Southwest Metro Sydenham to Bankstown Construction Soil and Water Management Plan

Document and Revision History

Document Details		
Title	Construction Soil and Water Management Plan- South West Metro – Sydenham Bankstown	
Client	Sydney Metro City & Southwest	
Client reference no.	**SWMC, BEW, SWM1 & 2, SWMC additional works**	SMCSWSSJ-JHL-WEC-EM-PLN-000010
JHLOR JV contract no.	K44	

Revisions

Revision	Date	Description	Prepared by	Reviewed by
0.0	19/10/2020	Internal Draft	Dylan Greeff	Dan Keegan
1.0	28/10/2020	Issued for review	Dylan Greeff	Dan Keegan
2.0	23/11/2020	Updated for Sydney Metro and ER comments	Rachael Labruyere	Dan Keegan
3.0	8/01/2020	Updated for Sydney Metro, ER and stakeholder comments	Rachael Labruyere	Dan Keegan
4.0	05/02/2021	Updated for DPE comments	Rachael Labruyere	Dan Keegan
5.0	02/08/2021	Minor update for the Bankstown Early Works	Chris McCallum	Mark Turner
6.0	1/09/2021	Updated for Sydney Metro and ER comments	Dan Keegan	Chris McCallum
7.0	19/09/2021	Updated for Sydney Metro and ER comments and consultation with City of Canterbury Bankstown Council	Dan Keegan	Chris McCallum
8.0	14/05/2022	6 monthly submission- 1st review	Dan Talbot	Lucas Dobrolot
9.0	01/06/2022	6 monthly submission- 2nd review	Dan Talbot	Lucas Dobrolot
10.0	06/06/2022	Update for Bankstown and Additional Corridor Works (BAC)	Chris McCallum	Lucas Dobrolot
11.0	11/07/2022	Updated for Sydney Metro and ER comments	David Parkinson	Chris McCallum
12.0	08/08/2022	Updated after local Council review	David Parkinson	Chris McCallum
13.0	28/03/2023	Update for excluding BAC	Zhengyi Zhang	Lucas Dobrolot
14.0	21/06/2023	Update for station bracket scope	Zhengyi Zhang	Lucas Dobrolot
15.0	28/06/2023	Updated for Sydney Metro and ER comments	Zhengyi Zhang	Lucas Dobrolot

Revision	Date	Description	Prepared by	Reviewed by
16.0	09/11/2023	Update for SWM2	Zhengyi Zhang	Chris McCallum
17.0	21/05/2024	Updated to consolidate JHLOR Portfolio of works under S2B (including SWM3 scope)	Lucas Dobrolot	Chris McCallum
18.0	03/07/2024	Address Comments from SM & ER	Zhengyi Zhang	Lucas Dobrolot

Management reviews

Version	Details	Date	Reviewed By	Signature

Controlled:	NO	Copy no.:	Uncontrolled:	YES

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Terms and definitions

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

Terms	Explanation
AHD	Australian Height Datum
ARI	Average Rainfall Intensity
AS	Australian Standard
Assurance Application	Laing O'Rourke's Online Tool to manage Non-Conformances
BAC	Bankstown Station and Additional Corridor Works (scope of works removed)
BEW	Bankstown Early Works scope of works
CAR	Corrective Action Request
CBT	Corridor Bankstown
CCB	City of Canterbury-Bankstown (Council)
CCS	Community Consultation Strategy
CCTV	Closed Circuit Television
CEMF	Construction Environmental Management Framework
CEMP	Construction Environmental Management Plan
CFCs	Chlorofluorocarbons
CHMP	Construction Heritage Management Plan
CNVMP	Construction Noise and Vibration Management Plan
CNVIS	Construction Noise and Vibration Impact Statement
CNVS	Construction Noise and Vibration Statement
CoA	Conditions of Approval
Core Process and Enabling Processes	Core Process (Governance) and Enabling Process (Detail) provide a coordinated overview of the processes and controls in Laing O'Rourke.
CRAW	Construction Risk Assessment Workshop
CSSI	Critical State Significant Infrastructure
CTMP	Construction Traffic Management Plan
Cwth	Commonwealth
dB	Decibels
DIPNR	Department of Infrastructure, Planning and Natural Resources
DDA	Disability Discrimination Act
DECC	NSW Department of Energy and Climate Change (now DCCEEW)
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPHI	NSW Department of Planning Housing and Infrastructure
ECM	Environmental Control Map
ECR	Environmental Compliance Requirement
EEC	Endangered Ecological Community
EIFR	Environmental Incident Frequency Rate

Terms	Explanation
PPE	Personal protective equipment
Proponent	The person or organisation identified as the proponent in Schedule 1 of the planning approval. In this case Sydney Metro Authority
Registered Aboriginal Parties	As defined in the Aboriginal cultural heritage consultation requirements for proponents 2010
REMM	Revised Environmental Mitigation Measure
RMS	Road and Maritime Services
S2B	Sydenham to Bankstown is the JHLORJV scope of works, collectively SWMC, BEW, BAC, SWM1, 2, and 3)
SCO	Sydney Coordination Office
Secretary	The Secretary of the Department of Planning, Industry and Environment
SDS	Safety Data Sheet
SM	Sydney Metro
SSI	State Significant Infrastructure
SMC	South West Metro Corridor scope of works
SWM	(SWM 1, 2, 3) South West Metro scope 1, 2 and 3 of the S2B Project
SWMS	Safe Works Method Statement
TBA	To be Advised
TEC	Threatened Environmental Communities
TfNSW	Transport for New South Wales
TS	Threatened Species
WIRES	Wildlife Information, Rescue and Education Service

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 *Environmental Planning and Assessment Act 1979* (EP&A Act). The Project determination was made on the 12th of December 2018 and Modified on the 22nd of October 2020. John Holland Laing O'Rourke Joint Venture (JHLOR) have been awarded the Southwest Metro Corridor (SMC) works.

This Construction Soil and Water Management Plan (CSWMP) outlines the SMC approach to implementing measures to mitigate the risk of impact to soil and water in accordance with Project's legal, planning and contractual requirements. The CSWMP will cover the works from Sydenham Station to Bankstown Station which will be undertaken by John Holland & Laing O'Rourke joint venture (JHLOR).

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 Sydenham to Bankstown (S2B), 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). The S2B Project site is located on the T3 Bankstown line between Sydenham and Bankstown stations, NSW. Works will predominately occur within the rail corridor, with limited activities occurring within station precincts. Southwest Metro Station Upgrade Packages will be undertaken by others.

The Sydenham to Bankstown scope of works comprise of the South West Metro Corridor (SMC) Works, Bankstown Early Works (BEW) and South West Metro 1 & 2 (SWM1 and SWM2 respectively). This management plan has been updated in revision 17 to include the SWM3 scope of works. Due to the cancellation of the Bankstown and Additional Corridor Works (BAC) in late 2022, the BAC scope has been released as part of the SWM1, and SWM2 and SWM3 contract packages.

John Holland Laing O'Rourke Joint Venture have been nominated as Principal Contractor and as such, the works will occur under the Laing O'Rourke Health, Safety and Environment Management System (HSEMS). Further details of the HSEMS are provided in Section 4.0 of the CEMP.

This CSWMP has been developed for the Construction phase of the Project, in compliance with the HSEMS, the Project's legal, planning and contractual requirements. Due to limited environmental risk associated with groundwater on SMC and BEW, the management of groundwater has been incorporated into the Project CEMP (Doc Ref: SMCSWSSJ-JHL-WEC-EM-PLN-000011) in Appendix 4 (Operational Control Procedures - Environmental Risk Action Plan (ERAP) 3 – Groundwater).

1.3 Scope of Works

1.3.1 Permanent Works

The permanent works include:

- Installation and commissioning of Combined Service Route (GST, GLT, pit & pipe)
- Signalling, communications and HV diversions
- Rail embankment stabilisation including retaining and noise walls
- Installation of drainage
- Installation of security and segregation fencing Civil enabling works for traction substations
- Vegetation clearing
- Access road upgrades/establishment
- Utility diversions
- Bridge remedial works, including installation of crash barriers and throw screens
- Modifications to the existing rail track (including crossovers diamond crossings, hi rail ramps, buffer stops, hi-rail access pads and earthworks and removal of kinematic envelope infringements),
- Overhead wire works (including structure and footings installation/removal)
- Demolition of redundant infrastructure; repairs and upgrades to station buildings and structures; painting; secondary egress provisions at selected stations; fencing; wayfinding; landscaping
- Bankstown Service Building installation
- Bankstown Southern (down) and Northern (up) platform construction
- Finishing works, ULX rectification, Station bracket installation and secondary containment, Mechanical Gap Fillers (MGF) and Platform Screen Doors (PSD) installation at the following stations
    - Marrickville Station
    - Dulwich Hill Station
    - Hurlstone Park Station
    - Canterbury Station
    - Belmore Station
    - Lakemba Station
    - Wiley Park Station
    - Campsie Station
    - Punchbowl Station
- SWMC additional works
    - Demolition of the State Heritage Listed Bankstown Parcel Office (Subject to EWMS & heritage specialist review)
    - Demolition of Bankstown Amenity Block
    - OHW footing removal and relocation with new to facilitate future truncation of the Bankstown Station (Separation of Sydney Metro from Sydney Trains lines)
    - Diversion of existing stormwater track drainage and services
    - Additional Southwest Corridor Works consisting of boundary fencing and associated vegetation management and track monitoring
    - Additional Asset Upgrades
        - Infringement and track rectification
        - Bridge upgrades renewals
        - Civil asset upgrade renewal
    - Utility works
        - Qenos Pipe removal
        - Non ST or SM assets (typically non-contestable works)

- Local area works including modification, reinstatement of public space, roads and pedestrian way
- Property works comprises permanent adjustments to existing private properties

1.3.2 Temporary Works Including Compounds

The 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, barriers and signage 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/compounds required for design and construction of the Works (i.e. Canterbury Bowls Club), including set-up and operation;
- 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 including services searching and geotechnical investigations in the vicinity of Bankstown Station for SWM1 & 2, BEW and SWMC Additional works along the full alignment from Sydenham to Bankstown.

