



Construction Soil and Water Management Plan

SMCSWSSJ-JHL-WEC-EM-PLN-000004

Document and Revision History

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Terms and definitions

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

Terms	Explanation
AEP	Annual Exceedance Probability - The probability that a given rainfall total accumulated over a given duration will be exceeded in any one year
AHD	Australian Heritage Database
CCBC	City of Canterbury Bankstown Council
CEMF	Construction Environmental Management Framework
CEMP	Construction Environmental Management Plan
CMP	Construction Monitoring Program (the Water Quality Monitoring Program outlined in Section 7 of this plan is part of the overall CMP)
CoA	Conditions of Approval
CSSI	Critical State Significance Infrastructure
CSWMP	Construction Soil and Water Management Plan
DPI Water	NSW Department of Primary Industries -Water
DPI&E	Department of Planning, Industry & Environment (formerly Department of Planning & Environment – DP&E)
EIS	Environmental Impact Statement
EPL	Environment Protection Licence
ER	Environmental Representative
ESCP	Erosion and Sediment Control Plan
IWC	Inner West Council
JH	John Holland Group Pty Limited
JHLOR	John Holland and Laing O'Rourke joint venture
Laing O'Rourke	Laing O'Rourke Australia Construction Pty Limited
LGA	Local Government Area
Minister, the	NSW Minister for Planning
NSW	New South Wales
OEH	Office of Environment and Heritage
RTS	Response to Submissions
SES	NSW State Emergency Service
SMCSW	Sydney Metro City and Southwest
SMEW	Southwest Metro Early Works
SWM	Southwest Metro (scope approved under CSSI 8256 – previously known as Sydenham to Bankstown Upgrade)
WHS	Work Health and Safety

1. Introduction

1.1 Purpose

The Southwest Metro Project (SWM) was assessed as Critical State Significance Infrastructure (CSSI 8256) by the Minister for Planning and Environment under Part 5 Division 5.2 of the EP&A Act. The Project determination was made on the 12th of December 2018. To enable the full scope of the Southwest Metro Project, a package of early works was awarded to the John Holland Laing O'Rourke joint venture. This early works package is known as Southwest Metro Early Works (SMEW).

This Construction Soil and Water Management Plan (CSWMP) outlines the Southwest Metro Early Works approach to implementing measures to mitigate the risk of impact to soil and water in accordance with Project's legal, planning and contractual requirements.

1.2 Background and Scope

Sydney Metro City & Southwest is a new 30km metro line extending metro rail from the end of Sydney Metro Northwest at Chatswood under Sydney Harbour, through new CBD stations and southwest to Bankstown. It is due to open in 2024 with the capacity to run a metro train every two minutes each way through the centre of Sydney. The Sydney Metro City & Southwest comprises of two components;

- Chatswood to Sydenham Project
- Sydenham to Bankstown upgrade, now known as Southwest Metro

The Southwest Metro Early Works, referred to as "the Project" or 'the works' in this document, will be undertaken in accordance with the *Sydney Metro City & Southwest Sydenham to Bankstown Upgrade Instrument of Approval* (SSI_8256) and will include critical enabling work activities for the greater Southwest Metro Project. The SMEW Project site is located on the T3 Bankstown line between Sydenham and Loch St, Campsie, NSW.

Some supporting works may occur within the *Sydney Metro City & Southwest Sydenham to Bankstown Upgrade* project boundary between Loch St, Campsie and Bankstown. In particular;

- A generator will be installed temporarily adjacent to Belmore Station for emergency back-up power provisions during Sydney Trains high voltage feeder outages associated with SMEW. The generator will be installed for short durations, nominally three weeks, during Sydney Trains high voltage feeder outages and removed once the outages have ended.
- Relocation of existing Sydney Trains Service route at Lakemba, Wiley Park, Punchbowl and Bankstown
- Trimming and removal of vegetation to facilitate Sydney Trains Service route at Lakemba, Wiley Park, Punchbowl and Bankstown

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

This CSWMP has been developed for the Construction phase of the Project, in compliance with Laing O'Rourke's environmental management system, the Project's legal, planning and contractual requirements. Due to limited environmental risk associated with groundwater on SMEW, the management of groundwater has been incorporated into the Project CEMP (SMCSWSSJ-JHL-WEC-EM-PLN-000001) in Appendix 4 (Operational Control Procedures - Environmental Risk Action Plan (ERAP) 3 – Groundwater).

1.3 SMEW Scope of Works

1.3.1 Permanent Works

The works include all permanent new infrastructure and modifications to existing infrastructure. The permanent new infrastructure and modifications to existing infrastructure to be constructed includes;

- Installation and commissioning of Combined Service Route (CSR), including Galvanised Steel Trough (GST), Ground Level Trough (GLT), Under Road Crossings (URX) – works will occur over a series of zones within the rail corridor between Marrickville and Campsie, these works will not occur on stations. These works will occur within both the Inner West Council and City of Canterbury Bankstown Local Government Area (LGA).
- Sydney Trains signalling, communications and HV diversions – site wide. These works will occur within both the Inner West Council and City of Canterbury Bankstown LGA.
- Rail embankment stabilisation including retaining walls – specifically Retaining Wall 1 (RW1) from the western side of Canterbury Station to the Cooks River, Retaining Wall 2 (RW2) from the Cooks River to Wairoa Street, Canterbury and Retaining Wall 3 (RW3) from Wairoa St to Oswald Lane, Canterbury. All retaining walls are on the southern side (down side) of the track. This works will occur within the City of Canterbury Bankstown LGA.
- Installation of drainage/works to existing swales (table drains) – an existing vegetated swale conveys water from the southern side of the corridor between Campsie Station and the Cooks River, crossing Wairoa St via a culvert. The swale collects water from the existing embankment that will be stabilised by RW2 and RW3. This works will occur within the City of Canterbury Bankstown LGA.
- Fencing – works will occur over a series of zones within the rail corridor, these works will not occur on stations. These works will occur within both the Inner West Council and City of Canterbury Bankstown LGA.
- Civil enabling works for a traction substation – Campsie. This works will occur within the City of Canterbury Bankstown LGA.
- Vegetation clearing –works will occur over a series of zones within the rail corridor, these works will not occur on stations. These works will occur within both the Inner West Council and City of Canterbury Bankstown LGA.

1.3.2 Temporary Works

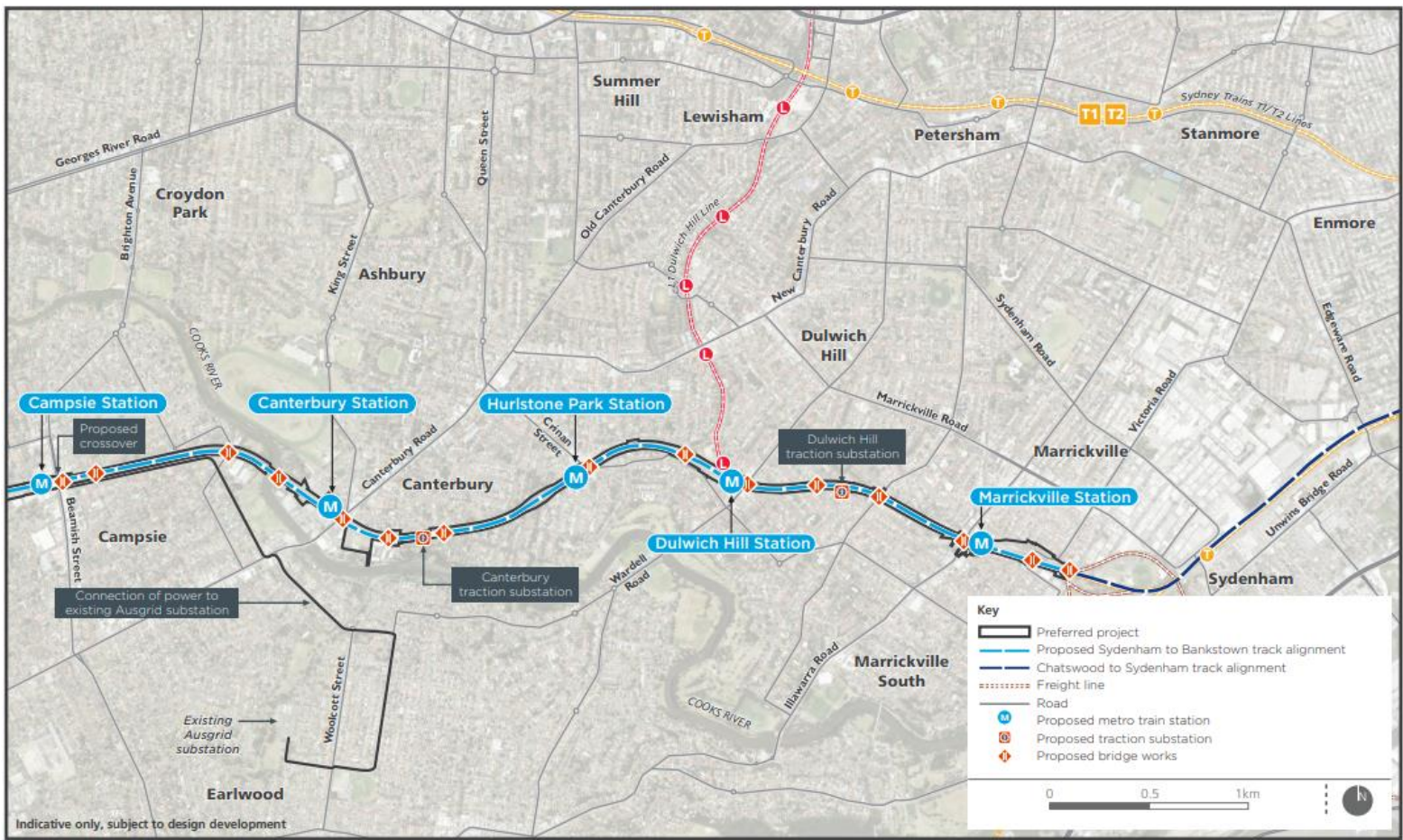
The SMEW temporary works include:

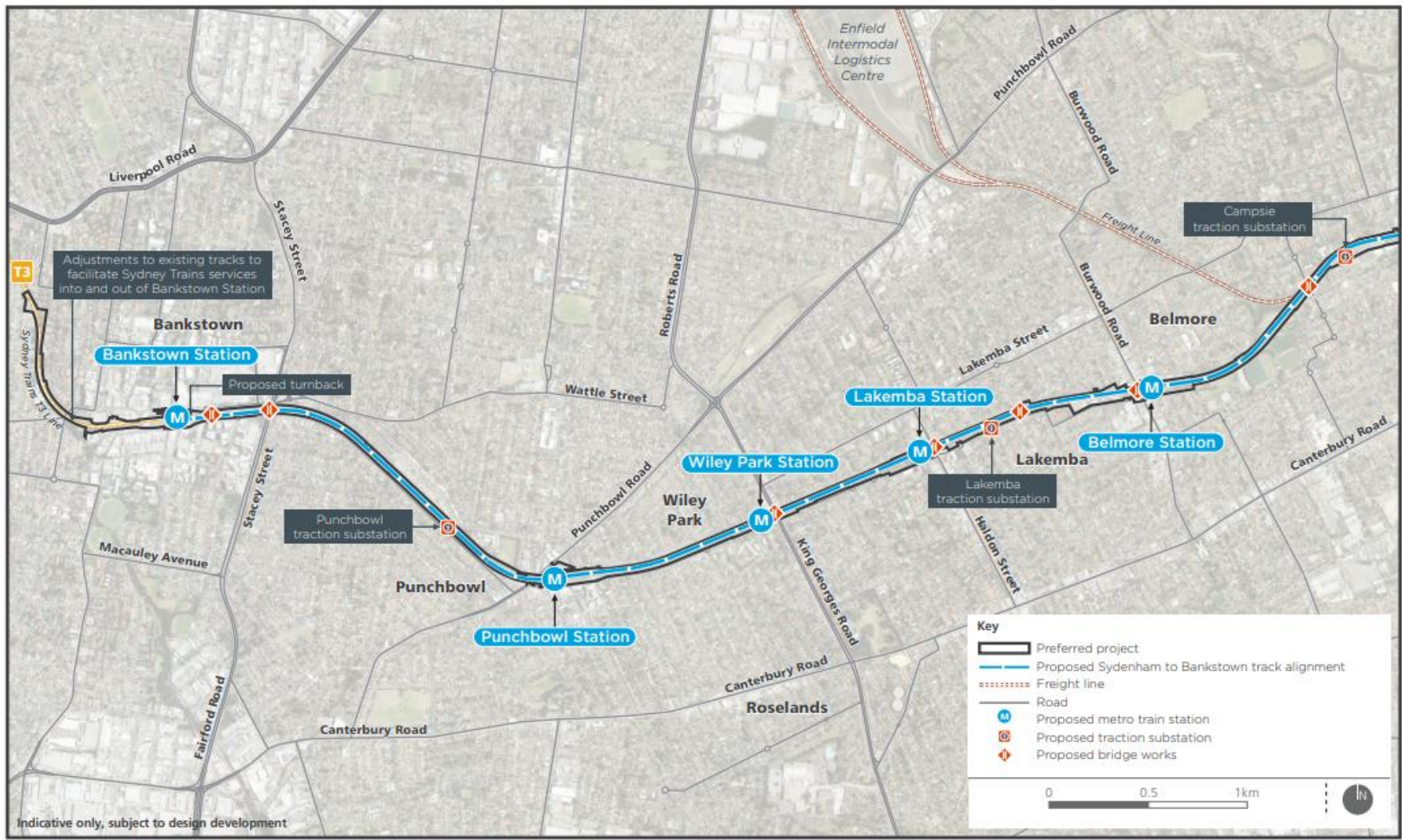
- Temporary arrangements to divert and control pedestrians, public transport users, cyclists, public transport and traffic and to provide public access, amenity, security and safety during all stages of design and construction of the Works;
- Temporary arrangements for people and vehicles to safely access all property, including publicly accessible space affected by the Contractor's Activities;
- Temporary arrangements for people and vehicles to safely access the Site;
- Temporary access stairs, walkways and platforms within the Site;

- Temporary construction hoardings, fencing, noise walls, access gates and barriers on and around the Site;
- All environmental safeguards and measures necessary to mitigate environmental effects which may arise during the design and construction of the Works;
- Cleaning, maintenance, repair, replacement and reinstatement, as required, of all areas occupied by the Contractor during design and construction of the Works;
- Temporary site facilities required for design and construction of the Works,;
- Temporary infrastructure, safety screens and ground support installed or erected to undertake design and construction of the Works;
- Temporary arrangements for Utility Services including water, electricity, stormwater, sewerage, gas and electronic communications;
- Temporary power for stations
- Temporary works and measures required as a consequence of requirements arising from the stakeholder and community liaison process; and
- All other temporary works and measures required for the construction of the Works.
- Investigation works

The SMEW work location and site layout is highlighted in Figure 1.

Figure 1 Southwest Metro Early Works Project Site





1.4 Objectives and Targets

The objectives of the CSWMP are as follows:

Table 1 Objectives and Targets

Objective	Target	Responsible
Minimise pollution of surface water through appropriate erosion and sediment control	<p>Erosion and sediment controls are to be inspected on the following basis;</p> <ul style="list-style-type: none"> Weekly during the Weekly Environmental Inspection Prior to a rainfall of >20mm in a 24hour period where forecasted (with issues recorded within an Inclement Weather Inspection Form) Following a rainfall event of >20mm in a 24hours period (with issues recorded within an Inclement Weather Inspection Form) Daily (with issues recorded in site diaries) <p>No pollution incidents resulting in environmental harm or regulatory action</p>	Environmental Manager (or delegate)
Maintain existing water quality of surrounding surface watercourses	<p>Water monitoring to be undertaken in accordance with frequencies committed to in Table 7 and to show that SMEW works have not impacted baseline water quality (i.e. water quality not to worsen from baseline readings)</p> <p>No pollution incidents resulting in environmental harm or regulatory action</p>	Environmental Manager (or delegate)
Source construction water from non-potable sources, where feasible and reasonable	Produce a Water Balance Study prior to Construction	Sustainability Manager (or delegate)

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

1.5 Consultation

A summary of consultation undertaken as per Conditions of Approval (CoAs) -C3(b), C8(b), C10 for the preparation of this CSWMP including the Construction Monitoring Program (CMP) for Water Quality (known as the Water Quality Monitoring Program) is provided in Table 2 and in Appendix E. The CSWMP (including the CMP) has been updated further following receipt of comments, as required and records of consultation are contained in a separate document to this plan for the information of the DPI&E.

Table 2 Summary of Consultation

CoA SSI-8256	Agency Consultation	Requirements and date submitted	Key issues raised	CSWMP Section Reference
C3(b), C7, C8(b), C10	Department of Planning, Industry & Environment	Submitted for Approval		
	Department of Industry (also a	Submitted 20/04/2019 Did not attend Management Plan Consultation Workshop on 29/04/2019	No comment received	N/A

	requirement of REMM FHW4)	Follow up email sent - 7/05/2019 Called 13/05/2019 - voicemail left		
	Office of Environment and Heritage	Submitted 20/04/2019 Did not attend Management Plan Consultation Workshop on 29/04/2019 Response received 29/04/2019	Response received on 29/04/2019 stating OEH have no comment on the plan	N/A
	City of Canterbury-Bankstown	Submitted 20/04/2019 Attended Management Plan Consultation Workshop on 29/04/2019 Response received 16/05/2019	Frequency of Erosion and Sediment Control inspections Discharge into Council stormwater assets	Section 6.1.4 Section 6.2.3 Appendix E
	Inner West Council	Submitted 20/04/2019 Did not attend Construction Soil and Water Management Plan portion of Consultation Workshop on 29/04/2019 Response received 14/05/2019	Runoff to meet Botany Bay Water Quality Improvement Plan targets	Appendix E
REMM FHW4 (Water Quality Monitoring Program)	NSW EPA	Submitted 20/04/2019 Did not attend Management Plan Consultation Workshop on 29/04/2019 Response received 6/05/2019	NSW EPA do not comment on Plans and Monitoring Programs	N/A

1.6 Approval

This sub-plan will be reviewed and endorsed by the Independent Environmental Representative in accordance with CoA-A26. Sydney Metro will also review the plan in accordance with condition 3.3e) of the Construction Environmental Management Framework (CEMF).

In accordance with CoA-C6 the sub-plan must be submitted to the Secretary one month prior to the commencement of construction. Construction must not commence until the Secretary has approved the sub-plan in accordance with CoA-C7.

In accordance with CoA-C11 the Water Quality Monitoring Program will be endorsed by the ER and then submitted to the Secretary for approval at least one (1) month before commencement of construction or within another timeframe agreed with the Secretary.

In accordance with CoA-C12 construction must not commence until the Secretary has approved all of the required Construction Monitoring Programs, including the Water Quality Monitoring Program, and all relevant baseline data for the specific construction activity has been collected.

2. Legal and Other Requirements

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

Table 3 Legislation and Planning Instruments

Legislation	Description	Relevance to this CSWMP
<i>Environmental Planning and Assessment Act 1979</i>	This Act establishes a system of environmental planning and assessment of development proposals for the State.	The approval conditions and obligations are incorporated into this CSWMP.
<i>Contaminated Land Management Act 1997</i>	This Act provides for a process to investigate and remediate land that has been contaminated and presents a significant risk of harm to human health. Section 60 of the Act is a "Duty to Report Contamination". This duty applies to owners of land and persons who become aware their activities have contaminated the land.	This plan defines how JHLOR will manage works to comply with this Act
<i>Protection of the Environment Operations Act 1997</i>	This Act includes all the controls necessary to regulate pollution and reduce degradation of the environment, provides for licensing of scheduled development work, scheduled activities and for offences and prosecution under this Act.	This plan defines how JHLOR will manage works to comply with this Act. The works will be conducted in accordance with the requirements of the EPL.
<i>Water Management Act 2000</i> <i>Water Management (General) Regulation 2018</i>	This Act and Regulation provide for the protection, conservation and ecologically sustainable development of water sources of the State and in particular to protect, enhance and restore water sources and their associated ecosystems.	<p>This Act will have low relevance to the Project and will only be relevant if water is to be extracted.</p> <p>Sydney Metro projects assessed under Part 5.1 of the Environmental Planning and Assessment Act 1979 (EP&A Act) are exempt from obtaining water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91. Provisions for aquifer interference approvals have yet to be enabled, as no proclamation has been made under Section 88 of the Water Management Act.</p> <p>Under the Clause 21(1) of the Water Management (General) Regulation 2018 (NSW), Transport Authorities are exempt from the requirement to hold an access licence. Transport Authorities are also exempt under Clause 34(1) of the Water Management (General) Regulation 2018 (NSW) from the requirement to hold a water use approval. Transport Authorities are not exempt from the requirement to hold a water supply work approval.</p>

The CSWMP addresses applicable requirements within the following documents:

- The Sydney Metro City & Southwest – Sydenham to Bankstown – State Significant Infrastructure Assessment (SSI 8256), dated 12th December 2018

- The Sydney Metro City & Southwest – Sydenham to Bankstown - Environmental Impact Statement (EIS), dated 7th September 2017;
- The Sydney Metro City & Southwest – Sydenham to Bankstown – Submissions and Preferred Infrastructure Report (SPIR), June 2018;
- The Sydney Metro City & Southwest – Sydenham to Bankstown – Instrument of Approval (CoA), dated 12th December 2018
- Sydney Metro City & Southwest – Sydenham to Bankstown Upgrade Staging Report (Sydney Metro, 2019).
- The Sydney Metro Construction Environmental Management Framework v3.2 (CEMF);
- The Sydenham Station and Junction Project Deed

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

2.1 Guidelines

Additional guidelines and standards relating to the management of soil and water include:

- Landcom (2004). Managing Urban Stormwater: Soils and Construction. (Volume 1 of the 'Blue Book').
- DECC (2008). Managing Urban Stormwater: Soils and Construction. Volume 2D: Main Road Construction. (Volume 2D of the 'Blue Book').
- ANZECC (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality (collectively known as the 'ANZECC Guidelines').
- ANZECC (2000). Australian and New Zealand Guidelines for Water Quality Monitoring and Reporting (collectively known as the 'ANZECC Guidelines').
- NSW Fisheries (2004). Guidelines for Controlled Activities, Policy and Guidelines for Fish-Friendly Waterway Crossings.
- NSW Fisheries (1999). Policy and Guidelines for Design and Construction of Bridges, Roads, Causeways, Culverts and Similar Structures.
- ASSMAC (1998). Acid Sulphate Soil Manual. Acid Sulphate Soil Management Advisory Committee, NSW.
- Sydney Metro - Water Discharge or Reuse Procedure.
- Guidelines for the Management of Acid Sulphate Materials: Acid Sulphate Soils, Acid Sulphate Rock and Monosulfidic Black Ooze, RTA;
- NSW Environmental Protection Authority - Assessing and Managing Acid Sulphate Soils; and
- Environment Protection Authority, Victoria Information Publication 655 - Acid Sulphate Soil and Rock.
- Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land (Department of Urban Affairs and Planning and Environment Protection Authority, 1998)
- Acid Sulphate Soil Manual (Acid Sulfate Soil Management Advisory Committee, 1998)
- National Environment Protection (Assessment of Site Contamination) Amendment Measure (No. 1) 2013
- NSW EPA (2014) Waste Classification Guidelines – Part 1: Classifying Wastes
- Sustainable Remediation Forum (SuRF), Australia 2009. A Framework for Assessing the Sustainability of Soil and Groundwater Remediation
-

2.2 EPL

SMEW will be delivered in accordance with the Laing O'Rourke EPL 21147. It is noted that this EPL also includes works occurring for the Sydney Metro City and Southwest Chatswood to Sydenham – Sydenham Station Junction project (SSI_7400).

It is noted that the EPL does not authorise the pollution of waters by any pollutant other than those specified in condition L2.4.

