 3A.</p> <p>9/8/2022 – Follow up email to EPA to determine if comments would be provided.</p>				
Inner West Council	6/7/2022 - Initial contact with IWC to overview the management plans and organise a	Response not provided during consultation period.	NA	NA	NA

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	<p>briefing to be run by the Project.</p> <p>19/7/2022 - Submission of SSWMP to IWC formally via email</p> <p>19/7/2022 – submission of SSWMP formally via Planning Portal</p> <p>18/7/22 - Project briefing held with key members from IWC to overview Stage 3A.</p> <p>16/8/2022 – follow up email to IWC to check whether any comments on the plan would be provided</p>				
SWMP (Appendix H1 of this Plan)					
DPE Water	27/7/2022 – email correspondence to DPIE Water introducing project	28/7/2022 – email received from DPIE	NA	NA	NA

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	<p>and offering a project briefing.</p> <p>27/7/2022 – formal submission of SWMP via email.</p> <p>27/7/2022 – formal submission of SWMP via Planning Portal.</p>	<p>Water that a briefing was not necessary.</p> <p>29/7/2022 – written correspondence received via the Planning Portal that the agency has no comments on the plan.</p>			
EPA	<p>6/7/2022 - Call to Stuart Clark advising of imminent submission of management plans for consultation. A briefing on the Project scope was offered and ultimately accepted by the EPA officer.</p> <p>18/7/22 Call to Michael Simpson, message left, to discuss management plan consultation and to set a date for a briefing.</p>	<p>17/8/22 – Email response received from EPA. No comments provided.</p>	NA	NA	NA

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	<p>27/7/2022 – Formal submission of SWMP to EPA via email.</p> <p>27/7/2022 – Formal submission of SWMP to EPA via Planning Portal.</p> <p>28/7/2022 – Project briefing presented to representatives of the EPA to outline Stage 3A.</p> <p>9/8/2022 – Follow up email to EPA to determine if comments would be provided.</p>				
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Note: Consultation with Sydney Water is not required as the Project will not be utilising any Sydney Water assets for discharge. If a change occurs where discharge is proposed to a Sydney Water asset, consultation with Sydney Water on this Plan will be undertaken..

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## 5 Existing Environment

The Project is located within the Inner West Local Government Area (LGA). The areas surrounding the Project alignment and construction support sites are mostly residential, except for clusters of commercial and industrial receivers around White Bay.

The Project will be constructed from two construction support sites: the Western Harbour Tunnel cut and cover structure at Rozelle (WHT12) which was established by the M4-M5 Link Rozelle Interchange project, and the White Bay construction support site (WHT3). The Western Harbour Tunnel cut and cover structure (WHT12) is a fully paved site which slopes away from City West Link. The site also has fully constructed drainage. White Bay construction support site (WHT3) is currently used as an industrial port facility. The majority of White Bay consists of concrete handstand, internal access roads and no vegetated or landscaped areas. The White Bay construction support site (WHT3) will operate predominantly on hardstand or sealed areas and will only be used by the Project for parking, laydown, office and amenity blocks.

### 5.1 Topography and soil

The terrain along the Project corridor is at an elevation of around 10 metres Australian Height Datum (AHD) at its southern extent at Rozelle and gently undulates towards Birchgrove.

The area beneath the Project comprises of Hawkesbury Sandstone however, there are areas of anthropogenic fill (man-made fill) which is mapped within Birchgrove Park. Stage 3A of the Project will not involve surface soil disturbance as the construction activities are limited to tunnel excavation and ancillary facility operation, as outlined in Section 1.2.

The EIS indicates that most of the alignment is underlain by soils of the GyMEA landscape group. GyMEA can be found on undulating to rolling low hills on Hawkesbury Sandstone with local reliefs of 20 to 80 metres, slopes of 10 to 25 per cent and rock outcrops of less than 25 per cent. Soils are characteristically shallow to moderately deep yellow earths and earthy sands on crests and on the inside of benches. GyMEA soils have a high soil erosion potential. Soils are shallow and highly permeable with very low fertility.

#### 5.1.1 Potential acid sulfate soils

Potential acid sulfate soils (PASS) have been identified within the Project area at Rozelle Rail Yards (Class 1 ASS risk) and Birchgrove Park (Class 2 ASS risk). Additionally, Sydney Harbour, Rozelle Bay, and land adjacent to watercourses such as Whites Creek are identified as having a high probability of acid sulfate soils (Jacobs 2020b).

The Project is not expecting to excavate or undertake construction in PASS or Acid sulfate soils (ASS). M4-M5 Link tunnels under the Rozelle Rail Yards and Whites Creek have already affected the groundwater pressure and levels in the area and the risk of acidification has been mitigated through design and monitoring. Refer to the Stage 3A Groundwater Management Sub-Plan (GMP) for more information.

#### 5.1.2 Contamination risk

Due to the limited/negligible interaction the WHT Stage 3A Project will have with the contaminated lands identified in the EIS, contamination risks are considered low for the Stage 3A works.

The Project is not expecting to excavate or undertake construction in contaminated areas.

## 5.2 Surface water


Surface water investigations and baseline data were collected as part of the EIS and are presented in Appendix O of the EIS (Technical working paper: Surface water quality and hydrology). Following the EIS, a pre-construction water quality monitoring report by Environmental Resources Management Australia Pty Ltd (ERM) shows the results of sampling and analysis to provide baseline surface water quality data.

### 5.2.1 Existing drainage regimes

The Project intersects the Easton Park and White Bay catchment areas, as shown in Figure 5-2.

The main body of water surrounding the Project area is the Sydney Harbour estuary. The main waterway in proximity to the Project is Whites Creek which discharges into Sydney Harbour. For discharge purposes, these waterways are considered to be marine waterways. A description of these waterways is provided in Table 5-1.

Table 5-1 Description of key waterways and catchments relevant to the Project, adopted from the EIS

Waterway/catchment	Description	Relevant Project features
Sydney Harbour (Sydney Harbour and Parramatta River regional catchment)	<ul style="list-style-type: none"> <li>Sydney Harbour in the context of the Project is the body of water that White Bay and Rozelle Bay feed into.</li> </ul>	White Bay construction support site (WHT3) drains into White Bay and into Sydney Harbour
Whites Creek (Whites Creek catchment, includes Easton Park catchment)  	<ul style="list-style-type: none"> <li>Small creek (about two kilometres long) in the densely developed inner western suburbs of Sydney. It drains a catchment dominated by residential areas and roads</li> <li>Headwaters are in the suburbs of Stanmore and Leichhardt, and flows in a northerly direction discharging to Rozelle Bay, Sydney Harbour</li> <li>The complete length of the creek is a stormwater drain with buried pipes in the upper reaches and open concrete channel for the lower one kilometre</li> <li>Sydney Water has begun works on naturalising Whites Creek due to its deteriorated condition. It is likely to incorporate features such as sandstone blocks and vegetated benches to provide ecological benefits to the channel.</li> </ul> <p>Although the EIS states that these works have begun, Sydney Water information indicates that these are future works. Soil disturbance and erosion that are associated with the naturalisation of Whites Creek are therefore not a necessary consideration for Stage 3A. Were this to change, this plan would be</p>	Western Harbour Tunnel (WHT12) treated tunnel water will be discharged to Rozelle Bay. Whites Creek also discharges into Rozelle Bay.

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Waterway/catchment	Description	Relevant Project features
	reviewed and updated as outlined in Section 9.	

The locations of the waterways and catchments associated with all stages of the Western Harbour Tunnel and Warringah Freeway Upgrade project are shown in Figure 5-2.

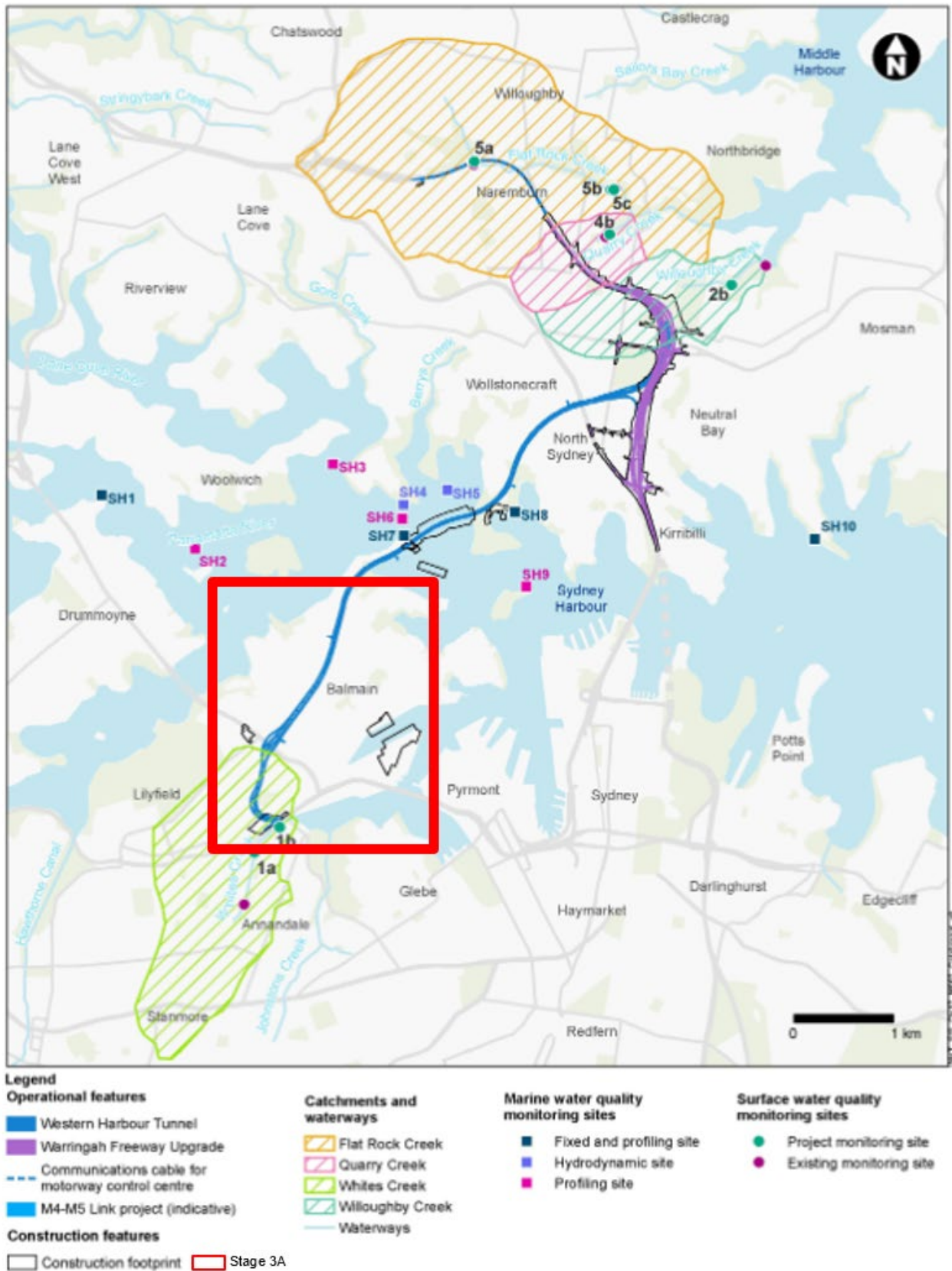


Figure 5-1 EIS water quality monitoring locations on the Western Harbour Tunnel and Warringah Freeway Upgrade project

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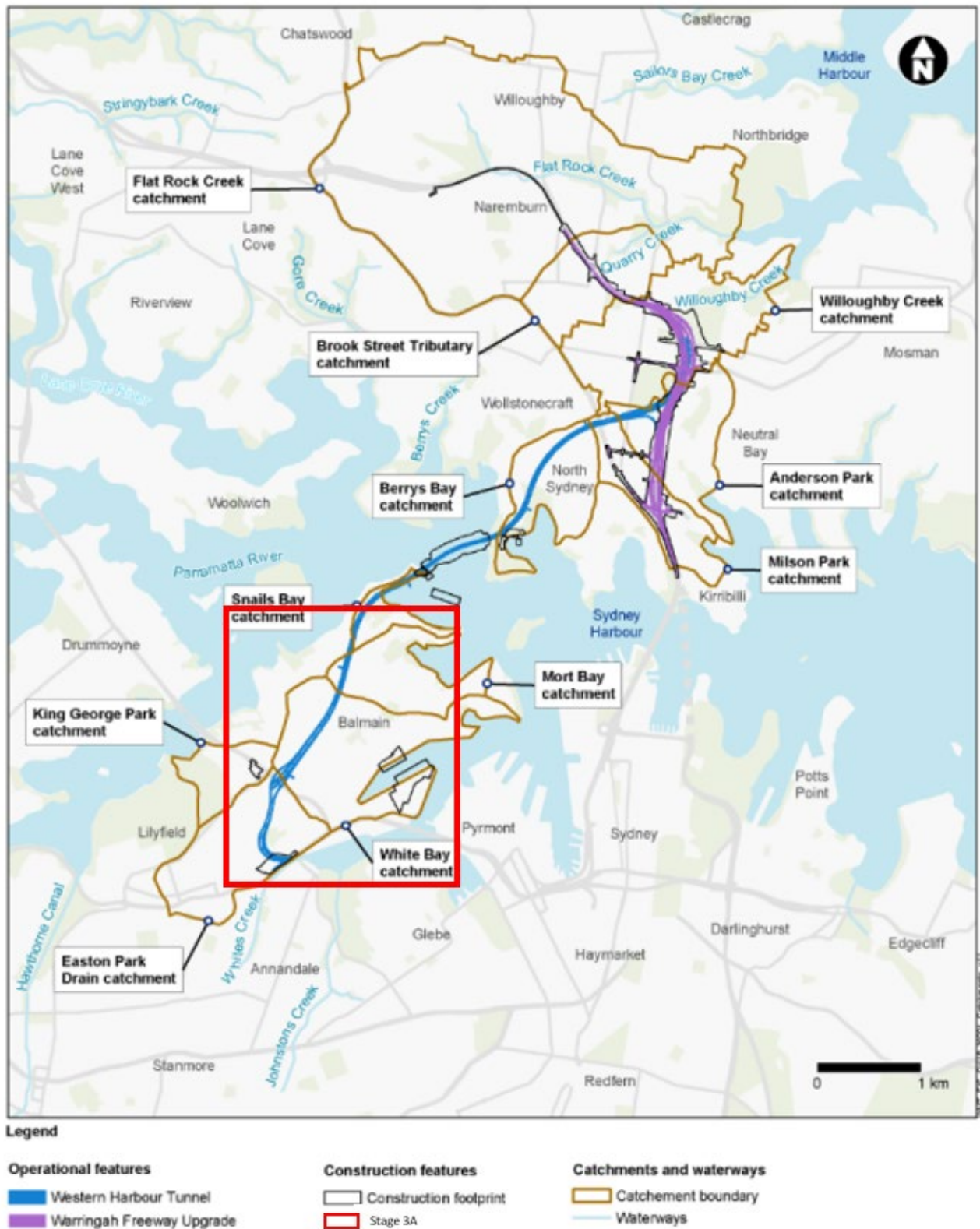


Figure 5-2 Catchment areas on the Western Harbour Tunnel and Warringah Freeway Upgrade project

### 5.2.2 Surface water quality

Assessment of the surface water quality involved site visits to seven monitoring locations. The two locations relevant to this Project is summarised in Table 5-2. The site visits included monitoring and visually assessing the conditions of the water courses relevant to the Project. The ERM pre-construction monitoring results is used for assessing potential impacts during construction where comparison to a baseline is appropriate.