Compound

In addition to the above works, JHLOR will continue to use the main compound area at the Canterbury Bowls Club site, Close Street, Canterbury. This main compound site will be used by the S2B Project, TSOM Project and other Sydney Metro City and Southwest Sydenham to Bankstown projects as directed by Sydney Metro. The area has been leased by Sydney Metro from City of Canterbury Bankstown. JHLOR will comply with the terms of the lease.

The compound set-up included;

- ERSED controls
- Archaeological investigations
- Geotechnical and service investigations
- Fencing
- Tree trimming and removal
- Installation of hard stand, haul roads and ramps
- Demolition of an existing structure
- Installation of utilities and services for the compound
- Installation of buildings, containers and structures

- Supporting activities required to establish the compound (i.e. road sweeping, dust suppression)

A compound has been established within the carpark on the country (northern) side of Bankstown station within the North Terrace carpark. An amenities block has been provided at the western end of the Metro Service building site. These areas are approved for Construction Compounds within the Sydney Metro City and Southwest Sydenham to Bankstown Submissions and Preferred Infrastructure Report.

Ancillary Facilities

JHLORJV will require ancillary facilities from time to time to support general construction activities. The areas may be used as laydown for construction materials or stockpiling.

In addition JHLORJV have also established ancillary facilities in the MSB locations to provide a PC Supervisory role so that interface contractors can deliver their works. These amenities are minor and temporary in nature and are approved via the relevant Ancillary Facilities assessment process, unless already approved through the EIS/SPIR. The amenities consist of mobile caravan offices and consist of the following functional sections in one enclosure to minimise the impact of the ancillary facility:

- Ablution block
- Office area
- Lunch area
- Generator

Ancillary facilities

Ancillary Facility	Status
A17 Way Street Ancillary Facility and Laydown	August 2024
A19 Belmore Triangle Minor Ancillary Facility	Currently not in use, however maybe reapplied for as required
A19 Punchbowl Minor Ancillary Facility (Access from The Boulevard, Punchbowl)	Currently not in use, however maybe reapplied for as required
A17 Carrington Road Ancillary Facility and Laydown	August 2024
A17 Belmore Triangle (Upper) Ancillary Facility and Laydown	September 2025
A19 Hurlstone Park MSB Ancillary Facility (with caravan)	December 2024
A19 Belmore MSB Ancillary Facility (with caravan)	August 2025
A19 Wiley Park MSB Ancillary Facility (with caravan)	August 2025
A16 Marrickville Station Metro Services Building (MSB) (with caravan)	EIS Approved
A16 Dulwich Hill Station MSB (with caravan)	EIS Approved
A16 Lakemba Station MSB (with caravan)	EIS Approved
A16 Campsie Station MSB (with caravan)	EIS Approved
A16 Punchbowl Station MSB (with caravan)	EIS Approved

Ongoing communication with local residents and businesses will occur in accordance with the Community Communication Strategy.

Figure 1.1 Southwest Metro Corridor Project Site (Source: Sydney Metro City & Southwest – Sydenham to Bankstown – Submissions and Preferred Infrastructure Report, 2018)

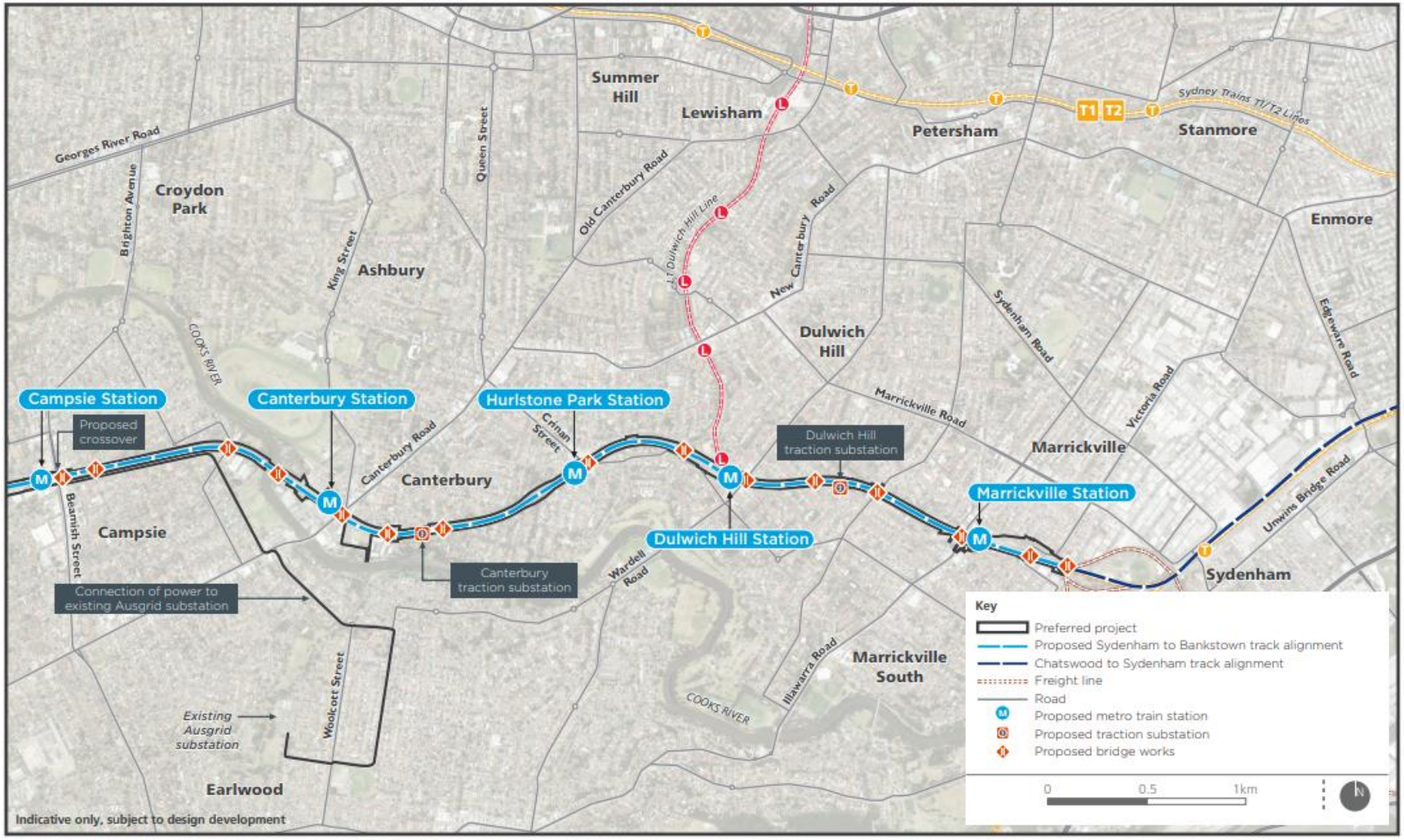
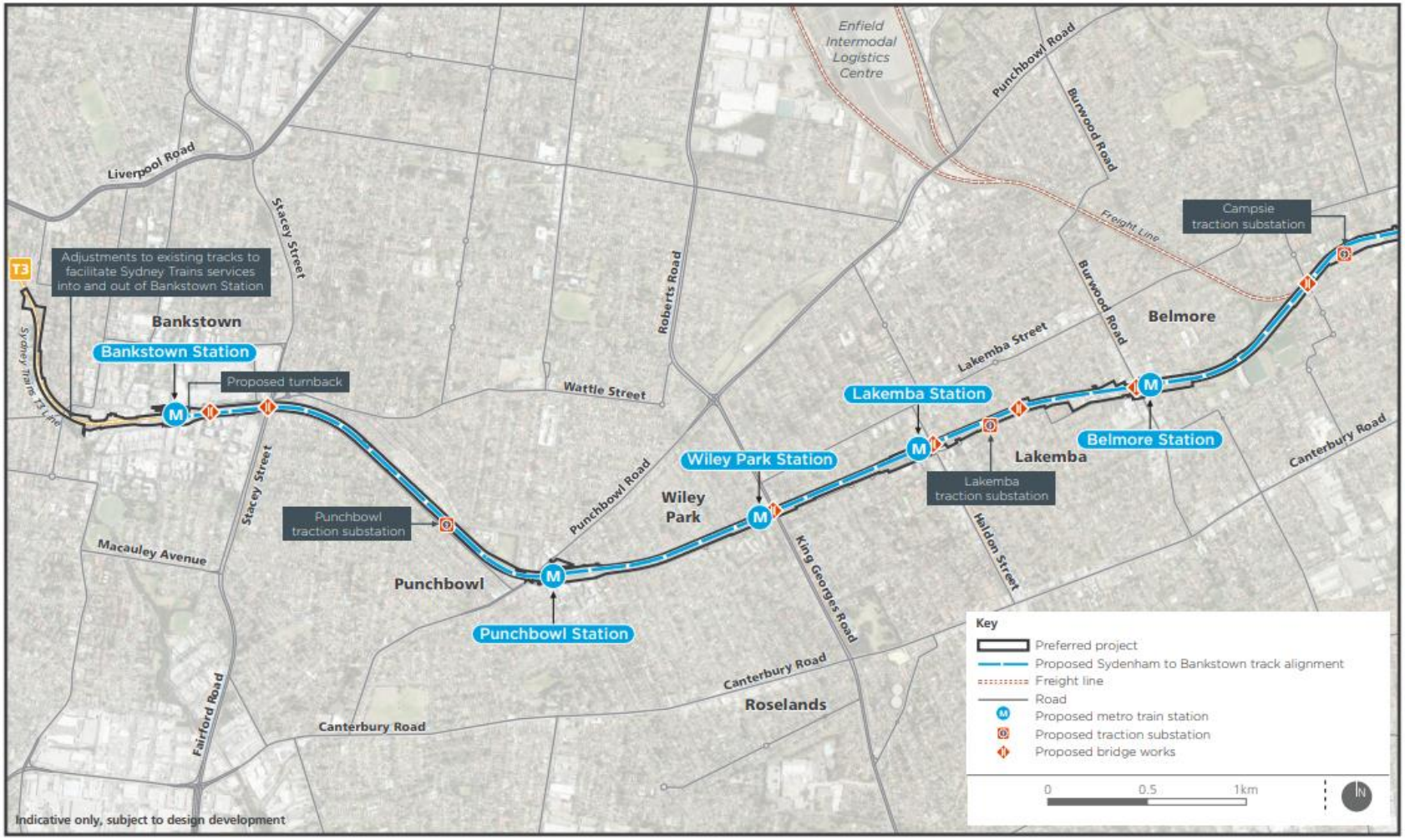