3. Roles and Responsibilities

The roles and responsibilities of key SMEW Personnel with respect to soil and water are as follows:

Table 4 Roles and Responsibilities

Project Director	Managing the delivery of SMEW including overseeing implementation of soil, water and groundwater management measures Act as Contractor's Representative
Environment Manager	Oversee the implementation of all soil, water and groundwater management initiatives Responsible for managing ongoing compliance with the CoA and environmental document requirements Monitor and report on soil and water management during construction
Commercial Manager	Ensure that relevant soil, water and groundwater management requirements are considered in procuring materials and services
Construction Managers Site Superintendent	Manage the delivery of the construction process, in relation to soil, water and groundwater management across all sites in conjunction with the Environment Manager
Sustainability Manager	Track and report soil and water elements against sustainability targets
Environment Coordinator	Manage the on-ground application of soil and water management measures during construction (e.g. erosion and sediment control, water treatment and monitoring) Monitor and report on soil and water management during construction
Project Engineer	Implement soil and water management activities during construction works
Site Supervisors	Monitor and report on erosion and sediment controls during construction works

Independent Environment Representative (ER)

- Receive and respond to communication from the Planning Secretary in relation to the environmental performance of the CSSI;
- Consider and inform the Planning Secretary on matters specified in the terms of this approval;
- Consider and recommend to the Proponent any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and to the community;
- Review documents identified in Conditions C1, C3 and C8 and any other documents that are identified by the Planning Secretary, to ensure they are consistent with requirements in or under this approval and if so:
 - (i) make a written statement to this effect before submission of such documents to the Planning Secretary (if those documents are required to be approved by the Planning Secretary), or
 - (ii) make a written statement to this effect before the implementation of such documents (if those documents are required to be submitted to the Planning Secretary for information or are not required to be submitted to the Secretary);
- Regularly monitor the implementation of the documents listed in Conditions C1, C3 and C8 to ensure implementation is being carried out in accordance with the document and the terms of this approval;
- As may be requested by the Planning Secretary, assist the Department in the resolution of community complaints;
- Consider any minor amendments to be made to the documents listed in Conditions C1, C3 and C8 and any document that requires the approval of the Planning Secretary that comprise updating or are of an administrative or minor nature and are consistent with the terms of this approval and the documents listed in Conditions C1, C3 and C8 or other documents approved by the Planning Secretary and, if satisfied such amendment is necessary, approve the amendment. This does not include any modifications to the terms of this approval; and
- Prepare and submit to the Planning Secretary and other relevant regulatory agencies, for information, an Environmental Representative Monthly Report detailing the ER's actions and decisions on matters for which the ER was responsible in the preceding month. The Environmental Representative Monthly Report must be submitted within seven (7) days following the end of each month for the duration of the ER's engagement for the CSSI.
- Must complete Project induction covering LORs' environmental management system.

It is noted that the site team, including the Environmental Manager, Environmental Coordinator, Construction Manager, Site Superintendent and Site Supervisors will attend site inspections with the ER upon request.

The ER may request information relating to soil and water management from JHLOR, the primary contact being the Environmental Manager.

4. Existing Environment

4.1 Existing Soil Landscape

The Project area traverses three soil landscape types identified by the Sydney 1:100,000 Soil Landscape Series Sheet 9130 (Herbert, 1983). These include Birrong, Gymea and Blacktown soil units.

These soil landscape types are described as follows:

4.1.1 Birrong

- Extensively cleared tall open forest and woodland Soils – deep (> 250 cm) yellow podzolic soils and yellow solodic soils on older alluvial terraces
- Limitations – localised flooding, high soil erosion hazard, saline subsoils, seasonal waterlogging, and very low soil fertility.

4.1.2 Gymea

- Soils – shallow to moderately deep yellow earths and earthy sands on crests and on the inside of benches
- Limitations – high soil erosion, rock outcrop, shallow highly permeable soil, and very low soil fertility.

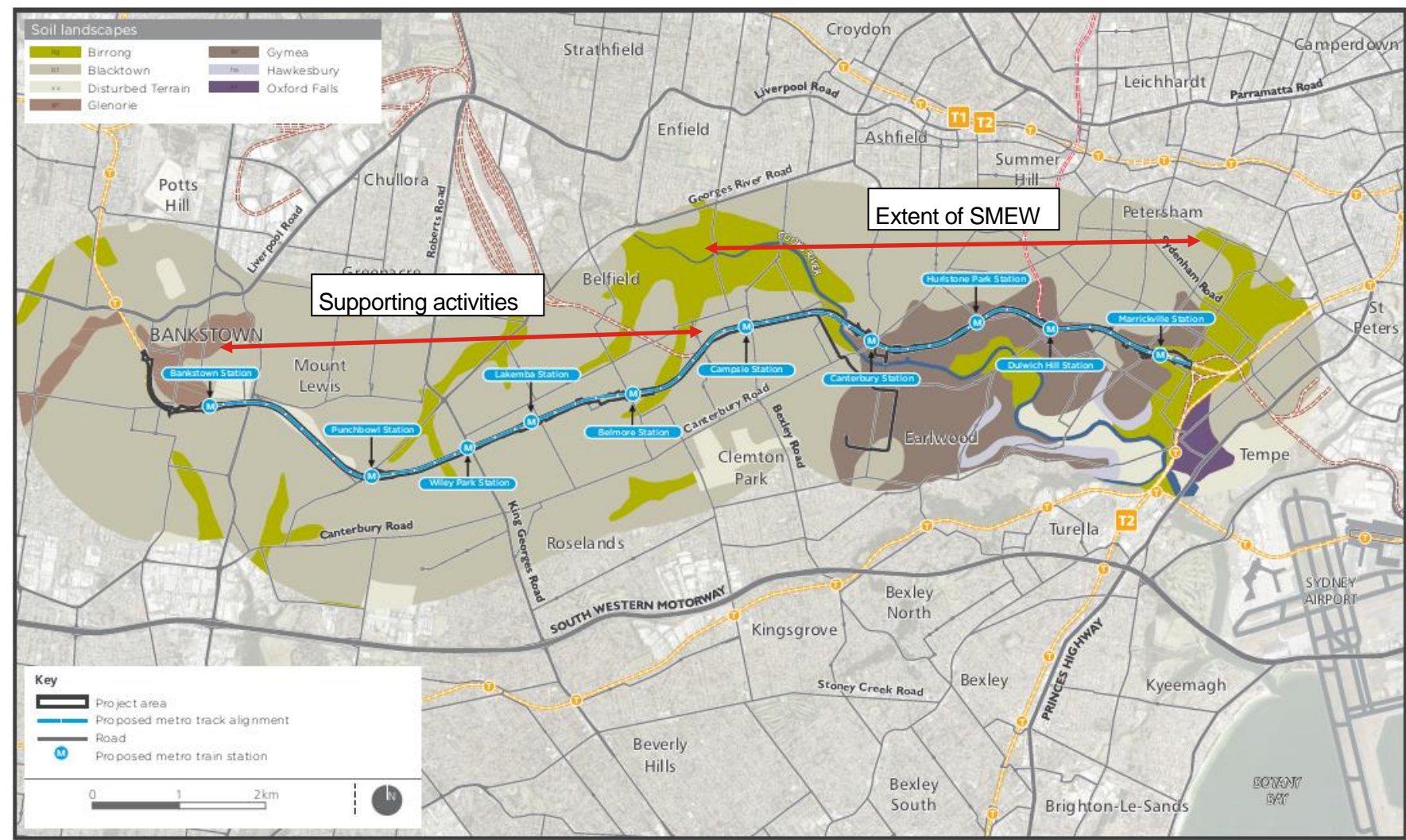
4.1.3 Blacktown

- Soils – shallow to moderately deep hard setting mottled texture contrast soils, red and brown podzolic soils on crests grading to yellow podzolic soils on lower slopes and in drainage lines
- Limitations – moderately reactive, highly plastic subsoil, with low fertility and poor drainage.

It is noted that the Project site is highly disturbed and soils on the site likely include imported materials.

Figure 2 indicates the soil units within the Sydney Metro City & Southwest Sydenham to Bankstown Upgrade, including Southwest Metro Early Works.

Figure 2 Soil landscapes for Sydney Metro alignment from Marrickville to Bankstown (note that the SMEW will occur between Marrickville and Campsie) Source: Sydney Metro City and Southwest EIS Sydenham to Bankstown



4.2 Geology

The Project area traverses a number of regional geological units identified by the *Sydney 1:100,000 Geological Sheet 9130* (Herbert, 1983).

Section 20.2.2 of the Sydney Metro City and Southwest – Sydenham to Bankstown - Environmental Impact Statement identifies the following regional geological units within the SMEW Project footprint;

- Fill – located through numerous parts of the site, particularly within embankments
- Quaternary Sediments – alluvium and estuarine deposits near Marrickville Station and the Cooks River
- Wianamatta Group – includes Ashfields shales near Canterbury Station
- Mittagong Formation – between Dulwich Hill and Canterbury
- Hawkesbury Sandstone – between Marrickville and Canterbury
- Dykes – Volcanic intrusions at Marrickville and Canterbury

4.2.1 Geotechnical Report

Preliminary geotechnical investigations undertaken as part of the design indicate that typical layers found on the Project site include;

- Fill material
- Residual fill & Alluvium
- Ashfield Shale (Canterbury)
- Mittagong Formation (Marrickville to Canterbury)
- Hawkesbury Sandstone

Depths of the above layers vary over the site. It is likely that the majority of the SMEW works will occur within fill and residual soils. Piling related to retaining wall works may penetrate to layers of Ashfield Shale and Hawkesbury Sandstone.

4.3 Salinity

Salinity in the Project area was considered within the Sydney Metro City and Southwest – Sydenham to Bankstown - Environmental Impact Statement. The EIS found that there was evidence of soil salinity within the SMEW supporting scope area, specifically to the West of Punchbowl Station (Figure 3). The EIS states "...potential saline soils are located west of Punchbowl Station. The remainder of the Project area is not mapped as having salinity potential. However, there may be areas of salinity potential in these areas."

Due to some areas shown as having a salinity potential, REMM SC3 is relevant to the SMEW scope and as such, areas with potential soil salinity will need to undertake testing to confirm presence of salinity prior to ground disturbance. In cases where saline soils are encountered, they are to be managed in accordance with *Site Investigations for Urban Salinity* (DLWC, 2002) including applying the following mitigation measures:

- Minimising water infiltration
- Landscaping using native plants
- Retention (where practicable) of deep rooted vegetation
- Minimising soil disturbance such as compaction, cut and fill
- Inclusion of saline and sodic soils within the ERSED plans.

Note, works within the identified saline areas include the installation of galvanised steel trough and pit & pipe route which will have limited impacts on the soil.

4.4 Acid Sulphate Soils

Acid sulphate soils (ASS) are the common name given to naturally occurring sediments and soils containing iron sulphides (principally iron sulphide or iron disulphide or their precursors).

Exposure of the sulphide in these soils to oxygen as a result of drainage or excavation leads to the generation of sulphuric acid. Areas of acid sulphate soils can typically be found in low-lying and flat locations that are often swampy or prone to flooding.

In accordance with the Australian Soil Resource Information System (CSIRO, 2015) parts of the Project area has been deemed to have a high potential for the presence of Acid Sulphate Soils, particularly the area near the Cooks River. Refer to Figure 3 for mapping.

Sydney Metro City & Southwest Sydenham to Bankstown upgrade: Technical Paper – Contamination Assessment Report (GHD, 2017) has reviewed available information on Acid Sulphate Soil and states;

“Marrickville Station to Section D (country side of Hurlstone Park Station) – A review of the mapping indicates that there is unlikely to be occurrences of ASS.

Canterbury Station – The western quarter of the Canterbury Station has been mapped as ‘disturbed terrain’; and there is potential for ASS to depths varying between 2 and 4 m below ground level.

Section E (country side of Canterbury Station to city side of Campsie Station) – The eastern half of section E has been mapped as having a low risk of acid sulphate soils (at two to four metres below ground surface) and ‘disturbed terrain’ on the western and eastern sides of the Cooks River, respectively.

Campsie Station to Section K (Bankstown Station) – A review of the mapping indicates that there is unlikely to be occurrences of ASS.”

City & Southwest, Sydney Metro Sub-portion 2 - Sydenham to Bankstown Targeted Contamination Assessment (GHD, 2017) indicates that 3 samples within the SMEW Project area are to be considered Potential Acid Sulphate Soils (PASS) following Chromium Reducible Sulphur (SCR) testing. The three samples were taken from the Marrickville area at a depth of 2-3m. Excavations within these areas are not expected to exceed 1.5m. As such, JHLOR does not expect to encounter PASS in these areas. A number of samples within the vicinity of the Cooks River (BH072/2-2.1m, BH073/2-2.1m & BH074/3.1-3.2m) identify a range of liming rates from 1 to 8.8kg CaCO₃/t for PASS. It is noted that these samples did not exceed the SCR ASS criteria and are therefore not considered PASS.

The Sydney Metro Track Condition Assessment – Environmental Site Assessment (GHD, 2017) does not include an assessment of Acid Sulphate Soils.

JHLOR have undertaken further testing throughout the Project area, refer *Southwest Corridor Conversion Works – Tranche 1B Contamination Assessment Report* (AGJV, 2019), referred to as the “Tranche 1B Contamination Assessment Report” within this document. A number of locations throughout the Project area were tested for acid sulphate soils as part of these works. Of these test locations, acid sulphate soils were detected in two locations;

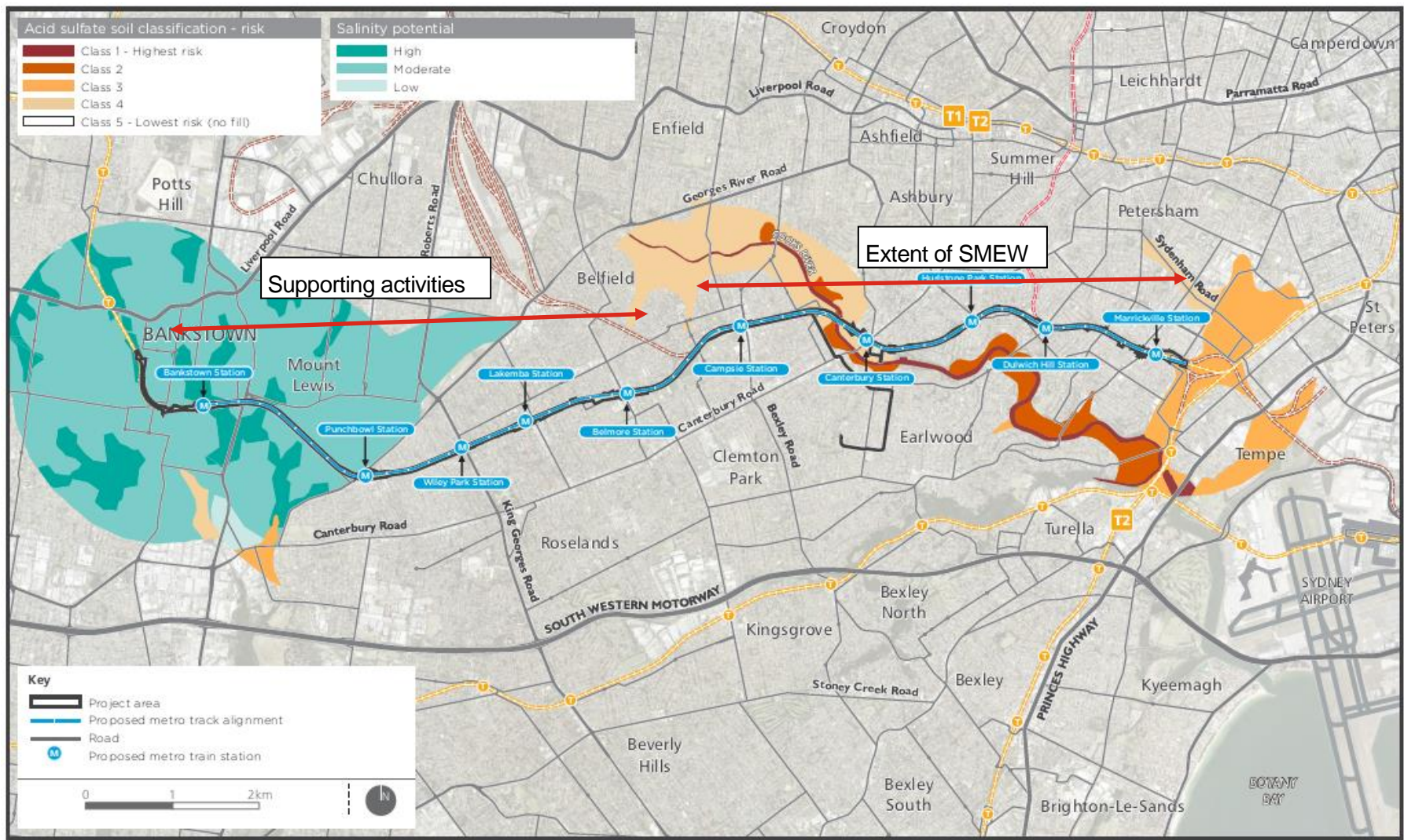
- RW-17-BH01 (at a depth of 11.4-11.5m bgl)
- RW-17-BH02 (at a depth of 8.9-9m bgl)

Noting that retaining wall piles are designed to a depth of 7m bgl, it is unlikely that acid sulphate soils will be encountered.

JHLOR will undertake field PASS indicator tests at a rate of 1 test per 200m³ of material taken from these locations where spoil is to be reused on site. Testing for ASS/PASS will also be included within any waste classification suite for any spoil taken from these locations.

The above reports meet the requirements of REMM SC2.

Figure 3 Salinity Potential and Acid Sulphate Soil Risk Classification - Source: Sydney Metro City and Southwest EIS Sydenham to Bankstown



4.5 Contamination

The Project site has been part of an operational rail corridor for more than 130 years. The area around the Project site has been increasingly developed from residential to commercial and industrial since the early 20th century.

The Sydney Metro City & Southwest: Sydenham to Bankstown EIS states “No site listed on the EPA’s contaminated land register are located within 100 metres of the project area. However, three sites which have been notified to the EPA are located within 100 metres of the project area.” Two of these sites are adjacent to the SMEW Project area;

- XPT Maintenance Centre, Marrickville
- 2 Carrington Road, Marrickville

Due to the history of the Project Site and surrounds, there is a potential for contamination to be present within the Project site. Phase 2 contamination testing has been undertaken on the Project site. These assessments include;

- Sydney Metro City & Southwest Sydenham to Bankstown upgrade: Technical Paper – Contamination Assessment Report (GHD, 2017)
- Sydney Metro Track Condition Assessment – Environmental Site Assessment (GHD, 2017)
- City & Southwest, Sydney Metro Sub-portion 2 - Sydenham to Bankstown Targeted Contamination Assessment (GHD, 2017)
- Southwest Corridor Conversion Works – Tranche 1B Contamination Assessment Report (AGJV, 2019)

Refer to each of these reports for data associated with soil contamination.

The EIS refers to the Environmental Site Assessment and states the following “The preliminary environmental site assessment identified the potential risk of contamination along the Project area. The assessment concluded that there is a risk of contamination along the length of the Project area, albeit a low to medium risk for the majority of the Project area, with potential contamination sources being historical rail activities, and commercial and residential land use in surrounding areas. Potential contaminants identified in low to medium risk areas included:

- asbestos
- hydrocarbons
- heavy metals
- herbicides.”

The EIS also notes one area of medium to high contamination risk within the SMEW footprint. This is located between Sydenham and Marrickville stations. The EIS states; previous site investigations identified asbestos in soil and petroleum aromatic hydrocarbons in groundwater north of the Project area, at 361 Victoria Road”. It is noted that asbestos is commonly found through-out rail corridors. Any asbestos finds will be managed under the Unexpected Contaminated Land Procedure and Asbestos Finds Procedure, as per CoA-E39 & CoA-E40.

JHLOR’s scope within the Sydenham to Marrickville area includes excavations to a depth of 1.5m. The depth of petroleum aromatic hydrocarbon impacted groundwater in this area is at approximately 2.3m below ground surface (as stated in Section 21.2.6 of the EIS). As such, JHLOR works will not interact with groundwater. Contamination will be managed in accordance

with the Unexpected Contaminated Land Procedure and Asbestos Finds Procedure, as per CoA-E39 & CoA-E40.

Potential human exposure to the contaminants of concern (most likely to construction workers) may occur through direct contact or the inhalation of dust and vapours. Contaminants may also leach through soils into groundwater or stormwater.

City & Southwest, Sydney Metro Sub-portion 2 - Sydenham to Bankstown Targeted Contamination Assessment (GHD, 2017) was developed based on the initial Sydney Metro Sydenham to Bankstown concept, which included a greater scope of works, including drainage and stormwater attenuations within the Marrickville area. As such, many of the test locations undertaken for this report are not relevant to SMEW. BH001, located within 50m of the JHLOR work front on the country side of Victoria Road Bridge and the city side Marrickville Station, indicates TPH > C₁₆-C₃₄ at 4,800mg/kg at a depth of 0.4-0.5m, exceeding the commercial/industrial Management Levels for Total Petroleum Hydrocarbons as stated within NEPM 2013. Asbestos was encountered at a number of other test locations within the corridor, including on the city side of Livingstone Bridge, Marrickville and the city side of Campsie Station.

The Targeted Contamination Assessment states that the conceptual site model is complete and any contaminants, including those listed above, can be “managed by using appropriate PPE and management measures.” These measures are included within Section 6 of this Plan.

JHLOR has undertaken additional contamination testing throughout the Project area, refer Tranche 1B Contamination Assessment Report. The report found;

- The soil contamination assessment concluded that there is a low potential risk to metro construction workers and intrusive maintenance workers (via inhalation of soil vapour, ingestion and direct contact of soils) within the project area.
- Asbestos was not reported in any of the soil samples submitted for analysis. However one ACM fragment at one test location was reported containing chrysotile asbestos. Given the presence of fill material across the project area, and depth of filling encountered at some of the investigation locations, the presence of asbestos within fill across the project footprint cannot be discounted.
- The in-situ waste classification concluded that fill soil at all investigation locations are classified as general solid waste with the exception of the following:
- Fill soil at SSC-S1-TP09 is classified as Special Waste (Asbestos) – located west of Marrickville Station
- Fill soil at SSC-RW18-BH08 is classified as Restricted Solid Waste – located west of Nowra St, Canterbury
- Fill soil at SSC-S3-BH01 is classified as Restricted Solid Waste – located east of Ness Avenue, Dulwich Hill
- The alluvium and residual soil and bedrock present beneath the project area are classified as General Solid Waste and or VENM to the depths of investigation, should excavation into the underlying natural soils be required.

The refined Tranche 1B Contamination Assessment Report Refined Conceptual Site Model identifies the inhalation of airborne (asbestos) fibres as a potential pathway to receptors and recommends that an Asbestos Management Plan with an appropriate unexpected finds procedure is developed and implemented for the works. Refer to Section 6 for details on mitigation measures.

The Targeted Contamination Assessment and the Tranche 1B Contamination Assessment Report meet the requirements of REMM SC5.

It is noted that REMM SC7 states “In the event a Remediation Action Plan is required, it would be developed in accordance with Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land (Department of Urban Affairs and Planning and Environment Protection Authority, 1998) and a NSW Environment Protection Authority Accredited site auditor would be engaged to audit the works.” Based on the results of the contamination assessments, a Remediation Action Plan is not required.

It is noted that the construction process may lead to the disturbance and mobilisation of existing contamination, or may result in the addition of new contamination to soil, surface water or groundwater via spills or leaks of fuels, oils or other hazardous materials. The risk of contamination arising through the construction process will be mitigated by implementing the mitigation measures as described within Section 6 of this management plan.

It is noted that some utilities may contain or be made of hazardous materials. In accordance with REMM SC6 hazardous materials surveys would be undertaken during detailed design for utility adjustments as required.

4.6 Groundwater

The Sydney Metro City & Southwest: Sydenham to Bankstown EIS makes the following statements in regards to groundwater;

- “The groundwater level along most of the project area was recorded at between about 2.3 metres below ground level (to the east of the project area in Marrickville) and about 10.3 metres below ground level (near Bankstown Station).”
- “Groundwater has been observed discharging from open cuttings along the rail corridor. The surface groundwater system is likely to be recharged by rainfall and percolation from irrigation of residential gardens and open spaces, as well as incidental runoff from impervious surfaces, such as roads and footpaths.”
- “Quaternary alluvium underlies the Cooks River and its tributaries and forms an aquifer. Groundwater is also present within localised alluvial deposits in some gullies. Groundwater salinity within the Quaternary alluvium and localised alluvial deposits is expected to vary from lower salinity in the upper reaches of the Cooks River, to higher salinity in the lower reaches due to mixing and tidal influences.”

The majority of excavations undertaken by JHLOR will be shallow, approximately 1.5m for GST posts, fence posts and other combined service route. Piling for the retaining wall that will run along the rail alignment from 18 Charles St, Canterbury to 12 South Parade Canterbury, adjacent to the Cooks River rail crossing, will involve deeper excavations and an increased likelihood of groundwater interaction. Piling depth is expected to reach approximately 7m bgl or RL 1m AHD.

The *Sydney Metro City & Southwest Technical Services Southwest Stations and Corridor (SSC) Geotechnical Interpretive Report* (AECOM & Parson Brinckerhoff, 2017) states “The regional groundwater system consists of a deep groundwater system (where groundwater flows through joints and other discontinuities in the underlying rock) and a more localised surface, or “perched”, groundwater system (where groundwater flows through overlying alluvium, residual soils and fill). The residual soil above the Bringelly and Ashfield Shale can act as an aquitard.”