The water quality of waterways relevant to the Project is influenced by several factors including:

- Current and former polluting land uses within the catchments
- Stormwater and sewage overflows
- Leachate from contaminated and/or reclaimed land
- Urban stormwater runoff
- Illegal dumping or discharge.

A review of the existing water quality data and site-specific water quality monitoring indicates that the waterways are in very poor condition and are representative of a heavily urbanised system.

The EIS provides a summary of relevant water quality data and this is included in Table 5-2 below.

Table 5-2 Water quality summary

EIS Sample ID	Waterway	Sampling locations	Summary description
1a	Whites Creek	Upstream Brennan Street, Annandale	<ul style="list-style-type: none"><li>• Tidally influenced</li><li>• Concrete-lined stormwater channel</li></ul>
1b	Whites Creek	Upstream Railway Parade, Annandale.  Considered in the EIS and ERM report to be downstream, however is also upstream of the actual discharge point in Rozelle Bay.	<ul style="list-style-type: none"><li>• Elevated concentrations of heavy metals (chromium, copper, lead and zinc), phosphorus, nitrogen, nitrate and oxides of nitrogen</li><li>• On some occasions the pH was outside guideline levels and the turbidity exceeds guideline levels (ANZECC, 2000).</li></ul>

A Surface Water Monitoring Program will be carried out for the Project and is included in Appendix H1 of this Plan.

### 5.2.3 Sensitive receiving environments

A sensitive receiving environment is an environment that has high conservation or community value, or that supports ecosystem or human uses of water, and that is particularly sensitive to pollution or degradation of water quality. According to the EIS, the Project has the potential to interact with fish habitat in Rozelle Bay. Sydney Harbour is classified as a sensitive receiving environment that has a high conservation and community value that supports ecosystems and human uses of its waters. Sydney harbour is considered as a Type 1 Fish Habitat due to the presence of several species of seagrass, the potential habitat for vulnerable species including the Black Rock Cod and is a primary contact recreation area.

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Rainfall climate data was sourced from the Bureau of Meteorology (BOM) website for Observatory Hill station 66062. The weather monitoring station is less than 3km from the Project. Data is presented in Table 5-3, showing that temperatures are warm in summer, with mild winters. Rainfall occurs throughout the year with slight summer dominance. Mean annual rainfall is 1,215.7 mm/yr.

Table 5-3 Climate statistics for Observatory Hill (Station 66062) from the Bureau of Meteorology

	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Mean max temp (°C)	26.0	25.8	24.8	22.5	19.5	17.0	16.4	17.9	20.1	22.2	23.7	25.2
Mean min temp (°C)	18.7	18.8	17.6	14.7	11.6	9.3	8.1	9.0	11.1	13.6	15.7	17.5
Mean rainfall (mm)	102.2	117.6	130.9	128.5	118.6	133.2	96.6	81.1	68.4	76.4	83.8	77.6
Avg no of days >1mm rain	8.6	9.0	9.8	9.0	8.6	8.7	7.5	7.2	7.2	7.9	8.4	8.0
Mean 9am wind speed (kmh)	8.6	8.2	7.9	8.8	10.5	11.9	13.1	13.3	12.4	12.2	11.0	9.8
Mean 3pm wind speed (kmh)	17.9	16.8	15.2	13.8	12.7	13.6	15.3	17.6	18.3	19.1	19.4	19.5

### 5.3 Rainfall erosivity factor

The rainfall erosivity factor is a measure of the ability of rainfall to cause erosion (referred as “R” in the Revised Universal Soil Loss Equation RUSLE). The rainfall erosivity factor is used to determine the soil loss in tonnes per hectare over one year and is used in calculations when sizing construction sediment basins. For the purpose of managing erosion the Rainfall Erosivity Factor erosion index (EI) of 3,480 EI has been selected, based on the Rainfall Erosivity maps in the Blue Book. Specific R values for specific sites will be listed in the site-specific SEPs, where required.

The risk of rainfall erosion would ordinarily be slightly higher during summer months; dry weather combined with high winds or high intensity storms can lead to erosion.

Stage 3A of the Project will occur predominantly underground, with surface-based activities limited to hardstand or sealed areas with a negligible risk of erosion. Where required, storm intensity and frequency would be considered when planning erosion controls (Table 5-4 below).

Table 5-4 Monthly % and annual rainfall erosivity (R – factor) values

Monthly % and annual rainfall erosivity (R – factor) values													
	Dec	Jan	Feb	Mar	Apr	Mar	Jun	July	Aug	Sep	Oct	Nov	Year
%	12	15	16	11	9	5	4	4	4	5	7	8	100
R – Value	418	522	557	383	313	174	139	139	139	174	244	278	3,480

## 6 Environmental aspects and impacts

### 6.1 Construction activities

Construction activities for the Western Harbour Tunnel and Warringah Freeway Upgrade project are outlined in Section 6.4 of the EIS, Section A4 of the RtS, as well as the latest Staging Report.

The Project (Stage 3A) will include the construction of driven and ventilation tunnels and associated activities (e.g. limited in tunnel road pavement and drainage work), as outlined in Section 1.4.1 of the CEMP. Given that the majority of the Project's construction activities will be predominantly undertaken either underground or from within already fully established sites, construction activities that could result in impacts to soils and surface water are limited. As outlined in Section 1.4 of the CEMP, the tunnels are excavated using roadheaders with spoil material transported to a stockpiling and loading area within the tunnel. The stockpiling and loading area is located approximately 300 metres underground and is accessed via a network of sealed access roads. Heavy vehicles are then loaded underground and will travel through environmental controls before exiting the site. These environmental controls will be included within the Site Environment Plan.

Construction activities that could impact on soil and surface water would include:

- Operation of the ancillary facilities Western Harbour Tunnel cut and cover structure at Rozelle (WHT13) and White Bay construction support site (WHT3)
- Delivery of materials and haulage of spoil and construction waste.

### 6.2 Impacts arising from construction

The potential for impacts on soil and water depends on a number of factors. Primarily, impacts will be dependent on the nature, extent and magnitude of construction activities and their interaction with the natural environment.

Potential impacts from construction of the Project may include:

- Impacts to soils from erosion and sedimentation
- Changes in water quality from spills and incidents
- Discharges from water treatment plant
- Scour and changes to channel geomorphology

#### 6.2.1 Potential impacts to soils

##### Erosion and sedimentation

Construction activities associated with the Project that could cause erosion and sediment impacts are limited given the negligible amount of surface soil disturbance that will be undertaken during construction. Construction activities will be predominantly limited to within the established Western Harbour Tunnel cut and cover structure construction support site (WHT12). Furthermore, stockpiling and material handling will occur within the cut and cover structure or within the tunnels. Controls relating to stockpile management and material handling will be detailed in a site environmental plan, where required.

It is highly unlikely that soil would be exposed to water runoff or wind that could increase soil erosion potential. It is also highly unlikely that soils and other unconsolidated materials, such as spoil, sand and other aggregates could be transported from the construction support sites into surrounding waterways via stormwater runoff. Controls to prevent material tracking are detailed Section 7.

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## **Soil salinity**

As outlined in Section 16.3 of the EIS, naturally occurring soil salinity is not considered a concern for the Project. Salinity is considered unlikely to represent a risk to surface water during the construction of the Project.

## **6.2.2 Surface water**

### **Water treatment plant discharges**

Groundwater captured during construction will be treated at a water treatment plant within the Western Harbour Tunnel cut and cover structure at Rozelle (WHT12). The water treatment plant will be required to treat water to the criteria of MCoA E208 and in accordance with the requirements of the Project EPL. This licence will be obtained with regard to relevant legislative requirements and the provisions of MCoA E210, including a water pollution impact assessment (Discharge Impact Assessment). The Discharge Impact Assessment forms part of the process undertaken to obtain an EPL from the EPA. Water will then be discharged to Rozelle Bay or reused. Further information on water treatment and reuse is included in the Groundwater Management Sub-plan and the Water Reuse Strategy.

### **Spills and incidents**

Vehicle or plant and equipment leakages may cause spills of oils, lubricants, hydraulic fluids and chemicals during the construction of the Project. The severity of the potential impact would depend on the magnitude and/or location of the spill in relation to sensitive receivers, emergency response procedures and/or environmental management measures implemented on site and the nature of the receiving environment.

Emergency Spill measures procedures will be implemented to avoid and manage accidental spillages of fuels, chemicals, and fluids to minimise the risk of human health impacts and contamination of groundwater/surface water. Any spills that travel into the tunnel drainage system would be treated as tunnel wastewater and managed accordingly under the Groundwater Management Sub-plan.

Liquid chemicals, oils and fuels will be stored in appropriate containers in bunded areas. For more information refer to Spill Control Procedure (Appendix H3)

### **Geomorphology**

The EIS identified that direct geomorphology impacts are not anticipated as a result of the Project. Construction activities at the Western Harbour Tunnel cut and cover construction support site (WHT12) would occur about 40 metres from Whites Creek. Therefore, the impacts on Whites Creek are expected to be negligible given no instream works are proposed and the creek has been concrete lined in this location.

### **Flooding**

Surface water that falls within the Western Harbour Tunnel cut and cover structure construction support site (WHT12) (i.e. rainfall runoff in tunnel portals and ventilation tunnels) would drain into the tunnels and would be treated by the water treatment plant at the site. Due to the established nature of the Western Harbour Tunnel cut and cover structure (WHT12), the amount of surface water generated as a result of construction is anticipated to be negligible. Any water would be treated as tunnel wastewater and managed accordingly under the Groundwater Management Sub-plan and the Water Reuse Strategy.

## 7 Environmental control measures

Specific measures and requirements relevant to the Project are outlined in Table 7-1. These will be implemented to minimise impacts to soil and water and ensure all commitments and requirements of the project approval are met. These specific management and mitigation measures have been developed to address the requirements of applicable legislation, the MCoA and commitments of the REMMs.



Table 7-1 Soil and surface water management and mitigation measures

ID	Measure	Resources	Timing	Responsibility	Reference	Evidence
<b>General</b>						
SWMM01	Training will be provided to relevant Project personnel, including relevant subcontractors on soil, contamination, surface water and groundwater requirements through inductions, toolboxes or targeted training.	Suitably qualified / trained persons	Prior to construction Construction	Project Managers Environment Manager	Condition C2 of the MCoA  CEMP Section 3.4	Induction records  Toolbox talk record
SWMM02	<p>All employees, contractors and subcontractors will receive a Project induction prior to commencing work on site. The environmental component, covered in either the induction or toolboxes, will include (as a minimum):</p> <ul style="list-style-type: none"> <li>• Existence and requirements of this Plan</li> <li>• Relevant legislation and guidelines</li> <li>• Erosion and sediment control measures</li> <li>• Emergency spill procedures</li> <li>• Management of discovery of previously unidentified contaminated material</li> </ul>	Suitably qualified / trained persons	Prior to construction Construction	Project Managers Environment	Condition C2 of the MCoA  CEMP Section 3.4, 3.5	Induction records  Toolbox talk record

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ID	Measure	Resources	Timing	Responsibility	Reference	Evidence
	<ul style="list-style-type: none"> <li>Complaints reporting and recording</li> <li>How to implement soil and water management measures</li> <li>Specific responsibilities to minimise impacts on soil and water quality by the works.</li> </ul>					
SWMM03	Weather conditions and forecasts (including rainfall prediction maps) will be monitored and where required, relevant information provided to the site Superintendent/Foreperson to allow for adequate planning for significant rain events.	Bureau of Meteorology website	Construction	Project Managers Superintendent / Foreperson Environment Manager	Section 3.2 of the SWMP	Weather records
<b>Erosion and sediment control</b>						
SWMM04	A Progressive Site Environment Plan (SEP) will be developed for the Project.	Suitably qualified / trained persons	Prior to construction	Project Managers Superintendent / Foreperson Environment Manager	Condition E114 of the MCoA	Site Environment Plan (SEP)

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ID	Measure	Resources	Timing	Responsibility	Reference	Evidence
SWMM05	Erosion and sedimentation controls will be checked and maintained on a regular basis	Suitably qualified / trained persons	Construction	Project Managers Superintendent / Foreperson Environment Manager	Condition E114 of the MCoA  REMM WQ1  CEMP Section 3.9	Site surveillance and inspections reports
SWMM06	Sediment controls will be installed around stormwater inlet pits where appropriate and where they will not cause or exacerbate flooding. Traffic management and safety requirements will be considered if installing such devices on live traffic roads.	Suitably qualified / trained persons	Construction	Project Managers Superintendent / Foreperson Environment Manager	Conditions E114, E207 of the MCoA  REMMs SG5, WQ1, WQ7	Site Environment Plan (SEP) Site surveillance and inspections reports
<b>Surface water quality management</b>						
SWMM07	Prior to forecast heavy rainfall events, the Environment Manager or delegate will inspect the site and note any areas requiring additional management measures. Additional measures will be implemented as required.	Suitably qualified / trained persons	Construction	Superintendent / Foreperson Environment Manager	CEMP Section 3.9	Site Surveillance and Inspection reports