Figure 1.2 Southwest Metro Corridor Project Site (Source: Sydney Metro City & Southwest – Sydenham to Bankstown – Submissions and Preferred Infrastructure Report, 2018)



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	Erosion and sediment controls are to be inspected on the following basis; • As part of the Weekly Environmental Inspection • Prior to a forecasted rainfall event of >20mm in a 24hour period (with issues recorded within an Inclement Weather Inspection Form) • Following a rainfall event of >20mm in a 24hour period (with issues recorded within an Inclement Weather Inspection Form) • Daily (with issues recorded in site diaries) No pollution incidents resulting in environmental harm or regulatory action	Environmental Manager (or delegate)
Maintain existing water quality of surrounding surface watercourses	Water monitoring to be undertaken in accordance with Section 7 of this Plan. SMC works have no impacts in relation to baseline water quality (i.e. water quality not to worsen from baseline) No pollution incidents resulting in environmental harm or regulatory action	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), and 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 D. The CSWMP (including the CMP) will be updated further following receipt of comments, as required. Records of consultation will be contained in a separate document to this plan for the information of the Department of Planning and Environment (DPE).

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 & Environment - Water	Plan submitted 18/01/2021 Feedback Received 29/01/2021	Water reuse/treatment Monitoring Compounds Unexpected finds Flooding Water quality Responsibilities Stormwater Flooding Management Plan	Various – refer to Appendix D for details

CoA SSI-8256	Agency Consultation	Requirements and date submitted	Key issues raised	CSWMP Section Reference
	Environment Energy and Science Group (EES) (formerly Office of Environment and Heritage)	Plan submitted 25/11/2020	No comments provided	N/A
	Natural Resources Access Regulator (NRAR) (formerly Department of Industry) (also a requirement of REMM FHW4)	Plan submitted 25/11/2020	No comments provided	N/A
	City of Canterbury-Bankstown	Plan submitted 30/11/2020 Feedback received 22/12/2020 Revised Plan for BEW submitted 4/09/2021. CSWMP consultation meeting held 16/09/2021 Feedback received 17/09/2021 Revised Plan for BAC s(and also applicable for SWM 1, 2 & 3) submitted 19/07/2022. Comments received 08/08/2022	No comments provided No further comment made of BEW updates BAC - "Council had a review on these Construction Soil and Water Management Plan and there is nothing major to comment on and overall it looks quite good."	N/A
	Inner West Council	Plan submitted 30/11/2020 Feedback received 18/12/2020 No consultation required for BEW Revised Plan for BAC (and also applicable for SWM 1, 2 & 3) submitted 19/07/2022. Comments received 08/08/2022	Some flooding related comments Comments generally relate to preservation of top-soil/seed bank BAC – No comment.	SMC - Various – refer to Appendix D for details
REMM FHW4 (Water Quality Monitoring Program)	NSW EPA	Plan submitted 25/11/2020	No comments provided	N/A

1.6 Approval

This Sub-plan will be reviewed and endorsed by the Independent Environmental Representative (ER) 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
Contaminated Land Management Act 1997 (CLM Act)	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
Environmental Planning and Assessment Act 1979 (EP&A Act)	This Act establishes a system of environmental planning and assessment of development proposals for the State.	The approval conditions and obligations are incorporated into this CSWMP.
Protection of the Environment Operations Act 1997	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.
Water Management Act 2000 (WM Act) *Water Management (General) Regulation 2018* (WM Regulation)	This Act and Regulation provide for the protection, conservation and ecologically sustainable development of water sources of the State and in particular to protect, enhance and restore water sources and their associated ecosystems.	This Act will have low relevance to the Project and will only be relevant if water is to be extracted. Sydney Metro projects assessed under Part 5.1 of the EP&A Act are exempt from obtaining water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91. Provisions for aquifer interference approvals have yet to be enabled, as no proclamation has been made under Section 88 of the WM Act. Under the Clause 21(1) of the WM Regulation, Transport Authorities are exempt from the requirement to hold an access licence. Transport Authorities are also exempt under Clause 34(1) of the WM Regulation from the requirement to hold a water use approval. Transport Authorities are not exempt from the requirement to hold a water supply work approval.

The CSWMP addresses applicable requirements within the following documents:

- The Sydney Metro City & Southwest – Sydenham to Bankstown – State Significant Infrastructure Assessment (SSI 8256), dated 12 December 2018
- The Sydney Metro City & Southwest – Sydenham to Bankstown - Environmental Impact Statement (EIS), dated 7 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 12 December 2018
- Sydney Metro City & Southwest – Sydenham to Bankstown Upgrade Staging Report Rev06 (Sydney Metro, 2022).

- The Sydney Metro Construction Environmental Management Framework v3.2 (CEMF);
- The Sydenham Station and Junction Project Deed
- The Sydney Metro – Sydenham to Bankstown – Bankstown Station Modification Report May 2020
- The Sydney Metro – Sydenham to Bankstown – Modification of Infrastructure Approval, dated 22 October 2020

The Compliance Matrix in Appendix A provides a comprehensive list of compliance requirements from the project approval, EIS, CEMF and EPL.

2.1 Guidelines

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

- Acid Sulphate Soil Manual (Acid Sulfate Soil Management Advisory Committee, 1998)
- 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').
- Landcom (2004) Managing Urban Stormwater: Soils and Construction. (Volume 1 of the 'Blue Book').
- Department of Environment and Climate Change (2008) Managing Urban Stormwater: Soils and Construction. Volume 2D: Main Road Construction. (Volume 2D of the 'Blue Book').
- Guidelines for the Management of Acid Sulphate Materials: Acid Sulphate Soils, Acid Sulphate Rock and Monosulfidic Black Ooze, RTA;
- Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land (Department of Urban Affairs and Planning and Environment Protection Authority, 1998)
- National Environment Protection (Assessment of Site Contamination) Amendment Measure (No. 1) 2013
- NSW Environmental Protection Authority - Assessing and Managing Acid Sulphate Soils; and Environment Protection Authority, Victoria Information Publication 655 - Acid Sulphate Soil and Rock.
- NSW EPA (2014) Waste Classification Guidelines – Part 1: Classifying Wastes
- 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.
- Sydney Metro - Water Discharge or Reuse Procedure.

2.2 EPL

SMC will be delivered in accordance with the LOR EPL 21147. It is noted that this EPL also currently includes works occurring for the Sydney Metro City and Southwest Chatswood to Sydenham – Sydenham Station Junction project (SSI_7400). Following the approval of a Consistency Assessment to combine the works at Sydenham Junction with the SMC, the construction hours in the EPL will be amended to align with the 8256 Project.

It is noted that the EPL does not authorise the pollution of waters by any pollutant other than those specified by various concentration thresholds in condition L2.4 which include oil and grease, pH and total suspended solids.

3. Roles and Responsibilities

The roles and responsibilities of key SMC Personnel with respect to soil and water are presented in Table 4. Further details of the overarching environmental roles and responsibilities are included in the CEMP Table 6.:

Table 4 Roles and Responsibilities

Role	Responsibilities
Project Director	Managing the delivery of SMC and BEW 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);

Role	Responsibilities
	• 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 four soil landscape types identified by the Sydney 1:100,000 Soil Landscape Series Sheet 9130 (Herbert, 1983). These include Birrong, Gymea, Blacktown and Glenorie soil units. The likely extent of the soil units in relation to the SMC works are displayed in Figure 2.

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.