A number of boreholes were installed in the vicinity of the Cooks River rail crossing, between Canterbury and Campsie Stations. BH525 (city side of Cooks River), BH526 (country side of Cooks River) and BH527 (Country Side of Wairoa Street) were commenced from the top of the embankment, at RL 9.1m AHD, 10.1m AHD and 11.6m AHD respectively. The following groundwater observations were made;

- BH525 – groundwater not observed - Borehole to depth of 15m
- BH526 – groundwater not observed - Borehole to depth of 15.6m
- BH527 – groundwater not observed - Borehole to depth of 10.6m

One groundwater well was constructed in the vicinity of the Cooks River rail crossing at Canterbury for the *City & Southwest, Sydney Metro Sub-portion 2 - Sydenham to Bankstown Targeted Contamination Assessment* (GHD, 2017). BH067 was commenced in the laydown area adjacent to 18 Charles St, Canterbury, at RL 8.4m AHD. Groundwater was observed at the following depth;

- BH067 – 8.1m bgl (RL 0.3m AHD) – Borehole to depth of 9m

JHLOR has installed additional boreholes throughout the Project area for geotechnical testing purposes, including testing for groundwater, refer Tranche 1B Contamination Assessment Report. A number of boreholes were installed within the Project area in the vicinity of the retaining wall works. Boreholes were installed between a depth of 12m and 25m below ground level. Groundwater was not observed during these investigations.

The above results indicate that piling is unlikely to interact with groundwater. Any interaction with groundwater will be monitored during construction. It is expected that works requiring open excavations will not interact with the groundwater table.

If JHLOR will interact with groundwater, JHLOR would make good any impacts on groundwater users and would avoid any damage to buildings from settlement.

An assessment of groundwater quality from previous studies is included within the *City & Southwest, Sydney Metro Sub-portion 2 - Sydenham to Bankstown Targeted Contamination Assessment* (GHD, 2017) has noted the following;

- LNAPL were identified in one well near the site at 361 Victoria Rd, Marrickville. The Project site is down gradient to the impacted well and a well closer to the Project site reported TPH concentrations less than the laboratory limits of reporting.
- Slightly elevated levels of copper, zinc and chromium were identified in groundwater between Campsie and Belmore Stations.

Testing of groundwater within the *City & Southwest, Sydney Metro Sub-portion 2 - Sydenham to Bankstown Targeted Contamination Assessment* (GHD, 2017) found;

- “All groundwater samples reported one or more analysed metal (copper, mercury, nickel or zinc) concentrations above the groundwater investigation level (GIL) for protecting freshwater aquatic ecosystems. These elevated heavy metal concentrations are likely representing the background levels of the groundwater aquifer in the investigation area and the Sydney basin”
- Concentrations of TRH, BTEX, PAHs, OCP, OPP and PCB in all groundwater samples were below the adopted health screening criteria for commercial and industrial land use and the adopted GIL
- pH of groundwater was between pH4.4 and pH 6.7

Due to the depth of excavations associated with SMEW, it is unlikely that contaminated groundwater will be encountered. Should groundwater be encountered during works and should that groundwater need to be dewatered, the primary approach would be to dewater the groundwater to a nearby water body, if ANZECC Guideline criteria is met. Where groundwater cannot be stored and treated to meet ANZECC guideline criteria, JHLOR will dispose of the groundwater in accordance with the NSW Waste Classification Guidelines.

It is noted that construction processes, if not managed appropriately, could lead to contamination of groundwater via spills and leaks. Management measures outlined in Section 6 will mitigate the risk of impact to groundwater quality.

4.7 Surface Water

The Project site forms part of the overall Cooks River catchment with water from the area discharging into the Cooks River via local stormwater drainage or overland flow. The catchment area is highly urbanised with mixed residential, commercial and industrial properties.

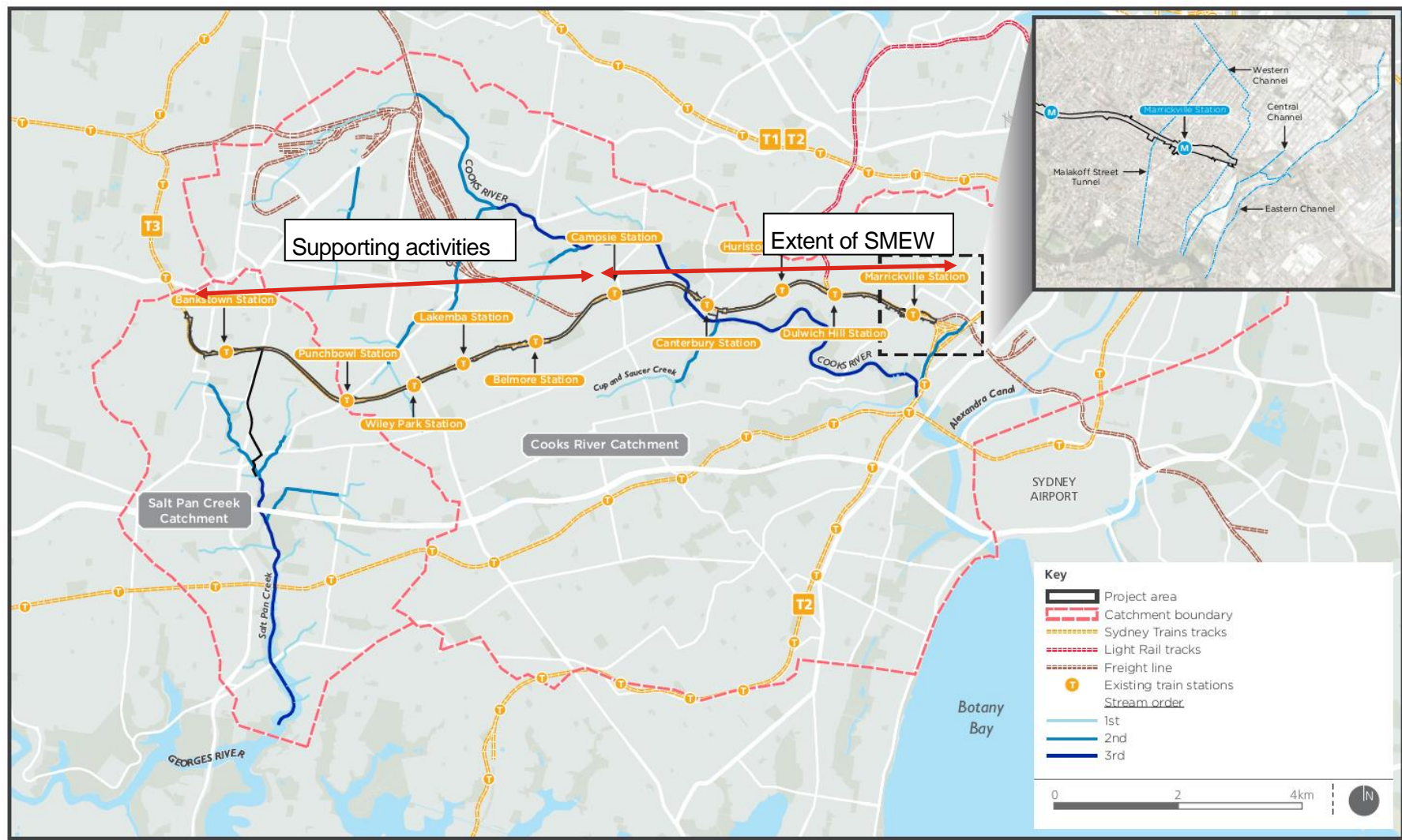
The EIS states “The Cooks River catchment, located in the inner to middle south-western suburbs of Sydney, has an area of about 102 square kilometres. The majority of the catchment is highly developed. The Cooks River itself is about 23 kilometres long, and flows from Chullora in the west to Botany Bay in the east. The river discharges into the north of Botany Bay, near Sydney Airport. The river is tidally influenced as far as South Enfield. Major tributaries of the river include:

- Coxs Creek
- Cup and Saucer Creek
- Wolli Creek
- Alexandra Canal
- Muddy Creek
- Eastern Channel
- Western Channel.”

It is noted that in accordance with REMM FHW7, works within or near watercourses (including the Cooks River) would be undertaken with consideration given to the NSW Office of Water’s guidelines for controlled activities.

Figure 4 indicates the catchments and stream order of waterways for the Sydney Metro City & Southwest - Sydenham to Bankstown Upgrade.

Figure 4 Catchment and Stream Order (Sydney Metro City & Southwest - Sydenham to Bankstown EIS)



4.8 Water Quality

Water courses within the Project site catchment are heavily urbanised, with stormwater collected by developed stormwater networks and the Cooks River.

Water quality is measured on an ongoing basis for the wider Cooks River catchment by the NSW Office of Environment and Heritage as part of the Beachwatch programme. The monitoring point is at Kyeemagh Baths at the mouth of the Cooks River in Port Botany. Water quality within the Cooks River catchment is influenced by stormwater, fertilisers, industrial discharges and sewage contamination.

Limited background water quality data is available for the Cooks River through monitoring undertaken by the Cooks River Alliance. However, the most recent data available is from 2013/2014 and monitoring was not undertaken in close proximity to SMEW area.

REMM FHW8 states “erosion and sediment mitigation measures would be installed and maintained for the duration of the construction period”. Refer to Section 6 for erosion and sediment control measures.

REMM FHW9 states “the water quality monitoring program would continue during construction, to monitor water quality at identified discharge points.” Refer to Section 7 for details regarding the Water Quality Monitoring Program.

REMM FHW10 states “discharges from construction water treatment devices would be monitored to ensure compliance with the discharge criteria in the environmental protection licence.” Only minor volumes of water treatment are expected. It is noted that the criteria for discharge within the Laing O’Rourke EPL 21147 condition L2.4 aligns with the discharge criteria within the *Sydney Metro – Water Discharge or Reuse form*, that is pH 6.5 to 8.5, Total Suspended Solids (TSS) less than 50mg/L and no visible oil and grease. JHLOR will comply with Section 120 of the Protection of the Environment Operations Act 1997.

4.9 Flooding

The EIS states “The project involves upgrading rail infrastructure in areas subject to regular existing flooding – particularly in Marrickville.”

A number of flood related structures and components are located within the Marrickville area, including local stormwater systems, trunk drainage and flood storage. In particular, McNeilly Park, located adjacent to the rail corridor on the down side, country side of Marrickville Station acts as a flood storage area for the local catchment.

In regards to the Marrickville area the EIS states “The *Marrickville Valley Flood Study* (NSW Government and Sydney Water, 2013) notes that the existing rail corridor and surrounds near Marrickville Station are susceptible to flooding, with flooding predicted to occur in events as frequent as the 39 per cent Annual Exceedance Probability (AEP). Flood depths in the rail corridor are estimated to be up to one metre in a one per cent AEP event near the Illawarra Road bridge. Most of the rail corridor between Livingstone Road and Illawarra Road, and a section of corridor about 150 metres east of Marrickville Station, is identified as a high flood hazard area during the one per cent AEP event.”

SMEW works within the rail corridor throughout Marrickville and adjacent to McNeilly Park are minor in nature, consisting of the installation of Galvanised Steel Trough (GST) on posts at 2m centres, a 20m length of Ground Level Trough (GLT) and security fencing. The works will remove a negligible amount of storage area from the catchment and will not restrict overland flow. As such, SMEW works will have negligible impact on flooding within the area.

In regards to the remainder of the rail corridor where SMEW will occur, Dulwich Hill to Campsie, the EIS states “In other areas of the catchment, the draft *Overland Flow Study Canterbury LGA Cooks River Catchment* (Cardno, 2016) indicates that a section of the existing rail corridor located east of Canterbury Station is subject to flooding during the five per cent AEP event. The study also identifies that sections of the rail corridor 100 metres east of Canterbury Station and 100 metres west of Campsie Station are high flood hazard areas during the one per cent AEP event. The majority of the remainder of the rail corridor is either not classified as a flood hazard, or is classified as a low flood hazard in short sections.” Works to occur 100m to the east of Canterbury Station and 100m to the west of Campsie station are also minor in nature, consisting of GST installation. The works will remove a negligible amount of storage area from the catchment and will not restrict overland flow. As such, SMEW works will have negligible impact on flooding within these areas.

The SMEW works will include adjustments to a minor swale (overland flow path in the form of a shallow, grass lined channel) in the vicinity of Retaining Walls RW2 and RW3, from the Cooks River, west to Wairoa St, Canterbury (201m) and from Wairoa St to Wonga St, Canterbury (199m). JHLOR will maintain the functionality of this flow path during the construction period. This may include the installation of temporary diversion pipes. The swale will also be subject to erosion and sediment controls such as check dams, lining and water sensitive urban design treatments. Impacts to flooding relating to these measures will be assessed by the construction team and included in the Erosion and Sediment Control Plans as appropriate.

REMM FHW5 states “Detailed construction planning would consider flood risk for all compounds and work sites. This would include identification of measures to not worsen existing flooding characteristics.

Not worsen is defined as:

- a maximum increase in flood levels of 50 mm in a one per cent AEP event
- a maximum increase in time of inundation of one hour in a one per cent AEP event
- no increase in the potential for soil erosion and scouring from any increase in flow velocity in a one per cent AEP flood event”

When determining potential locations for proposed compounds and worksites, JHLOR will review and consider existing flood information from multiples sources, including the *Sydney Metro City & Southwest Sydenham to Bankstown EIS Technical Paper 8 – Hydrology, Flooding and Water Quality Assessment*, Council Flood Studies and Local Environmental Plan Flood Maps. JHLOR will undertake further assessment where compounds or worksite are proposed for areas of flooding, to ensure conditions are not worsened in accordance with REMM FHW5.

JHLOR will limit construction compounds and worksites in areas of known high flooding potential, such as Marrickville, 100m to the east of Canterbury Station and 100mm to the west of Campsie Station. Stockpiling of spoil and quarry materials will occur outside of these areas. Worksites in these areas will be minor in nature with a small amount of materials used to construct GST, GLT and security fencing. These materials would be stored in laydown areas outside of the flood prone areas, where possible. Any plant or equipment will be stored outside flood prone areas where possible. This includes catchment storage, retention of flood waters or an increase to water velocities within overland flows or through culverts. Where materials are proposed to be stored within areas that may flood it is noted that the size and nature of the construction components, plant and equipment will lead to negligible impacts to existing (pre-Construction) flooding. Any site offices or ancillary facilities would be located on piers or stilts above the known 10% AEP flood level.

REMM FHW6 states “The site layout and staging of construction activities would:

- avoid or minimise obstruction of overland flow paths and limit the extent of flow diversion required
- consider how works would affect the existing stormwater network such that alternatives are in place prior to any disconnection or diversion of stormwater infrastructure.”

JHLOR will mitigate the risk to overland flow paths and the existing stormwater network. The majority of works (GST, GLT, fencing, HV relocations) will not impact on overland flow routes or local drainage. As described above, an overland flow path within the rail corridor adjacent to the proposed retaining walls RW2 and RW3 will be impacted during the works. JHLOR will mitigate impacts to overland flows by enacting temporary measures such as diversion pipes, installed for short lengths, as required. Diversion of overland flow through pipes or berms is a preferred method within Managing Urban Stormwater: Soils and Construction for limiting erosion and sedimentation impacts. Where temporary diversion measures will be utilised, temporary works design will be undertaken to ensure the measures are appropriately sized.

In regards to REMM FHW5 and FHW6 it is noted that Section 7.4.2 of the SPIR states “*the need to undertake further assessment works regarding the potential impacts of the flooding management system is no longer relevant to the preferred project and no further flood modelling or assessment is proposed as part of detailed design.*”

REMM FHW7 states “works within or near watercourses (including the Cooks River) would be undertaken with consideration given to the NSW Office of Water’s guidelines for controlled activities.” The Cooks River, in the vicinity of the Canterbury (Cooks River) Underbridges, is a tidally influenced fourth order stream formed by concrete channel walls on each bank. As such, in accordance with the guidelines for controlled activities, the riparian corridor (RC) and vegetated riparian zone (VRZ) extend 40m from each channel wall. It is noted that the area is a highly disturbed and urbanised, with minimal remaining riparian vegetation on the downstream side of the Canterbury Underbridges. There will be no impact to riparian vegetation as part of the works.

Works to occur within the vicinity of the Cooks River will include the removal of vegetation on the rail embankment, earthworks and piling associated with embankment stabilisation, drainage and the installation of combined service route. In accordance with the objectives for riparian corridor management JHLOR will;

- Seek to minimise disturbance and harm to the RC/VRZ,
- Minimise the number of crossings (crossings are not part of the JHLOR scope of works)
- Locate services and infrastructure outside of the RC/VRZ, where possible
- Treat stormwater run-off before discharging onto the RC/VRZ

Any re-planting of trees within the project site following works, including within the riparian corridor, is outside JHLOR’s scope and is to be addressed by Sydney Metro in accordance with the tree management requirements of the Planning Approval.

The guidelines objectives are addressed by the mitigation measures in Section 6 of this Plan.

Any REMM or other condition relating to design for flooding will be addressed within the relevant Design Report, rather than this construction based document. This includes REMM FHW1 and REMM FHW3. Refer to Appendix A Compliance Matrix for details.

5. Aspects and Potential Impacts

The key aspects and potential impacts associated with the management of soil and water during the delivery the works are listed in Table 5.

These potential impacts and opportunities have been taken into account in the development of this CSWMP and site-specific procedures for the works.

Soil and water related risks are assessed within Appendix 3 of the Construction Environmental management Plan (CEMP).

Table 5 Aspects and Potential Impacts

Aspects	Potential impacts/opportunities
Discharge of contaminated water from within site boundary during rainfall Concrete washout	<ul style="list-style-type: none"> Contamination of adjacent watercourse Contamination of soils
Dust from the worksites or from vehicles	<ul style="list-style-type: none"> Potential pollution of waterways and air
Earthworks / Embankment works/platform excavation works	<ul style="list-style-type: none"> Potential spread of contamination into soils /surface or groundwater Personnel exposure to contaminants Sediment degrading surrounding environment Change to flooding characteristics
Flooding of worksites	<ul style="list-style-type: none"> Contamination of floodwaters by sewage, fuels and/or chemicals onsite
Leaks or spillages of fuels, oils and grease from construction plant and equipment and at compounds	<ul style="list-style-type: none"> Contamination of soil Contamination of watercourse, riparian environment and groundwater ecosystems Personnel exposure to contaminants
Disturbance of Potential Acid Sulphate soils and Actual Acid Sulphate Soils during excavations.	<ul style="list-style-type: none"> Mobilisation of metals within runoff to levels toxic to natural systems. Release of acidic runoff.
Modifications to natural hydrology or water quality from excavations	<ul style="list-style-type: none"> Localised pollution of waterways Potential loss of surface flow from existing drainage lines
Sediment laden runoff during rainfall	<ul style="list-style-type: none"> Runoff entering drainage lines causing pollution and impacting aquatic life in Cooks River
Sediment tracking onto public roads from vehicles leaving site	<ul style="list-style-type: none"> Potential impact on traffic safety Potential for sediment laden runoff during rainfall Potential for generation of dust
Storage of hazardous substances	<ul style="list-style-type: none"> Contamination as a result of a spill Impact to watercourses from pollution
Construction laydown spills	<ul style="list-style-type: none"> Contamination of soils Potential for pollutants to wash into drainage system Sediment laden/ contaminated runoff entering drainage system Potential for contamination of floodwaters by sewerage, fuels and/or chemicals onsite
Inappropriate management (handling, stockpiling, transport and disposal) of identified contamination or contaminated materials encountered during construction works (e.g. excavation)	<ul style="list-style-type: none"> Potential for spread of contamination (soil/water) Personnel exposure to contaminants Local media coverage Fines and prosecution from Regulatory Authorities

An assessment of construction activities, including laydown and stockpiling, in relation to stormwater drainage and overland flows has been undertaken as part of this Plan. Mapping of this assessment is included within Appendix G. The maps indicate that some construction will occur within areas known to be subject to concentrated overland flow and flooding. Area specific Erosion and Sediment Controls Plans are to be developed to mitigate risk to stormwater drainage.

It is noted that groundwater was not further analysed within the assessment as JHLOR do not expect to encounter groundwater during the works, refer to Section 4.6 of this Plan. No stormwater storage structures will be impacted by JHLOR works.

6. Soil and Water Management

6.1 Erosion and Sediment Control

6.1.1 General Principles

Environmental protection during construction will involve the installation, use and maintenance of a number of temporary erosion and sediment control measures as required in accordance with the following principles:

- Before undertaking any construction work (including any earthmoving or vegetation removal works), implement all soil and water management works required to minimise pollution of waters
- All erosion and sediment controls will be installed in accordance with best-practice guidelines such as NSW Blue Book Volumes 1 and 2D (Landcom, 2004 and DECC, 2008)
- Maintaining ground cover for as long as possible to prevent erosion and sedimentation
- Diversion of 'clean' run-off from offsite around or through the worksite without it contacting exposed soils or mixing with 'dirty' onsite water and maintaining existing drainage infrastructure wherever possible
- Installation of any permanent scour protection measures required for the operational phase would occur as soon as practical
- Minimisation of soil erosion and mobilisation of sediment during rain events
- Use of suitable sediment retention structures and control measures to filter or retain mobilised sediment generated during rain events over surface disturbances
- Maximum sediment capture through effective positioning of temporary erosion and sediment control structures
- Progressive rehabilitation and/or stabilisation of completed areas to minimise erosion hazard, as soon as practicable
- Regular inspection and maintenance of all erosion and sediment controls to ensure they are effective
- Use of water efficient fittings and fixtures where reasonable and feasible for temporary site facilities
- Targeted training on ERSSED principles for key staff
- JHLOR would ensure that any road, footpath, shared path or cycleway which is open to the public is at all times kept free of mud, dirt, dust, deleterious material, debris, obstructions and trip hazards arising from JHLOR activities in accordance with the Project Approval
- JHLOR would install, maintain and utilise appropriate site exit controls. This may include wheel wash facilities. These measures would be put in place to mitigate the risk of any loss of fuels, lubricants, load or other substances
- Any spillage or build-up of such material or debris would be cleaned up as soon as practicable
- diversion of run-off from areas of exposed soil to appropriate sediment control devices as much as practicable; and
- installing erosion controls in the base of drains used to divert runoff, to minimise erosion of sediment from the drain

6.1.2 [Resources](#)

Ultimate responsibility for erosion and sediment control will rest with the Construction Personnel within the Construction Team, led by Construction Managers, who will be responsible for the on-ground installation and maintenance of erosion and sediment controls. This would include (although is not limited to):

- Hard standing and deployment of spray-on soil stabilisers as required
- Installation, cleaning and maintenance of controls such as sediment fences, gravel socks, inlet filters, straw bales, sandbags etc.
- Installation of temporary drain and channel liners (e.g. geofabric, jute matting etc.)
- All dewatering activities.

Relevant personnel will receive training and ongoing toolbox talks on installation and maintenance of erosion and sediment controls.

6.1.3 [Sediment Basins](#)

Sediment basins are not required during the construction stage, an Erosion Hazard assessment has indicated a low-moderate risk of erosion for the retaining wall works.

There is limited space available on the Project site. Erosion and sediment impacts can be sufficiently mitigated by other measures as included in Section 6.1.4.

6.1.4 [Erosion and Sediment Control Plans](#)

Erosion and Sediment Control Plans (ESCPs) will be developed for the Project area in accordance with requirements of the “Blue Book”. The ESCP’s will typically contain the following key management measures, as applicable to the works:

- **Site Entry and Access Requirements**
 - Establish stabilised access points with rumble grids or wheel washes to prevent mud tracking on roads
 - Clearly delineate access points
 - Use of street sweepers
 - Longer term and/or heavily used haul roads would generally be sealed. Sealed haul roads would be regularly cleaned
 - Unsealed haul roads would be regularly damped down with fixed or mobile sprinkler systems
 - Appropriate site speed limits would be imposed and signed on haul routes
 - Exclusion zones would be designated on construction sites to limit disturbance
- **Soil Stripping and Stockpiling**
 - Stockpile areas are to be established within approved low-hazard areas clear of watercourses, stormwater drainage lines/culverts and not within the dripline of any retained trees where feasible and reasonable
 - Diversion drains/bunds are to be installed on the high side of stockpiles if run—off from upslope lands could impact on the stockpile
 - As much as is feasible, mulched vegetation, topsoil and subsoil (if applicable) are to be stockpiled separately
 - Any contaminated material stockpiles (i.e. asbestos, contaminated soil) will be covered on-site and short-term material stockpiles (>5 days not in use) with potential to generate dust will be wetted down or covered to prevent fugitive dust emissions or run-off during wet

weather. Long-term stockpiles (>30 days) will be stabilized and /or covered in accordance with “Blue Book” requirements.