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ID	Measure	Resources	Timing	Responsibility	Reference	Evidence
SWMM08	Vehicles and machinery will be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks.	Suitably qualified / trained persons	Construction	Superintendent / Foreperson	TfNSW Specification Guide NG36 Section 4.6	Maintenance Records  Site surveillance and inspections reports
<b>Concreting, saw cutting and asphaltting</b>						
SWMM09	Concrete mixers, pumps, concrete tools and other equipment will be washed at specially designated washout areas that are designed and constructed in a manner that will prevent stormwater surface run-off from being contaminated.	Suitably qualified / trained persons	Construction	Superintendent / Foreperson  Environment Manager	CEMP Section 4	Site surveillance and inspections  Spill Control Procedure (Appendix H3)
SWMM10	Washout areas will be monitored to ensure that they are draining correctly and washing activity is not contaminating the surrounding area.	Suitably qualified / trained persons	Construction	Superintendent / Foreperson  Environment Manager	CEMP Section 4	Site surveillance and inspections
SWMM11	As part of the Project induction program, all personnel performing concreting or saw cutting activities will be advised of the concrete washout areas and their obligations to: <ul style="list-style-type: none"> <li>Clean their plant, tools and equipment within the designated area</li> </ul>	Suitably qualified / trained persons	Construction	Project Managers  Environment Manager	Condition C2 of the MCoA  CEMP Section 3.5	Induction records

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ID	Measure	Resources	Timing	Responsibility	Reference	Evidence
	<ul style="list-style-type: none"> <li>Maintain the area in a clean condition</li> <li>Ensure that contaminated water associated with their activities is appropriately controlled and prevented from reaching natural stormwater surface drainage areas.</li> </ul>					
<b>Spill response and management</b>						
SWMM12	A Spill Control Procedure will be developed and implemented for the Project.	Suitably qualified / trained persons	Prior to Construction	Environment Manager	REMMs SG23, WQ2  Appendix H3 - Spill Control Procedure	Toolbox talks
SWMM13	Any spills of fuel or bitumen materials will be promptly contained and collected using spill kits.	Suitably qualified / trained persons	Construction	Superintendent / Foreperson	REMMs SG23, WQ2  Appendix H3 - Spill Control Procedure	Toolbox talk record  Site surveillance and inspections
SWMM14	Spill kits and fire extinguishers will be maintained at all times on site and in site vehicles.	Suitably qualified / trained persons	Construction	Superintendent / Foreperson  Work Health and Safety Manager	REMM SG23	Site surveillance and inspections

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ID	Measure	Resources	Timing	Responsibility	Reference	Evidence
SWMM15	All spills will be promptly reported to the JHCPB Environment Manager.	Suitably qualified / trained persons  (Appendix H3)	Construction	Superintendent / Foreperson  Environment Manager	Conditions A43, C2, Appendix A of the MCoA	Induction records  Toolbox talk record  Site surveillance and inspections
<b>Storage and handling of fuels and chemicals</b>						
SWMM16	A Safety Data Sheet (SDS) and Hazardous Products Register and copies of all SDS documents will be maintained in the site office within a special SDS folder.	Suitably qualified / trained persons	Construction	Superintendent / Foreperson  Environment Manager	REMM HR1	SDS and Hazardous Products Register
SWMM17	Liquid and dry chemicals (including oils and fuels) will be clearly labelled, used and handled in accordance with the instructions provided in the relevant SDS documents.	Suitably qualified / trained persons	Construction	Superintendent / Foreperson  Environment Manager	REMM HR1	SDS and Hazardous Products Register  Site surveillance and inspections
SWMM18	Liquid chemicals and fuels will be stored in appropriate containers in bunded areas. Bunded areas will have the capacity to hold 110% of the liquid waste volume for bulk storage or 120% of the volume of the largest container for smaller packaged storage.	Suitably qualified / trained persons	Construction	Superintendent / Foreperson  Environment Manager	REMM HR1	Site surveillance and inspections

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## 8 Compliance management

### 8.1 Roles and responsibilities

The Project Team's organisational structure and overall roles and responsibilities are outlined in Section 3.3 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Section 7 of this SSWMP.

### 8.2 Training

All employees, contractors and subcontractors working onsite will undergo site induction training relating to soil and surface water management issues. The induction training will address elements related to soil and water management including:

- Requirements of this Plan
- Relevant legislation
- Roles and responsibilities for soil and surface water management
- Procedure to be implemented in the event of an unexpected discovery of contamination (refer Appendix H2)
- Procedure to be implemented in the event of a spill (refer Appendix H3)
- Surface water quality management and mitigation measures.

Targeted training in the form of toolbox talks or specific training will also be provided to personnel with a key role in soil and surface water management. Toolbox talks are further outlined in Section 3.5.2 of the CEMP.

### 8.3 Monitoring and inspection

The Surface Water Monitoring Program (Appendix H1) provides detailed inspection criteria including:

- Surface water quality monitoring locations
- Parameters/analytes to be monitored
- Type and frequency of monitoring
- Monitoring methodology.

Regular monitoring and inspection requirements in addition to the above are documented in Section 3.9 CEMP.

Where a non-conformance or non-compliance is detected or monitoring results are outside of the expected range and are directly attributable to the Project, the process described in Section 3.10 of the CEMP will be implemented.

Opportunities for improvement of the monitoring and inspection processes will be identified in accordance with Section 9 of this Plan.

### 8.4 Licences and permits

The Project construction activities will be regulated by an EPL, issued by the NSW Environment Protection Authority (EPA).

The EPL typically details the monitoring and analytical requirements and references applicable publications.

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## 8.5 Weather monitoring

Weather (rainfall, temperature, wind speed/direction) will be monitored during the construction phase via a nearby Bureau of Meteorology weather station (e.g. Sydney Observatory Hill). If a significant rain event is anticipated, all “shut-down” controls detailed in the SEPs will be implemented prior to the rainfall event.

Rainfall at a suitable location in the vicinity of the ancillary facility premise will be measured and recorded in millimetres per 24-hour period on a regular basis from the time that the site office (WHT12) associated with the activities is established.

## 8.6 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, as well as compliance with this Plan, the MCoA and other relevant approvals, licences and guidelines included in this Plan.

Auditing will comply with conditions A37 to A42 of the MCoA. Audit requirements are detailed in Section 3.9.3 of the CEMP.

## 8.7 Reporting

Reporting requirements and responsibilities are documented in Section 3.9.4 and 3.9.5 of the CEMP. Table 8-1 details the soil and surface water reporting schedule.

Table 8-1 Soil and surface water reporting schedule

Project phase	Report timing	Report requirements
Construction	Weekly	Weekly inspection report undertaken by JHCPB environmental personnel
	Following ER inspections	Environmental Representative inspection report
	Monthly	Monthly Environmental Report to TfNSW
	Six-monthly	All reporting as required by the Surface Water Monitoring Program (Appendix H1)
		Report on Surface Water Monitoring Program (Appendix H1) results obtained during construction. Determine the need for adjustments to the SWMP, if necessary
	Annual	EPL Annual Return



## 9 Review and improvement

### 9.1 Continuous improvement

Continuous improvement of this Plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance
- Determine the cause or causes of non-conformances and deficiencies
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies
- Verify the effectiveness of the corrective and preventative actions
- Document any changes in procedures resulting from process improvement
- Make comparisons with objectives and targets.

Should the review process of this Plan identify any issues or items within that are either redundant or in need of updating, it is the responsibility of the Environment and Sustainability Manager (or delegate) to prepare the revised documents. The Environmental Representative (ER) can approve minor changes to the CEMP and Sub-plans in accordance with Section 3.13 of the CEMP.

### 9.2 Updates and amendment to this Plan

The processes described in Section 3.9 to Section 3.13 of the CEMP may result in the need to update or revise this Plan. Only the Environment Manager, or delegate, has the authority to change any of the environmental management documentation, including this Plan. As stated above, the ER can approve minor changes to the CEMP and Sub-plans in accordance with Section 3.13 of the CEMP.

**Appendix H1 – Surface Water Monitoring Program**

# Appendix H1

## Surface Water Monitoring Program

STW-JHC-PRG-00-WA-002-000001

Western Harbour Tunnel Stage 3A

24 October 2022

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## Document control

Revision	Date	Prepared by	Reviewed by	Remarks
Rev A	04/05/2022	Evelyn Cardona	Ciara Moriarty	JHCPB JV Internal Draft
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Rev 00	25/08/2022	Evelyn Cardona	Adrian Broger	For ER endorsement
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### Distribution of controlled copies

This Surface Water Monitoring Program as part of the Stage 3A CEMP is available to all personnel and subcontractors via the Project document control management system. An electronic copy can be found on the Project website.

The document is uncontrolled when printed.

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## Glossary/ Abbreviations

Abbreviation	Expanded text
ANZECC	Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand
ANZG	Australian and New Zealand Guidelines for Fresh and Marine Water Quality
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
BOM	The Australian Bureau of Meteorology
BTEXN	Benzene, toluene, ethylbenzene, xylene, and naphthalene
CEMP	Construction Environmental Management Plan
Construction	Has the same definition as Schedule 1 of the Minister's Conditions of Approval (SSI #8863)
DLWC	Department of Land and Water Conservation
DPE	New South Wales Department of Planning and Environment (formerly the Department of Planning, Industry and Environment)
DPE – Water	New South Wales Department of Planning, Industry and Environment (Water)
DPIE	New South Wales Department of Planning, Industry and Environment (now known as the Department of Planning and Environment)
EC	Electrical conductivity
EESG	Environment, Energy and Science Group
EIS	Environmental Impact Statement
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence
Environmental Representative (ER)	The Environmental Representative(s) for the CSSI approved by the Planning Secretary

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Abbreviation	Expanded text
ERM	Environmental Resources Management Australia Pty Ltd
JHCPB	John Holland CPB Contractors (the Contractor)
MCoA	Minister's Conditions of Approval
NATA	National Association of Testing Authorities
Non-conformance	Failure to conform to the requirements of Project system documentation including the CEMP or supporting documentation
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
Project, the	Western Harbour Tunnel Project Stage 3A
REMMs	Revised Environmental Management Measures
SSTVs	Site Specific Trigger Values
SSWMP	Soil and Surface Water Management Plan, which is a Sub-plan of the Stage 3A CEMP
SWMP	Surface Water Monitoring Program
TfNSW	Transport for New South Wales (formerly Roads and Maritime)
TRH	Total recoverable hydrocarbons
TPH	Total petroleum hydrocarbons
WFU	Warringah Freeway Upgrade
WHT	Western Harbour Tunnel
WHT3	The White Bay construction support site
WHT12	The Western Harbour Tunnel cut and cover structure at Rozelle



# 1 Introduction

## 1.1 Context

This Surface Water Monitoring Program (SWMP or this Program) forms part of the Soil and Surface Water Management Sub-plan (SSWMP) for the Western Harbour Tunnel Stage 3A project (the Project), a component of the Western Harbour Tunnel and Warringah Freeway Upgrade project.

This Program has been prepared to address the requirements of the Minister's Conditions of Approval (MCoA) for the Western Harbour Tunnel and Warringah Freeway Upgrade project (SSI #8863), the Western Harbour Tunnel and Warringah Freeway Upgrade Environmental Impact Statement dated January 2020 (the EIS), the Western Harbour Tunnel and Warringah Freeway Upgrade Response to Submissions report dated September 2020 (the RtS) and applicable guidelines and legislation.

## 1.2 Purpose and scope of this Program

This Program describes how the Project will monitor potential impacts to surface water quality during construction of the Project. Operational monitoring does not fall within the scope of the construction phase and therefore are not included within this Program. Other stages of the Western Harbour Tunnel and Warringah Freeway Upgrade project are also not included within this Program as they are not relevant to the Project.

## 1.3 Implementation of this Program

This Program must be endorsed by the Environmental Representative (ER) and then submitted to the Secretary for approval at least one (1) month prior to commencement of construction, in accordance with condition C18 of the MCoA.

Construction activities that are relevant to this Program will not commence until the Secretary has approved this Program, and all relevant baseline data for the specific construction activity has been collected.

This Program, as approved by the Secretary, including any minor amendments approved by the ER, will be implemented for the duration of construction and for any longer period set out in the Program or specified by the Secretary, whichever is the greater.

## 2 Purpose and objectives

### 2.1 Purpose

The purpose of the Program is to describe how surface water quality will be monitored during construction of the Project.

The Program will be implemented to monitor the effectiveness of mitigation measures applied during the construction phase of the Project. Monitoring of surface water will be undertaken to identify potential impacts and ensure an appropriate management regime can be implemented to address those impacts and manage local surface water quality.

This Program provides details of the surface water monitoring network, frequency of monitoring, and test parameters. This Program supplements the SSWMP, which itself is an appendix of the Construction Environmental Management Plan (CEMP).

This Program was developed to consider baseline data from the EIS, the M4-M5 Link Rozelle Interchange project and the pre-construction water quality monitoring report by Environmental Resources Management Australia Pty Ltd (ERM)

### 2.2 Objectives

The key objectives of this Program are to ensure all MCoAs, REMMs, and licence/permit requirements relating to surface water monitoring are described, scheduled, and assigned responsibility as outlined in:

- The EIS prepared for Western Harbour Tunnel and Warringah Freeway Upgrade
- Western Harbour Tunnel and Warringah Freeway Upgrade Response to Submissions Report - September 2020
- Minister's Conditions of Approval
- RMS specification G38 (2017)
- The Project's Environment Protection Licence (EPL)
- All relevant legislation and other requirements described in Section 3 of the Soil and Surface Water Management Plan.

This program has also been prepared in accordance with:

- Guideline for Construction Water Quality Monitoring (RTA, 2003)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000)
- Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2018

### 2.3 Consultation

This program will be provided to New South Wales Department of Planning, Industry and Environment – Water (DPE Water) and the Environment Protection Authority (EPA) in accordance with condition C11(c) of the MCoA. Consultation with Sydney Water is not required as the Project will not be utilising any Sydney Water assets for discharge. If a change occurs where discharge is proposed to a Sydney Water asset, consultation with Sydney Water on this Program will be undertaken. Refer to Section 3.7.2 of the CEMP for the consultation requirements relating to the CEMP and all Sub-plans.

A summary of consultation undertaken for this Program is contained within Section 4 of the SSWMP.

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Ongoing consultation with relevant councils and other stakeholders, including any unique local receivers, will be undertaken for particular issues pertaining to the Project's impact on soil and surface water as required by conditions C11 (c) and C17 of the MCoA. Community feedback and complaints relating to surface water quality will be managed in accordance with the Community Communication Strategy and Complaints Management System.

## 3 Monitoring Program Requirements

### 3.1 Minister's Conditions of Approval

MCoA specific to this Program are included in . A cross reference is also included to indicate where the condition is addressed in this program or other Project management documents.