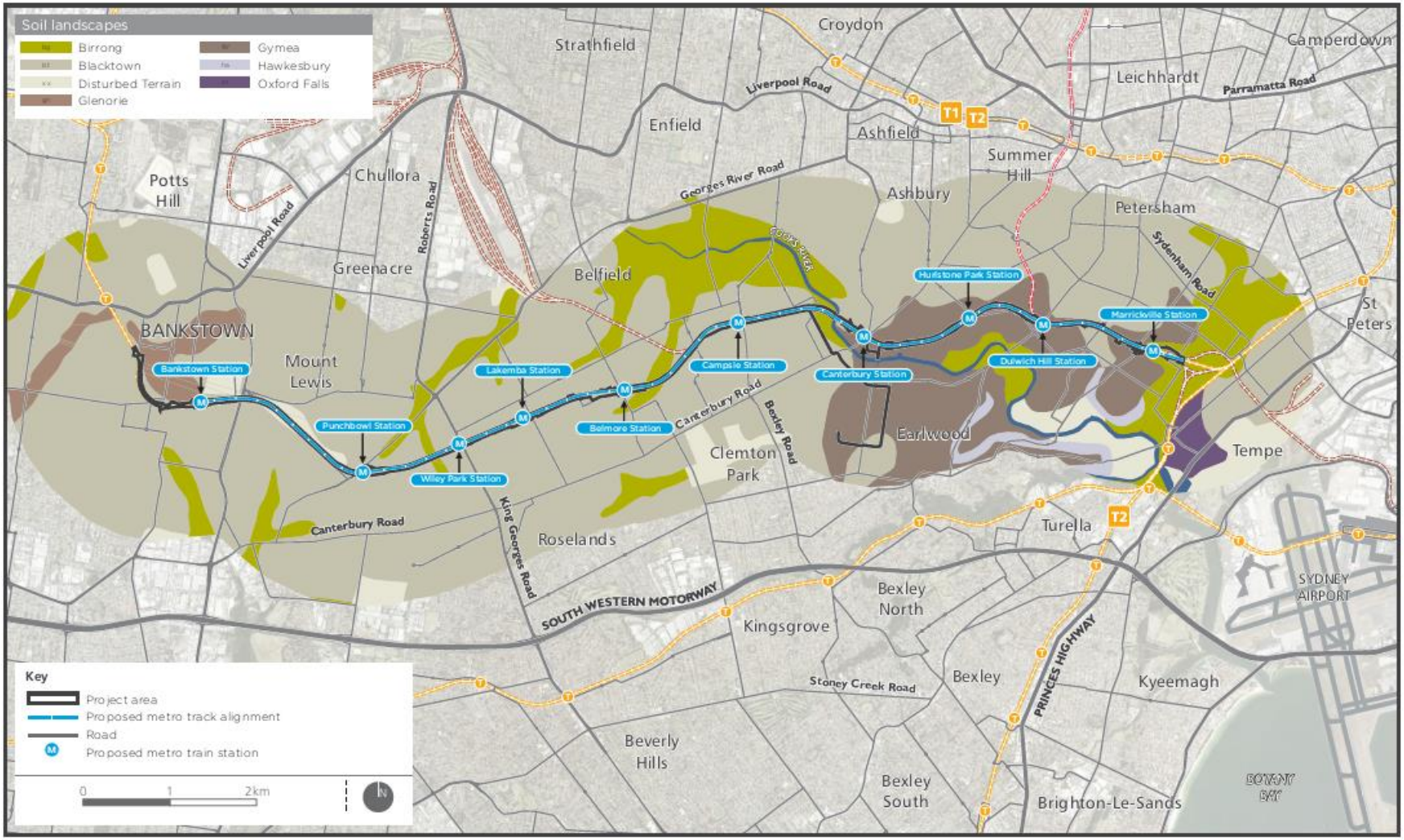
4.1.4 Glenorie

- Soils – shallow to moderately deep Yellow Podzolic Soils and Gleyed Podzolic Soils along drainage lines.
- Limitations – high soil erosion hazard, localised impermeable highly plastic soil, moderately reactive.

Additionally, a further soil landscape type is identified west of Bankstown station – Glenorie, however these soils are mapped as falling just outside of the project area.

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

Figure 2 Soil landscapes for Sydney Metro alignment from Marrickville to Bankstown. 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 (EIS) (Table 20.2) identifies the following regional geological units within the SMC 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

Geotechnical investigations indicate that typical layers found on the Project site include;

- Fill material
- Residual fill & Alluvium
- Ashfield Shale (Canterbury)
- Mittagong Formation (Marrickville to Canterbury)
- Minchinbury Sandstone (Wiley Park to Punchbowl)
- Bringelly Shale (overlaying Minchinbury Sandstone between Wiley Park and Punchbowl)
- Hawkesbury Sandstone

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

4.3 Salinity

Salinity in the Project area was considered within the Sydney Metro City and Southwest – Sydenham to Bankstown - EIS. The EIS found that there was evidence of soil salinity within the SMC 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*."

Excavation would be undertaken in areas with high to moderate potential for salinity surrounding Bankstown and Punchbowl stations. Impacts may occur as a result of the erosion and off-site transport of saline sediments, resulting in impacts on the receiving environment. Due to some areas shown as having a salinity potential, REMM SC3 is relevant to the SMC and BEW scope and as such, for areas with potential soil salinity, JHLOR will 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 erosion and sediment control plans (ESCPs).

Note, works within the identified saline areas include fencing, overhead wire installation and combined service route (CSR) works which will have limited impacts on the soil and groundwater. Bulk earthworks around Retaining Wall 21 in Lakemba are considered to be outside of the saline areas and unlikely to encounter saline soils.

The Geotechnical Interpretive Report – Bankstown Station (Metron T2M, 2020) includes an investigation undertaken into the salinity of soils within the vicinity of Bankstown Station. The report has found that risks associated with salinity are low. During construction JHLOR will monitor for signs of salinity, such as waterlogged soil, salt crystals, increased soil erosion.

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 ASS, 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 ASS 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."

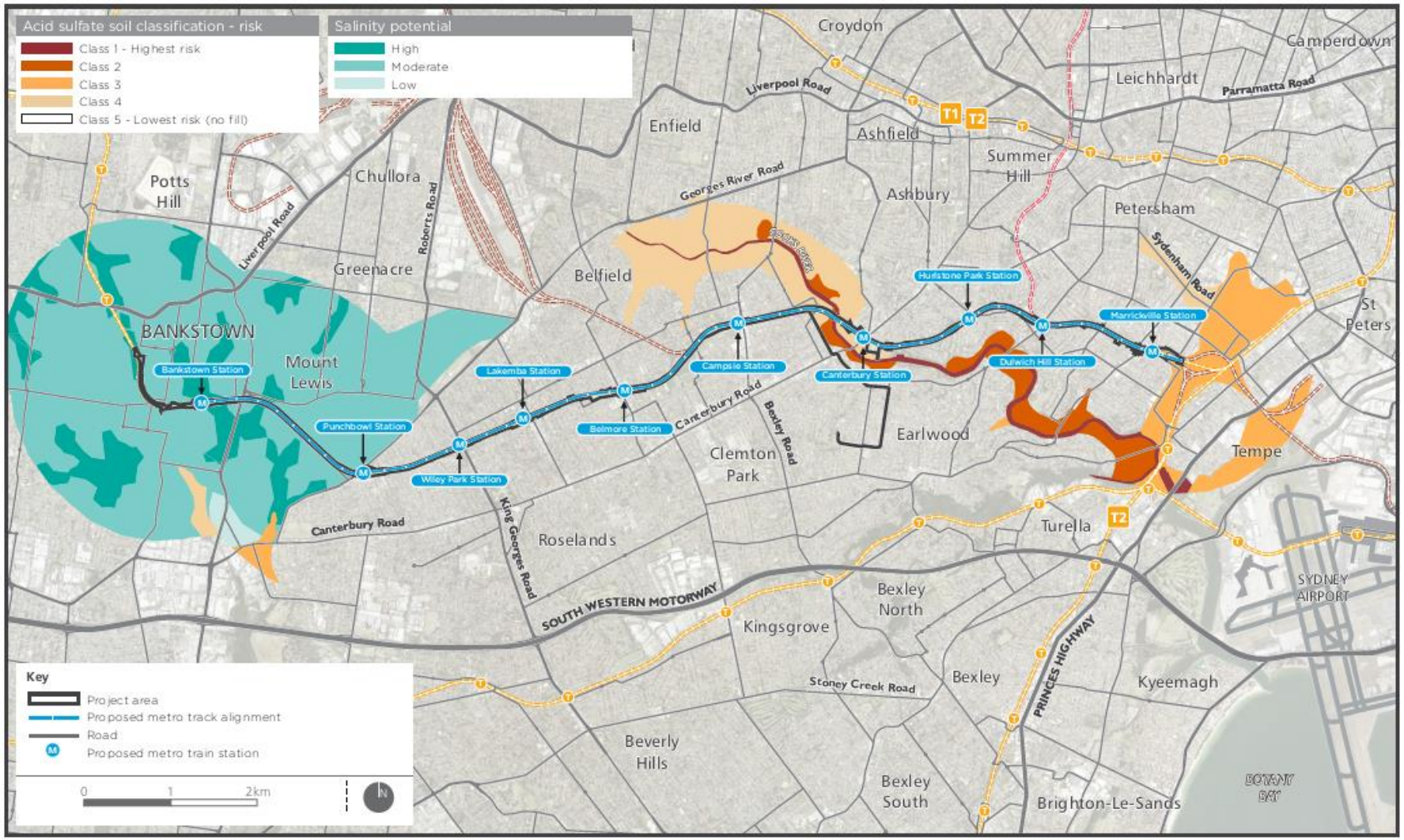
City & Southwest, Sydney Metro Sub-portion 2 - Sydenham to Bankstown Targeted Contamination Assessment (GHD, 2017) indicates that 3 samples within the SMC Project area are to be considered Potential Acid Sulphate Soils (PASS) following Chromium Reducible Sulphur (SCR) testing. The three samples were 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 ASS.