- Topsoil and mulch stockpiles will be constructed to no more than 2m in height where possible
- Stockpiles will be battered down to a maximum slope of 2:1 (H:V) where space permits.
- Material transport from site to surrounding pavement surfaces would be minimised
- **Dust Control**
 - Dust suppression will be carried out whenever necessary to minimise sediments becoming air borne due to wind erosion.
 - Wherever possible, water detained onsite will be re-used for dust control.
- **Stabilisation**
 - Undertake progressive stabilisation of ground surfaces as quickly as possible as they are completed rather than at the end of the works program.
 - Progressively revegetate disturbed areas utilising appropriate species in those areas to be revegetated.
 - Temporary ground covers such as hydraulic soil stabilisers or geotextile fabric will be used as much as possible to stabilise batters, stockpiles and large surface areas.
 - Scour protection and energy dissipation would be used around discharge points at local points to reduce erosion where necessary.
- **Sediment Controls**
 - Sediment controls will be installed around stormwater inlet pits where appropriate and where they will not cause or exacerbate flooding. Traffic management and safety will need to be considered if installing such devices on or near live traffic.
 - Maximise the diversion of turbid construction runoff into sediment retention devices such as sediment sumps, sediment fences and other sediment traps.
 - Mulch bunds will not be used in concentrated flow areas or if they have the potential to result in tannin leachate into waterways.
 - All erosion and sediment controls will be inspected by the Environmental Manager (or delegate) at least weekly, before forecast rainfall exceeding 20 mm in 24 hours, after rainfall exceeding 20 mm in 24 hours and before a site closure of two days or more. Maintenance will be carried out as required prior to the next forecast rainfall event.
 - Site supervisors will undertake daily erosion and sediment control checks and record any issues within site diaries. Site supervisors will ensure controls are maintained and in working order.
 - Concrete washout will be confined to designated concrete washout locations or using a Concrete Waste Separation Unit (CWSU), which allows for recycling of concrete waste
 - Clean water diversions would be constructed and stabilised around work areas
 - No stockpiles of materials or storage of fuels or chemicals would be located adjacent to the existing culverts
- **Water Storage**
 - Although sediment basins are not required for the site, some water may be stored for treatment before discharge or re-use. In particular, water within excavations that does not meet the criteria for discharge may be pumped into storage tanks or an impermeable bund for treatment, allowing works to recommence in parallel with water treatment.

ESCPs will provide guidance on the installation of measures, as per the Blue Book.

As the works will mainly occur under rail possessions (i.e. short term works, over a limited amount of area) JHLOR will not implement a primary ESCP but will develop a series of ESCPs for the works as they progress. This series of ESCPs will focus on the erosion and sediment risks of each work front as they are established and closed out. The ESCPs will be maintained on the Project Drive. A baseline ESCP for initial construction works (August-September 2019) is included in Appendix F.

The Project intends to engage an ERSED Specialist Consultant to review initial site controls and, where activities are deemed high risk by the Environmental Manager, ESCPs developed by JHLOR. JHLOR will incorporate any feasible and reasonable recommendations made by the ERSED specialist.

All ESCPs developed, will require sign-off by the Environment Manager (or delegate) prior to implementation. As a minimum, the worksite activities that would require ESCPs to be developed are included as hold points in Table 8.

JHLOR will comply with CoA-E38 which states “All reasonably practicable erosion and sediment controls must be installed and appropriately maintained to minimise water pollution. When implementing such controls, any relevant guidance in the Managing Urban Stormwater series must be considered.”

REMM SC1 states “Erosion and sediment control measures would be implemented in accordance with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) and Managing Urban Stormwater: Soils and Construction Volume 2A (DECC, 2008). Measures would be designed as a minimum for the 80th percentile, five day rainfall event.” JHLOR will comply with this REMM as it applies to the works, all measures will be installed in accordance with this documentation (e.g. sediment fence, rock check dams, batter protection etc.). It is noted that the “measures” to be designed in accordance with the 80th percentile, five day rainfall event are the different types of sediment basins described under the Managing Urban Stormwater guidelines. As stated in Section 6.1.3, JHLOR is not expecting to implement sediment basins on SMEW. As such, the part of REMM SC1 that states “Measures would be designed as a minimum for the 80th percentile, five day rainfall event” is not relevant to the JHLOR works.

6.2 Surface Water Management

The Project site forms part of the greater Cooks River catchment. Specific Water Quality Objectives have been derived for the catchment in line with the NSW Water Quality Objectives. Catchment mapping classifies the Project site as a waterway that is “affected by urban development”. The water quality objectives for the catchment include the protection of:

- Aquatic ecosystems - Maintaining or improving the ecological condition of waterbodies and their riparian zones over the long term
- Visual amenity - Aesthetic qualities of waters
- Secondary contact recreation - Maintaining or improving water quality for activities such as boating and wading, where there is a low probability of water being swallowed

It is noted that a Permit to Discharge, authorised by the Environmental Manager (or delegate), is required before any reuse or discharge of water on the Project, including off-site. Refer to Section 12.1 Hold Points.

6.2.1 [Reuse](#)

Where practicable, any water collected in excavations / work sites will be reused within, the Premises (e.g. dust suppression, watering retained vegetation). The Sydney Metro - Water Discharge or Reuse Procedure regulates both onsite reuse and offsite point source discharge. Prior to any discharge off the premises, or reuse within the premises, the Environment Manager or Coordinator (or delegate authorised by the Environment Manager/Coordinator) is to sign off that the water is suitable for reuse or discharge.

6.2.2 [Onsite Reuse](#)

For onsite reuse, the following criteria will be utilised:

- pH – 6.5 to 8.5.
- No visible oil and grease
- No potential for water to leave the premises
- No surface runoff will be generated from the reuse (reuse includes dust suppression, watering retained vegetation etc.)
- No potential for water to reach any watercourse

6.2.3 [Offsite Discharge](#)

No water will be discharged off site until it is tested and a Permit to discharge is approved by the Environmental Manager (or delegate). This includes any water from water treatment plants. Water quality testing will be undertaken prior to discharge offsite in accordance with conditions M2 and L2 of the Laing O'Rourke EPL 21147 and the Sydney Metro - Water Discharge or Reuse Procedure for the following parameters and monitored on a daily basis:

- Oil and grease – none visible
- Total Suspended Solids (TSS) – <50mg/L
- pH – 6.5 to 8.5.

Monitoring for the concentration of a pollutant discharged to waters or applied to must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted. Offsite discharge will occur at the approved discharge points as per the Laing O'Rourke EPL Condition P1.1.

The Water Quality Monitoring Program, as included within Section 7, will implemented to monitor impacts on surface resources during construction. The Program shall be developed in consultation with the DoI, NSW EPA, City of Canterbury Bankstown and Inner West Council. Refer Section 7.

In accordance with REMM FHW10 discharges from construction water treatment devices would be monitored to ensure compliance with the discharge criteria in the environment protection licence, as stated above.

JHLOR will consult with the relevant Council prior to discharge in Council stormwater assets where the capacity of the stormwater system may be reduced during wet weather. It is noted that volume of stormwater captured and discharged offsite is expected to be negligible and that under most circumstances the capacity of the system would be sufficient.

6.2.4 [General Flooding](#)

The construction works will have negligible impacts on flooding within the catchment, with minimal loss of flood storage and minimal changes or restrictions to existing flood regimes.

JHLOR will implement a number of measures to mitigate the impacts of flooding on the Project site. These include;

- Stockpiling and storage of materials to occur outside potential flood areas
- Temporary facilities and hazardous material storage to be above flood levels.
- Maintain overland flow paths
- Monitoring of rainfall will be undertaken in accordance with Water Quality Monitoring Program
- Construction equipment (or excess material) would be removed from prone areas where significant events are predicted
- Site sheds and chemical stores will be constructed above the 10 year ARI level
- Site inspections will be completed to ensure ERSED controls are place prior to the event
- Where applicable, temporary levees or bunds would be strategically placed to contain potential flooding impacts resulting from any temporary works on the floodplain and minimise the risk to surrounding properties which might otherwise be affected.
- Stockpiles will be located away from areas subject to concentrated overland flow
- In the event of an emergency the requirements set out in the Emergency Management Plan (ERP) will be implemented

Where the works will worsen flooding impacts, JHLOR will implement measures to address those impacts.

Works within or near watercourses (including the Cooks River) would be undertaken with consideration given to the NSW Office of Water's guidelines for controlled activities.

A Stormwater and Flooding Management Plan will be produced for the project area relevant to JHLORs scope and subject to flooding, prior to the commencement of Construction.

6.3 Refuelling, Chemicals and Spill Management

Hazardous substances and dangerous goods will be stored and used onsite in accordance with the following protocols:

- Hazardous substances will be stored onsite in lockable containers, in their original receptacles.
- Emergency spill kits would be kept on-site at all times. All staff would be made aware of the location of the spill kit and be trained in its use.
- All hazardous substances will be clearly labelled and will have Hazardous Chemicals and Safety Data Sheets (SDS) affixed or available nearby. The SDS will be used to determine compatibility of hazardous chemicals to be stored together, i.e. no flammables with corrosives, not all corrosives compatible with each other etc.
- A bund sized to 110% of the largest stored receptacle will be established around any storage area for hazardous substances.
- Storage and handling of flammable or combustible liquids will be in accordance with OEH guidelines for Bunding and Spill Management, as well as AS 1940-1993 – The Storage and Handling of Flammable and Combustible Liquids.
- An up-to-date register of hazardous substances will be kept onsite at all times.
- Hazardous substances will only be used onsite as required, in accordance with the manufacturer/supplier instructions.
- Any substances with the potential to impact water quality will be assessed by the Environment Manager to determine what environmental safeguards or procedures are required for that substance to minimise the risk of environmental harm.

- The use of any hazardous substance that could result in a spill will be undertaken away from drainage or stormwater lines and, wherever possible, within defined bunds.
- All spills or leakages will be immediately contained and absorbed. Routine inspections of all construction vehicles and equipment would be undertaken for evidence of fuel/oil leaks
- Vehicles and machinery would be properly maintained to minimise the risk of fuel/oil leaks
- In the event of a spill, the Spill Management Procedure will be implemented. As set out in the CEMP, the management of environmental incidents where material harm to the environment is caused or threatened will be managed in accordance with the Emergency Response Plan.
- Construction plant, vehicles and equipment would be refuelled off-site, or in designated re-fuelling areas located at a minimum distance of 50 metres from drainage lines or waterways, where possible

In accordance with CoA-E41 dangerous goods, as defined by the Australian Dangerous Goods Code, must be stored and handled strictly in accordance with:

- a) All relevant Australian Standards;
- b) For liquids, a minimum bund volume requirement of 110% of the volume of the largest single stored volume within the bund; and
- c) The Environment Protection Manual for Authorised Officers: Bunding and Spill Management technical bulletin (EPA, 1997)

In accordance with REMM HRS4 all hazardous substances that may be required for construction and operation would be stored and managed in accordance with the Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW, 2005) and the Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 (Department of Planning, 2011).

6.4 Contamination

6.4.1 Site wide contamination

Site investigation findings outlined in Section 4.5 have found no significant contamination with the Project site to date therefore not triggering requirements for further investigation or Remediation Action Plan, as per REMM SC7. The following mitigation measures will be implemented to mitigate risks associated with contamination on the Project site:

- Known contaminated areas will be clearly demarcated on site and within the ECM – this will be updated during the course of the Project if areas of potential contamination are identified
- Known and potential contamination would be assessed, managed and/or remediated as per the *SMEW-EP-Unexpected Contaminated Land Procedure and Asbestos Finds Procedure* (in Appendix B) and the Waste and Spoil Management (SMCSWSSJ-JHL-WEC-EN-PLN-000007) for appropriate waste classification and removal of material off-site in accordance with its classification status to an EPA licenced facility or facility that can lawfully accept the waste. Options for management and/or remediation will undergo a sustainability appraisal in accordance with Table 1 of 'A Framework for Assessing the Sustainability of Soil and Groundwater Remediation' (SuRF 2009). Refer to Appendix H Remediation Action Plan - Sustainability Appraisal Template. The appraisal process will document appropriate remediation options whilst also factoring effectiveness and durability of the remedial solution and maintenance and monitoring requirements over the lifetime of the infrastructure.
- Appropriate environmental controls/measures will be included on ECMs/ESCPs and implemented to manage and prevent the spread of contamination. Typical examples of controls/measures would include (although is not limited to):

- segregating contaminated material to minimise cross contamination (where safe to do so);
- establishing suitable lining prior to stockpiling;
- signposting;
- covering material; and,
- implementing measures outlined within section 6.6 of this plan for ASS/PASS
- Identifying reporting requirements, including requirements under the Contaminated Land Management Act 1997, when contamination is encountered
- Providing inductions and toolbox talks detailing the correct response when contaminated material is encountered.

In the event of unexpected finds of contamination the *SMEW-EP-Unexpected Contaminated Land Procedure and Asbestos Finds Procedure* (refer Appendix B) will be implemented. In brief, the following would occur:

- Cease work in the area of concern immediately.
- Isolate the area with barrier tape or any other physical barrier to prevent workers from entering the potentially contaminated location.
- Report the area of concern to the Environment Manager and WHS Manager immediately. Nearby work groups would be notified.
- Environment Manager will engage a suitably qualified contamination consultant inspect the site and carry out an initial assessment of the nature and extent of the contamination.
- The Contamination Consultant will advise what management is required in accordance with this plan, any Planning Approval requirements and the contamination report prepared.
- Hazardous materials surveys would be undertaken during detailed design for utility adjustments as required.

Where contamination is encountered, workers will apply the appropriate Personal Protective Equipment (PPE). The appropriate PPE will depend on the contaminant type and the works to be undertaken. Appropriate PPE will be decided upon in consultation with an Occupational Hygienist.

6.5 Acid Sulphate Soils

As stated within the EIS and site contamination reports, Acid Sulphate Soils (ASS) and Potential Acid Sulphate Soils (PASS) are known to exist on the Project site. As such, ongoing testing will occur as per the field testing and laboratory testing requirements outlined below. General management of ASS and PASS on site will be undertaken in accordance with the requirements of the Acid Sulphate Soil Manual (Acid Sulphate Soil Management Advisory Committee, 1998).

General mitigation measures for working with ASS and/or PASS include:

- Spoil to be managed in accordance with the Waste and Spoil Environmental Risk Action Plan within the Construction Environmental Management Plan
- Areas of ASS and PASS should be included on ECMs and any mapping included in the permit to disturb
- Plan works to minimise disturbance to areas of ASS and PASS
- Excavation of ASS or PASS will not occur until an appropriate storage/treatment area is established. This includes the establishment of erosion and sediment controls in the vicinity of the storage/treatment area.

- Field testing for suspected ASS or PASS at a rate of 1 sample per 200m³ of excavated material from low, medium or high risk areas or where previous testing has indicated the presence of PASS or ASS.
- Field testing will be undertaken with the use of Hydrogen Peroxide based on Appendix I of the Acid Sulfate Soils Assessment Guidelines (Ahern et al, 1998a). Soils that record a pH of below 4, following oxidation with H₂O₂, will be managed as acid sulfate soils.
- 10% of samples will be sent for laboratory analysis using the chromium reducible suite (Scr) method to confirm the peroxide screening test results and to confirm the required liming rate.
- PASS will be kept wet to prevent oxidation
- ASS or PASS stockpiles will be located at least 50m away from drainage lines, unless a risk assessment is undertaken to prove that risks associated with the stockpile storage area are minimal
- ASS or PASS that will be treated is to be stockpiled separately in a bunded stockpile area. Treatment will occur in accordance with the soil ASS Treatment Plan as described within Appendix C.
- Treatment rates will be determined by laboratory analysis. Estimated treatment rates are included in Section 6.5.1 below.
- Testing will occur to validate any treatment of ASS or PASS
- Any surface water captured within the ASS/PASS storage bund or treatment pad area, or excavation where ASS/PASS is present will be tested in accordance with the Sydney Metro Water Discharge and Re-use Procedure to mitigate impacts on water quality and aquatic environments.
- Inductions and toolbox talks related to the management of ASS and PASS

A register of Acid Sulphate Soil testing will be maintained on the Project drive. A register of ASS/PASS stockpiles, including liming of these stockpiles, will also be maintained.

Complete records of all testing, treatment and monitoring should be kept by the contractor including:

- The lime register;
- Results of pH and verification testing; and
- Waste classification reports
- Verification testing reports (if required)

6.5.1 Treatment and Liming

Sampling undertaken within the *City & Southwest, Sydney Metro Sub-portion 2 - Sydenham to Bankstown Targeted Contamination Assessment* indicated that the liming rate for ASS or PASS soils on site would be between 1 and 8.8 kg CaCO₃/tonne. Liming rates would be confirmed by a Waste Classification Report for any material encountered.

When treating ASS / PASS onsite the following shall apply:

- Any ASS/PASS material shall be treated when there is sufficient quantity – generally in 100m³ batches.
- A bunded impervious pad (treatment pad) shall be created for the treatment of extracted ASS. The area shall be selected to ensure no impact to other environmental aspects or elements.
- A compacted bund wall of no less than 500 mm shall be constructed around the entire perimeter of the ASS treatment pad. The bund should be surface limed to neutralise any runoff from stockpiled materials. The location of the bund and treatment pad will be identified on the ECM and is to be a minimum of 50m away from any waterway.

- The base of the treatment pad shall have a minimum of 300 mm of clay or plastic lining and be dressed with a layer of lime or crushed limestone of at least 200mm thickness. This is to be established prior to stockpiling and/or placement of ASS materials at this location. A sump shall be constructed at the lowest point on the inside of the bund to contain runoff from the treatment. The sump shall be limed if required to neutralise runoff from stockpiled materials. If the water is to be discharged from this it must comply with the requirements outlined in Section 6.2 of this plan.
- The treatment pad shall be graded so that all surface water flows to the sump.
- The bund will be covered at the end of each day or in the event of any rainfall.

6.5.2 Waste Classification and Offsite Disposal

Prior to removal from the treatment area, treated materials shall be validated at 1 random test per 200m³ or each batch of soil treated (whichever is less) to ensure effectiveness of treatment.

A batch of soil is defined as soil from one location that has a different liming rate to the rest of the soil on the treatment pad. Should the treated ASS remain above the guideline requirements, further treatment shall be conducted for the balance of lime required.

Once ASS is treated, tested and validated as per the guidelines, the material will no longer be considered ASS. As such, the material can be placed as non-structural fill (where appropriate).

Excavated surfaces will be treated with lime and tested to ensure ASS does not pose a risk to the installation of services.

It is currently the intention that treated materials be reused on site, as far as is practicable, as fill material above the groundwater table. However, should this not be possible, or volumes of excavated material be in excess of that which can be reused, the treated soil will be disposed of to an appropriately licensed landfill following a waste classification by an appropriately qualified environmental consultant.

The waste classification and disposal will be undertaken in accordance with relevant standards and requirements, including the NSW EPA (2014) Waste Classification Guidelines – Part 1: Classifying Wastes. It is noted that the treated soil cannot be classified as VENM as per the NSW DECC (2014) requirements.

6.6 **Asbestos**

Identified fragments of Asbestos Containing Material (ACM) on the surface and within miscellaneous stockpiles on site would be managed in accordance with measures discussed in section above, the Project's Work Health and Safety Management Plan, Asbestos Management Plan, and a task specific Asbestos Removal Control Plan. An unexpected contamination finds procedure will be implemented.

Removal would be by a licensed asbestos removal contractor who would produce the following:

- Asbestos removal licences for workers performing the removal works
- A task specific SWMS
- Evidence of notification to the relevant authority and asbestos removal permit
- Where there is uncertainty as to whether the exposure standard may be exceeded, or if it is likely to be exceeded, then air monitoring must be performed by a competent person who is independent of the removalist
- At the completion of the removal works a clearance certificate must be obtained from a competent person

- A waste disposal certificate must be provided by the removalist following the completion of the works to prove that any asbestos containing material removed from the site has gone to a licenced landfill facility.
- Unless a specific exemption exists, asbestos waste must be tracked using the NSW EPA's WasteLocate. Evidence of this is to be provided by the asbestos removalist.

Safety considerations relating to contamination and asbestos are included within the Workplace Health & Safety Management Plan & Occupational Health Hygiene Welfare Management Plan. Task specific Asbestos Removal Control Plans will be developed for the works if asbestos is encountered.

Where asbestos is encountered, workers will apply the appropriate Personal Protective Equipment (PPE). Appropriate PPE will be decided upon in consultation with an Occupational Hygienist.

6.7 Groundwater

If groundwater seepage occurs into any excavations water will be either treated to meet ANZECC criteria for the nearest water body and discharged, or will be removed from site as liquid waste in accordance with the Waste Classification Guidelines (NSW EPA, 2014).

In accordance with the Laing O'Rourke EPL "*the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997*". Any discharge of water will be undertaken in accordance with this requirement, discharge would primarily be undertaken directly to existing stormwater drainage pits, once the relevant discharge criteria are met, to mitigate the risk of downstream erosion.

6.8 Salinity

In accordance with the findings of the EIS, the potential for salinity issues on the majority of the Project site is low. Saline soils may be encountered between Punchbowl and Bankstown. JHLOR will undertake further testing to determine the degree of salinity within soils that may be impacted by the works. Should salinity be identified during the Project works further investigation is to occur, and measures would be put in place to protect building materials, vegetation and landscaping. Unexpected Finds

In the event of unexpected finds of contamination the *SMEW-EP-Unexpected Contaminated Land Procedure and Asbestos Finds Procedure* (refer Appendix B) will be implemented.

In brief, the following would occur:

- Cease work in the area of concern immediately.
- Isolate the area with barrier tape or any other physical barrier to prevent workers from entering the potentially contaminated location.
- Report the area of concern to the Environment Manager and WHS Manager immediately. Nearby work groups would be notified.
- Environment Manager will engage a suitably qualified contamination consultant inspect the site and carry out an initial assessment of the nature and extent of the contamination.
- The Contamination Consultant will advise what management is required in accordance with this plan and the contamination report prepared.

6.9 Potable Water

In-line with the Construction Environmental Management Framework the following water resource management objectives will apply to the construction of the Project:

- Minimise use of potable water
- Maximise opportunities to for reuse of rainwater, stormwater, wastewater and groundwater

A water balance study will be undertaken to meet these objectives. The Water Balance Study will be completed during the design phase, prior to the commencement of construction and will estimate the quantities, types and potential sources of water that will be required for the Project. The study will identify the best opportunities to use non-potable water (where available) instead of potable water and minimise the quantities of both potable and non-potable water which will be consumed.

The water balance study will consider the following:

- Site facilities
- Dust control for construction activities
- Subgrade treatments
- Trenching activities
- Piling activities
- Landscape establishment
- Water demand ongoing for operation and maintenance

Measures to minimise water consumption are identified in the Sustainability Opportunities Register (included in the SMP). Examples of initiatives that will be investigated and implemented where practicable include:

- Installing water efficient controls, fixtures and fittings in temporary facilities
- Harvesting and reusing rainwater from roofs of temporary facilities and operation facilities
- Using non-potable water sources for dust suppression during construction
- Using water efficient construction methods and equipment
- Specifying within supply chain contracts that offsite batching plant concrete production operation water is recycled, suitably treated and incorporated into concrete production that is supplied the Project
- Maximise the use of stormwater in the urban design
- Include a drought tolerant planting schedule in the urban design

7. Water Quality Monitoring Program

The Water Quality Monitoring Program, forming part of the wider Construction Monitoring Program, is being implemented to monitor impacts on surface water quality resources as well as the effectiveness of the mitigation measures applied as part of SMEW. The detailed methodology provided below sets out the CMP to be implemented to comply with CoAs – C8 to C15 and REMM FHW4 of the Project Approval (SSI 8256).

As per requirements of CoA-C8(b), the City of Canterbury Bankstown and the Inner West Council have been consulted with for the development of this program. In accordance with REMM FHW4, the NSW EPA and DPI (Water) were consulted with for this monitoring program (refer Section 1.7 for details of consultation). The Secretary's approval will be sought to implement this CMP as part of seeking approval of this Plan.

This CMP has the following two key phases addressed within the remainder of this section:

- Pre-Construction SMEW water quality monitoring; and,
- SMEW Construction stage water quality monitoring

It should be noted that groundwater monitoring is not a specific requirement of the Construction Monitoring Program as per the Instrument of Approval (CoA-C8-C15); and has therefore not been included within this plan or the Project CEMP. JHLOR will reassess the need for groundwater monitoring should groundwater be encountered during the works.

It should also be noted that the majority of works along the alignment consist of works such as GST and fencing installation, which are considered a low risk to water quality. Earthworks associated with the proposed retaining walls to the west of Canterbury Station are associated with a moderate risk to water quality. As such, monitoring will focus on water quality within the Cooks River immediately downstream of these works.

As per Figure 4, two drainage structures cross the project boundary within Marrickville. The "Malakoff Tunnel" and the "Western Channel". It is noted that the "Central Channel and Eastern Channel" are outside the project boundary, to the east.