Table 3-1 MCoA Specific to this Program

MCoA No.	Condition Requirements	Document Reference	How Addressed
<b>General</b>			
C12	<p>Each Construction Monitoring Program must provide:</p> <ul style="list-style-type: none"> <li>(a) details of baseline data available;</li> <li>(b) details of baseline data to be obtained and when;</li> <li>(c) details of all monitoring of the project to be undertaken;</li> <li>(d) the parameters of the project to be monitored;</li> <li>(e) the frequency of monitoring to be undertaken;</li> <li>(f) the location of monitoring;</li> <li>(g) the reporting of monitoring results and analysis results against relevant criteria;</li> <li>(h) details of the methods that will be used to analyse the monitoring data;</li> <li>(i) procedures to identify and implement additional mitigation measures where the results of the monitoring indicate unacceptable project impacts;</li> <li>(j) a consideration of SMART principles;</li> </ul>	<p>This SWMP provides the following:</p> <ul style="list-style-type: none"> <li>a) Baseline data is detailed in Section 5.1</li> <li>b) Baseline data is available in Section 5.1</li> <li>c) Monitoring to be undertaken is outlined in Section 5.2</li> <li>d) Parameters to monitor during construction outlined in Section 5.2.5</li> <li>e) Frequency of monitoring is outlined in Section 5.2.4</li> <li>f) Monitoring locations are contained within Section 5.2.3</li> <li>g) Reporting and analysis of results is outlined in Section 7.5 and Section 7.3</li> <li>h) Monitoring methodology is contained within Section 6</li> <li>i) Review and improvement is outlined in Section 8</li> </ul>	<p>This SWMP details the requirements to meet condition C12 of the MCoA in relation to monitoring, reporting and review.</p>

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MCoA No.	Condition Requirements	Document Reference	How Addressed
	<p>(k) any consultation to be undertaken in relation to the monitoring programs; and</p> <p>(l) any specific requirements as required by Conditions C13 to C16.</p>	<p>j) SMART principles are outlined in Section 4</p> <p>k) Consultation is outlined in Section 2.3 and Section 4 of the SSWMP</p> <p>l) Not applicable to this plan</p>	
C17	The Construction Monitoring Programs must be developed in consultation with relevant government agencies as identified in Condition C11. Details of all information requested by an agency during consultation must be provided to the Planning Secretary as part of any submission of the relevant Construction Monitoring Programs, including copies of all correspondence from those agencies as required by Condition A5.	<p>Section 2.3</p> <p>Section 4 of the SSWMP</p>	The SWMP has been prepared in accordance with this condition and describes how the Project proposes to monitor surface water quality during construction of the Project.
C18	The Construction Monitoring Programs must be endorsed by the ER and then submitted to the Planning Secretary for approval at least one month before the commencement of construction.	Section 1.3 deals with ER endorsement and the approval process.	<p>The SWMP will be endorsed by the ER.</p> <p>The SWMP will be submitted to DPE as part of the Soil and Surface Water Management Plan, for approval no later than one month prior to the commencement of construction activities.</p>

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MCoA No.	Condition Requirements	Document Reference	How Addressed
C19	Unless otherwise agreed with the Planning Secretary, construction must not commence until all of the relevant Construction Monitoring Programs have been approved by the Planning Secretary, and all relevant baseline data for the specific construction activity has been collected.	Section 1.3 Section 3.9 of the CEMP	Construction will not commence until the CEMP and Sub-plans, including relevant construction monitoring programs have been approved by the Secretary.
C20	The Construction Monitoring Programs, as approved by the Planning Secretary including any minor amendments approved by the ER must be implemented for the duration of construction and for any longer period set out in the monitoring program or specified by the Planning Secretary, whichever is the greater.	Section 1.3 Section 3.9 of the CEMP	The SWMP will be implemented for the duration of construction as detailed in Section 1.3 of the SWMP.
C21	The results of the Construction Monitoring Programs must be submitted to the Planning Secretary, and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program.  <i>Note: Where a relevant CEMP Sub-plan exists, the relevant Construction Monitoring Program may be incorporated into that CEMP Sub-plan.</i>	Section 3.9 of the CEMP Section 7.5	Section 7.5 of the SWMP details the reporting requirements and the frequency required for this reporting.

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MCoA No.	Condition Requirements	Document Reference	How Addressed
E210	If construction stage stormwater discharges are proposed, a water pollution impact assessment will be required to inform licensing consistent with section 45 of the POEO Act. Any such assessment must be prepared in consultation with the EPA and be consistent with the National Water Quality Guidelines, with a level of detail commensurate with the potential water pollution risk.	Section 6.2 of the SSWMP	Construction stage stormwater discharges will be managed under the Project EPL. This licence will be obtained with regard to relevant legislation and the requirements of condition E210, including a water pollution impact assessment (Discharge Impact Assessment). The Discharge Impact Assessment forms part of the process undertaken to obtain an EPL from the EPA.

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## 3.2 Revised Environmental Management Measures

Relevant Revised Environmental Management Measures (REMMs), as identified in Part D of the RtS, are listed in Table 3-2 below. Table 3-2 also includes references to required outcomes, the timing of when and how the commitment applies and where it has been addressed in this Plan or other Project documents.

Table 3-2 REMMs specific to this Program

REMM	Measure	Timing	Document reference	How addressed
<b>Hydrodynamics and water quality</b>				
WQ4	<p>A freshwater quality monitoring program for the construction of the project will be developed and implemented, with consideration of the freshwater monitoring being carried out for the M4-M5 Link and Beaches Link and Gore Hill Freeway Connection projects.</p> <p>The program will be developed in consultation with the Environment Protection Authority, Department of Planning, Industry and Environment (Regions, Industry, Agriculture and Resources), Department of Planning, Industry and Environment (Water), and relevant councils.</p> <p>Sampling locations and monitoring methodology will be in accordance with the Guideline for Construction Water Quality Monitoring (RTA, 2003) and ANZG (2018).</p> <p>If exceedances of the criteria established under the freshwater monitoring program are detected, a management response will be triggered. This response will be documented within the construction freshwater quality monitoring program.</p>	Construction	<p>This monitoring program.</p> <p>Other project consideration in Section 5.1</p> <p>Consultation in Section 2.3</p> <p>Guidelines in Section 2.2, locations in Section 5.2.3 and methodology in Section 6</p> <p>Criteria exceedance and review in Section 7.3</p>	<p>This Program has been developed to meet the objectives of this REMM, the requirements of which are replicated within the CoAs contained in</p>

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## 4 SMART Principles

This Program has been developed using the 'SMART' principles.

- **Specific:** This Program is for WHT Stage 3A monitoring of surface water. Surface water monitoring for other stages and operation of Western Harbour Tunnel and Warringah Freeway Upgrade will be detailed in other documents outside of Stage 3A
- **Measurable:** Monitoring criteria or purposes are provided in Section 5.2
- **Actionable:** Monitoring actions succinctly are described in Section 7.1
- **Realistic:** The requirements of Section 5.2 are realistically achievable, there is a history of implementation of similar actions on previous infrastructure projects.
- **Timely:** Timing for actions is provided in Section 7.1.

## 5 Surface water quality monitoring

### 5.1 Baseline monitoring

#### 5.1.1 Overview

Baseline monitoring for WHT Stage 3A is comprised of the following:

- Data collected during the Western Harbour Tunnel and Warringah Freeway Upgrade project environmental assessment phase, included in Appendix O of the EIS (Technical working paper: Surface Water Quality and Hydrology).

During the environmental assessment phase of the WHTWUFU project, site visits were carried out to monitor water quality and visually assess the conditions of the watercourses relevant to the project. Seven monitoring locations were selected and, for most waterways, monitoring was generally carried out immediately upstream and downstream of the Western Harbour Tunnel and Warringah Freeway Upgrade project alignment unless site access was prevented. Two of these locations are relevant to Stage 3A of the WHT and are outlined further in the sections below.

- ERM supplementary baseline data collected following publication of the EIS on behalf of TfNSW.
- Data from the M4-M5 Link Tunnel project (RIC) not included in the WHTWUFU EIS.

#### 5.1.2 Monitoring network

The Project intersects the Easton Park and White Bay catchment areas. The main body of water surrounding the Project area is the Sydney Harbour estuary. The main waterway in proximity to the Project is Whites Creek which is a concrete lined channel located within a highly urbanised and disturbed area. Whites Creek discharges into Sydney Harbour at Rozelle Bay.

As outlined above, there are 3 sources of baseline data for Stage 3A considered in this Program. The monitoring network for the baseline data is as follows:

- The WHTWUFU EIS provides baseline water quality monitoring locations for the Western Harbour Tunnel and Warringah Freeway Upgrade project (Figure 5-1). Two of these EIS monitoring locations were chosen to provide general characterisation of the waterways in the vicinity of the Project (refer Table 5-1). One location is upstream and one downstream of the Stage 3A WHT12 works, however, the downstream location (1b) is upstream of the actual discharge point. All other EIS water quality monitoring locations for the Western Harbour

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Tunnel and Warringah Freeway Upgrade project are to the north of Sydney Harbour and are therefore out of scope for this Project.

- The ERM baseline monitoring locations for the Western Harbour Tunnel and Warringah Freeway Upgrade project are identified in Figure 5-2. The baseline data identifies the monitoring locations to be upstream and downstream of Stage 3A works, however, the downstream location is actually upstream of the discharge point.
- RIC baseline data from a location downstream of the Stage 3A discharge point as marked in Figure 5-3.

Table 5-1 summarises the comparative surface water quality baseline monitoring locations presented in Figure 5-1, Figure 5-2 and Figure 5-3.

Table 5-1 Baseline surface water monitoring locations relevant to the Project

EIS Sample ID	ERM Sample ID	RIC Sample ID	Waterway	Monitoring location
1a	WHC US	N/A	Whites Creek	Upstream: Brennan Street, Annandale
1b	WHC DS	N/A	Whites Creek	Downstream: Railway Parade, Annandale Considered in the EIS and ERM report to be downstream, however, is also upstream of the actual discharge point in Rozelle Bay.
N/A	N/A	SW01	Rozelle Bay	Downstream of Stage 3A discharge point, in Rozelle Bay

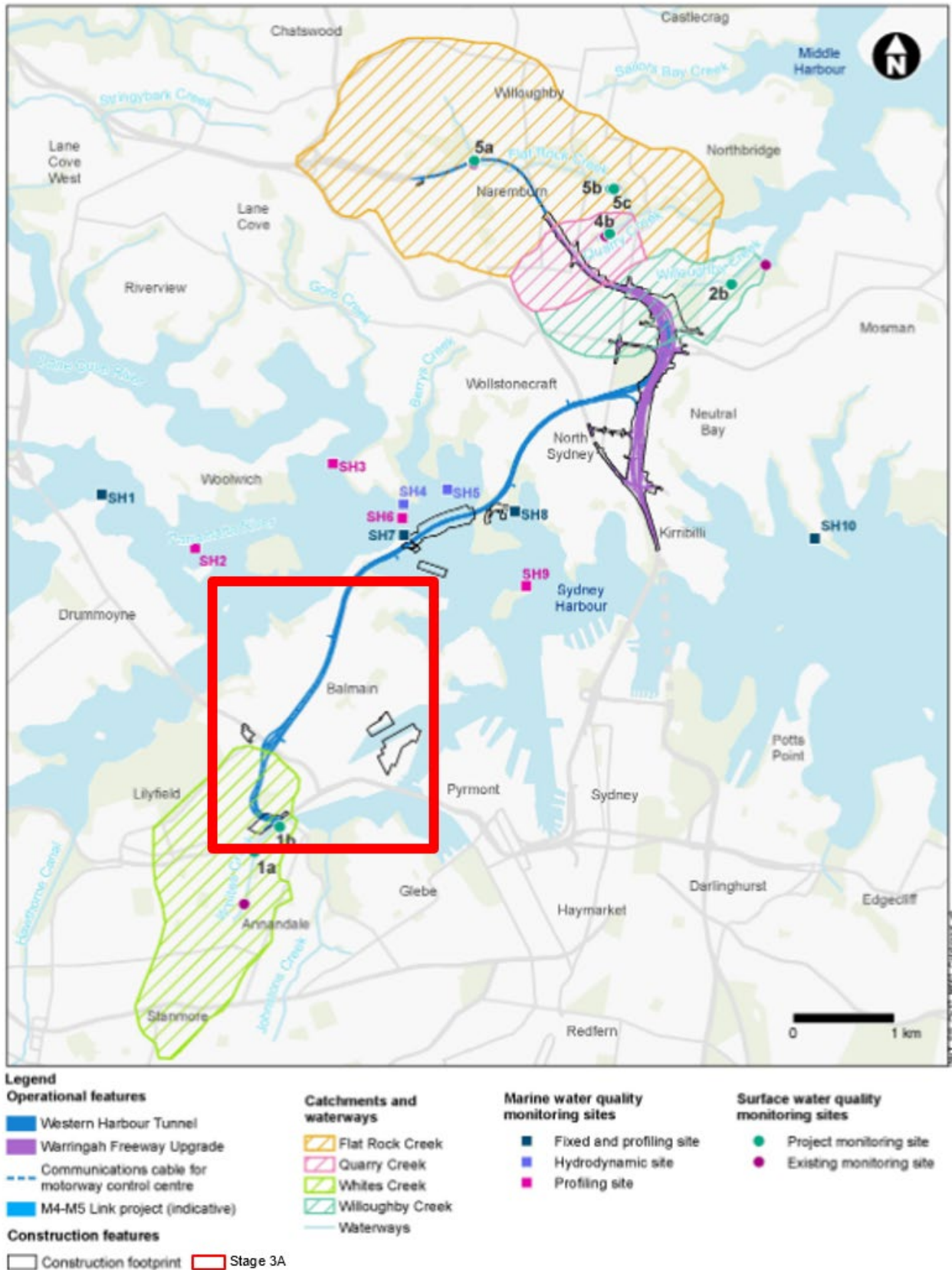


Figure 5-1 EIS sampling locations for the Western Harbour Tunnel and Warringah Freeway Upgrade project