JHLOR will undertake field PASS indicator tests at a rate of 1 test per 200m^3 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, and implementation of the above measures, would 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*." As per Table 20.3 of the EIS, these sites adjacent to the SMC Project area are:

- XPT Maintenance Centre, Marrickville
- 2 Carrington Road, Marrickville
- 348 Burwood Road, Belmore

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)
- *Bankstown Station and Additional Corridor Works BAC DPK 003 Contamination Assessment Report (AGJV, 2022)*

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

The EIS refers to the Environmental Site Assessment and states, "*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 areas of medium to high contamination risk within the SMC footprint (Table 5). 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 (*Appendix B), as per CoA-E39 & CoA-E40.

Table 5 Areas with a Medium to High Contamination Risk in the SMC Project Area

Location	Potential Contamination Sources	Potential Contaminants Present
1. Between Sydenham and Marrickville Stations	• Previous site investigations identified asbestos in soil and petroleum aromatic hydrocarbons in groundwater north of the project area, at 361 Victoria Road	Within the vicinity of 361 Victoria Road: • Asbestos in soil • Petroleum aromatic hydrocarbons in groundwater
2. Between Campsie and Belmore stations (triangular area within the rail corridor)	• historical rail activities • historical commercial and residential land use	• Arsenic in ballast • Asbestos • Hydrocarbons (including chlorinated hydrocarbons in fill) • Heavy metals (including in groundwater) • Herbicides
3. Between Punchbowl and Bankstown Stations (car park at North Terrace)	• Historical rail activities • Historical commercial and residential land use	• Asbestos • Hydrocarbons (in soil and groundwater) • Heavy metals • Herbicides

JHLOR's scope within the Sydenham to Marrickville area includes excavations to a depth of 1.5m. The depth of petroleum aromatic hydrocarbon (PAH) 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 in this area. In the event that groundwater is encountered, such as in underground crossing high voltage pits, it will be managed in accordance with section 6.7 of this plan. Contamination will be managed in accordance with the *Unexpected Contaminated Land Procedure and Asbestos Finds Procedure*, as per CoA-E39 & CoA-E40.

JHLOR will install fencing and undertake turn-out prebuild within the Belmore rail triangle. Further testing will occur within this area.

JHLOR's scope extends to Bankstown Station. JHLOR undertook minor excavation within the North Terrace carpark (to the northeast of Bankstown Station) for the establishment of a construction compound. Excavations were for the installation of a rainwater capture tank, fence posts and service routes. Spoil from piling and excavations for BEW will be stockpiled in the Belmore Triangle for waste classification testing and disposal. Further in-situ testing of the BEW construction area did not occur under SMC.

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 SMC and BEW. BH001, located within 50m of the JHLOR work front on the country side of Victoria Road Bridge and the city side Marrickville Station, indicates Total Petroleum Hydrocarbons (TPH) > C_{16}-C_{34} at 4,800mg/kg at a depth of 0.4-0.5m, exceeding the commercial / industrial Management Levels for TPH as stated within

NEPM 2013. This was the only exceedance of management levels within the vicinity of the SMC works. Within the Targeted Contamination Assessment, asbestos was encountered at a number of other test locations within the corridor, including on the city side of Livingstone Bridge, Marrickville, Canterbury Station, the city side of Campsie Station, at the Belmore rail triangle, Belmore Station, Lakemba Station, Wiley Park Station and Punchbowl Station Carpark. I

The Targeted Contamination Assessment indicates that soils in the vicinity of the Bankstown Early Works (i.e. on the city side of the station) meet general solid waste. This includes BH183, undertaken within the North Terrace Carpark. BH183 satisfies the requirement for testing within the Northern Terrace carpark as per REMM SC5. In addition, any material removed from the carpark for compound set-up will be stockpiled separately and will undergo waste classification prior to disposal or reuse.

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 conducted additional contamination testing throughout the SMEW 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.

JHLOR conducted additional contamination testing throughout the BAC (AKA SWM1, 2, 3 minus track slabs) Project area, refer BAC Contamination Assessment Report. The report found:

- Soil data reviewed in previous investigation reports for the Project area indicates that concentrations of contaminants of potential concern (COPC) are below relevant health screening criteria for industrial land use.
- One investigation location (BN-TP110) near Bankstown Station contained TRH F3 (7,700 mg/kg), which exceeds the NEPM (2013) Management Limit (3,500 mg/kg). The

impacted sample was collected from a depth of 0.1 mbgl with no obvious TRH impact detected in the underlying sample collected from 07-0.8 mbgl.

- Elevated concentrations of heavy metals, in particular arsenic and lead, were detected in several soil samples; however, concentrations did not exceed the health screening criteria for industrial land use (HIL-D).
- Asbestos was not detected in analysed soil samples or observed during the investigations.
- Based on the analytical results and absence of exceedences of NEPM HIL/HSL-D, there is likely to be low potential for a health risk to BAC and metro construction workers and allow risk to future metro infrastructure users from exposure to contamination in soil.
- The fill soils at the majority of investigation locations are classified as General Solid Waste.
- Shallow fill at one location (BN_BH103 at 0.5m) in the rail corridor to the east of Bankstown Station contained elevated concentrations of arsenic and the material is classified Restricted Solid Waste.

Note: the major focus of the BAC Contamination Assessment Report was relative to the track slab scope of work that is no longer required as part of the S2B scope of works. The data will be used to refine the preliminary contamination assessment layer used in the ECM , noting that this layer is not used as a waste classification for disposal. No new areas of Medium to High Contamination Risk in the S2B Project Area have been identified as a result

JHLOR will review any additional contamination investigation information that may be relevant to the project as it becomes available and update this Plan where required.

JHLOR will undertake Workcover Dangerous Goods searches in accordance with REMM SC4. A dangerous goods search will be conducted for 348 Burwood Road, Belmore.

In order to comply with REMM SC5 JHLOR completed contamination testing at the following locations prior to Construction. Further contamination investigations will occur in the vicinity, as required to JHLOR's scope of works as part of BAC:

- Between Campsie and Belmore stations (triangular area within the rail corridor) - a baseline contamination assessment was prepared (SSJ-25-18923.LTR2.v1f). Any spoil removed from the area is to undergo a separate waste classification.348 Burwood Road, Belmore - a WorkCover dangerous goods report (454315_results_29_1_2021_5_46_45_167) indicated that the facility had approval for storage of 1000L Petrol and 500kg of mixed gases. The file indicates flammable liquid storage may also have taken place.
- North Terrace carpark area - targeted testing undertaken within Sydenham to Bankstown Targeted Contamination Assessment (GHD, 2017) indicates that the area is classified as General Solid Waste. JHLOR undertook testing on material removed from the carpark and found that the material was GSW.

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 existing contamination assessments, a Remediation Action Plan (RAP) is not required. However, should further contamination testing indicate that contamination on site meets the criteria for a RAP, JHLOR will produce a RAP in accordance with REMM SC7.

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, oil or other hazardous chemicals. The risk of contamination arising through the construction process will be mitigated by implementing the mitigation measures as described within Section 6 of this 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 and prior to demolition of redundant infrastructure as required.

4.6 Groundwater

The Sydney Metro City & Southwest: Sydenham to Bankstown EIS makes the following statements in regard 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. A number of small, high level retaining walls will be installed across the project. A more substantially sized retaining wall (RW21) on the country side of Lakemba Station is complete and involved deeper excavations, and no groundwater was encountered.

As part of BEW, JHLOR will be installing piles to a maximum depth of approximately 9 meters (generally the pile depth will be approximately 7m). As the piles will be above the recorded groundwater level there is no expectation for intercepting groundwater during BEW.

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 boreholes were installed in the vicinity of the proposed Lakemba Retaining Wall (RW21) as part of the investigation. The results indicate;

- Lakemba BH539 – groundwater observed at 6.2m bgl (borehole commenced from track at surface level 32.92m RL AHD)

The above results indicate that piling may interact with groundwater at Lakemba. Any interaction with groundwater will be visually monitored during construction. Due to the construction methodology it is unlikely that dewatering will be required.

It is expected that works requiring open excavations will not interact with the groundwater table. There is potential for stormwater to be encountered during works at existing underline crossing high voltage pits. In the event that dewatering is required, it will be managed in accordance with section 6.7 of this plan.

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 at a public car park at North Terrace, northeast of the station precinct found petroleum hydrocarbons within shallow soils and in groundwater at the site at concentrations below the adopted investigation levels.