It was deemed not necessary to undertake water quality monitoring within these drainage structures as JHLOR works within these areas are of short duration and minimal disturbance – galvanised steel trough on posts at 2m centres. Works in these areas are expected to take approximately one month.

As of the 23rd of March 2021, SMEW Construction activities associated with embankment stabilisation to the west of Canterbury Station to Oswald Street, Canterbury have been completed and the area stabilised. As such, Construction within the area is complete and the risks to water quality are now negligible.

JHLOR will discontinue the water quality monitoring programme, noting that localised water quality testing associated with dewatering or incidents on remaining work will continue. This Section of the CSWMP will remain for information purposes and any data captured from the water quality monitoring programme that has not yet been included in a Construction Monitoring Report will be included within the final SMEW Construction Monitoring Report.

7.1 Scope and Objectives

Activities that could result in water quality impacts are set out in Section 5 and locations of activities are included in Section 1.3. JHLOR's objectives for water quality management during construction are:

- The prevention of pollution
- No adverse impacts on receiving water environmental values
- Minimising the risk of polluted, sediment-laden or contaminated water leaving the premises and impacting both surface and groundwater
- Implementing a comprehensive management and adaptive monitoring regime on site.

Although adaptive monitoring will be conducted offsite in the receiving waters as set out below, this will simply be a proactive mechanism to trigger investigations and ensure that site processes and procedures are more than adequate.

Surface water quality monitoring of the receiving environment prior to construction is highly unlikely to define suitable standards or benchmarks for water quality discharges from the SMEW Works given that water quality from urban areas is highly variable and changes according to prevailing weather patterns and day-to-day during rainfall.

Surface water quality monitoring will be undertaken during Pre-construction Works (monthly, once given site control) and during the Construction Stage (quarterly) subject to wet weather events.

The water quality monitoring set out in Section 7.3 will be undertaken in addition to the monitoring to be undertaken within the Premises prior to discharge during construction set out in Section 6.2.

7.2 Background Data

Water quality is measured on an ongoing basis for the wider Cooks River catchment by the NSW Office of Environment and Heritage as part of the Beachwatch programme. The monitoring point is at Kyeemagh Baths at the mouth of the Cooks River in Port Botany. This monitoring point is considered to be too far away from the Project site to provide data that is useful for background information.

Limited background water quality data is available for the Cooks River through monitoring undertaken by the Cooks River Alliance. However, the most recent data available is from 2013/2014 and monitoring was not undertaken in close proximity to SMEW area.

For the purpose of establishing baseline water quality data, water quality monitoring will be undertaken for a period prior to construction in accordance with the frequency and parameters as outlined in the Preconstruction column of Table 7 (i.e. once per month and once after >20mm rainfall in a 24hour period, if possible). A minimum of three baseline samples will be obtained (i.e. over 3 months). JHLOR will undertake monitoring during both dry and wet conditions, with at least one dry weather round of monitoring and one wet weather round of monitoring taken as part of the baseline monitoring program.

Pre-construction baseline data will be collected and stored on the SMEW Project Drive.

7.3 Monitoring Parameters

The range of parameters to be tested for water quality monitoring of surrounding waterways is detailed in Table 6. These parameters have been based on the environmental values of the

surrounding water ways and how they relate to possible impacts from the SMEW works. Note: proposed trigger values and actions outlined in Table 6 may be further refined during the Project depending on the monitoring data set collated and analysed.

Table 6 Water Monitoring Parameters

Parameter	Sampling Methods	Analytical Method	ANZECC Criteria* Freshwater	Proposed Trigger Values	Proposed Actions
Temperature (°C)	Probe	Field analysis	> 80%ile < 20%ile	Downstream results are > than upstream results in rainfall events up to and including the significant event threshold of >20mm in 24 hours. Downstream results are > than upstream results during dry weather sampling	Environment Manager (or delegate) to re-test to confirm results and undertake an inspection of the adjacent works and propose actions where required.
Dissolved Oxygen (DO)	Probe	Field analysis	Lower limit – 85 Upper limit – 110		
Turbidity (NTU)	Probe	Field analysis	6 – 50		
Oil and grease	Visual analysis, then grab sample if required	Visual assessment. Confirmed with lab analysis if required	-		
pH	Probe, grab sample if required	Field analysis, lab analysis if required	Lower limit – 6.5 Upper limit – 8.5		
Salinity (EC)	Probe	Field analysis	125 – 2200		
Total Suspended Solids (TSS)	Probe, grab sample if required	Field analysis, lab analysis if required	-		
Total phosphorus	Grab sample	Lab analysis	25ug/L		
Total nitrogen	Grab sample	Lab analysis	350ug/L		
Chlorophyll-a	Grab sample	Lab analysis	3ug/L		

*ANZECC guideline criteria are included for reference. It is noted that baseline testing will indicate whether water quality passing through the Project site prior to construction meets ANZECC guidelines. JHLOR will comply with Section 120 of the *Protection of the Environment Operations Act 1997*.

7.4 Water Quality Monitoring

The proposed surface water quality monitoring locations and the frequency of monitoring that will be conducted pre-construction and during construction of SMEW are identified in Table 7. Water monitoring will be undertaken within the Cooks River on both the eastern and western river banks (upstream and downstream of the Cooks River rail bridge at Canterbury – refer to Appendix D for the map showing indicative surface water quality monitoring locations). The parameters to be tested are identified in Table 6.

The water quality monitoring locations have been chosen as they are directly upstream and downstream of the SMEW retaining wall works. Comparing the upstream and downstream monitoring results will enable JHLOR to assess impacts of construction. The four locations identified are the only locations that offer safe access for water monitoring. It is noted that there are several other drainage outlets along the length of the Cooks River that may convey water into the channel between the upstream and downstream monitoring locations. Gaining access to the river at these point is not possible due to safety reasons.

Surface water quality monitoring of the receiving environment prior to construction is highly unlikely to define suitable standards or benchmarks for water quality discharges from the SMEW works. The Cooks River collects and transfers water from a large urbanised catchment area. As such, there is a potential for contaminants to enter the stormwater systems and subsequently the downstream waterway from many different sources.

Water quality monitoring will occur during dry and wet conditions and will be compared against baseline water quality monitoring undertaken during the pre-Construction phase.

Results of water quality monitoring will be recorded on the Water Quality Monitoring Form and will be maintained on a Water Quality Monitoring Register on the Project Document System/Server, as appropriate.

Weather monitoring will be conducted using data from the Canterbury Racecourse weather station, accessed via the bureau of Meteorology website (<http://www.bom.gov.au>)

In accordance with CoA-C13 the Water Quality Monitoring Program, once 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 as specified by the Secretary. As of 23rd March 2021 Construction activities related to the water quality monitoring programme had been finalised. The water quality monitoring programme has now ceased.

Where exceedances to the Water Monitoring Parameters within Table 6 occur, and where those exceedances are not reflected in pre-construction baseline data, retesting will occur within 24 hours to confirm results. A site inspection will also occur within 24 hours to determine if any construction works may be contributing to water quality parameter exceedances.

Table 7 Water Quality Monitoring Program

Waterway	Indicative Monitoring Points	Interaction with SMEW works	Monitoring location, Scope and Frequency	
			Preconstruction works	During Construction Phase
Cooks River	Cooks River East 1 (CRE-1) Upstream of works – eastern side	Receiving waters for the site	Monthly for parameters detailed in Table 6 (including at least one dry weather round of sampling) One wet weather event, if possible, for the parameters detailed in Table 6 Note: A wet weather event is when the receiving area has received >20mm of rain in 24 hours. The sampling will be undertaken immediately during construction hours and if it is safe to do so.	Quarterly for parameters detailed in Table 6 (including during dry weather) Four wet weather events per year for the parameters in Table 6 subject to event occurrence, safe conditions for monitoring and access being available to conduct monitoring. JHLOR will target one monitoring event every three months, however, this will depend of wet weather event occurrence within the 3 month period.
	Cooks River East 2 (CRE-2) downstream of works – eastern side			
	Cooks River West 1 (CRW-1) Upstream of works – western side			
	Cooks River West 2 (CRW-2) downstream of works – western side			

7.5 Reporting

CoA 14 states that “*The results of the Construction Monitoring Programs must be submitted to the Secretary for information, and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program*”.

Relevant agencies are identified within CoA-C8. As such, a Construction Monitoring Report (CMR) will be submitted on a six monthly basis to the following agencies;

- Department of Planning and Environment
- City of Canterbury Bankstown

The Independent Environmental Representative will review the Construction Monitoring Report prior to submission to the Department of Planning and City of Canterbury Bankstown. JHLOR will participate in further consultation with these agencies where any relevant water quality issues are identified by the monitoring.

Note that water quality monitoring results will not be submitted to Inner West Council, unless requested by Inner West Council for information purposes, as no water quality monitoring is required for activities within the Inner West Local Government Area.

7.6 Adaptive Water Quality Monitoring Program

The proposed water quality monitoring program, including monitoring parameters (Table 6), monitoring locations, monitoring frequency (Table 7) and reporting (Section 7.5) would be reviewed and further refined by SMEW based on the monitoring data set collated and analysed over the first 12-month period. Refinements to the water quality-monitoring program would typically include (although is not limited to):

- Amending monitoring locations and parameters to capture appropriate monitoring data and maybe adding temporary testing locations to identify any point sources impacting on water quality
- Reducing or increasing monitoring frequency, if potential impacts attributable to SMEW are identified
- Assessing and revising work methods and management practices if considered necessary

Any changes made to the water quality-monitoring program would be subject to ER review and approval in line with CoA – C13.

7.7 Review of Mitigation Measures

Where a review of monitoring results indicates that activities associated with SMEW are causing exceedances to the baseline levels or the water quality parameters in Table 6 the Environmental Manager will consult with the construction team in regards to additional mitigation measures. Consultation will occur within 24 hours and any additional measures will be implemented as soon as reasonably practicable. These additional mitigation measures may include additional controls or changed work practices.

Any non-compliances, incidents, corrective or preventative actions relating to the Water Quality Monitoring Program will be managed in accordance with Section 16 and Section 17 of the SMEW CEMP.

7.8 Consultation

In addition to the provision of the Construction Monitoring Report, JHLOR will facilitate ongoing consultation relating to the Water Quality Monitoring Program, where requested by relevant regulatory agencies. This may include meetings, briefing sessions or other means to discuss items such as issues relating to water quality monitoring or the results within the CMR.

8. Training

All personnel working on site will undergo site induction training relating to soil and water issues. The training will cover the following issues such as:

- Legislative requirements (POEO Act, EPL etc.) including Section 120.
- Erosion and sedimentation control planning and hold points
- Duty to notify of environmental harm (or the potential for it) including chain of reporting
- Spill containment and management procedure
- Storage and use of hazardous substances
- Water discharge and reuse procedure
- Maintenance of environmental controls (e.g. erosion and sediment controls)
- Contamination and Unexpected Finds.

Detailed training will be provided to key personnel regarding erosion and sediment control. This training will include:

- Legislation as it applies to erosion and sediment control
- Basics of soil management, handling and stockpiling
- Appropriate use, installation and maintenance of various erosion and sediment control techniques
- Effective site rehabilitation and stabilisation
- Use of erosion control techniques such as geotextiles, organic fibre mats, mulches and soil polymer stabilisers
- Preparing, reading and interpreting Erosion and Sediment Control Plans
- Typical controls around existing drains and maintenance of controls
- Relevant sampling, testing and reporting requirements
- Toolbox talks will also be used to further reinforce awareness of Soil and Water issues.
- Further details regarding staff induction and training are outlined in the CEMP.

Refer to Section 12 of the CEMP for further information on environmental training.

9. Monitoring, Auditing and Reporting

JHLOR will regularly review the SMEW activities to ensure compliance with this Plan. A regular inspection, program for soil and water will be conducted as follows:

- Details of daily inspections undertaken by the Site Supervisor will be logged in their respective site diaries.
- Routine weekly inspections are to be conducted to monitor erosion and sediment controls in active worksites. Weekly inspections will be documented on the Environmental Inspection Form.
- Pre/Post inclement weather events will be recorded within the Inclement Weather Inspection Form.
- Inspect the operation of soil and water management works installed on the premises and undertake any works required to repair and/or maintain these controls:
 - at least weekly during normal construction hours
 - prior to any major rainfall event forecasted (>20mm, in 24 hours)
 - daily following a major rainfall event in any 24 hour period (>20mm), if safe to do so
 - prior to any site closure of greater than 24 hours

Typical records generated and maintained (on the Project SMEW Server/Document System) would include:

- Copies of current ESCPs for all active construction sites
- Records of soil and water inspections undertaken
- Observations and works undertaken to repair and/or maintain soil and water management works
- Records of testing of any water prior to discharge
- Records of the release of the hold point to discharge water from the construction site to the receiving environment
- Records of water quality monitoring and results
- Unexpected finds
- Records for contamination management – soil classification, spoil tracking, disposal dockets, remedial action plans, occupational hygienist clearances, and Site Auditor sign-offs.

As stated in Section 7.5, the results of the Water Quality Monitoring Program will be provided to the Department of Planning and Environment and City of Canterbury Bankstown, in the form of a Construction Monitoring Report. The CMR will be produced and submitted on a six monthly basis, within 6 weeks of the end of each monitoring period. The Construction Monitoring Report will include a summary of monitoring undertaken, an overview of the results, analysis of the results and raw data from monitoring.

10. Review and Improvement

The CSWMP will be reviewed on an annual basis and earlier if required taking into account below:

- The status and progress of JHLOR's activities
- Changes in the design, delivery and operations processes and conditions
- The adaptive Water Quality Monitoring Program and results
- Lessons learnt during delivery and operations
- Changes in other related Project Plans
- Requirements and matters not covered by the existing Project Plans
- Changes to Project Plans as directed by Sydney Metro's Representative under the Deed.
- Where deemed appropriate in relation to items raised within inspections or audits
- Lessons learnt from incident, events or near misses
- Feedback from Compliance Tracking Reports
- Feedback on Construction Monitoring Program results

11. Enquiries, Complaints and Incident Management

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

12. CSWMP Administration

12.1 Hold Points

Pre-construction and construction hold points are included within Table 8.

Table 8 Pre-Construction and Construction Hold Points

Item	Process Held	Acceptance Criteria	Approval Authority
Construction Environmental Management Plan, sub-plans and Water Quality Monitoring Program	Site activities (prior to construction commencement)	Site specific Construction Environmental Management Plan and sub-plans (this CSWMP including the CMP) have been developed, reviewed and approved.	ER endorsement Department of Planning and Environment approval
Reuse or Discharge of water	Dewatering activities (during construction)	Implementation of requirements within Section 6.2 of this plan, prior to any discharge off the premises or reuse within the premises	Environmental Manager or Coordinator (or delegate authorised by Environment Manager/Coordinator)
Water Quality Monitoring Program Amendments (CoA C13)	Amendments to Water Quality Monitoring Program (during construction, as per CoA C13)	Amendments have been reviewed and approved for implementation	ER approval
Specific Environmental Control Maps (ECMs)/ progressive ESCPS	a) Retaining wall works b) Site stabilisation	ECMs/PESCPs are developed with site specific environmental controls/mitigation measures with site supervisor/engineers for work activities and are to be implemented prior to works commencing (or a new work stage as appropriate)	Environmental Manager or Coordinator

12.2 Records

Records associated with this management plan and monitoring programme will be maintained in accordance with Section 15 of the CEMP.

Appendix A Construction Soil and Water Management Compliance Matrix

No.	Measure	Timing	Requirement	Responsibility	Reference
Project Approval – Specific Management Plan Requirements					
1.	<p>The CEMP Sub-plans must be prepared in consultation with the relevant government agencies identified for each CEMP Sub-plan and be consistent with the CEMF and CEMP referred to in Condition C1:</p> <p>Consultation required for CEMP Sub-plans Relevant government agencies to be consulted for CEMP Sub-plans</p> <p>Consultation required for CEMP Sub-plans Relevant government agencies to be consulted for CEMP Sub-plans</p> <p>(b) Soil and water Relevant council(s), DoI, OEH</p>	Prior to Construction	S2B SSI 8256 COA – C3	Environment Manager	Section 1.5 Section 1.6 Appendix E
2.	The CEMP Sub-plans must be prepared in accordance with the CEMF.	Prior to Construction	S2B SSI 8256 COA – C4	Environment Manager	This plan and Appendix A
3.	Details of all information requested by an agency to be included in a CEMP Sub-plan as a result of consultation, including copies of all correspondence from those agencies, must be provided with the relevant CEMP Sub-Plan.	Prior to Construction	S2B SSI 8256 COA – C5	Environment Manager	Section 1.5 Appendix E
4.	Any of the CEMP sub-plans may be submitted to the Secretary along with, or subsequent to, the submission of the CEMP but in any event, no later than one (1) month before commencement of construction.	Prior to construction	S2B SSI 8256 COA – C6	Environment Manager	Section 1.6
5.	Construction must not commence until the CEMP and all CEMP Sub-plans have been approved by the Planning Secretary. The CEMP and CEMP Sub-plans, as approved by the Planning Secretary, including any minor amendments approved by the ER must be implemented for the duration of Construction. Where Construction of the CSSI is staged, Construction of a stage must not commence until the CEMP and sub-plans for that stage have been approved by the Planning Secretary.	Prior to construction	S2B SSI 8256 COA – C7	Environment Manager	Table 8
6.	<p>The following Construction Monitoring Programs must be prepared in consultation with the relevant government agencies identified for each to compare actual performance of Construction of the CSSI against the predicted performance.</p> <p>Consultation required for Construction Monitoring Programs Relevant government agencies to be consulted for Construction Monitoring Programs</p>	Prior to construction	S2B SSI 8256 COA – C8	Environment Manager	Section 1.5 Section 1.6 Section 7 Appendix E

No.	Measure	Timing	Requirement	Responsibility	Reference
	(b) Water Quality Relevant council(s)				
7.	Each Construction Monitoring Program must provide:	Prior to and during construction	S2B SSI 8256 COA – C9	Environment Manager	
	(a) details of baseline data available;				Section 7.2
	(b) details of baseline data to be obtained and when;				Section 7.2
	(c) details of all monitoring of the project to be undertaken;				Section 7
	(d) the parameters of the project to be monitored;				Section 7.3
	(e) the frequency of monitoring to be undertaken;				Section 7.4
	(f) the location of monitoring;				Section 7.4 Appendix D
	(g) the reporting of monitoring results;				Section 7.5
	(h) procedures to identify and implement additional mitigation measures where results of monitoring are unsatisfactory; and				Section 7.6 Section 7.7
	(i) any consultation to be undertaken in relation to the monitoring programs.				Section 1.5 Section 7.8 Appendix E

No.	Measure	Timing	Requirement	Responsibility	Reference
8.	The Construction Monitoring Programs must be developed in consultation with relevant government agencies as identified in Condition C8 of this approval and must include reasonable information requested by an agency to be included in a Construction Monitoring Programs during such consultation. Details of all information requested by an agency including copies of all correspondence from those agencies, must be provided with the relevant Construction Monitoring Program.	Prior to construction	S2B SSI 8256 COA – C10	Environment Manager	Section 1.5 Section 1.6 Section 7 Appendix E
9.	The Construction Monitoring Programs must be endorsed by the ER and then submitted to the Planning Secretary for approval at least one (1) month before the commencement of Construction.	Prior to construction	S2B SSI 8256 COA – C11	Environment Manager	Section 1.6 Table 8
10.	Construction must not commence until the Planning Secretary has approved all of the required Construction Monitoring Programs.	Prior to construction	S2B SSI 8256 COA – C12	Environment Manager	Section 1.6 Table 8
11.	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.	Prior to construction	S2B SSI 8256 COA – C13	Environment Manager	Noted
12.	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.	Prior to construction	S2B SSI 8256 COA – C14	Environment Manager	Section 7.5 Section 9
13.	Where a relevant CEMP Sub-plan exists, the relevant Construction Monitoring Program may be incorporated into that CEMP Sub-plan.	Prior to construction	S2B SSI 8256 COA – C15	Environment Manager	Section 7
14.	The location of Construction compounds must not worsen the existing flooding characteristics of the area.	Prior to and during construction	S2B SSI 8256 COA – E8	Environment Manager Project Engineer Site Superintendent	Section 4 Section 5 Section 6.2
15.	Where the CSSI will worsen flooding impacts, the Proponent is responsible for implementing measures to address those impacts.	Prior to and during construction	S2B SSI 8256 COA – E9	Environment Manager Project Engineer Site Superintendent	Section 4 Section 5 Section 6.2

No.	Measure	Timing	Requirement	Responsibility	Reference
16.	All reasonably practicable erosion and sediment controls must be installed and appropriately maintained to minimise water pollution. When implementing such controls, any relevant guidance in the Managing Urban Stormwater series must be considered.	Prior to and during construction	S2B SSI 8256 COA – E38	Environment Manager Project Engineer Site Superintendent	Section 4 Section 5 Section 6.1
17.	An Unexpected Contaminated Land Procedure and Asbestos Finds Procedure must be prepared and must be followed should unexpected contaminated land or asbestos be excavated or otherwise discovered during Construction.	During Construction	S2B SSI 8256 COA – E39	Environment Manager Project Engineer Site Superintendent	Section 4.5 Section 6.7 Appendix B
18.	The Unexpected Contaminated Land Procedure and Asbestos Finds Procedure must be implemented throughout Construction.	During Construction	S2B SSI 8256 COA – E40		Section 4.5 Section 6.7
19.	Dangerous goods, as defined by the Australian Dangerous Goods Code, must be stored and handled strictly in accordance with: (a) All relevant Australian Standards; (b) For liquids, a minimum bund volume requirement of 110% of the volume of the largest single stored volume within the bund; and (c) The Environment Protection Manual for Authorised Officers: Bunding and Spill Management technical bulletin (EPA, 1997)	During Construction	S2B SSI 8256 COA – E41		Section 6.3
In the event of an inconsistency between the requirements listed from (a) to (c) above, the most stringent requirement shall prevail to the extent of the inconsistency.					
Revised Environmental Mitigation Measures					
20.	Erosion and sediment control measures would be implemented in accordance with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) and Managing Urban Stormwater: Soils and Construction Volume 2A (DECC, 2008). Measures would be designed as a minimum for the 80th percentile, five day rainfall event.	Prior to and during construction	S2B SSI 8256 REMM SC1	Environment Manager Project Engineer Site Superintendent	Section 6.1
21.	Prior to ground disturbance in high probability acid sulfate areas, testing would be carried out to determine the presence of acid sulfate soils. If acid sulfate soils are encountered, they would be managed in accordance with the Acid Sulfate Soil Manual (Acid Sulfate Soil Management Advisory Committee, 1998) and the Waste Classification Guidelines - Part 4: Acid Sulfate Soils (EPA, 2014).	Prior to and during construction	S2B SSI 8256 REMM SC2	Environment Manager Project Engineer Site Superintendent	Section 4 Section 6 Appendix C

No.	Measure	Timing	Requirement	Responsibility	Reference
22.	Prior to ground disturbance in areas of potential soil salinity, testing would be carried out to confirm the presence of saline soils. If saline soils are encountered, they would be managed in accordance with Site Investigations for Urban Salinity (DLWC, 2002).	Prior to construction	S2B SSI 8256 REMM SC3	Environment Manager	It is noted that this REMM is only relevant to works within the Punchbowl and Bankstown Station areas. As JHLOR's current scope does not include work within this area, this REMM is not relevant to the SMEW scope. If JHLOR's scope changes, or if salinity issues are encountered, JHLOR will reassess the relevance of this REMM and update this Plan as required. Any changes to this Plan would be assessed by the ER in accordance with CoA-A26.