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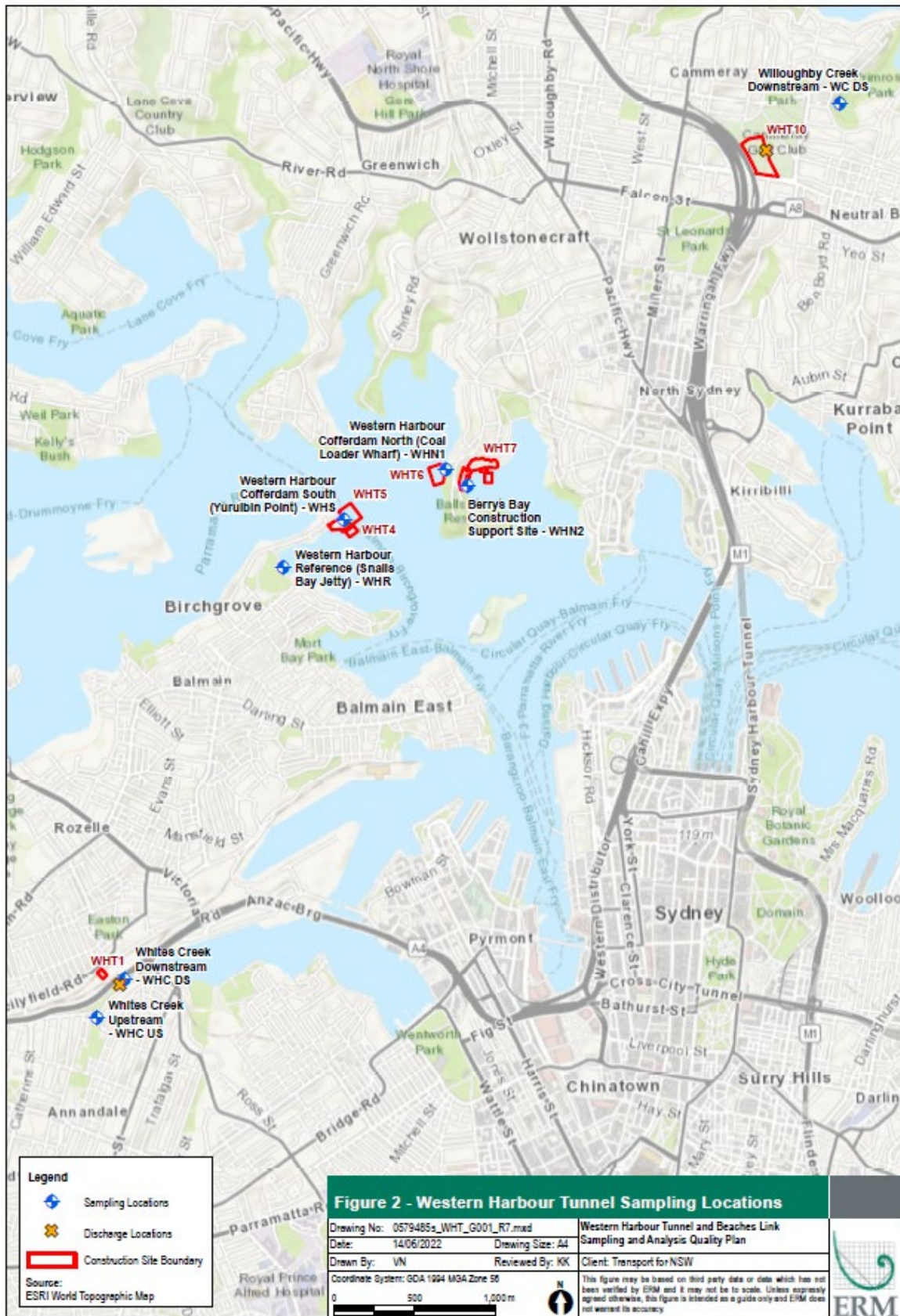


Figure 5-2 ERM sampling locations for the Western Harbour Tunnel and Warringah Freeway Upgrade project

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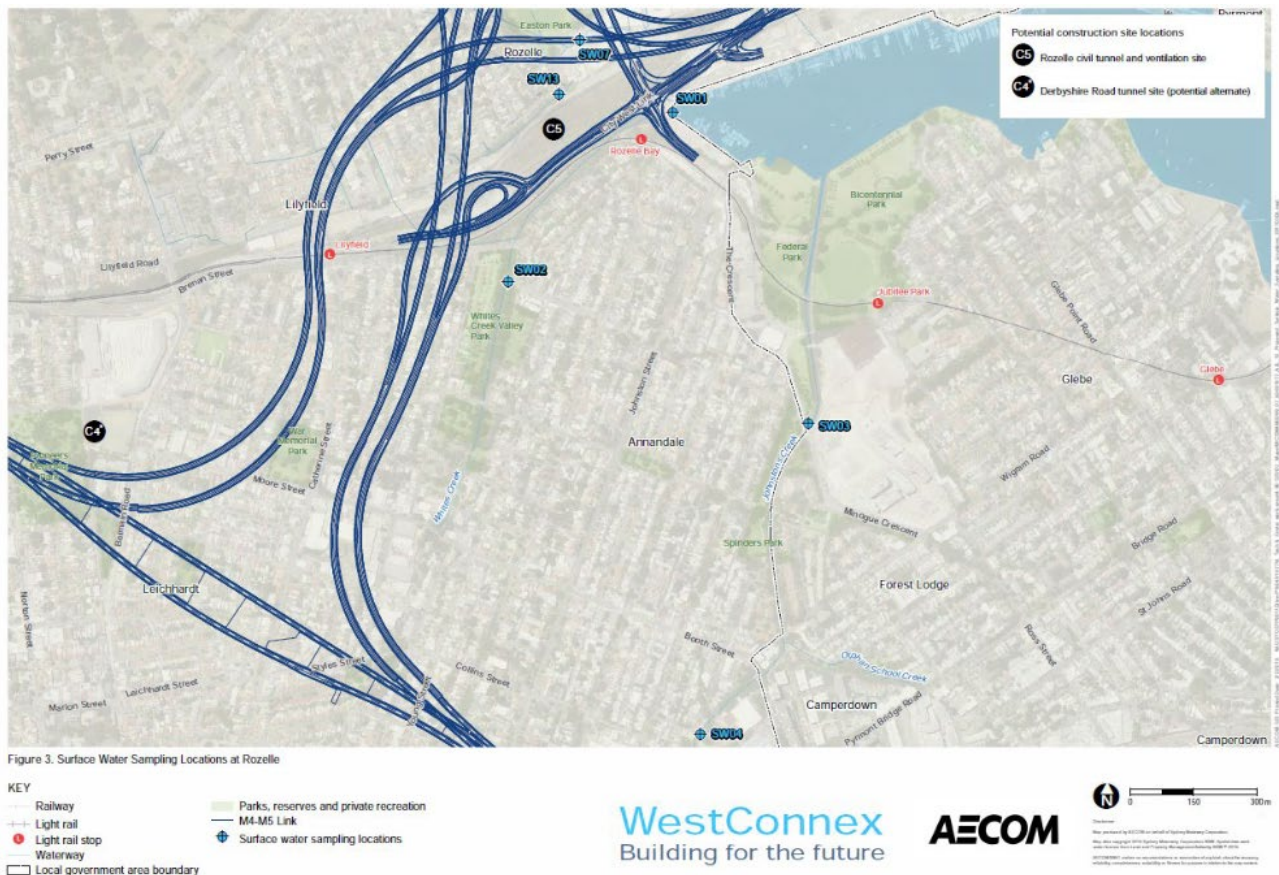


Figure 5-3 M4-M5 Link RIC surface water sampling locations

### 5.1.3 Surface water quality sampling program and summary

An overview of the EIS baseline surface water quality sampling program is provided below in Table 5-2. A full summary of the baseline surface water quality data applicable to the Project is included in Appendix O (Technical working paper: Surface water quality and hydrology) of the EIS. Interpretation of the baseline surface water quality monitoring data is summarised in Table 5-5.

Table 5-2 EIS baseline surface water quality sampling program

Project Sample ID	Number of samples	Start of baseline monitoring	Minimum frequency
1a	37	July 2016	Monthly
1b	37	July 2016	Monthly

An overview of the ERM baseline surface water quality sampling program is provided in Table 5-4. Surface water sampling was conducted from December 2020 to November 2021. Sampling of the Whites Creek upstream location was discontinued after two sampling events as existing monitoring results were identified as being available from the EIS baseline after the 2019-2020 program (ERM, 2022).



Table 5-3 ERM baseline surface water quality sampling program

Project Sample ID	Number of samples	Start of baseline monitoring	Minimum frequency
Whites Creek Upstream	2	December 2020 – February 2021	Monthly
Whites Creek Downstream	12	December 2020	Monthly

An overview of the baseline surface water quality sampling program undertaken as part of the RIC project is presented in

Table 5-4.

Table 5-4 RIC baseline surface water quality sampling program

Project Sample ID	Number of samples	Start of baseline monitoring	Minimum frequency
SW01 (Rozelle Bay)	37	July 2016	Monthly

Interpretation of the baseline surface water quality monitoring data is summarised in Table 5-5. The results have been compared against the Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (ANZECC) (2018) water quality guidelines. It should be noted that these guidelines are not to be used as a mandatory standard; rather they provide a guideline for the environmental values of water resources.

Table 5-5 Baseline water quality conditions in the Project area

Waterway	Data source	Baseline data obtained	Description of water quality
Whites Creek Upstream	WHTWUFU EIS Sample ID: 1a	EIS: Water quality monitored as part of M4-M5 Link and The Bays Precinct project with samples carried out between June 2016 and May 2017	<ul style="list-style-type: none"> <li>Tidally influenced</li> <li>Concrete-lined stormwater channel</li> <li>Elevated concentrations of heavy metals (chromium, copper, lead and zinc), phosphorus, nitrogen, nitrate and oxides of nitrogen were recorded.</li> <li>On some occasions the pH was outside guideline levels and the turbidity exceeds guideline levels.</li> </ul>
	ERM Sample ID: WHC US	Two samples collected over the 12-month monitoring period (December 2020 – February 2021)	<ul style="list-style-type: none"> <li>Freshwater and marine criteria were applied for the creek and harbour results, respectively.</li> <li>Several metals were reported above the ANZG 2018 guideline values, with copper having exceedance at each location.</li> </ul>

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Waterway	Data source	Baseline data obtained	Description of water quality
Whites Creek Downstream	WHTWFE EIS Sample ID: 1b	Water quality monitored as part of M4-M5 Link and The Bays Precinct project with samples carried out between June 2016 and May 2017	<ul style="list-style-type: none"> <li>Tidally influenced</li> <li>Concrete-lined stormwater channel</li> <li>Elevated concentrations of heavy metals (copper, chromium, lead and zinc), nitrogen, phosphorous, nitrate, oxides of nitrogen, ammonia and chlorophyll have been recorded.</li> <li>On some occasions the pH is outside guideline levels and the turbidity exceeds guideline levels.</li> </ul>
	ERM Sample ID: WHC DS	Monitoring occurred monthly, December 2020 – November 2021	<ul style="list-style-type: none"> <li>Freshwater and marine criteria were applied for the creek and harbour results, respectively.</li> <li>Several metals were reported above the ANZG 2018 guideline values, with copper having exceedance at each location.</li> </ul>
Rozelle Bay	RIC Sample ID: SW01	<p>Samples collected at SW01.</p> <p>Samples collected by The University of Sydney on behalf of UrbanGrowth NSW at BW1 as part of The Bays Precinct transformation project between July 2016 and June 2018.</p>	<ul style="list-style-type: none"> <li>Elevated concentrations of heavy metals (copper, chromium, lead and zinc), nitrogen, phosphorous, nitrate, oxides of nitrogen, ammonia and chlorophyll have been recorded.</li> <li>On some occasions the pH is outside guideline levels and the turbidity exceeds guideline levels.</li> </ul>

## 5.2 Surface water quality construction monitoring

### 5.2.1 Overview

The Project will be constructed from two construction support sites: the Western Harbour Tunnel cut and cover structure at Rozelle (WHT12) which was established by the M4-M5 Link Rozelle Interchange project, and the White Bay construction support site (WHT3). The Western Harbour Tunnel cut and cover construction support site (WHT12) is a fully paved site which slopes away from City West Link. The site also has fully constructed drainage. The White Bay construction support site (WHT3) is currently used as an industrial port facility, consisting of concrete handstand and internal access roads. The White Bay construction support site (WHT3) has no vegetated or landscaped areas and will only be used by the Project for parking, laydown, office and amenity blocks.

The surface works component of the Project is minimal and the main impact on surface water is the discharge from the water treatment plant into highly urbanised and disturbed catchments and waterways. Discharging from the water treatment plant will be managed in accordance with the Stage 3A Groundwater Management Sub-plan and Groundwater Monitoring Program and is therefore not considered further in this Program.

Given that the majority of the Project's construction activities will be predominantly undertaken either underground or from within already fully established sites, construction activities that could

result in impacts to soils and surface water are limited. Additionally, stockpiling will occur within the WHT cut and cover at Rozelle therefore, the likelihood of mobilisation of sediments and pollutants is considered to be highly unlikely. Any surface water (e.g. groundwater ingress, rainfall runoff into tunnel portals and ventilation tunnels, heat and dust suppression water, and washdown runoff) would drain into the tunnels and would be treated by the water treatment plant at the site.

### 5.2.2 Rainfall monitoring

To provide data to assess water quality trends, rainfall will be monitored during the construction phase via a rain gauge or the Bureau of Meteorology (BOM) website.

### 5.2.3 Monitoring locations

Surface water quality monitoring will be carried out during construction at two locations marked as STW1 and STW2 in Figure 5-4 and as outlined in Table 5-6 . Construction phase monitoring will begin following the commencement of Stage 3A works.

Monitoring allows for the assessment of trends in water quality, including natural variations, and will allow sufficient data to enable assessment of any potential impacts measured during construction. Monitoring of discharge from the water treatment plants is discussed in the Ground Water Management Sub-plan and Groundwater Monitoring Program.