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 zine) concentrations above the groundwater investigation level (GIL) for protecting freshwater aquatic ecosystems. These elevated heavy metal concentrations are likely representing the background levels of the groundwater aquifer in the investigation area and the Sydney basin*"
- Concentrations of TRH, BTEX, PAHs, OCP, OPP and PCB in all groundwater samples were below the adopted health screening criteria for commercial and industrial land use and the adopted GIL
- pH of groundwater was between pH 4.4 and pH 6.7

An analysis of groundwater from the *Bankstown Station and Additional Corridor Works BAC DPK 003 Contamination Assessment Report (AGJV, 2022)* showed:

- Concentrations of BTEXN and TRH in groundwater samples were below health the screening criteria in relation to a potential vapour intrusion pathway.
- Concentrations of metals (lead and manganese) in groundwater samples collected in June 2022 exceeded the health screening criteria in relation to direct contact pathway for recreational water use. The criteria for recreational water were considered in the absence of more specific construction / industrial land use criteria for heavy metals and to give context to the water quality sampled. Recreational screening criteria assumes an ingestion exposure scenario (i.e. drinking 200 ml water per day).
- Concentrations of metals (cadmium, chromium, copper, lead, manganese, nickel and zinc) were above the screening criteria for protection of aquatic ecosystems based on a 95% species protection level.

Due to the depth of excavations associated with SMC and BEW, it is unlikely that contaminated groundwater will be encountered. Should groundwater be encountered. JHLOR will store and dispose offsite the groundwater in accordance with the NSW Waste Classification Guidelines. Further details on management of groundwater is included in Section 6.7.

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 mostly forms part of the overall Cooks River catchment with works West of Punchbowl Station forming part of the Salt Pan Creek Catchment. Runoff from these areas discharges into the Cooks River or Georges River (via Saltpan Creek) via local stormwater drainage or overland flow. These catchment areas are 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*."

The EIS also states "Georges River catchment, located in the southern and western suburbs of Sydney, covers an area of about 960 square kilometres. With a population of over one million people, it one of the most highly urbanised catchments in Australia. Georges River itself is about 96 kilometres long and flows from Appin in the south in a northerly direction to Chipping Norton, then in an easterly direction to Botany Bay. The river discharges into the south of Botany Bay, between Sans Souci and Kurnell.

The western most portion of the project area drains to Salt Pan Creek, which is one of the major tributaries of the Georges River. Salt Pan Creek has a catchment area of about 26 square kilometres. The creek itself is about seven kilometres long and flows in a generally southerly direction to the Georges River, at Riverwood. The creek is tidally influenced as far west as Fairford Road at Bankstown.

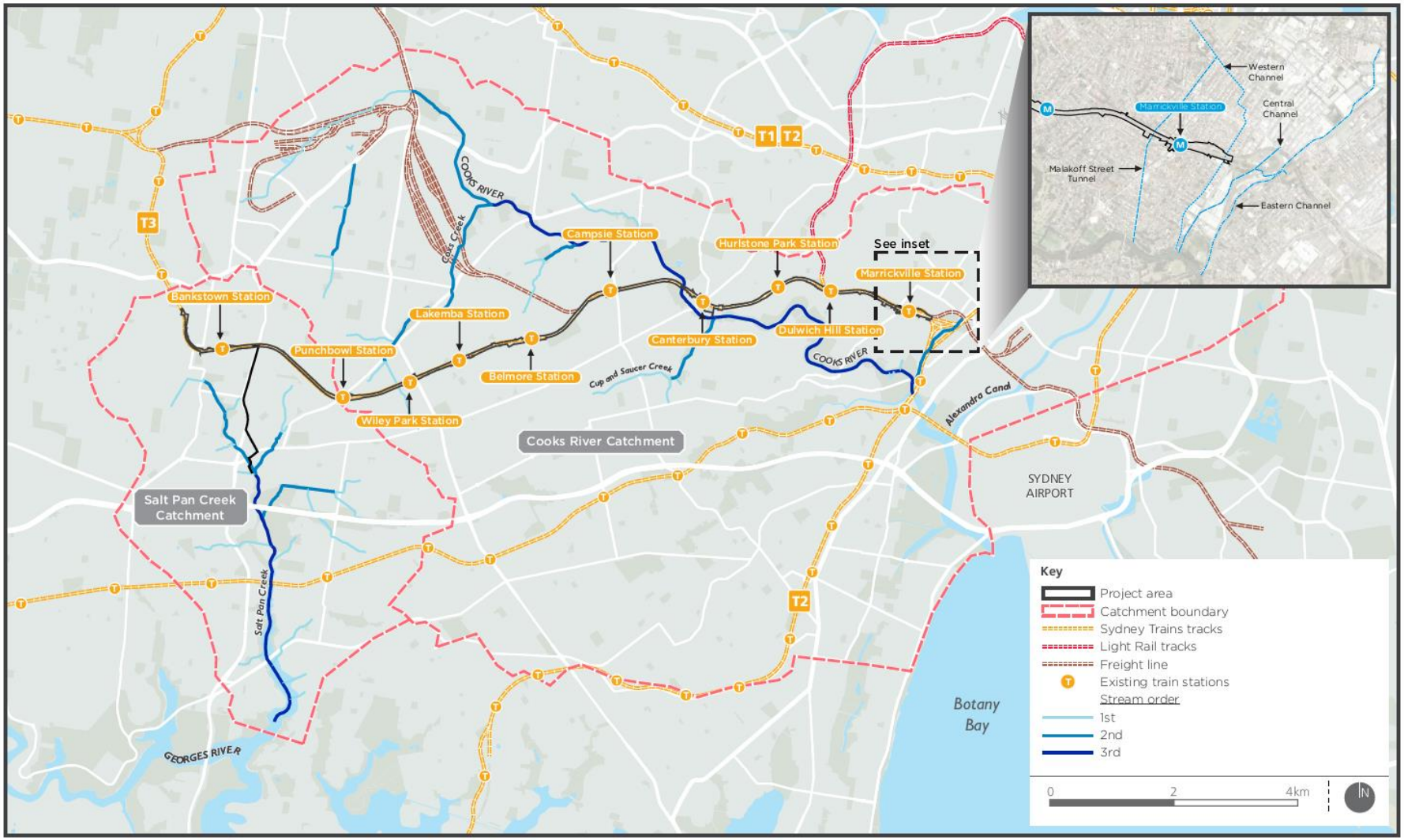
The upper reaches of the creek are highly modified and are generally concrete lined, with limited vegetation until the Canterbury Road crossing. There are no recognised tributaries for the creek on available mapping, however a number of unnamed channels drain to its upper reaches.

The project is located in the upper reaches of the Salt Pan Creek catchment. Upstream (north) of the project area, the catchment is relatively steep, and surface water runoff is managed by the existing stormwater drainage network.

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 catchments are heavily urbanised, with stormwater collected by developed stormwater networks and discharging to Salt Pan Creek and the Cooks River.

Water quality is measured on an ongoing basis for the wider Cooks River catchment by the DPE Environment and Heritage (inc NPWS) as part of the Beachwatch program. 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. It is noted in the EIS that water quality within the Cooks River is generally considered to be poor and unfit for contact by humans.

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

The EIS, referring to the Salt Pan Creek catchments, states "*A number of beaches in the lower Georges River are monitored as part of OEH's Beachwatch program. The most recent State of the Beaches annual report noted that these locations were graded as 'good', meaning that the quality of the water was appropriate for swimming most of the time*". It is noted however that the catchment is impact by development, including construction impacts and litter, as well as other influences such as wastewater overflows and a landfill operation.

There is also limited data available for water quality within Salt Pan Creek. *Little Saltpan Creek Data Compilation Study* (WP Geomarine, 1998) notes that some data had been collected within the late 1990s at Alma Road Footbridge and Henry Lawson Drive (more than 5km from the T3 Bankstown line rail corridor). The study found elevated levels of phosphorus and nitrates. The EIS references more recent studies, stating "*Heavy development in the Salt Pan Creek catchment, including construction effects and litter, as well as other influences such as sewer overflows and a landfill operation, have resulted in historically poor water quality in the creek. The water quality was designated D- ("poor") in 2009-2010. However water quality has improved in the ensuing years through the efforts of local councils and others. The most recently available report, the 2015-2016 River Health Report Card for the Georges River (GRCCC, 2016), identified the overall water quality health of Salt Pan Creek as "good" (A-). It is understood that water quality treatment devices in the form of trash racks and GPTs have been installed in the catchment together with the implementation of a public education program, amongst other controls*."

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 LOR 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 that 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 downside, 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.*"

SMC works within the rail corridor throughout Marrickville and adjacent to McNeilly Park are minor in nature, consisting of the installation of security fencing and overhead wire infrastructure. The works will remove a negligible amount of storage area from the catchment and will not restrict overland flow. As such, SMC works should have a negligible impact on flooding within the area.

In regards to the remainder of the Cooks River Catchment where SMC will occur, 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 within these areas are minor in nature and of short duration/intermittent. The scope of the works consists of the installation of security fencing and overhead wire infrastructure approximately 5m from the banks of the Cooks River. The works will have negligible impact on landform and storage area within the catchment and will not restrict overland flow. As such, SMC works will have negligible impact on flooding within these areas.

The EIS describes flooding within the Salt Pan Creek Catchment as follows "Mapping undertaken for the *Salt Pan Creek Stormwater Catchment Study* (Bankstown City Council, 2011a) indicates the potential for flooding of the rail corridor during the one per cent AEP event at several locations. The mapping indicates:

- Ponding on the north side of the rail corridor adjacent to Marion Street in Bankstown near the intersection with Bungalow Crescent, in events as frequent as a 63 per cent AEP event.
- Flooding and surface ponding from the local drainage network near the rail corridor on Olympic Parade and short sections of North Terrace and South Terrace in Bankstown during the one per cent AEP event.
- Downstream of the rail corridor, a number of residential properties would be impacted by flooding in events as small as the 18 per cent AEP event.