No.	Measure	Timing	Requirement	Responsibility	Reference
23.	WorkCover dangerous goods searches would be carried out for properties that have potential contamination near Belmore Station, to provide additional site characterisation and identify the risk of contamination in these areas.	Prior to construction	S2B SSI 8256 REMM SC4	Environment Manager	It is noted that this REMM is only relevant to works within the Belmore Station area. As JHLOR's current scope does not include work within this area, this REMM is not relevant to the SMEW scope. If JHLOR's scope changes, JHLOR will reassess the relevance of this REMM and update this Plan as required. Any changes to this Plan would be assessed by the ER in accordance with CoA-A26.
24.	Prior to ground disturbance, a detailed contamination assessment would be undertaken in areas with a medium to high risk of contamination, to confirm the nature and extent of contamination, specific requirements for further investigation and remediation, and/or management requirements of any contamination.	Prior to construction	S2B SSI 8256 REMM SC5	Environment Manager	Section 4

No.	Measure	Timing	Requirement	Responsibility	Reference
25.	Hazardous materials surveys would be undertaken during detailed design for all proposed demolition activities, and for utility adjustments as required.	Prior to construction	S2B SSI 8256 REMM SC6	Environment Manager Project Engineer Site Superintendent	Section 4 Section 6
26.	In the event a Remediation Action Plan is required, it would be developed in accordance with Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land (Department of Urban Affairs and Planning and Environment Protection Authority, 1998) and a NSW Environment Protection Authority Accredited site auditor would be engaged to audit the works.	Prior to construction	S2B SSI 8256 REMM SC7	Environment Manager	Section 4.5
27.	In the event that indicators of contamination are encountered during construction (such as odours or visually contaminated materials), work in the area would cease, and the finds would be managed in accordance with the unexpected contamination finds procedure.	During construction	S2B SSI 8256 REMM SC8	Environment Manager Project Engineer Site Superintendent	Section 6 Appendix B
28.	Where feasible and reasonable, detailed design would result in no net increase in stormwater runoff rates in all storm events, unless it can be demonstrated that increased runoff rates as a result of the project would not increase downstream flood risk.	Prior to construction	S2B SSI 8256 REMM FHW1	Design Manager	Section 4.9 Design Report
29.	Detailed design of the project would, as required at Bankstown between Stacey Street and Marion Street, take into account the impact of overland flooding for the full range of floods events up to the Probable Maximum Flood level.	Prior to construction	S2B SSI 8256 REMM FHW2	Not applicable	Not relevant to SMEW
30.	The project would be designed in accordance with water quality design criteria based on the Water Sensitive Urban Design Guideline (Roads and Maritime, 2017) to ensure there is minimal potential for water quality impacts, including incorporating water sensitive urban design elements.	Prior to construction	S2B SSI 8256 REMM FHW3	Design Manager	Section 4.9 Design Report
31.	A construction water quality monitoring program would be developed and would commence prior to construction, to monitor water quality at identified discharge points. The program would include relevant water quality objectives, parameters, and criteria and specific monitoring locations identified in consultation with DPI (Water) and the EPA.	Prior to construction	S2B SSI 8256 REMM FHW4	Environment Manager	Section 7
32.	Detailed construction planning would consider flood risk for all compounds and work sites. This would include identification of measures to not worsen existing flooding characteristics. Not worsen is defined as: • a maximum increase in flood levels of 50 mm in a one per cent AEP event	Prior to and during construction	S2B SSI 8256 REMM FHW5	Environment Manager	Section 4 Section 6.2.4

No.	Measure	Timing	Requirement	Responsibility	Reference
	<ul style="list-style-type: none"> a maximum increase in time of inundation of one hour in a one per cent AEP event no increase in the potential for soil erosion and scouring from any increase in flow velocity in a one per cent AEP flood event 				
33.	<p>The site layout and staging of construction activities would:</p> <ul style="list-style-type: none"> avoid or minimise obstruction of overland flow paths and limit the extent of flow diversion required consider how works would affect the existing stormwater network such that alternatives are in place prior to any disconnection or diversion of stormwater infrastructure. 	Prior to and during construction	S2B SSI 8256 REMM FW6	Environment Manager	Section 4
34.	Works within or near watercourses (including the Cooks River) would be undertaken with consideration given to the NSW Office of Water's guidelines for controlled activities.	Prior to and during construction	S2B SSI 8256 REMM FW7	Environment Manager	Section 4
35.	Erosion and sediment mitigation measures would be installed and maintained for the duration of the construction period.	Prior to and during construction	S2B SSI 8256 REMM FW8	Environment Manager	Section 4 Section 5 Section 6
36.	The water quality monitoring program would continue during construction, to monitor water quality at identified discharge points.	Prior to and during construction	S2B SSI 8256 REMM FW9	Environment Manager	Section 7
37.	Discharges from construction water treatment devices would be monitored to ensure compliance with the discharge criteria in the environment protection licence.	During construction	S2B SSI 8256 REMM FW10	Environment Manager Project Engineer Site Superintendent	Section 4.8 Section 6
38.	All hazardous substances that may be required for construction and operation would be stored and managed in accordance with the Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW, 2005) and the Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 (Department of Planning, 2011).	During construction	S2B SSI 8256 REMM HRS4	Environment Manager Project Engineer Site Superintendent	Section 6
Revised Environmental Performance Outcomes					
39.	<p>Flooding and hydrology</p> <p>Construction is undertaken in a manner that minimises the potential for adverse flooding impacts, through staging of works and the implementation of mitigation measures.</p>	During Construction	S2B EIS EPO – Flooding and hydrology	Environment Manager Project Engineer	Section 4 Section 6

No.	Measure	Timing	Requirement	Responsibility	Reference
	<p>Construction compounds and work sites are laid out such that flows are not significantly impeded.</p> <p>The preferred project maintains existing flood levels within and adjacent to the rail corridor.</p> <p>The preferred project avoids long term impacts to surface water.</p> <p>Opportunities to reuse water resources are considered during the design process.</p> <p>The use of water during construction is minimised.</p>				
40.	<p>Soils</p> <p>Site-specific soil characteristics are taken into consideration during detailed design and construction.</p> <p>Contamination is managed in accordance with relevant regulatory requirements.</p> <p>Soil waste is assessed, classified, managed and disposed of in accordance with the Waste Classification Guidelines (EPA, 2014).</p>	During Construction	S2B EIS EPO – Soils	Environment Manager Project Engineer	Section 4 Section 6
41.	<p>Water Quality</p> <p>Impacts to water quality during construction and operation are minimised.</p> <p>Erosion and sediment controls during construction are implemented in accordance with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) and Managing Urban Stormwater: Soils and Construction Volume 2 (Department of Environment and Climate Change, 2008).</p> <p>The preferred project would protect or contribute to achieving the Water Quality Objectives, during construction and operation.</p> <p>Construction water quality discharge would comply with the requirements of an environment protection licence issued to the project.</p>	During Construction	S2B EIS EPO – Water	Environment Manager Project Engineer	Section 4 Section 6
Construction Environmental Management Framework					
42.	<p>Soil and Water Management Objectives</p> <p>a. The following soil and water management objectives will apply to construction:</p> <ul style="list-style-type: none"> Minimise pollution of surface water through appropriate erosion and sediment control. Maintain existing water quality of surrounding surface watercourses. 	During Construction	CEMF Section 15.1)	Environment Manager Project Engineer Site Superintendent	Section 1.4

No.	Measure	Timing	Requirement	Responsibility	Reference
	<ul style="list-style-type: none"> Source construction water from non-potable sources, where feasible and reasonable. 				
43.	<p>Soil and Water Implementation</p> <p>Principal Contractors will develop and implement a Soil and Water Management Plan for their scope of works. The Soil and Water Management Plan will include as a minimum:</p> <ul style="list-style-type: none"> The surface water and flooding mitigation measures as detailed in the environmental approval documentation. details of construction activities and their locations, which have the potential to impact on water courses, storage facilities, stormwater flows, and groundwater; surface water and ground water impact assessment criteria consistent with the principles of the Australian and New Zealand Environment Conservation Council (ANZECC) guidelines; management measures to be used to minimise surface and groundwater impacts, including identification of water treatment measures and discharge points, details of how spoil and fill material required by the SSI will be sourced, handled, stockpiled, reused and managed; erosion and sediment control measures; salinity control measures and the consideration of flood events; a contingency plan, consistent with the Acid Sulphate Soils Manual (EPA 1998), to deal with the unexpected discovery of actual or potential acid sulphate soils, including procedures for the investigation, handling, treatment and management of such soils and water seepage; management measures for contaminated material (soils, water and building materials) and a contingency plan to be implemented in the case of unanticipated discovery of contaminated material, including asbestos, during construction; a description of how the effectiveness of these actions and measures would be monitored during the proposed works, clearly indicating how often this monitoring would be undertaken, the locations where monitoring would take place, how the results of the monitoring would be recorded and reported, and, if any exceedance of the criteria is detected how any noncompliance can be rectified; The requirements of any applicable EPL conditions. The responsibilities of key project personnel with respect to the implementation of the plan. Procedures for the development and implementation of progressive erosion and sediment control plans. 	During Construction	CEMF Section 15.2a)	Environment Manager Project Engineer Site Superintendent	<ol style="list-style-type: none"> Section 4, Section 6 Section 4, Section 5, Section 6, Appendix G Section 4, Section 6 Section 6 Section 6, Appendix C Section 6, Appendix B Section 6, Section 7, Section 9 Section 2.2 Section 3 Section 6

No.	Measure	Timing	Requirement	Responsibility	Reference
	<ul style="list-style-type: none"> Identification of locations where site specific Stormwater and Flooding Management Plans are required. Compliance record generation and management. 				11. Section 6.2.4 12. Section 9, Section 12 Spoil handling is managed in accordance with the Waste and Spoil Environmental Risk Action Plan in the Construction Environmental Management Plan
44.	Principal Contractors will develop and implement progressive erosion and sediment control plans (ESCPs) for all active worksites in accordance with Managing Urban Stormwater: Soils & Construction Volume 1 (Landcom, 2004) (known as the "Blue Book"). The ESCPs will be approved by the Contractor's Environmental Manager (or delegate) prior to any works commencing (including vegetation clearing) on a particular site. Copies of the approved ESCP will be held by the relevant Contractor personnel including the Engineer and the Site Foreman.	During Construction	CEMF Section 15.2b)	Environment Manager Project Engineer Site Superintendent	Section 6.1.4
45.	ESCPs will detail all required erosion and sediment control measures for the particular site at the particular point in time and be progressively updated to reflect the current site conditions.	During Construction	CEMF Section 15.2c)	Environment Manager Project Engineer Site Superintendent	Section 6.1.4

No.	Measure	Timing	Requirement	Responsibility	Reference
	Any amendments to the ESCP will be approved by the Contractor's Environmental Manager (or delegate).				
46.	Principal Contractors will develop and implement Stormwater and Flooding Management Plans for the relevant construction sites. These plans will identify the appropriate design standard for flood mitigation based on the duration of construction, proposed activities and flood risks. The plan will develop procedures to ensure that threats to human safety and damage to infrastructure are not exacerbated during the construction period.	During Construction	CEMF Section 15.2d)	Environment Manager Project Engineer Site Superintendent	Stormwater and Flooding Management Plans will be developed for construction sites prior to Construction
47.	Principal Contractors will undertake the following soil and water monitoring as a minimum: <ul style="list-style-type: none"> Weekly inspections of the erosion and sediment control measures. Issues identified would be rectified as soon as practicable. Additional inspections will be undertaken following significant rainfall events (greater than 20 mm in 24 hours). All water will be tested (and treated if required) prior to discharge from the site in order to determine compliance with the parameters of the EPL. No water will be discharged from the site without written approval of the Contractor's Environmental Manager (or delegate). This is to form a HOLD POINT. 	During Construction	CEMF Section 15.2e)	Environment Manager Project Engineer Site Superintendent	Section 6 Section 7 Table 7 Table 8
48.	The following compliance records will be kept by the Principal Contractors: <ul style="list-style-type: none"> Copies of current ESCPs for all active construction sites. Records of soil and water inspections undertaken. Records of testing of any water prior to discharge. Records of the release of the hold point to discharge water from the construction site to the receiving environment. 	During Construction	CEMF Section 15.2f)	Environment Manager Project Engineer Site Superintendent	Section 9
49.	The following water resources management objectives will apply to the construction of the project: <ul style="list-style-type: none"> i. Minimise demand for, and use of potable water; ii. Maximise opportunities for water re-use from captured stormwater, wastewater and groundwater; iii. Examples of measures to minimise potable water consumption include: 	Prior to Construction	CEMF Section 15.2g)	Environment Manager Project Engineer Site Superintendent	Section 6.8

No.	Measure	Timing	Requirement	Responsibility	Reference
	<ul style="list-style-type: none"> Water efficient controls, fixtures and fittings in temporary facilities; Collecting, treating and reusing water generated in tunnelling operations, concrete batching and casting facility processes; Using recycled water or treated water from onsite sources in the formulation of concrete; Harvesting and reusing rainwater from roofs of temporary facilities; Using water from recycled water networks; Collecting, treating and reusing groundwater and stormwater; Using water efficient construction methods and equipment; and Providing designated sealed areas for equipment wash down 				
50.	<p>Soil and Water Mitigation</p> <p>Examples of surface water and flooding mitigation measures include:</p> <ul style="list-style-type: none"> Clean water will be diverted around disturbed site areas, stockpiles and contaminated areas. Control measures will be installed downstream of works, stockpiles and other disturbed areas. Exposed surfaces will be minimised, and stabilised / revegetated as soon feasible and reasonable upon completion of construction. Dangerous good and hazardous materials storage will be within bunded areas with a capacity of 110 per cent of the maximum single stored volume. Spill kits will be provided at the batch plants, storage areas and main work sites. 	During Construction	CEMF Section 15.3)	Environment Manager Project Engineer Site Superintendent	Section 6
LOR EPL 21147					
51.	Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.	During construction	L1.1	Environment Manager Project Engineer Site Superintendent	Section 6
52.	Erosion and sediment control	During construction	O5.1	Environment Manager Project Engineer	Section 6.1

No.	Measure	Timing	Requirement	Responsibility	Reference
	All feasible and reasonable erosion and sediment controls are to be implemented to minimise sediment (including dust) leaving the premises and are to be implemented before any soil disturbance or vegetation clearing commences.			Site Superintendent	
53	All erosion and sediment controls at the premises must be maintained until all disturbed areas are stabilised.	During construction	O5.2	Environment Manager Project Engineer Site Superintendent	Section 6.1
54	The erosion and sediment controls to be implemented are to include but not be limited to: a) minimising the area of exposed soil as much as practicable, including stabilising disturbed areas as soon as practicable; and b) diversion of run-off from land upslope of the premises or undisturbed portions of the premises away from areas of soil disturbance as much as practicable; and c) diversion of run-off from areas of exposed soil to appropriate sediment control devices as much as practicable; and d) installing erosion controls in the base of drains used to divert runoff, to minimise erosion of sediment from the drain	During construction	O5.3	Environment Manager Project Engineer Site Superintendent	Section 6.1
55	Erosion and sediment controls are to be selected, installed and maintained taking into consideration the guidance in "Managing Urban Stormwater – Soils and Construction, Volume 2D, Main road construction" (DECC 2008) and "Managing urban stormwater: soils and construction – Volume 1" (Landcom 2006).	During construction	O5.4	Environment Manager Project Engineer Site Superintendent	Section 6.1
56	The licensee must inspect the operation of all erosion and sediment controls installed on the premises and undertake any works required to repair and/or maintain these controls: a) at least weekly; b) daily during periods of rainfall that causes runoff to occur; and c) prior to any site closure of greater than 24 hours.	During construction	O5.5	Environment Manager Project Engineer Site Superintendent	Section 6.1 Section 9
57	The licensee is required to prepare an erosion and sediment control strategy document. The licensee must ensure that: a) The document describes all erosion and sediment controls (including those relating to the minimisation of mud tracking from the premises) to be implemented at the site; and b) The document is prepared before the controls are implemented; and	During construction	O5.6	Environment Manager Project Engineer Site Superintendent	This plan Section 6.1.4

No.	Measure	Timing	Requirement	Responsibility	Reference																
	c) A copy of the document is kept at the premises until the licences is surrendered; and d) The document includes an assessment of how the reasonable and feasible erosion and sediment controls (including those relating to the minimisation of mud tracking from the premises) were selected; and e) The document is updated prior to any changes to the erosion and sediment controls.																				
58	The licensee must record all inspections of erosion and sediment controls, including observations on the condition of the controls, and works undertaken to repair and/or maintain the controls. These records are to be kept on the premises.	During construction	O5.7	Environment Manager Project Engineer Site Superintendent	Section 6.1 Section 9 Section 12																
59	All stockpiled material must be stabilised as soon as practicable if the stockpile has been left in-situ for greater than 5 days.	During construction	O5.8	Environment Manager Project Engineer Site Superintendent	Section 6.1																
60	A water quality sampling point is to be located on the discharge pipe from any sediment basin or other water treatment device and: a) The licensee must ensure that a sign is located at the discharge point noting the discharge point number identified under this licence; and b) A safe access path is to be provided to the sampling point to readily allow for the collection of samples.	During construction	O5.9	Environment Manager Project Engineer Site Superintendent	No sediment basins or treatment plants have been proposed																
61	Requirement to monitor concentration of pollutants discharged M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns.	During construction	M2.1	Environment Manager	Section 6.2																
62	Water and/ or Land Monitoring Requirements Points 5, 6 and 7 (note: points 1, 2, 3 and 4 are related to SSJ works) <table><tr><th>Pollutant</th><th>Units of measure</th><th>Frequency</th><th>Sampling Method</th></tr><tr><td>Oil and Grease</td><td>Visible</td><td>Special Frequency 1</td><td>Visual Inspection</td></tr><tr><td>pH</td><td>pH</td><td>Special Frequency 1</td><td>In situ</td></tr><tr><td>Total suspended solids</td><td>milligrams per litre</td><td>Special Frequency 1</td><td>Grab sample</td></tr></table>	Pollutant	Units of measure	Frequency	Sampling Method	Oil and Grease	Visible	Special Frequency 1	Visual Inspection	pH	pH	Special Frequency 1	In situ	Total suspended solids	milligrams per litre	Special Frequency 1	Grab sample	During construction	M2.2	Environment Manager	Section 6.2
Pollutant	Units of measure	Frequency	Sampling Method																		
Oil and Grease	Visible	Special Frequency 1	Visual Inspection																		
pH	pH	Special Frequency 1	In situ																		
Total suspended solids	milligrams per litre	Special Frequency 1	Grab sample																		

No.	Measure	Timing	Requirement	Responsibility	Reference																								
63	For the purposes of Conditions M2.1, the term 'Special Frequency 1' means: (a) Less than 24hours prior to controlled discharge and daily for any controlled discharge.	During construction	M2.3	Environment Manager	Section 6.2																								
64	Concentration limits For each monitoring/discharge point or utilisation area specified in the table/s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table	During construction	L2.1	Environment Manager	Section 6.2																								
65	Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.	During construction	L2.2	Environment Manager	Section 6.2																								
66	To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table/s	During construction	L2.3	Environment Manager	Section 2.2 Section 6.2																								
67	Water and/or Land Concentration Limits <table border="1"> <thead> <tr> <th>Pollutant</th><th>Units of Measure</th><th>50 Percentile concentration limit</th><th>90 Percentile concentration limit</th><th>3DGM concentration limit</th><th>100 percentile concentration limit</th></tr> </thead> <tbody> <tr> <td>Oil and Grease</td><td>Visible</td><td></td><td></td><td></td><td>Not visible</td></tr> <tr> <td>pH</td><td>pH</td><td></td><td></td><td></td><td>6.5-8.5</td></tr> <tr> <td>Total suspended solids</td><td>milligrams per litre</td><td></td><td></td><td></td><td>50</td></tr> </tbody> </table>	Pollutant	Units of Measure	50 Percentile concentration limit	90 Percentile concentration limit	3DGM concentration limit	100 percentile concentration limit	Oil and Grease	Visible				Not visible	pH	pH				6.5-8.5	Total suspended solids	milligrams per litre				50	During construction	L2.4	Environment Manager	Section 6.2
Pollutant	Units of Measure	50 Percentile concentration limit	90 Percentile concentration limit	3DGM concentration limit	100 percentile concentration limit																								
Oil and Grease	Visible				Not visible																								
pH	pH				6.5-8.5																								
Total suspended solids	milligrams per litre				50																								
68	If the licensee uses turbidity (NTU) in place of TSS to determine compliance with Conditions L2.4 the licensee must develop a statistical correlation which identifies the relationship between NTU and TSS for water quality in the sediment basins, water treatment plants and excavations in order to determine the NTU equivalent of 50 mg/L TSS before NTU is used.	During construction	L2.5	Environment Manager	A TSS probe will be used instead of NTU																								
69	The licensee must provide the EPA with a copy of the statistical assessment methodology and results before using NTU in place of TSS.	During construction	L2.6	Environment Manager	A TSS probe will be used instead of NTU																								
70	The licensee must develop and implement a method to enable the ongoing verification of the relationship between NTU and TSS.	During construction	L2.7	Environment Manager	A TSS probe will be used instead of NTU																								

No.	Measure	Timing	Requirement	Responsibility	Reference
71	The licensee must provide the EPA with any amendments the licensee makes to the statistical correlation as a result of the ongoing verification required by Condition L2.6 before using the revised statistical correlation.	During construction	L2.8	Environment Manager	A TSS probe will be used instead of NTU

Appendix B – Procedures



RESPONSIBILITY



ENVIRONMENT TEAM
CONSTRUCTION TEAM



CONSTRUCTION TEAM



CONSTRUCTION TEAM
ENVIRONMENT TEAM
SITE SUPERVISOR



CONSTRUCTION MANAGER
ENVIRONMENTAL
CONSULTANT



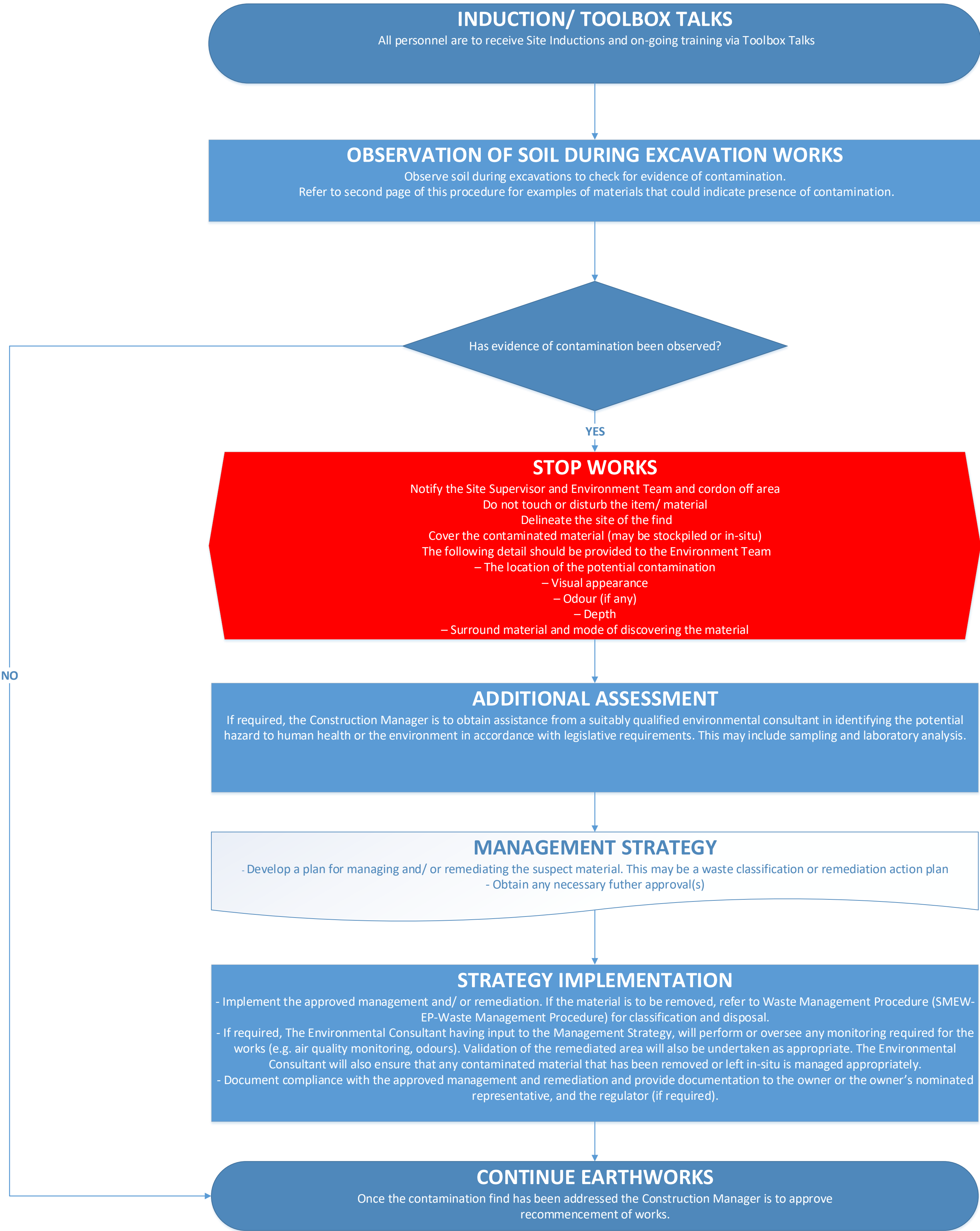
ENVIRONMENT TEAM
ENVIRONMENTAL
CONSULTANT



ENVIRONMENT TEAM
CONSTRUCTION TEAM
ENVIRONMENTAL
CONSULTANT



CONSTRUCTION
MANAGER



EVIDENCE OF CONTAMINATION

Example of materials that could indicate the presence of contamination include (but are not necessarily limited to):

- . Asbestos cement fragments or other potentially asbestos containing materials
- . Odorous or stained soil;
- . Buried chemical drums or containers
- . High proportion of waste materials or building debris
- . Tarry or ashy material
- . Brightly or unusually coloured material
- . A yellow and/or red mottling in the soil profile indicates there may be Acid Sulfate Soils (ASS)

Asbestos

Asbestos finds are to be managed in accordance with the Project WHS Management Plan

Acid Sulfate Soils (ASS)

ASS are naturally occurring soils, sediments or organic substrates that are formed under waterlogged conditions in coastal areas. When exposed to air after being disturbed, soils containing iron sulfides produce sulfuric acid and often release toxic quantities of iron, aluminium and heavy metals.