Table 5-6 Construction phase surface water monitoring program

Sample ID	Sample location	Ancillary Facility	Receiving environment	Analysis suite	Sampling frequency
STW1	Whites Creek (upstream)	Rozelle civil and tunnel site	Sydney Harbour/ Parramatta River	Physio-chemical parameters <sup>1</sup>	Monthly/ Wet weather <sup>2</sup>
STW2	Rozelle Bay (downstream)	Rozelle civil and tunnel site	Sydney Harbour/ Parramatta River	Physio-chemical parameters <sup>1</sup>	Monthly/ Wet weather <sup>2</sup>

Note:

1 Physico-chemical (field) parameter analysis as detailed in Table 5-7

2 Quarterly wet weather monitoring (at least once every 3 months following 25 mm of continuous rainfall – see Sampling frequency)



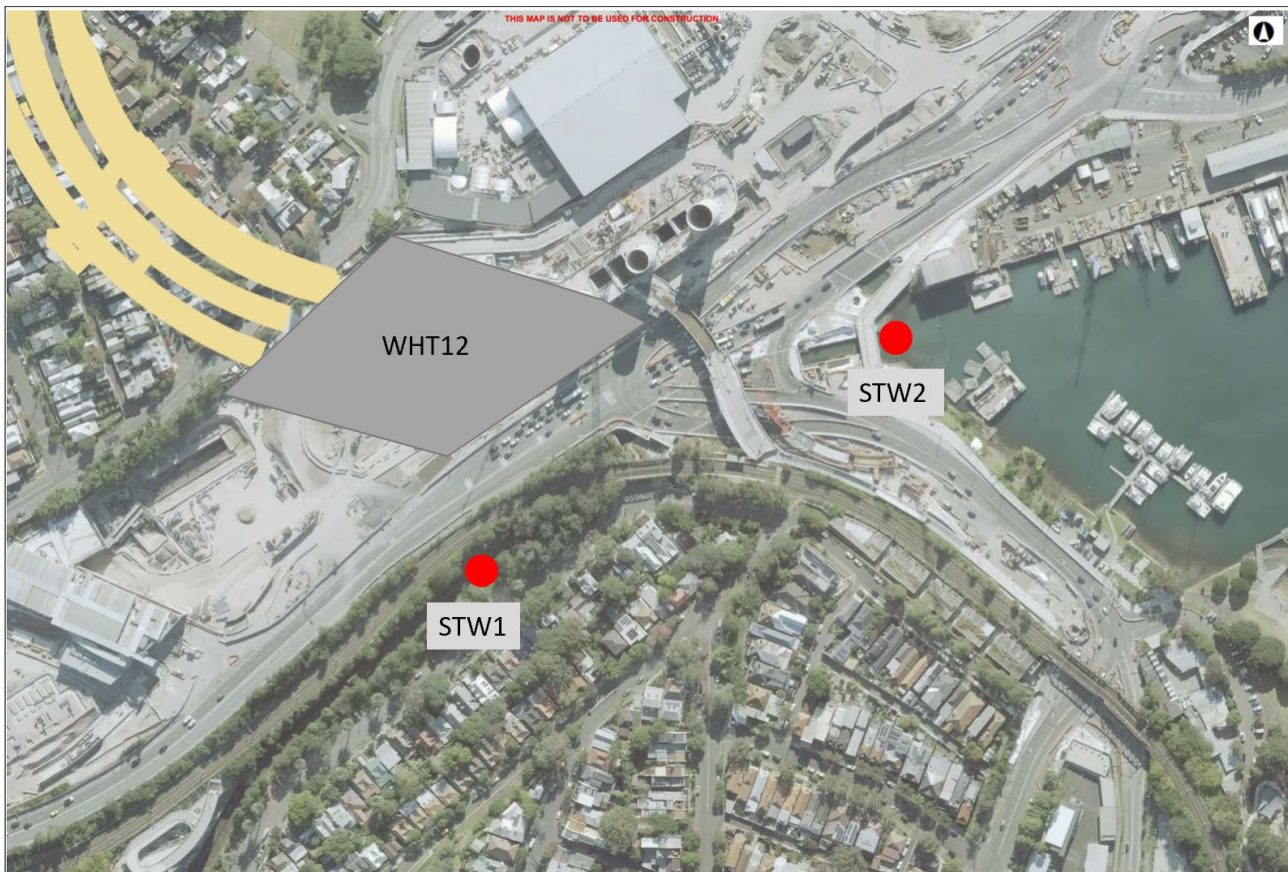


Figure 5-4 Stage 3A surface water quality monitoring locations

#### 5.2.4 Sampling frequency

During the construction phase, water quality sampling will be undertaken monthly.

Wet weather monitoring will be carried out (a minimum of once per 3 months where rainfall does not exceed 15mm or generate runoff) when a continuous rainfall event of >15 mm is received during a 24-hour period (as recorded on BOM website from the station closest to the local catchment).

For safety reasons sampling will not be undertaken during peak storm-flows. Sampling will be completed when flows are reasonably constant and monitoring points can be safely accessed, monitoring locations will be selected where possible to enable a safe monitoring location during all weather conditions.

#### 5.2.5 Surface water quality parameters

Table 5-7 details the analytes that will be monitored during the construction phase surface water quality monitoring at the locations listed in Table 5-2. In accordance with REMM WQ4, these parameters were derived with consideration of the M4-M5 Link Rozelle Interchange Surface Water Quality Monitoring Program.

Table 5-7 Surface water quality monitoring parameters

Category	Parameters <sup>1</sup>
Physico-chemical parameters	<ul style="list-style-type: none"> <li>• Temperature (°C)</li> <li>• Dissolved Oxygen (mg/L)</li> <li>• Electrical Conductivity (µS/cm)</li> <li>• Reduction-Oxidation Potential (Redox)(mV)</li> <li>• pH</li> <li>• Total dissolved solids (TDS)</li> <li>• Turbidity (NTU)</li> <li>• Visible oil and grease.</li> </ul>

Note: <sup>1</sup> Measured in the field using calibrated multi-probe water quality meter(s)

Surface water quality analysis results will be assessed and compared to baseline conditions, rainfall records, upstream monitoring results, and the performance criteria described below.

### 5.2.6 Performance criteria

Baseline monitoring shows that some surface water quality parameters exceed the default ANZECC (2000) and ANZG (2018) water quality trigger values for slightly to moderately disturbed ecosystems. This is not unexpected given the highly urbanised and disturbed area and receiving waterways surrounding the Project.

Location specific performance criteria (site-specific trigger values (SSTVs)) have been developed for downstream surface water monitoring locations (see Table 5-8 ). ANZG (2018) indicates that data collected over 2 years of monthly sampling are regarded as sufficient to indicate ecosystem variability and are therefore suitable for guideline value derivation. The RIC baseline data was collected over a timeframe deemed sufficient by ANZG (2018) and is therefore used to derive SSTVs as outlined below.

SSTVs were developed for appropriate parameters using baseline monitoring data and ANZECC guideline criteria for slightly to moderately disturbed ecosystems (generally protecting 90% of species). It also sets out values for physical and chemical stressors, and for bioaccumulative and persistent toxicants at a minimum of 95% species protection level (ANZG 2018).

- The 80th percentile of baseline data is used as the SSTV for those parameters/locations that exceeded the relevant ANZECC (2000) guideline criteria. It is noted that exceedances of the ANZECC (2000) guideline criteria are not unexpected due to the highly disturbed nature of the urban catchment area.
- The relevant ANZECC (2000) guideline criteria is used as the SSTV for parameters where the 80th percentile of baseline data was below the relevant ANZECC (2000) guideline criteria.

Table 5-8 Site specific trigger values

Parameter	Units	ANZECC guidelines	Location	
			STW1	STW2
pH	pH	7.0-8.5	7.0-8.5	7.0-8.5

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Parameter	Units	ANZECC guidelines	Location	
			STW1	STW2
Electrical Conductivity	µS /cm	125 - 2,200	23,348	49,812
Turbidity	NTU	0.5 - 10	8.66	12.98

The SSTVs provide an easily identifiable indication of a potential change in water quality. A management response would be initiated if any of the following occurs:

- A parameter exceeds the SSTV for any single monitoring event by more than 30%
- A parameter downstream exceeds the corresponding parameter upstream for any single monitoring event by more than 20%
- A parameter exceeds the SSTV for two consecutive monthly monitoring events
- A parameter exceeds the SSTV for half of the sampling events in a twelve-month period.

In the event that any of the above triggers are observed, a review will be initiated to determine the significance of the exceedance(s) and possible causes. The review will assess the baseline data for the relevant waterway, recent rainfall records, other activities within the catchment and recent activities or recorded erosion/sediment control incidents occurring in the catchment.

If the exceedance is determined to be attributable to Project works, the event will be treated as an environmental incident and managed in accordance with the requirements of Section 3.10 of the CEMP. Corrective and preventative actions will be identified and implemented as part of that process.

## 6 Monitoring methodology / sampling protocol

### 6.1 Sampling collection

Grab samples will be collected manually from the sampling locations identified in Table 5-6. The volume of sample collected will be sufficient for the required physio-chemical (field) parameter analysis using a multi-probe water quality meter(s).

### 6.2 Field measures

Field physico-chemical parameters including EC, pH, DO, TDS, ORP, temperature, and turbidity will be measured at each sampling location using a fully calibrated multi-probe water quality meter(s) or provided for laboratory analysis. Other observations including odour and colour may also be recorded.

The multi-probe field water quality meter(s) will be calibrated against known standards, as supplied by the manufacturer, at the start and completion of each day of water quality sampling.

### 6.3 Recording of field results

Results for each monitoring location will be recorded on appropriate field sheets (hard copy or digital) using unique sampling identification nomenclature consisting of the sample date, location, and sampler details.

### 6.4 Decontamination

Sampling equipment will be cleaned (decontaminated) between each sample. Where a sample site shows evidence of contamination (i.e. there is an algal bloom, or the site smells strongly of hydrocarbons, sewage or something else) equipment will need to be cleaned thoroughly. In addition, equipment will need to be cleaned periodically to prevent a build-up of dirt.

The following method will be followed:

- Rinse the equipment in tap water
- Clean with De-Con 90 (a phosphate free detergent), or equivalent
- Rinse again with tap water
- Rinse three times with de-ionised water
- Allow to dry.

De-ionised and tap water will be available for washing equipment in the field, if required.

### 6.5 Quality assurance and documentation

Any sample to be sent to a laboratory will be subject to quality assurance protocols.

Quality assurance and control protocols during sampling and recording of physio-chemical (field) parameters will be undertaken monthly (each sampling event) in accordance with ANZECC/ Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) (2000b) to ensure the integrity of the dataset.

As part of sampling the following will be undertaken:

- Rinsate blanks (one per sampling event only)
- Blind duplicates (at a rate not less than 20% of total samples)
- Split duplicates (at a rate not less than 20% of total samples).

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- Samples are to be transported to a National Association of Testing Authorities (NATA) accredited laboratory under documented chain-of custody protocols.

Field results will be checked for accuracy before leaving the site and errors or discrepancies will be cross-checked, and further investigation initiated if required.

Monitoring and calibration records will be maintained in accordance with the appropriate standard.

## 7 Compliance management

### 7.1 Roles, responsibility and training

The Project's organisational structure and overall roles and responsibilities are outlined in Section 3.3 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Section 7 of the Soil and Surface Water Management Sub-plan.

All employees, contractors and utility staff working on site will undergo site induction and targeted training relating to surface water management issues, detailed in the Soil and Surface Water Management Sub-plan.

Further details regarding staff induction and training are outlined in Section 3.5 of the CEMP.

### 7.2 Monitoring and inspection

This Program details the monitoring requirements for surface water. Additional soil and surface water inspection requirements (including weekly site inspections) are detailed in the Section 8.3 of the Soil and Surface Water Management Sub-plan.

The Project will be responsible for ensuring monitoring activities are undertaken in accordance with Section 3.3.1 of the CEMP. Additional requirements and responsibilities in relation to inspections are documented in Section 3.9 of the CEMP.

### 7.3 Data analysis and management response

Results from this Program will be compared with the SSTVs and with previous results.

Monthly monitoring results will be compared against SSTVs (Table 5-8) and reported on in the construction compliance monitoring reports. If a trigger is observed, a review will be initiated to determine the significance of the exceedance(s) and possible causes. The review will assess available surface water data, baseline data for the relevant waterway, recent rainfall records, and recent activities or recorded erosion/sediment control incidents occurring in the catchment. If the exceedance is determined to be attributable to construction work, the event will be treated as an environmental incident and managed in accordance with the requirements of the CEMP. Corrective and preventative actions will be identified and implemented as part of that process.

### 7.4 Auditing

Audits will be undertaken to assess the effectiveness of environmental controls, as well as compliance with this Sub-plan, the MCoA and other relevant approvals, licences and guidelines as stipulated in this Sub-plan.

Audit requirements are detailed in Section 3.9.3 of the CEMP.

### 7.5 Reporting

During construction, surface water quality data will be collected, tabulated, and assessed against baseline conditions and performance criteria. Monitoring reports will be submitted to the DPE within 30 days of the reporting period and then subsequently to DPE Water and the EPA.

Construction reporting requirements associated with this Program are reflected in Table 7-1 .



Table 7-1 Reporting requirements relevant to this Program

Schedule (during construction)	Requirements	Recipient (relevant authority)
Water Monitoring Reports (every six months)	Data summary reports presenting tabulated surface water monitoring data collected during the reporting period. Surface water quality results will be presented, and performance criteria exceedances will be highlighted and reasoning for exceedances investigated and reported on. Applicable management responses will be documented.	DPE Water, EPA
EPL Monitoring Reports	EPL monitoring reports will be prepared in accordance with the requirements of the EPL.	EPA
Annual Returns	An EPL Annual Return will be prepared in respect of each EPL reporting period (typically 12 months).	EPA
Monthly Environmental Report (every month)	Any incidents and key environmental issues identified in the monitoring program will be documented in the Monthly Environmental Report.	TfNSW

## 8 Review and improvement

### 8.1 Continuous improvement

Monitoring data will be reviewed throughout the construction period to provide potential requirements to increase, or decrease, the number of sampling locations and/or the analytical suites. Alterations to the SSTVs, monitoring locations, analytical suites, or frequencies will be reported in the Water Monitoring Reports (Section 7.5).

Continuous improvement of this Program will be achieved by the ongoing evaluation of environmental management performance against relevant environmental objectives and targets (Section 3.2.3 of the CEMP).

The continuous improvement process will:

- Identify areas of opportunity for improvement of environmental management and performance
- Determine the cause or causes of non-conformances and deficiencies
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies
- Verify the effectiveness of the corrective and preventative actions
- Document any changes in procedures resulting from process improvement
- Make comparisons with objectives and targets.

### 8.2 Updates and amendments to this Program

The processes described in Section 3.13.1 and Section 3.13.2 of the CEMP may result in the need to update or revise this Program. Revisions of this Program will be in accordance with the process outlined in Section 3.13.1 of the CEMP.

A copy of the updated Program and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure (Section 3.11.2 of the CEMP).



## 9 References

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Landcom, 2004. Managing Urban Stormwater: Soils and Construction. Landcom, (4th Edition) March 2004 (reprinted 2006) (the “Blue Book”). Volume 1 and Volume 2.