The report also identifies velocity-depth information for the rail corridor between Punchbowl Station and west of Bankstown Station. A section of the rail corridor 400 metres west of Punchbowl Station is likely to be associated with a low flood hazard. Shorter sections of the

corridor, about 200 metres in length, around Stacey Street and to the east of Bankstown Station, are likely to be classified as low flood hazard areas." Bankstown Station Rail line mostly in fill with limited potential for flooding of rail corridor. The SMC works will not occur within areas as described within the three dot points above. Works will occur between Punchbowl Station and Bankstown Station. The works to occur within these areas are minor in nature and include fencing, GST, bridge works, hi-rail access pad, traction substation civil works and installation of overhead wire infrastructure. SMC works is likely to have negligible impact on flooding within these areas.

The Metro Service Building, platform installation works, fencing, drainage and combined service route will also occur outside of flood prone areas as described within the EIS.

CoA-E8 states 'The location of Construction compounds must not worsen the existing flooding characteristics of the area' and 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. Assessments will be provided to the ER for review.

JHLOR will limit construction compounds and worksites in areas of known high flooding potential, such as Marrickville, within the rail corridor 100m to the east of Canterbury Station and 100m to the west of Campsie Station and in the vicinity of low lying areas near Marion Street and Greenwood Ave Bankstown (noting that laydown and a Minor Ancillary Facility may be set up at the Sydney Trains laydown area at Marion Street & Depot Place within the area at the top of the embankment). 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 facilitates would be located on piers or stilts above the known 10% AEP flood level.

JHLOR has established a compound within the Bankstown Station carpark on North Terrace, Bankstown. The Salt Pan Creek Catchments Floodplain Risk Management Study and Plan (Bewsher 2013) indicates that the area is subject to minor flooding during the 100yr ARI event. The Study indicates that flood water within the carpark could reach up to 100mm in depth in the location of the compound. As such, compound facilities have been constructed on stilts greater

than 100mm high to mitigate impacts to flooding as required by CoA-E8, REMM FHW5 and REMM FHW6.

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, OHW works, Metro Service Building, BEW Platform works) will not impact on overland flow routes or local drainage. Where necessary, JHLOR will mitigate impacts to overland flows by enacting temporary measures such as diversion pipes, installed for short lengths and 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.

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

Where feasible and reasonable, detailed design will result in no net increase in stormwater runoff such that the Project will not increase downstream flood risks. Further details on the REMMs (including REMM FHW1 and REMM FHW3) and other conditions relating to design for flooding are included the relevant Design Report 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 6.

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 CEMP.

Table 6 Aspects and Potential Impacts

Aspects	Potential impacts/opportunities
Discharge of contaminated water from within site boundary during rainfall Concrete washout	• Contamination of adjacent watercourse • Contamination of soils
Dust from the worksites or from vehicles	• Potential pollution of waterways and air
Earthworks / Embankment works/platform excavation works	• Potential spread of contamination into soils /surface or groundwater • Personnel exposure to contaminants • Sediment degrading surrounding environment • Change to flooding characteristics
Flooding of worksites	• 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	• 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.	• Mobilisation of metals within runoff to levels toxic to natural systems. • Release of acidic runoff.
Modifications to natural hydrology or water quality from excavations	• Localised pollution of waterways • Potential loss of surface flow from existing drainage lines
Sediment laden runoff during rainfall	• Runoff entering drainage lines causing pollution and impacting aquatic life in Cooks River
Sediment tracking onto public roads from vehicles leaving site	• Potential impact on traffic safety • Potential for sediment laden runoff during rainfall • Potential for generation of dust
Storage of hazardous substances	• Contamination as a result of a spill • Impact to watercourses from pollution
Construction laydown spills	• 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)	• Potential for spread of contamination (soil/water) • Personnel exposure to contaminants • Local media coverage • Fines and prosecution from Regulatory Authorities
Salinity	• Potential for mobilisation of saline groundwater and soils during construction to sensitive ecosystems • Increases in salinity levels due to construction works (dewatering/runoff) affecting local and nearby sensitive ecosystems
Intercepting groundwater	• Discharge of contaminated groundwater to surface water • Removal of water resources from groundwater table

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 F. The maps indicate that some construction will occur within areas known to be subject to concentrated overland flow and flooding. Area specific ESCPs 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. There is potential for groundwater to be encountered within underline crossing high voltage pits where electrical wiring works may be carried out. Any encountered groundwater which may require dewatering will be tested and treated in accordance with section 6.7 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 NSW Blue Book Volumes 1 and 2D (Landcom, 2004 and DECC, 2008)
- Maintaining ground cover for as long 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 ERSED principles for key staff (as relevant to scope and personnel – in the form of formal organisational training or toolbox sessions)
- JHLOR would ensure that any road, footpath, shared path or cycleway which is open to the public is at all times kept free of project related 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
- Topsoil will be maintained wherever practicable. Should topsoil need to be removed from site, seeds will be collected prior to removal

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 due to the limited ground disturbance in the SMC works scope. Additionally, sediment basins are not considered feasible for the SMC project due to the limited space available on the Project site.

Erosion and sediment impacts will be sufficiently mitigated by other measures as included in Section 6.1.4.

6.1.4 Erosion and Sediment Control Plans

ESCPs will be developed for the Project area in accordance with requirements of the “Blue Book” prior to the start of Construction. An example ESCP is presented in Appendix E of this Plan. The SMC ESCPs will contain the following key management measures, as applicable to the works:

- **Site Entry and Access Requirements**
  - Establish stabilised access points with rock, 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 be sealed where feasible. 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
  - Topsoil will be maintained wherever practicable. Should topsoil need to be removed from site, seeds will be collected prior to removal
- **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 through the use of green infrastructure as well as 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 20mm in 24 hours, after rainfall exceeding 20mm in 24 hours and before a site closure of more than two days. 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 will be produced prior to initial construction works.

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 7.

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 SMC. 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.

Where the 80th percentile, five-day rainfall event is not able to be achieved (due to space availability), Section 6.3.4 (g) of Managing Urban Stormwater Volume 1 will be implemented including reducing erosion hazards for high risk areas.

6.2 Surface Water Management

The Project site forms part of the greater Cooks River and Georges River catchments. 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
- Primary contact recreation – Maintaining or improving water quality for activities such as swimming and other direct water contact sports

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 to land, 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

Should the on-site reuse criteria be unable to be reached, water will be treated on-site until water quality criteria can be met, or disposed off-site as liquid waste.

6.2.3 Offsite Discharge

Offsite discharge may be required from time to time during SMC and BEW works. In the first instance, water will be re-used on-site in accordance with the *Sydney Metro – Water Discharge or Reuse Procedure (SM-17-00000098)* as detailed in Section 6.2.2.

In the event that an off-site disposal option is required, water disposal options will be investigated. Discharge to land within the rail corridor will be preferred to discharge to stormwater on a case-by-case basis. Determining a Suitable Discharge Location to land will occur in accordance with Sydney Metro – Water Discharge or Reuse Procedure (SM-17- 00000098) Section 4.6 with the following considerations:

a. Direction of groundwater flow- away from site and low-lying areas

b. Erosion: discharged on to an area with good ground cover, preferably on to a vegetated area rather than geofabric

c. Flora fauna: not to displace fauna or onto flora that is classified as endangered ecological communities or equivalent.

d. Flooding: infiltration capacity sufficient, not increase risk of flooding based on volumes

In the event discharge to stormwater is required, it would primarily be undertaken using existing stormwater drainage pits (once the relevant discharge criteria are met), to mitigate the risk of downstream erosion. There are currently eight (8) discharge points included in EPL 21147. It is not anticipated that these points will be required for use. Based on a risk assessment, any new discharge locations for stormwater may require an update to the EPL with a new discharge point. The EPL would be updated to include any new discharge requirements and any discharges would be undertaken in accordance with the EPL conditions. The Water Discharge or Reuse Procedure (SM-17-00000098) (including the water quality monitoring parameters detailed in Section 7.3), and with reference to the requirements of the Botany Bay and Catchment Water Quality Improvement Plan would be triggered by licenced discharge points. The water monitoring program (WMP) will not be updated for short term discharge to land.

Prior to discharging and as part of the risk assessment process, the source of the water should be tested for a full suite of analytes to have an understanding of the physical and chemical profile.

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 the 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.

As identified within Section 4.9. JHLOR has established a compound within the North Terrace carpark at Bankstown. A flood study for the area identifies flood levels at 100mm during a 100yr ARI event. JHLOR will implement the following measures for the compound:

- Facilities to be placed on stilts at least 100mm high
- Any laydown of materials or equipment will be temporary or raised out of potential flood levels
- Monitoring of extreme weather events
- Removal of equipment and materials out of potential flood areas.

6.3 Refuelling, Chemicals and Spill Management

Hazardous chemicals will be stored and used onsite in accordance with the following protocols:

- Hazardous chemicals will be stored onsite in lockable containers, in their original or suitable replacement receptacles.
- Emergency spill kits would be kept on-site at all times. All staff would be made aware of the location of the spill kit and be trained in its use.
- All hazardous chemicals will be clearly labelled and will have Safety Data Sheets (SDS) available nearby. The SDS will be used to determine compatibility of hazardous chemicals to be stored together, i.e. no flammables with corrosives, not all corrosives compatible with each other etc.
- A bund sized to 110% of the largest stored receptacle will be established around any storage area for hazardous chemicals.
- Storage and handling of flammable or combustible liquids will be in accordance with OEH guidelines for Bunding and Spill Management, as well as AS 1940-2017 – The Storage and Handling of Flammable and Combustible Liquids.
- An up-to-date register of hazardous chemicals will be kept onsite at all times.
- Hazardous chemicals 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 chemical 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 a RAP, as per REMM SC7. Should additional contamination testing indicate the presence of contamination at levels that require a RAP, JHLOR will develop and implement the RAP.