If ASS is encountered, possible management strategies include:

- . Modifying the works to avoid the area of ASS
- . Delineation and removal to a suitably licenced facility
- . Onsite treatment to neutralise the ASS, which could include the application of lime.

Note: The management of any ASS needs to include appropriate erosion and sedimentation controls to minimise the potential for pollution to waters. Refer to the Construction Spoil and Water Management Plan.

Management and Disposal of Contaminated Material

Specific approval may be required to implement management strategies and a Safe Work Methods Statement (SWMS) must be prepared prior to undertaking any remediation work, except in emergency situations.

Contaminated material will be disposed of in accordance with the Waste Management Procedure.



Appendix C – Acid Sulphate Soil Treatment Process

8.4.5 Soil treatment procedure

Acid sulfate soil material should be placed on the treatment pad (see Figure 8-1) or fill area in layers up to 300 mm thick. Thinner layers of soil can be more easily and thoroughly dried and mixed; 300 mm is suggested as a maximum, not only to prevent inadequate mixing but to prevent equipment from bogging and to allow compaction to improve strength, thus minimising subsidence and heave when filling. Once the ASS is dry enough to work, the appropriate amount of neutralising agent, calculated to include the safety factor, should be spread. The ASS may need reworking several times to achieve adequate mixing of the neutralising agent and/or drying of the soil.

The treated layer will require verification testing (see section 8.2 and ASS tips 13 and 14) to confirm whether enough neutralising agent has been incorporated into the soil. Treated and verified soil should be subsequently compacted before treatment of the next layer begins, or when moved to the permanent placement area if first mixed on temporary treatment pads. Compaction is not necessary if the treated soil is permitted to be disposed of or reused elsewhere.

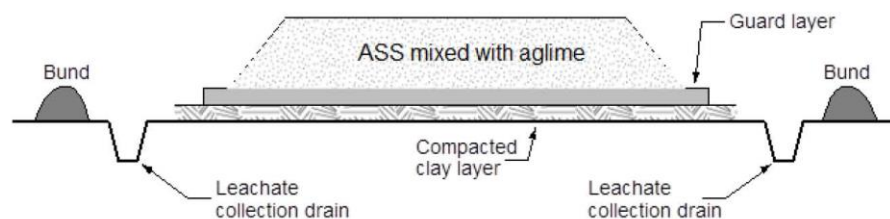


Figure 8-1: Schematic cross-section of a treatment pad, including a compacted clay layer, guard layer, leachate collection system and containment with bunding

Where soil mixing machinery (e.g. Figure 8-2) is used, soil treatment should still be carried out in a bunded and sealed area as per section 8.4.3. Treated batches should be spatially arranged in such a manner that re-treatment is easy in cases of verification test failure.

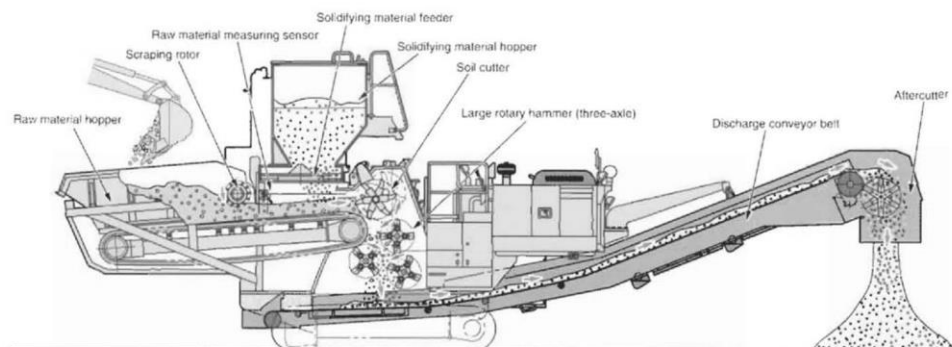
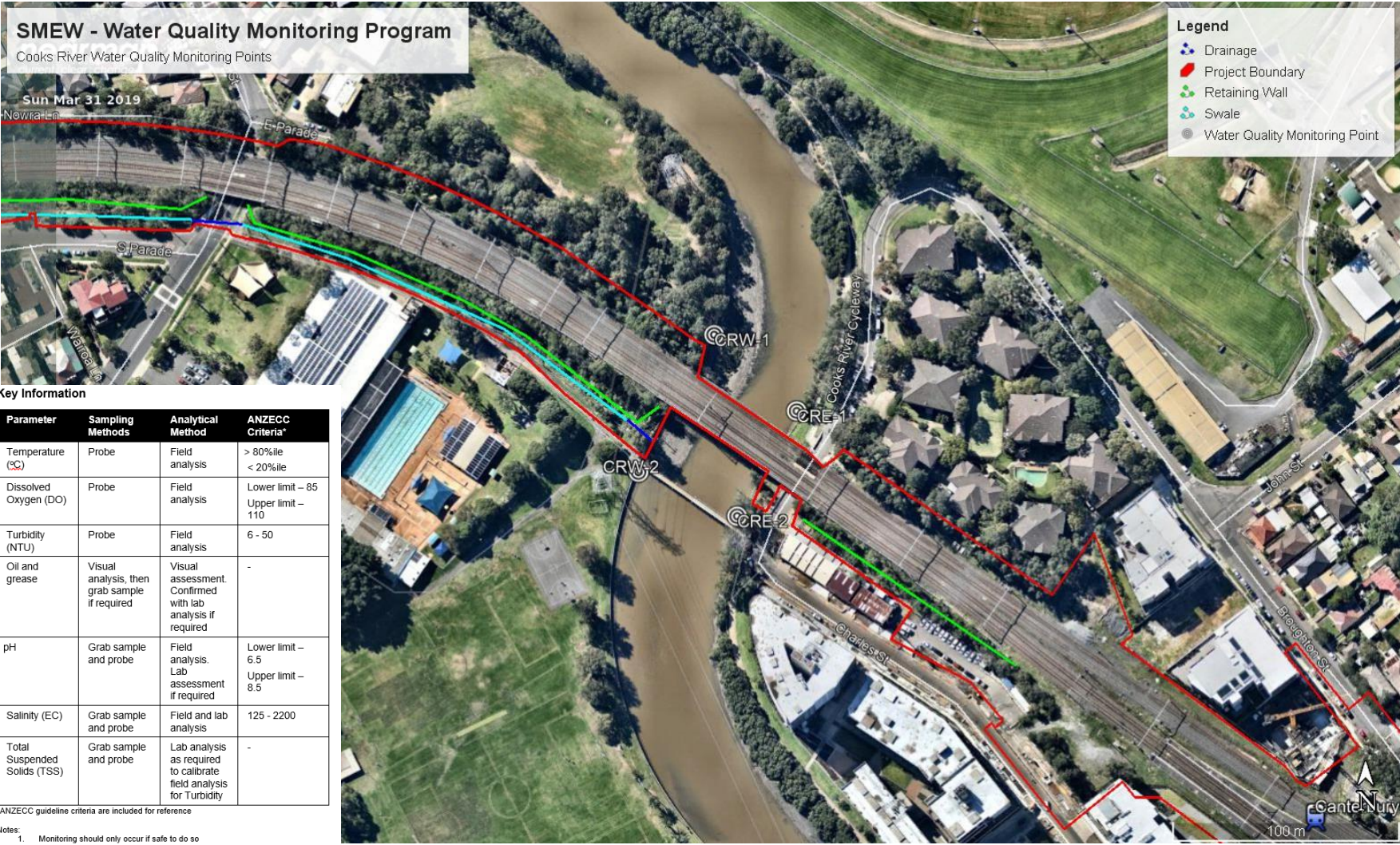


Figure 8-2: Cross-sectional view of soil mixing machinery (Komatsu, 2003). Note that soil treatment with such machinery should be carried out in an appropriately contained area, including bunding and measures to prevent leachate infiltration.

Appendix D – Water Quality Monitoring Locations



Appendix E – Consultation Register

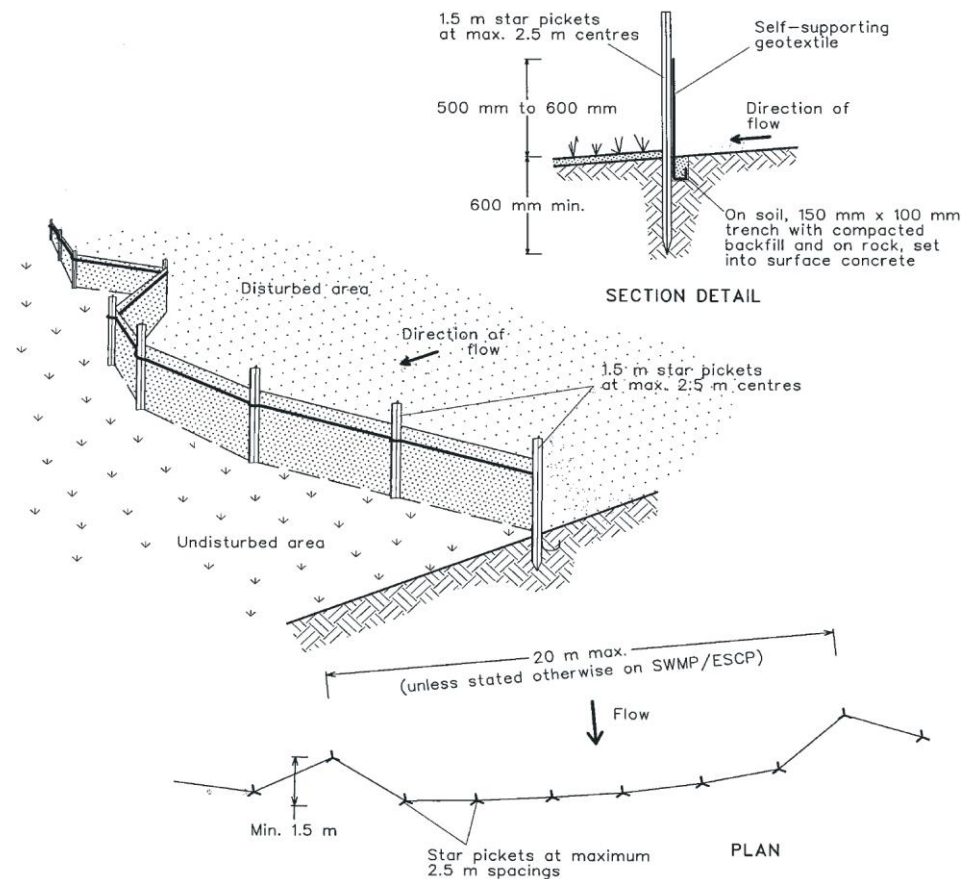
Agency	Comment	JHLOR Response
Department of Industry (also a requirement of REMM FHW4)	No comment received	
Office of Environment and Heritage	<p>Hi Daniel,</p> <p>I have reviewed the Construction Soil and Water Management Plan relevant to the project. It is agreed that the construction works will have negligible impacts on flooding within the catchment, with minimal loss of flood storage and minimal changes or restrictions to existing flood regimes.</p> <p>The management measures outlined in the report will be satisfactory in mitigation of residual flood risk on the project site.</p> <p>Please let me know if there is anything else you require in terms of OEH comment on flood risk relevant to the construction phase of this project</p>	Noted.
City of Canterbury-Bankstown	<p>Hi Daniel,</p> <p>The following is Council's comments to the Construction Soil and Water Management Plan (CSWMP) & Water Quality Monitoring Program :</p> <ul style="list-style-type: none"> - Page 29 of the Construction Soil and Water Management Plan states that all erosion and sediment controls will be inspected at least weekly, before forecast rain events, before a site closure of more than two days and after rainfall exceeding 10mm in 24 hours. Council believes that these controls should have a more frequent scheduled check regardless of forecast rain, site closure or after rainfall. This is to ensure that checks are undertaken and registered to reduce the potential for a pollution incident to occur. - It is noted that any water that may be discharged from the site (dewatering) to Council's stormwater system is to be tested and signed off by the environmental manager before the discharge is to commence. Will approval be sort from Council before this is undertaken? <p>If you need any further information please let me know, please co-ordinate with George Webb. Contact details are attached below.</p>	<p>Updated to include an additional dot point to Section 6.1.4 "Site supervisors will undertake daily erosion and sediment control checks and record any issues within site diaries. Site supervisors will ensure controls are maintained and in working order." It is noted that the rainfall event has been updated to 20mm in 24 hours to reflect the rest of the CSWMP and the Laing O'Rourke EMS.</p> <p>Dewatering will occur in accordance with the requirements of the Planning Approval. Water discharged to Council stormwater from the construction site would generally be captured by the same stormwater system under current conditions.</p> <p>The water quality requirements, as stated in Section 6.2.3 will sufficiently mitigate the impacts associated with poor water quality to the system (i.e. siltation). It is agreed that under some circumstances, the capacity of the stormwater system may be limited.</p>

		As such, JHLOR have added following statement to Section 6.2.3 "JHLOR will consult with the relevant Council prior to discharge in Council stormwater assets where the stormwater system's capacity may be reduced during wet weather. It is noted that volume of stormwater captured and discharged offsite is expected to be negligible."
Inner West Council	<p>Hi Daniel - below is a summary of the main points from Inner West Council's submission on SWM and comments relevant to this sub-plan are further below:</p> <p>Cooks River councils are working to make to Cooks River swimmable with the backing of the Commonwealth and State governments. The NSW Water Quality and River Flow Objectives and ANZECC 2000 guidelines are not sufficient for the Cooks River catchment. Inner West Council and the Cooks River Alliance councils apply the targets set by the Botany Bay Water Quality Improvement Program (BBWQIP) recommended by the NSW Government. All levels of government and catchment councils have invested significant resources and funding into improving the Cooks River and all water including runoff leaving the construction sites, rail corridor and associated infrastructure must be managed and treated to achieve the BBWQIP targets.</p> <p>Further comments relevant to this sub-plan are as follows:</p> <ul style="list-style-type: none"> • It should be noted that the scope of the plan covers early works only and not primary construction • There is no commitment to meet the runoff targets specified in the Botany Bay Water Quality Improvement Plan / Sydney Harbour Water Quality Improvement Plan (BBWQIP/SHWQIP). All water including runoff leaving the construction sites and associated infrastructure must be managed and treated to achieve the BBWQIP targets. 	<p>The Botany Bay Water Quality Improvement Plan (BBWQIP) sets a framework for water quality improvement within the Cooks River (and Botany Bay) and provides guidance on measures that may be implemented to achieve this.</p> <p>The BBWQIP provides targets for new developments to achieve during the "operational phase". These targets relate to a reductions of pollutants against a base case development (i.e. with no measures implemented).</p> <p>Although these targets are not applicable to the Sydney Metro Sydenham to Bankstown project in accordance with the Planning Approval (SSI- 8256), JHLOR have considered how these may be applied to benefit water quality on SMEW.</p> <p>As the BBWQMP relates to reducing stormwater pollutants during the operational phase of a project this comment relates to the design process rather than this CSWMP.</p> <p>The majority of JHLOR's scope of works will have no or negligible impacts on water quality during the operational phase (i.e. combined service route).</p> <p>JHLOR's scope does include drainage works adjacent to the retaining wall works in Canterbury. Noting that detailed design is ongoing, JHLOR will consider options for inclusion of Water Sensitive Urban Design within the design to target the "best case" scenario (i.e. vegetated swales, stormwater infiltration).</p>

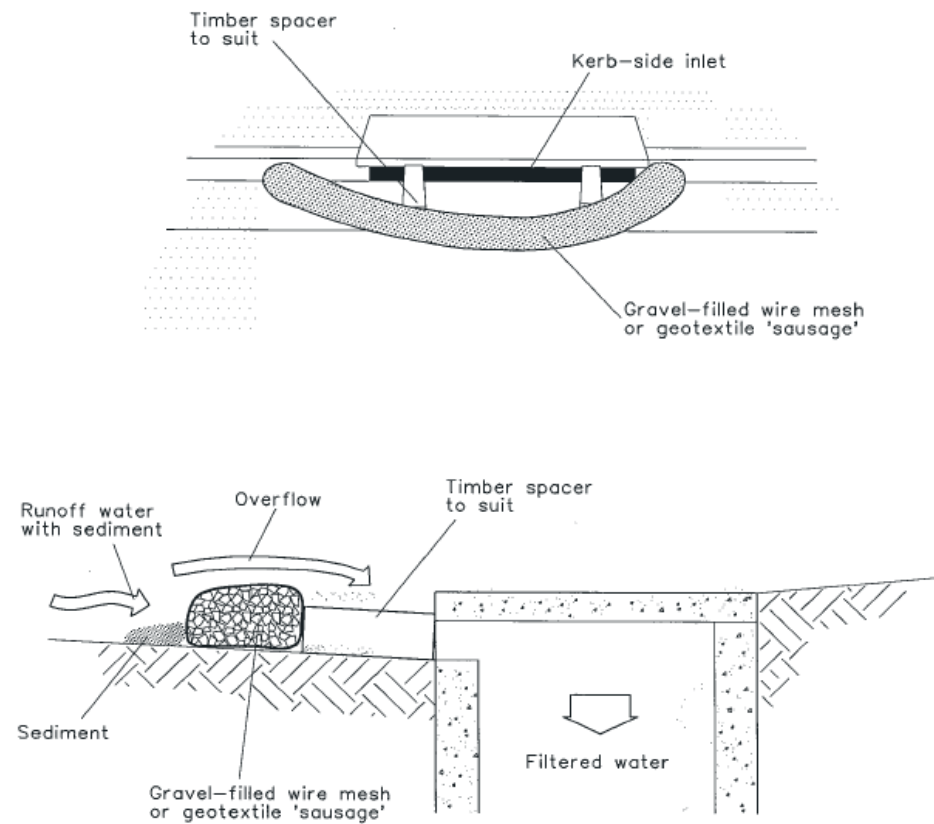
		It is noted that the best case scenario must also consider re-planting of riparian vegetation. Planting of trees is beyond the JHLOR scope and is to be addressed by Sydney Metro in accordance with the tree management requirements of the Planning Approval.
NSW EPA	<p>Hi Daniel,</p> <p>I refer to the Sydney Metro - Southwest Metro Early Works, Construction Environmental Management Plan (Report No. SMCSWSSJ-JHL-WEC-EM-PLN-000001) and Construction Soil and Water Management Plan (Report No. SMCSWSSJ-JHL-WEC-EM-PLN-000004) forwarded to EPA via email on 20 April 2019.</p> <p>Thank you for forwarding these documents for our records. The EPA encourages the development of such plans to ensure that proponents have determined how they will meet their statutory obligations and designated environmental objectives. However, it is not EPA policy to approve or endorse these documents. The EPA's role is to set environmental objectives/requirements for environmental management, rather than being directly involved in the development of strategies to achieve those objectives/requirements.</p> <p>EPA understands that the early works package are proposed to be undertaken under the Sydney Trains EPL12208 and your attention is directed to requirements therein.</p> <p>Thank you for your email and please do not hesitate to contact me should you wish to discuss.</p>	Noted.

Appendix F – Baseline ESCP for Initial Construction Works (August-September 2019)

Sediment Fence Install



Kerb Inlet Protection



NOTE: This practice only to be used where specified in an approved SWMP/ESCP.

Rumble Grids to be set up at access gates where dirt/mud may be tracked outside of the site (Photo from Wickham Transport Interchange)



Kerb Inlet Protection (photo from Blue Book)



*Drain protection can also be undertaken with coir logs, sandbags and geofabric

- To be reviewed by Environmental Manager (or delegate)

Role	Name	Signature	Date
Environment Manager / Coordinator			

ERSED Principles

- The implementation of temporary erosion controls will be progressive and continual
- Minimal disturbance at all times
- Sediment control measures will be designed so that they are as close as possible to the potential source of sediment
- Any temporary controls will be reinstated at the end of each day
- After rainfall events (>10mm in 24hrs, ERSED controls will be inspected

AIR QUALITY

Dust must not leave the project boundary

Introduce measures to minimise dust such as ground cover, water suppression and reduced speed on access routes

ACCESS GATES

Vehicles must be clean of sediment prior to leaving site to prevent tracking on roads

Maintain wheel washes or rumble grids

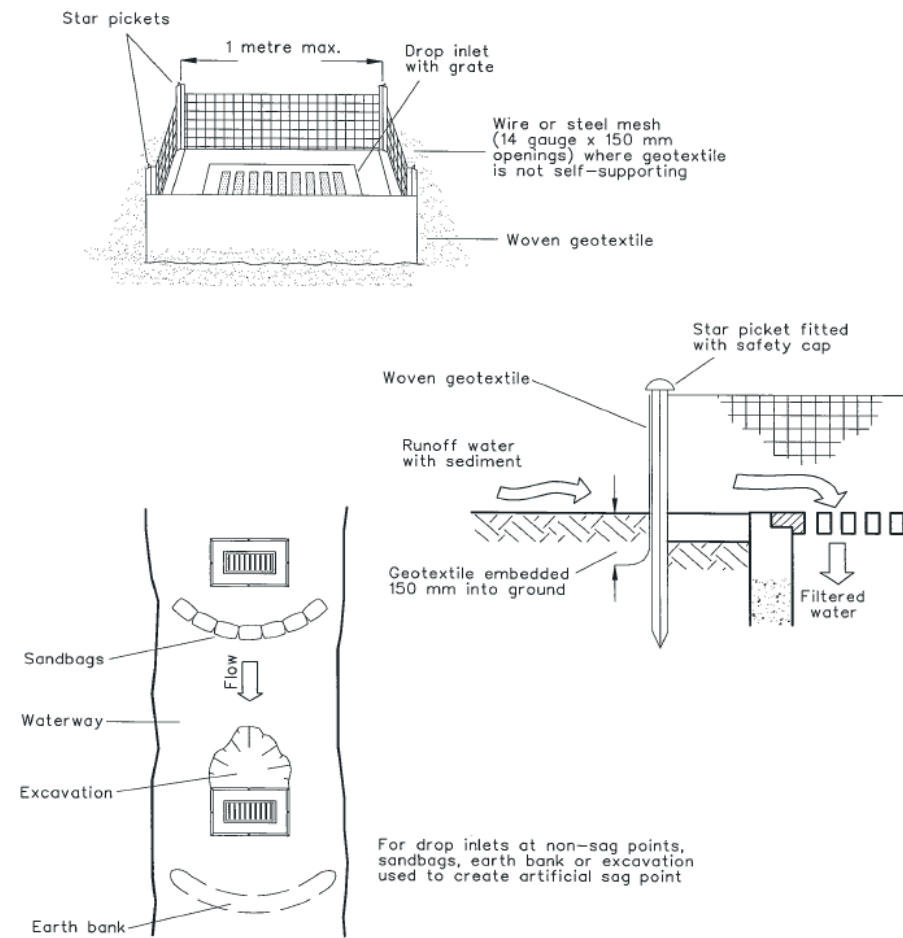
Sweep roads immediately if sediment has tracked off site

NO PERMIT NO PUMP

Water must not be discharged off site or reused on site without a permit from the environment team