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RTA, 1999. Guideline for Construction Water Quality Monitoring. NSW Road and Traffic Authority

## Annexure A ERM Baseline data

Sample ID	Parameter	Unit	Number of Samples	Minimum	Maximum	ANZG (2018) Freshwater - Highly disturbed system (90%)	Exceeds ANZG (2018) Freshwater - Highly disturbed system (90%)	ANZG (2018) Marine Water - Highly disturbed system (90%)	Exceeds ANZG (2018) Marine Water - Highly disturbed system (90%)
WHC DS	Dissolved Oxygen (Field)	mg/L	13	0.34	13.1				
WHC DS	Electrical Conductivity (Field)	uS/cm	13	0.552	33870				
WHC DS	pH (Field)	pH units	13	7.29	10.03				
WHC DS	Redox Potential (Field)	mV	13	-135.6	193				
WHC DS	Specific Electrical Conductivity (Field)	uS/cm	12	1.86	40600				
WHC DS	Temperature (Field)	oC	13	13.1	24				
WHC DS	Total Dissolved Solids (Field)	mg/L	11	263	26370				
WHC DS	Turbidity (Field)	NTU	12	0.27	11830				
WHC DS	Benzene	µg/L	12	0	0	1300	0	900	0
WHC DS	BTEX	µg/L	12	0	0				
WHC DS	Ethylbenzene	µg/L	12	0	0	110	0	110	0
WHC DS	Naphthalene	µg/L	12	0	0	37	0	90	0
WHC DS	Toluene	µg/L	12	0	0	230	0	230	0
WHC DS	Xylene (m & p)	µg/L	12	0	0	100	0	100	0
WHC DS	Xylene (o)	µg/L	12	0	0	470	0	470	0

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Sample ID	Parameter	Unit	Number of Samples	Minimum	Maximum	ANZG (2018) Freshwater - Highly disturbed system (90%)	Exceeds ANZG (2018) Freshwater - Highly disturbed system (90%)	ANZG (2018) Marine Water - Highly disturbed system (90%)	Exceeds ANZG (2018) Marine Water - Highly disturbed system (90%)
WHC DS	Xylene Total	µg/L	12	0	0				
WHC DS	Chlorophyll a	mg/m³	12	1	23				
WHC DS	Arsenic	µg/L	12	1	3	42	0		
WHC DS	Cadmium	µg/L	12	0.2	0.7	0.4	5	5.5	0
WHC DS	Chromium	µg/L	12	1	8	3.3	1	20	0
WHC DS	Copper	µg/L	12	3	16	1.8	11	3	0
WHC DS	Iron	µg/L	12	130	920				
WHC DS	Lead	µg/L	12	1	17	5.6	3	6.6	0
WHC DS	Manganese	µg/L	12	3	29	2500	0	80	0
WHC DS	Mercury	µg/L	12	0	0	0.6	0	0.4	0
WHC DS	Nickel	µg/L	12	1	2	13	0	200	0
WHC DS	Zinc	µg/L	12	39	250	15	11	23	0
WHC DS	Kjeldahl Nitrogen Total	mg/L	12	0.4	1.2				
WHC DS	Nitrite + Nitrate as N	mg/L	12	0.24	3.82				
WHC DS	Nitrogen (Total)	mg/L	12	1	4.7				
WHC DS	Total Phosphorus (as P)	mg/L	12	0.03	0.3				
WHC DS	Biological Oxygen Demand (BOD)	mg/L	12	2	3				
WHC DS	Chemical Oxygen Demand (COD)	mg/L	12	12	408				
WHC DS	Total Suspended Solids (TSS)	mg/L	12	6	32				
WHC DS	Turbidity	NTU	1	2	2				

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Sample ID	Parameter	Unit	Number of Samples	Minimum	Maximum	ANZG (2018) Freshwater - Highly disturbed system (90%)	Exceeds ANZG (2018) Freshwater - Highly disturbed system (90%)	ANZG (2018) Marine Water - Highly disturbed system (90%)	Exceeds ANZG (2018) Marine Water - Highly disturbed system (90%)
WHC DS	TRH C6-C9 Fraction	µg/L	12	0	0				
WHC DS	TRH C6-C10 Fraction	µg/L	12	0	0				
WHC DS	TRH C6-C10 less BTEX	µg/L	12	0	0				
WHC DS	TRH >C10-C14 Silica Gel Cleanup	µg/L	12	0	0				
WHC DS	TRH >C10-C16 less N Silica Gel Cleanup	µg/L	12	0	0				
WHC DS	TRH >C10-C16 Silica Gel Cleanup	µg/L	12	0	0				
WHC DS	TRH >C10-C36 Silica Gel Cleanup	µg/L	12	160	160				
WHC DS	TRH >C10-C40 Silica Gel Cleanup	µg/L	12	140	140				
WHC DS	TRH >C15-C28 Silica Gel Cleanup	µg/L	12	160	160				
WHC DS	TRH >C16-C34 Silica Gel Cleanup	µg/L	12	140	140				
WHC DS	TRH >C29-C36 Silica Gel Cleanup	µg/L	12	0	0				
WHC DS	TRH >C34-C40 Silica Gel Cleanup	µg/L	12	0	0				

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Sample ID	Parameter	Unit	Number of Samples	Minimum	Maximum	ANZG (2018) Freshwater - Highly disturbed system (90%)	Exceeds ANZG (2018) Freshwater - Highly disturbed system (90%)	ANZG (2018) Marine Water - Highly disturbed system (90%)	Exceeds ANZG (2018) Marine Water - Highly disturbed system (90%)
WHC US	Dissolved Oxygen (Field)	mg/L	2	0.67	9.76				
WHC US	Electrical Conductivity (Field)	uS/cm	2	249.1	937				
WHC US	pH (Field)	pH units	2	8.45	9				
WHC US	Redox Potential (Field)	mV	2	81.8	142.2				
WHC US	Specific Electrical Conductivity (Field)	uS/cm	1	269.7	269.7				
WHC US	Temperature (Field)	oC	2	21	22.2				
WHC US	Turbidity (Field)	NTU	2	608	22180				
WHC US	Benzene	µg/L	2	0	0	1300	0	900	0
WHC US	BTEX	µg/L	2	0	0				
WHC US	Ethylbenzene	µg/L	2	0	0	110	0	110	0
WHC US	Naphthalene	µg/L	2	0	0	37	0	90	0
WHC US	Toluene	µg/L	2	0	0	230	0	230	0
WHC US	Xylene (m & p)	µg/L	2	0	0	100	0	100	0
WHC US	Xylene (o)	µg/L	2	0	0	470	0	470	0
WHC US	Xylene Total	µg/L	2	0	0				
WHC US	Chlorophyll a	mg/m <sup>3</sup>	2	7	8				
WHC US	Arsenic	µg/L	2	1	2	42	0		
WHC US	Cadmium	µg/L	2	0.2	0.2	0.4	0	5.5	0
WHC US	Chromium	µg/L	2	1	1	3.3	0	20	0
WHC US	Copper	µg/L	2	9	13	1.8	2	3	0
WHC US	Iron	µg/L	2	380	590				

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Sample ID	Parameter	Unit	Number of Samples	Minimum	Maximum	ANZG (2018) Freshwater - Highly disturbed system (90%)	Exceeds ANZG (2018) Freshwater - Highly disturbed system (90%)	ANZG (2018) Marine Water - Highly disturbed system (90%)	Exceeds ANZG (2018) Marine Water - Highly disturbed system (90%)
WHC US	Lead	µg/L	2	6	11	5.6	2	6.6	0
WHC US	Manganese	µg/L	2	10	27	2500	0	80	0
WHC US	Mercury	µg/L	2	0	0	0.6	0	0.4	0
WHC US	Nickel	µg/L	2	1	2	13	0	200	0
WHC US	Zinc	µg/L	2	85	113	15	2	23	0
WHC US	Kjeldahl Nitrogen Total	mg/L	2	0.6	0.8				
WHC US	Nitrite + Nitrate as N	mg/L	2	0.73	1.74				
WHC US	Nitrogen (Total)	mg/L	2	1.5	2.3				
WHC US	Total Phosphorus (as P)	mg/L	2	0.1	0.11				
WHC US	Biological Oxygen Demand (BOD)	mg/L	2	4	4				
WHC US	Chemical Oxygen Demand (COD)	mg/L	2	10	18				
WHC US	Total Suspended Solids (TSS)	mg/L	2	11	17				
WHC US	TRH C6-C9 Fraction	µg/L	2	0	0				
WHC US	TRH C6-C10 Fraction	µg/L	2	0	0				
WHC US	TRH C6-C10 less BTEX	µg/L	2	0	0				

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Sample ID	Parameter	Unit	Number of Samples	Minimum	Maximum	ANZG (2018) Freshwater - Highly disturbed system (90%)	Exceeds ANZG (2018) Freshwater - Highly disturbed system (90%)	ANZG (2018) Marine Water - Highly disturbed system (90%)	Exceeds ANZG (2018) Marine Water - Highly disturbed system (90%)
WHC US	TRH >C10-C14 Silica Gel Cleanup	µg/L	2	0	0				
WHC US	TRH >C10-C16 less N Silica Gel Cleanup	µg/L	2	0	0				
WHC US	TRH >C10-C16 Silica Gel Cleanup	µg/L	2	0	0				
WHC US	TRH >C10-C36 Silica Gel Cleanup	µg/L	2	0	0				
WHC US	TRH >C10-C40 Silica Gel Cleanup	µg/L	2	0	0				
WHC US	TRH >C15-C28 Silica Gel Cleanup	µg/L	2	0	0				
WHC US	TRH >C16-C34 Silica Gel Cleanup	µg/L	2	0	0				
WHC US	TRH >C29-C36 Silica Gel Cleanup	µg/L	2	0	0				

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## Annexure B RIC Baseline Data

Baseline Surface Water Monitoring SW01						
Parameter	Units	Count	mean	min	max	80th percentile
Physiochemical Parameters						
Turbidity	NTU	33	5.89	0	52	8.66
pH	-	37	7.49	5.65	8.04	7.904
EC	µS/cm	37	40433.89	403	541180	49812.4
Temp	0C	37	20.74	15.7	28	24.68
DO	Mg/L	37	23.63	-0.16	558	6.656
Redox	mV	37	393.84	209.7	3980	387.04
Chemical analytes						
Ammonia as N	µg/L	3	245	70	240	-
Kjeldahl Nitrogen Total	mg/L	31	3.8	0.2	41.4	1.44
Nitrite (as N)	mg/L	31	0.03	0.01	0.04	0.04
Nitrogen (Total Oxidised)	mg/L	29	0.27	0.01	1.82	0.46
Nitrogen (Total)	mg/L	31	4315	300	41500	2240
Reactive Phosphorus as P	mg/L	31	0.027	0.01	0.08	0.04

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Baseline Surface Water Monitoring SW01						
Phosphorus (Total)	mg/L	31	0.30	0.02	3.76	0.17
Arsenic	mg/L	34	0.04	0.0013	0.42	0.0892
Cadmium	mg/L	34	0.0018	0.0001	0.006	0.00284
Chromium	mg/L	34	0.00167	0.0004	0.0064	0.00202
Chromium (III+VI)	mg/L	-	-	-	-	-
Copper	mg/L	28	0.010627	0.002	0.0586	0.0134
Ferrous Iron	mg/L	31	0.35	0.05	2.94	0.388
Iron	mg/L	33	0.3965	0.005	4.01	0.353
Lead	mg/L	34	0.0369054	0.0009	6.64	0.11208
Manganese	mg/L	33	0.021821429	0.0012	0.121	0.02484
Mercury	mg/L	34	0.021309	0.00006	0.0422	0.03674
Nickel	mg/L	34	0.44395	0.000008	1	0.00176
Zinc	mg/L	34	0.089169	0.0008	0.053	0.094
Benzene	µg/L	34	0.5	0.5	0.5	0.5
Ethylbenzene	µg/L	34	1	1	1	1
Toluene	µg/L	34	1	1	1	1
Xylene (m & p)	µg/L	34	1	1	1	1
Xylene (o)	µg/L	34	1	1	1	1
Xylene Total	µg/L	34	1	1	1	1

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Baseline Surface Water Monitoring SW01						
Naphthalene	µg/L	34	2.5	2.5	2.5	2.5
C6-C10	mg/L	34	0.01	0.01	0.01	0.01
C6-C10 less BTEX (F1)	mg/L	34	0.01	0.01	0.01	0.01
F2-NAPHTHALENE	mg/L	34	0.05	0.05	0.05	0.05
C10-C16	mg/L	34	0.05	0.05	0.05	0.05
C16-C34	mg/L	34	0.05	0.05	0.05	0.05
C34-C40	mg/L	34	0.05	0.05	0.05	0.05
C10-C40 (Sum of total)	mg/L	34	0.05	0.05	0.05	0.05
C6-C9	mg/L	34	0.01	0.01	0.01	0.01
C10-C14	mg/L	34	0.025	0.025	0.025	0.025
C15-C28	mg/L	34	0.05	0.05	0.05	0.05
C29-C36	mg/L	34	0.025	0.025	0.025	0.025
+C10-C36 (Sum of Total)	mg/L	34	0.025	0.025	0.025	0.025

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**Appendix H2 – Unexpected Finds Procedure for Contamination**

# Appendix H2

## Unexpected Finds Procedure for Contamination

STW-JHC-PRO-00-EN-002-000001

*Western Harbour Tunnel Stage 3A*

29 August 2022

### Version control

Revision	Date	Prepared by	Reviewed by	Remarks
A	21/04/2022	Chetan Jayaram	Kathy Lloyd	JHCPB Internal revision
B	18/05/2022	Chetan Jayaram	Kathy Lloyd	JHCPB Internal revision
C	20/05/2022	Chetan Jayaram	Kathy Lloyd	External revision for TfNSW and ER
D	20/07/2022	Adrian Broger	Adrian Broger	External revision updated to address TfNSW comments
E	29/08/2022	Adrian Broger	Adrian Broger	For DPE

### Distribution of controlled copies

This Procedure is available to all personnel and subcontractors via the Project document control management system. An electronic copy can be found on the Project website.

The document is uncontrolled when printed.

# 1. Introduction

## 1.1 Background

The Western Harbour Tunnel (WHT) will connect the approved M4-M5 Link in Rozelle to the Warringah Freeway at North Sydney / Cammeray. The Project (Stage 3A of the WHT) includes the following key features:

- A portion of the twin mainline tunnels connecting the M4-M5 Link at Rozelle to the Warringah Freeway, near Cammeray, of about 2 kilometres long and commencing from the stub tunnels at the M4-M5 Link in Rozelle and terminating underground at Birchgrove
- Ventilation cavern and tunnel excavation in Rozelle
- Limited in tunnel operational infrastructure including road pavement and drainage to enable Stage 3B works.

The construction of the Project will be supported by two surface based ancillary facilities, located at the WHT cut and cover structure (WHT12) in Rozelle and at White Bay (WHT3) in Rozelle.