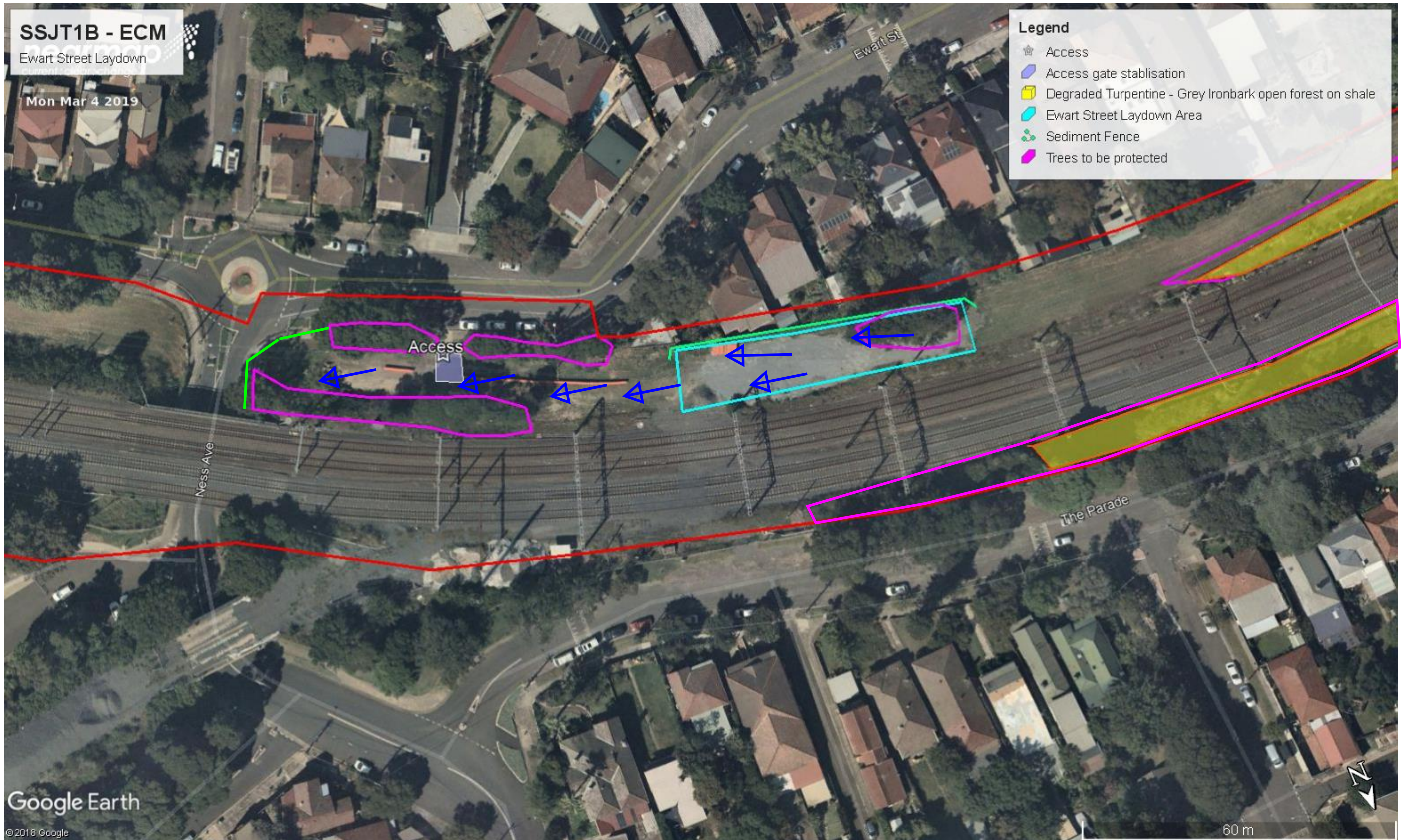
All condition of the permit must be implemented

Sag Pit Protection



Cover Stockpiles during inclement weather or when not in use





Appendix G – Construction Activity Analysis Maps







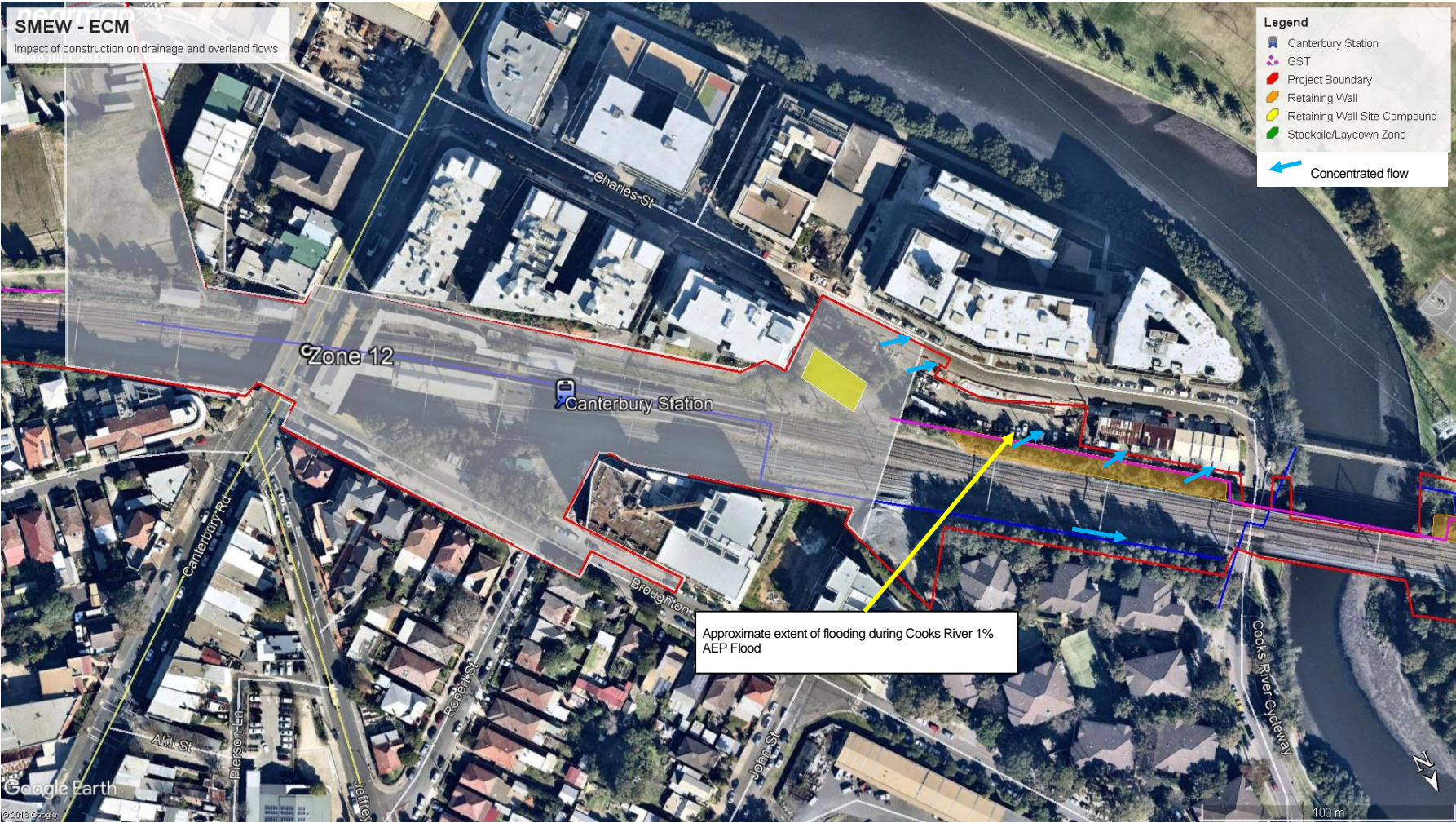


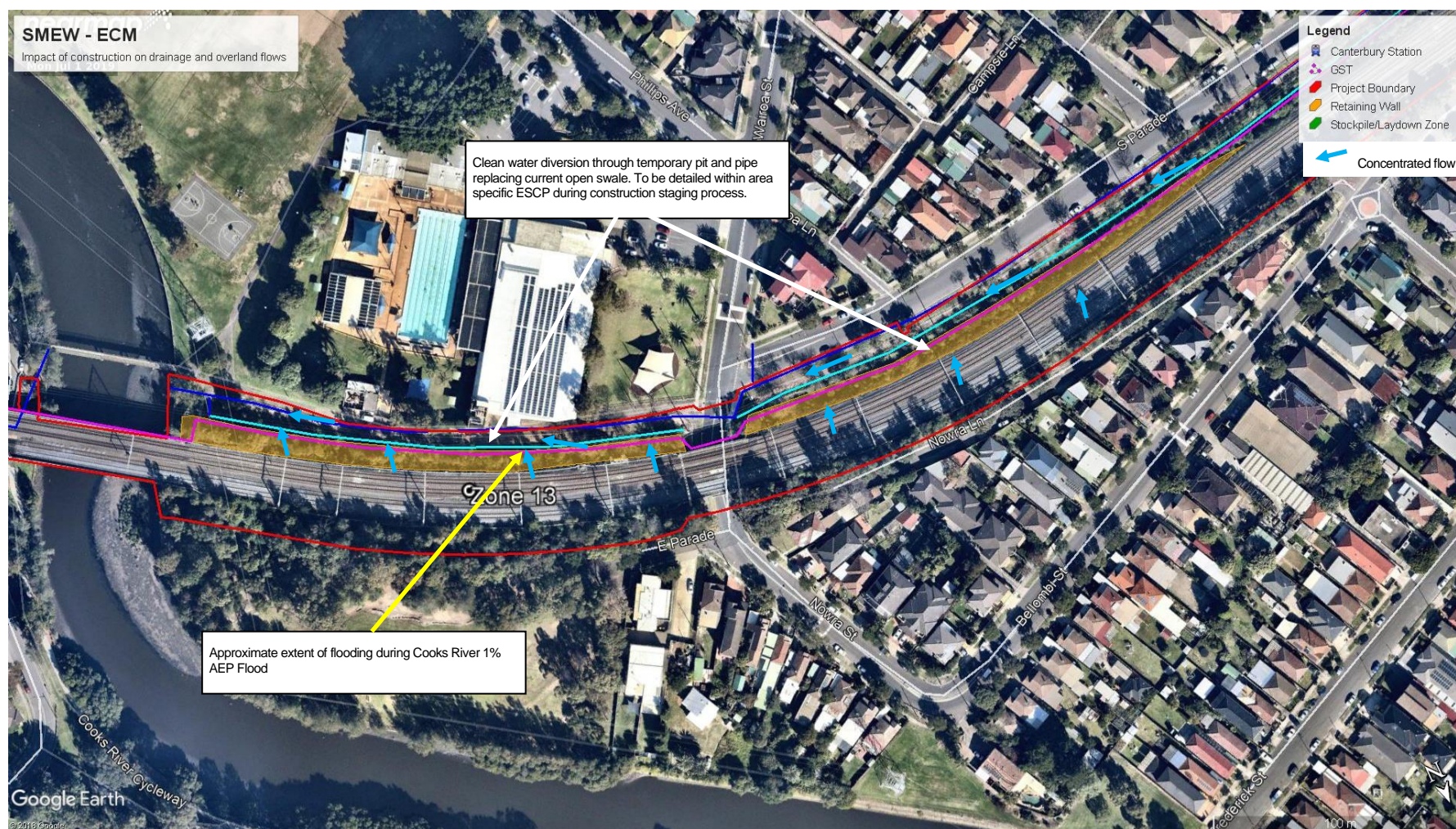






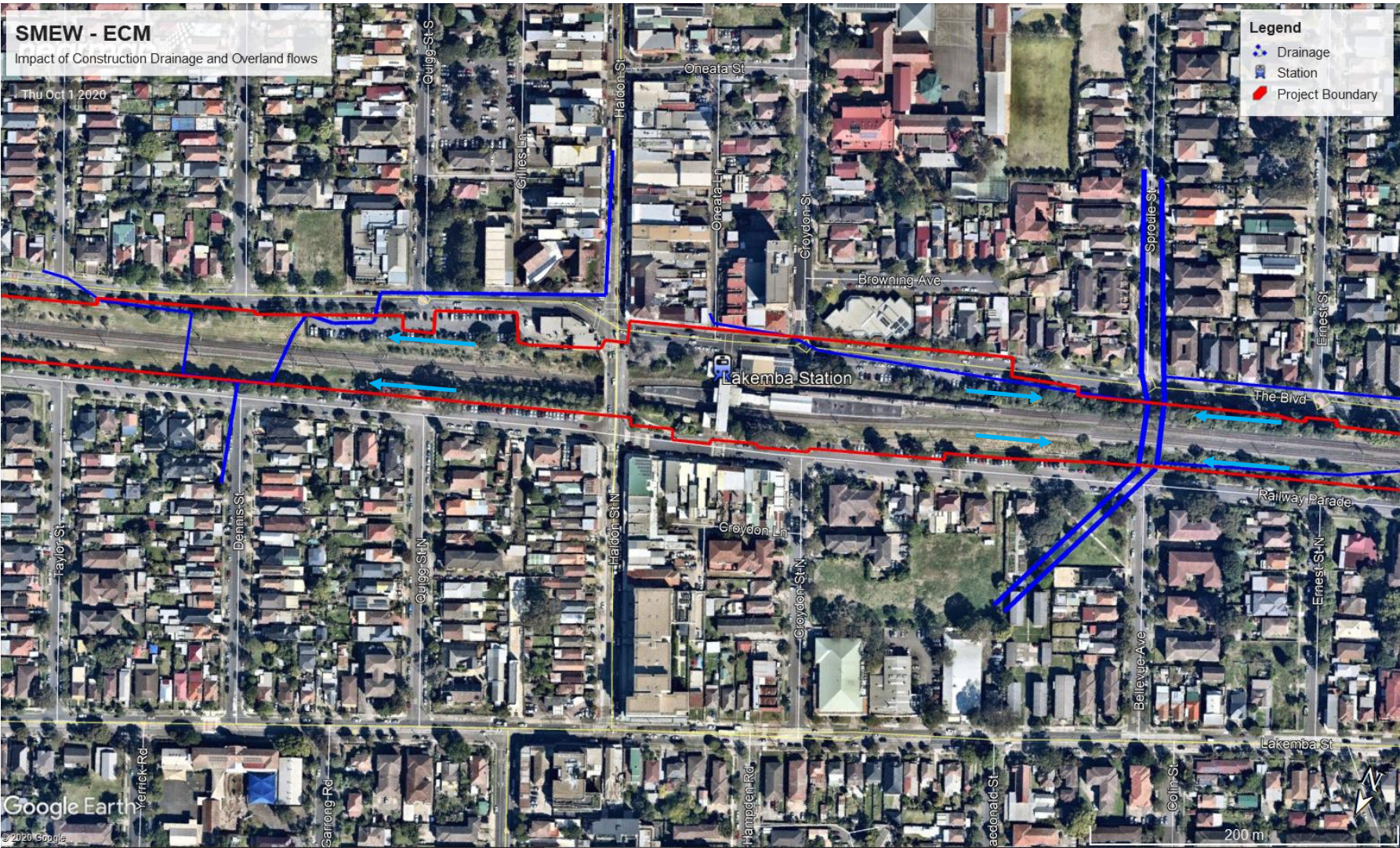




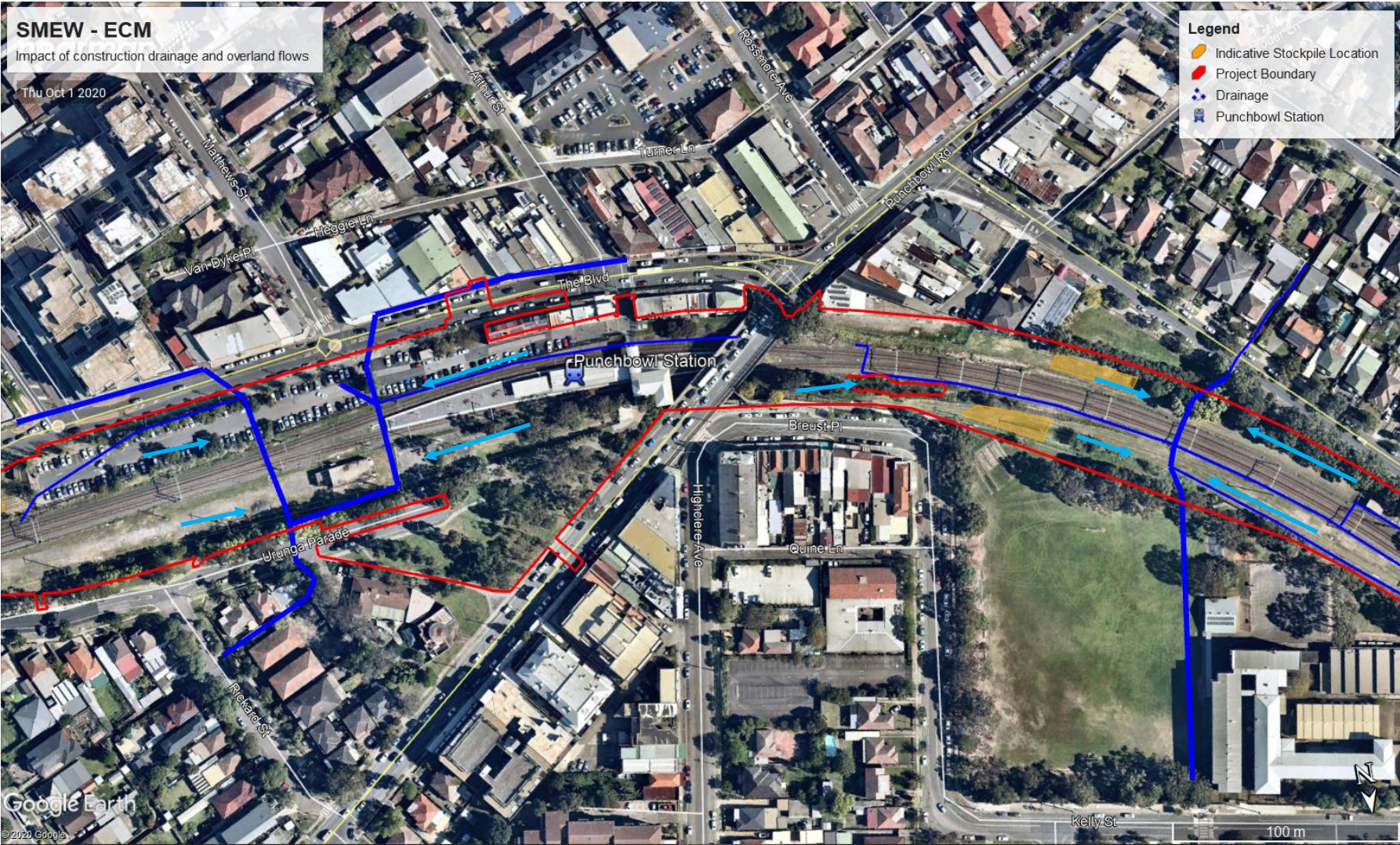


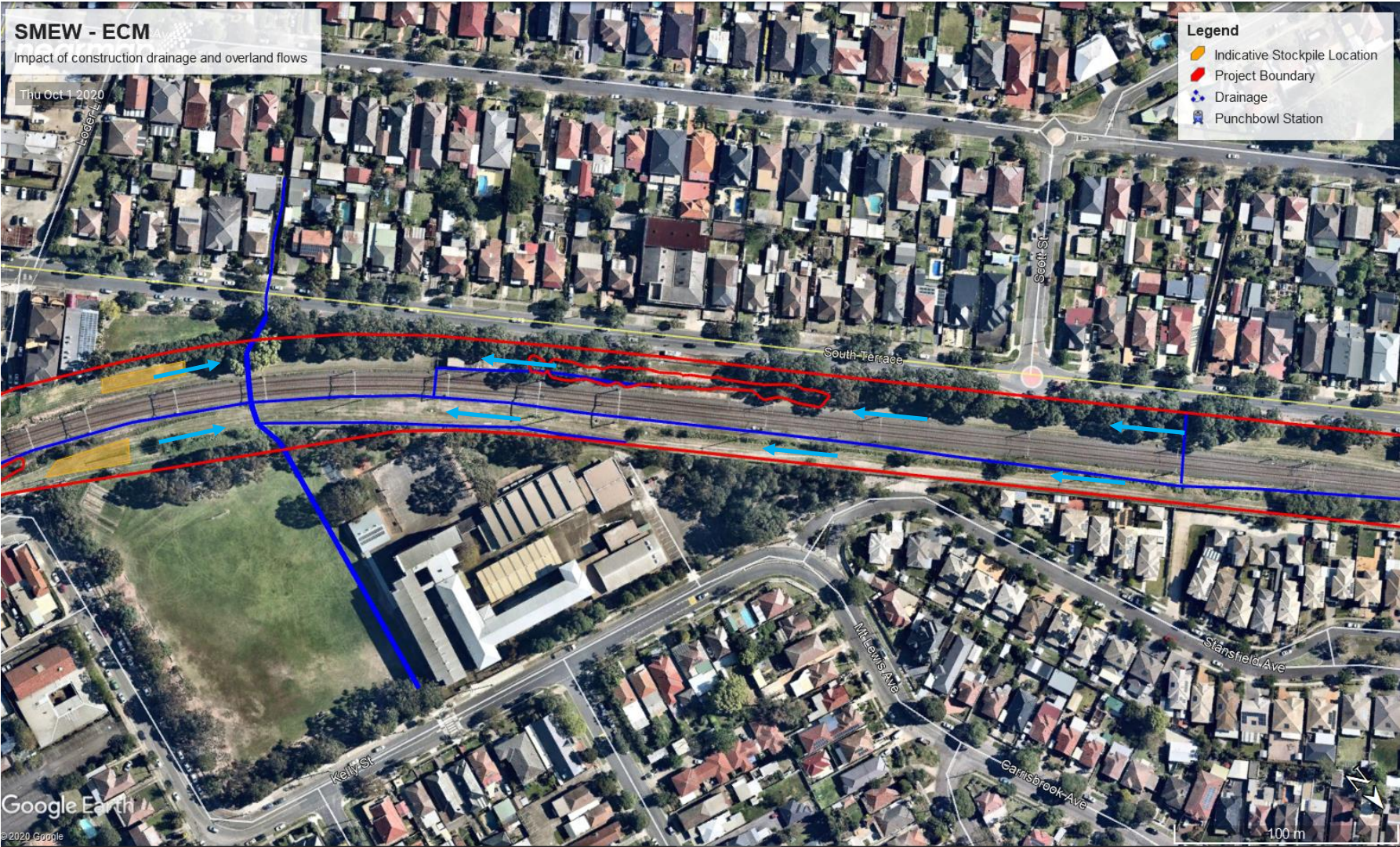












Appendix H Remediation Action Plan – Sustainability Appraisal Template



Date Identified:	Regulatory Action Required:
Type:	Date of Notification to Client (Sydney Metro):
Location:	

Sustainability Hierarchy (v1.2 IS)		Environmental	Impact i.e. High / Medium / Low	Social	Impact i.e. High / Medium / Low	Economic	Impact i.e. High / Medium / Low	GO or NO GO	Justification		Remedial Solution	Longevity of Remedial Solution	Maintenance Requirements	Monitoring Requirements	Evidence
1	If Practicable, on site treatment of the contamination, so that it is destroyed, or the associated risk is reduced to an acceptable level	Impacts on Air		Impacts on human health & safety		Direct economic costs & benefits				IF NO GO, MOVE TO NEXT STEP					
		Impacts on Soil		Ethical & equity considerations		Indirect economic costs & benefits									
		Impacts on Water		Impacts on neighbourhoods or regions		Employment & capital gain									
		Impacts on Ecology		Community involvement & satisfaction		Gearing									
		Use of natural resources & generation of wastes		Compliance with policy objectives & strategies		Life-span and 'project risks'									
		Intrusiveness		Uncertainty & evidence		Project flexibility									
		2	Off-site treatment of excavated soil, so that the contamination is destroyed, or the associated risk is reduced to an acceptable level, after which soil is returned to site.	Impacts on Air		Impacts on human health & safety									
Impacts on Soil				Ethical & equity considerations		Indirect economic costs & benefits									
Impacts on Water				Impacts on neighbourhoods or regions		Employment & capital gain									
Impacts on Ecology				Community involvement & satisfaction		Gearing									
Use of natural resources & generation of wastes				Compliance with policy objectives & strategies		Life-span and 'project risks'									
Intrusiveness				Uncertainty & evidence		Project flexibility									
3	Consolidation and isolation of the soil on site by containment with a property designed barrier.			Impacts on Air		Impacts on human health & safety		Direct economic costs & benefits				IF NO GO, MOVE TO NEXT STEP			
		Impacts on Soil		Ethical & equity considerations		Indirect economic costs & benefits									
		Impacts on Water		Impacts on neighbourhoods or regions		Employment & capital gain									
		Impacts on Ecology		Community involvement & satisfaction		Gearing									
		Use of natural resources & generation of wastes		Compliance with policy objectives & strategies		Life-span and 'project risks'									
		Intrusiveness		Uncertainty & evidence		Project flexibility									
		4	Removal of contaminated material to an approved site of facility, followed, where necessary, by replacement with appropriate material.	Impacts on Air		Impacts on human health & safety		Direct economic costs & benefits							
Impacts on Soil				Ethical & equity considerations		Indirect economic costs & benefits									
Impacts on Water				Impacts on neighbourhoods or regions		Employment & capital gain									
Impacts on Ecology				Community involvement & satisfaction		Gearing									
Use of natural resources & generation of wastes				Compliance with policy objectives & strategies		Life-span and 'project risks'									
Intrusiveness				Uncertainty & evidence		Project flexibility									
5	where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management			Impacts on Air		Impacts on human health & safety		Direct economic costs & benefits							
		Impacts on Soil		Ethical & equity considerations		Indirect economic costs & benefits									
		Impacts on Water		Impacts on neighbourhoods or regions		Employment & capital gain									
		Impacts on Ecology		Community involvement & satisfaction		Gearing									
		Use of natural resources & generation of wastes		Compliance with policy objectives & strategies		Life-span and 'project risks'									
		Intrusiveness		Uncertainty & evidence		Project flexibility									