Based on the findings presented in the Environmental Impact Statement (EIS) and given that the majority of the Project's construction activities will be predominantly undertaken either underground or from within already fully established support sites, it is not anticipated that any unexpected contamination, including asbestos containing material (ACM), will be encountered during construction of the Project. In the event that any ACM is discovered, a Project specific Contamination and/or Asbestos Management Sub-Plan (AMP) will be developed to:

- Ensure that safety and health of all stakeholders (workers, subcontractors, visitors, the public and other parties) is maintained; and
- Provide guidance on how to manage and control asbestos in the workplace and prevent human exposure to airborne asbestos fibres while on site.

The AMP will be prepared in accordance with relevant guidelines and legislation, including:

- *Protection of the Environment Operations Act 1977* (POEO Act);
- *Protection of the Environment Operations (Waste) Regulation 2014*;
- NSW Environment Protection Authority Waste Classification Guidelines (Part 1);
- *Contaminated Land Management Act 1997* (NSW);
- *Work Health and Safety Act 2011* (WHS Act) and Regulation (2017);
- SafeWork NSW (2019) Code of Practice – How to safely remove asbestos; and
- SafeWork NSW (2019) Code of Practice – How to manage and control asbestos in the workplace.

## 1.2 Purpose

This procedure describes how to manage unexpected encounters of land that contains (or is suspected of containing) substances that are actually (or potentially) hazardous to health or the environment. Contaminants may include:

- Hydrocarbons
- Polycyclic aromatic hydrocarbons
- Polychlorinated biphenyls (PCBs) and pesticides
- Heavy metals such as lead, arsenic, cadmium and mercury
- Asbestos containing material (ACM)
- Biologically pathogenic materials and waste
- Unusual odour from soils not detected in other similar areas
- Unusual odours, sheen or colour in groundwater and/or surface water
- Unexpected underground storage tanks, buried drums or machinery
- Acid sulphate soils (ASS).

This procedure has been prepared to meet the requirements of Minister's Condition of Approval (MCoA) E123 which states: *An Unexpected Finds Procedure for Contamination must be prepared before the commencement of work and must be followed should unexpected contamination or asbestos (or suspected contamination) be excavated or otherwise discovered.* This procedure will be submitted to the Planning Secretary for information.

CoA E124 requires that the Unexpected Finds Procedure for Contamination must be implemented throughout construction.

The Unexpected Finds Procedure process has been broken up into two flow charts – one for Contaminated Land Finds and one for Asbestos Finds, as shown in Section 4 (refer Figures 1 and 2) below.

In accordance with Revised Environmental Management Measure (REMM) SG11, this unexpected finds procedure has been prepared with consideration of the *Guideline for the Contamination of Management – Factsheet 12 (TfNSW (previously Roads and Maritime), 2013)*.

## 2. Roles and Responsibilities

### 2.1 JHCPB Site Supervisor

- Ensure this Unexpected Finds Procedure for Contamination is implemented throughout construction of the Project
- Stop work immediately upon becoming aware of a suspected unexpected contamination finds
- Inform JHCPB Environment Manager or delegate of unexpected finds including any ACM
- Assist JHCPB Environment team in recording details of unexpected contaminated finds
- Work with Environment team to develop and implement a plan for managing and/or remediating the unexpected contaminated finds (where applicable)
- If required, ensure asbestos removalist are appropriately licenced
- If required, treat acid sulfate soils (ASS) onsite to neutralise potential impact to environment. This would be done in accordance with the *Acid Sulfate Soil Manual (Acid Sulfate Soil Management Advisory Committee 1998)*
- Recommence work following approval from the Environment team

- Prior to any waste being disposed offsite, ensure the waste has been appropriately classified in accordance with the NSW Environment Protection Authority Waste Classification Guidelines (NSW EPA Part 1, 2014).

## 2.2 JHCPB Environment Manager (or delegate)

- Ensure this Unexpected Finds Procedure for Contamination is implemented throughout construction of the Project
- Record details of all unexpected finds
- Engage and coordinate with qualified contaminated land consultants following unexpected finds discovery
- Assist the contaminated land consultants in the investigations and assessment of unexpected finds
- Work with the construction teams and the Site Supervisor to develop a plan for managing and/or remediating the unexpected contaminated finds (where applicable)
- Advise JHCPB Site Supervisor of appropriate ASS treatment methodology to neutralise any potential threat to the environment
- In coordination with the JHCPB Site Supervisor, implement the plan for the management and/or remediation of the unexpected contaminated finds
- If required, ensure licenced asbestos removalists are engaged.

## 2.3 Qualified Contaminated Land Consultant/Licenced Asbestos Assessor

- Identify and advise on potential hazards to human health and/or the environment in accordance with *Contaminated Land Act 1997* requirements
- Undertake sampling of unexpected finds for laboratory analysis as per NSW Sampling Design Guidelines and classify material in accordance with NSW Environment Protection Authority Waste Classification Guidelines
- As requested by the Project team, undertake site inspection post removal of ACM and issue asbestos clearance certification and report.

## 3. Reporting

A record of the unexpected contaminated finds will be maintained by the Project and will include the following details:

- Date, time and location of unexpected find, including depth
- Details regarding assessment by JHCPB Environment Manager or delegate (and advice from the contaminated land consultants)
- Monitoring results
- Neutralisation and treatment process used
- Time of excavation, reuse or disposal of material
- Volume of excavated material
- Classification and destination of treated material (i.e., offsite or onsite disposal), including a record on a site plan.



If treated material is to be disposed of offsite, material tracking would be undertaken in accordance with the *Protection of the Environment Operations Act 1997*. Transport and disposal will be undertaken in accordance with the *Protection of the Environment Operations (Waste) Regulation 2005* and the Waste Classification Guidelines (EPA 2014). All contractors transporting waste from the site must be licenced to transport the classification of waste and must only dispose of the waste at a facility that is appropriately licenced to accept the waste classification.

## **4. Unexpected Finds Procedure Process**

The Unexpected Finds Procedure process has been broken up into two flow charts – one for Contaminated Land Finds and one for Asbestos Finds, as shown in Figures 1 and 2 below.

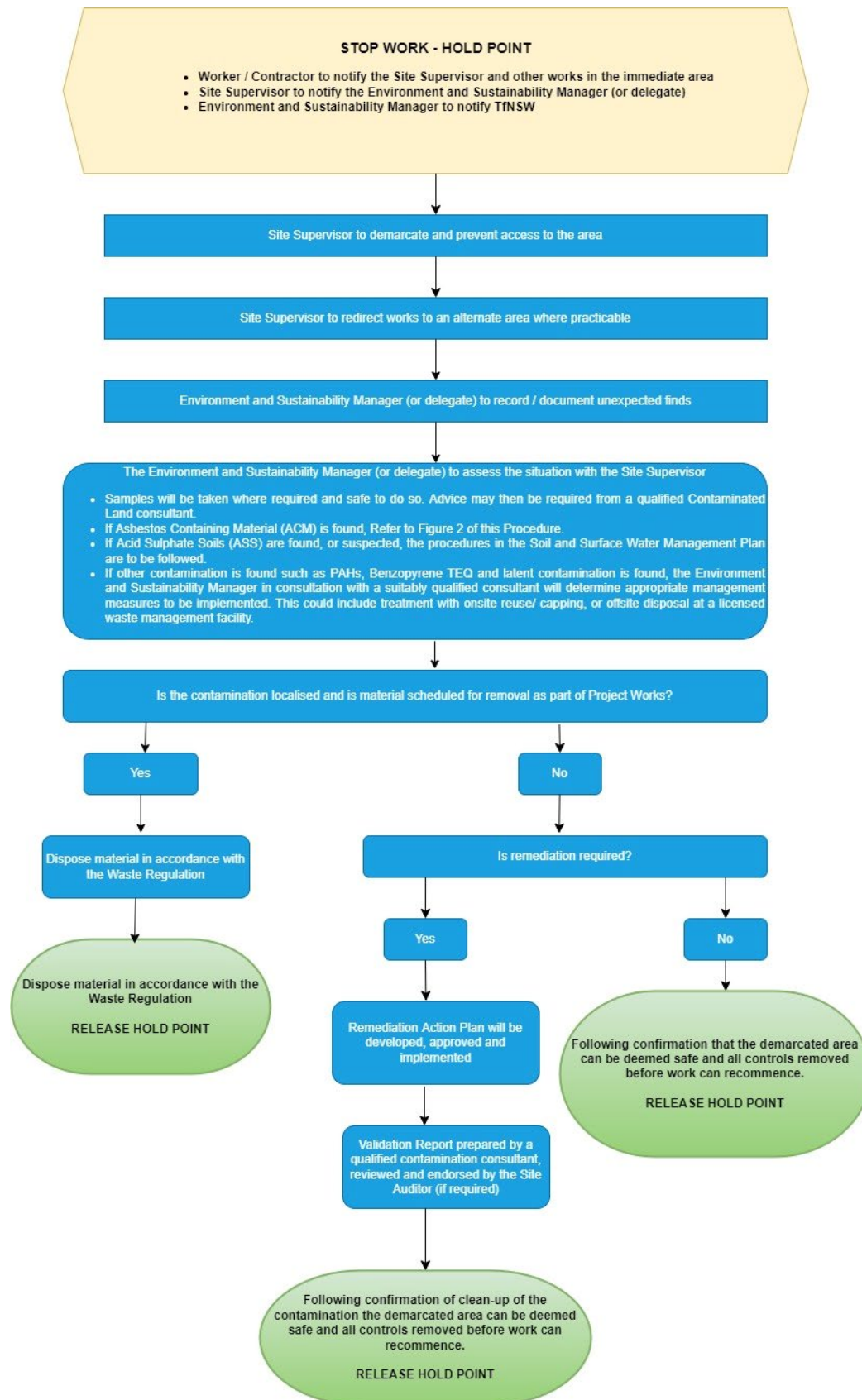


Figure 1 – Unexpected Contamination Finds Process Flowchart

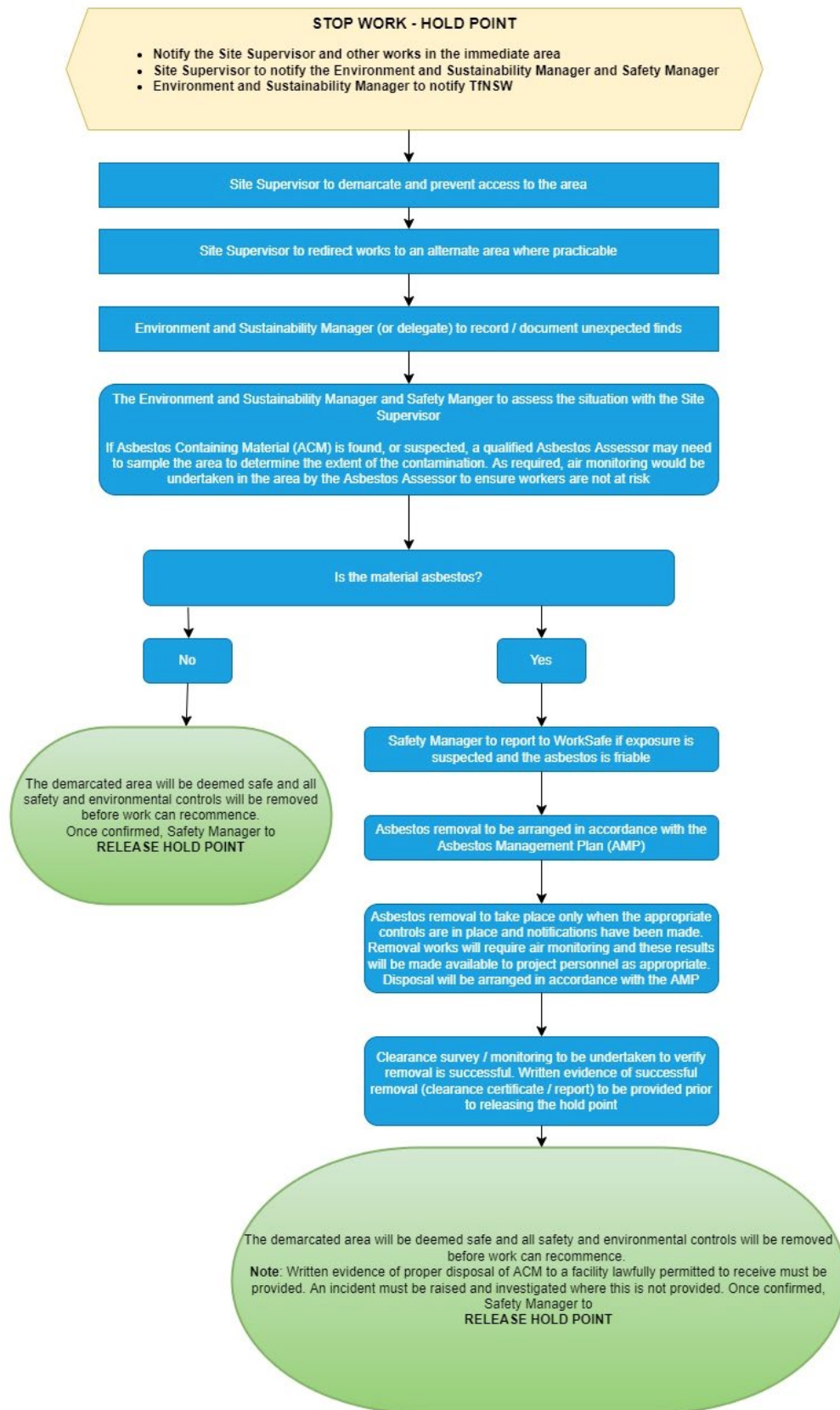


Figure 2 – Unexpected Asbestos Finds Procedure Flowchart

## 5. Emergency Contacts

In the event that unexpected contamination is discovered at any stage during construction of the Project, work will be stopped immediately and the internal reporting requirements of the Project followed. Internal notification includes contacting the Site Supervisor, the Environment Manager and/or Project Manager.

The regulatory agencies listed in Table 1 will be contacted where notification is required under relevant legislation or guidelines.

Table 1: External Agency Contacts

Agency	Contact Number
EPA pollution hotline	131 555
Fire and Rescue NSW	000 (for pollution incidents that present an immediate threat to human health or property) 1300 729 579 (for pollution incidents that do not present an immediate threat to human health or property)
The Ministry of Health	(02) 9391 9000
SafeWork NSW	131 050
Inner West Council	(02) 9392 5000

## Appendix H3 – Spill Control Procedure