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 *SMC-EP-Unexpected Contaminated Land Procedure and Asbestos Finds Procedure* (in Appendix B) and the Waste and Recycling Management Plan and the Spoil Management Planfor 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 G 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 CLM Act, when contamination is encountered.
- Providing inductions and toolbox talks detailing the correct response when contaminated material is encountered.
- Segregate material from the North Terrace carpark excavated during the compound set-up for waste classification prior to disposal or reuse.

In the event of unexpected finds of contamination, the *SMC-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). A high probability of occurrence for ASS and PASS has not been mapped along the SMC & BEW footprint. A low probability of occurrence has been mapped along a limited section between Canterbury and Campsie west of where the Cooks River flows under the rail corridor.

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

- Spoil to be managed in accordance with the Waste and Recycling Management Plan and the Spoil Management Plan.
- Areas of ASS and PASS should be included on ECMs
- Plan works to minimise disturbance to areas of ASS and PASS
- Excavation of ASS or PASS will not occur until an appropriate storage/treatment area is established. This includes the establishment of erosion and sediment controls in the vicinity of the storage/treatment area.
- Field testing for suspected ASS or PASS at a rate of 1 sample per 200m^3 of excavated material from low, medium or high risk areas or where previous testing has indicated the presence of PASS or ASS.
- Field testing will be undertaken with the use of Hydrogen Peroxide based on Appendix I of the Acid Sulfate Soils Assessment Guidelines (Ahern et al, 1998a). Soils that record a pH of below 4, following oxidation with H_2O_2, will be managed as ASS.
- 10% of samples will be sent for laboratory analysis using the chromium reducible suite (Scr) method to confirm the peroxide screening test results and to confirm the required liming rate.
- PASS will be kept wet to prevent oxidation
- ASS or PASS stockpiles will be located at least 50m away from drainage lines, unless a risk assessment is undertaken to prove that risks associated with the stockpile storage area are minimal

- ASS or PASS that will be treated is to be stockpiled separately in a bunded stockpile area. Treatment will occur in accordance with the soil ASS Treatment Plan as described within Appendix C.
- Treatment rates will be determined by laboratory analysis. Estimated treatment rates are included in Section 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 ASS 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;
- Waste classification reports; and
- 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 $CaCO_3$/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 100m^3 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.
- 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 200 mm 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.
- 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 50 m away from any waterway.
- To facilitate the delivery of material to be treated, one ‘face’ of the bund wall can be constructed in the manner of a rollover bund. This is to allow a trafficable point that diverts clean water away from P/ASS material and prevents egress of potentially impacted runoff from within the treatment pad.
- The treatment pad shall be graded so that all surface water flows to the sump.

- Sump will be sized in accordance with the total area of the treatment pad.
- The bund wall should be stabilised with soil binder or a similar control where possible. Where application of stabilisation control on bund is not possible, if practical, 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 200m^3 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.

As far as practicable, materials shall be reused on site 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.

Where more than 10 m^2 of asbestos is found, 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* system. Evidence of this is to be provided by the asbestos removalist to JHLOR.

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 less than 10 m^2 of asbestos is found, an appropriately trained staff member may remove the asbestos pieces for storage within an on-site special waste – asbestos bin.

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) or discharged to land in accordance with the Sydney Metro Discharge and Reuse Procedure.

Should discharge be required, the EPL would be updated to include any new discharge requirements, any discharges would be undertaken in accordance with the EPL requirements. Further details are included in the Groundwater Procedure, ERAP 3 as presented in Appendix 4 of the CEMP.

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. In accordance with REMM SC3, JHLOR will undertake further testing to confirm the presence of salinity (prior to ground disturbance) and 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 in accordance with *Site Investigations for Urban Salinity* (DLWC, 2002). The following mitigation measures would be applied:

- 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 ESCPs.

Note, works within the identified saline areas include fencing, overhead wire installation and combined service route (CSR) works which will have limited impacts on the soil and groundwater. Piling for the SMC & BEW may encounter saline soils and spoil will be stockpiled in the Depot Place, South and North Terrace compounds for waste classification testing and disposal.

6.9 Unexpected Finds

In the event of unexpected finds of contamination (including asbestos) the *SMC-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.

6.10 Potable Water

In-line with the CEMF the following water resource management objectives will apply to the construction of the Project:

- Minimise use of potable water
- 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 SMC. 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 will be consulted for the development of this program. In accordance with REMM FHW4, the NSW EPA and DPI (Water) will be consulted for this monitoring program (refer Section 1.5 for details of consultation). The Secretary's approval will be sought to implement this CMP as part of seeking approval of this Plan.As described within Section 1.3 the project scope consists of works such as GST, fencing installation, high level retaining walls, minor track and localised civil works including the SMC & BEW (Metro Service Building, Platform works, fencing, drainage and Combined Service Route). These are considered a low risk to water quality due to the minimal area of disturbance, the short duration of works, the requirements for dewatering are likely to be minimal and as the works can be managed effectively with localised erosion and sediment controls.

Section 21.4.1 of the EIS states "*Where discharge to surface watercourses is required, a monitoring program would be implemented as part of the construction environmental management plan to assess water quality prior to discharge.*"

JHLOR will manage water on-site in accordance with the *Sydney Metro – Water Discharge or Reuse Procedure* and will not discharge to surface watercourses. As such, monitoring within the identified watercourses is not applicable to the SMC works.

As noted in section 4, there are a number of major drainage crossings and outlets across the T3 Bankstown line. Many of these originate from and convey water from larger catchments beyond the rail corridor. The open channel to the north of the Bankstown Station northern platform will be diverted and closed by CBCC.

Due to the low risk of water quality issues, JHLOR will take an assurance approach to water quality monitoring, rather than sampling major water bodies. JHLOR will fulfil the requirement for water quality monitoring by implementing an environmental condition survey of major drainage crossings and outlets (prior to Construction works occurring in an area) and post-rainfall event inspections.

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.

7.2 Background Data

Water quality is measured on an ongoing basis for the wider Cooks River and Georges River catchments by the DPE Environment and Heritage (including NPWS) as part of the Beachwatch programme. These monitoring point are located at Kyeemagh Baths at the mouth of the Cooks River in Port Botany and a number of beaches in the lower Georges River. These monitoring points are 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 the SMC and BEW area.

As part of the SMEW Project JHLOR conducted monitoring in the Cooks River (near to Broughton Street) from May 2019 to September 2020 at quarterly intervals and also during rainfall events. It is noted that the data captured as part of the monitoring indicates that the water quality within the Cooks River at the monitoring location exceeds several of the ANZECC criteria regularly, including; pH and turbidity. The results fluctuate and offer little in terms of interpretation or predicable trends.

As per Section 4.8 there is also limited data for the Salt Pan Creek catchment. The EIS references recent studies, stating “Heavy development in the Salt Pan Creek catchment, including construction effects and litter, as well as other influences such as sewer overflows and a landfill operation, have resulted in historically poor water quality in the creek. The water quality was designated D- (“poor”) in 2009-2010. However water quality has improved in the ensuing years through the efforts of local councils and others. The most recently available report, the 2015-2016 River Health Report Card for the Georges River (GRCCC, 2016), identified the overall water quality health of Salt Pan Creek as “good” (A-). It is understood that water quality treatment devices in the form of trash racks and GPTs have been installed in the catchment together with the implementation of a public education program, amongst other controls

JHLOR will undertake environmental condition surveys on major drainage crossing and outlets within localised catchments where works are to occur. The surveys will include a photo of the drainage outlets during dry, and where possible, wet weather. JHLOR will record any particular noteworthy conditions related to water quality (e.g. turbid water observed and the source of the turbid water where visible, litter, discolouration, visible oils or sheens).

Pre-Construction information will be collected and stored on the SMC Project Drive.

7.3 Monitoring Methodology

Both prior to any major rainfall event forecasted (>20mm, in 24 hours), and Following rain events of greater than 20mm in a 24-hour period, JHLOR will undertake post rainfall inspections of monitoring locations to determine if there is any change in water quality post a significant first flush. An ‘event’ is defined as the first 20mm rainfall event within a 24-hour period. In the case of multiple consecutive events, only the first will be monitored. Monitoring will resume after a seven-day period of no rain. Monitoring locations are indicated in Appendix F. Visual inspections will include the following monitoring parameters:

- Water clarity and colour
- Odour
- Description of flow and quantity
- Oil and Grease determination
- Details of any foreign objects within the water, and
- Visible runoff (into the water body)

JHLOR will maintain a record of the inspections (including photographs) within the SMC Project drive.

Where water quality issues are visibly observed JHLOR will investigate further to determine if the source of the issue is related to JHLOR construction activities (where possible, noting safe access limitations). The JHLOR Environmental Manager or delegate will discuss changes in water quality associated with Construction with the JHLOR Construction Team to determine if further controls may be implemented, noting that any controls must be feasible and reasonable.

Once works in a particular area have been completed and any disturbed ground (from the works) reinstated to a suitable condition the associated monitoring within the particular area will cease.

It is noted that post-rainfall inspections within 24 hours of some drainage crossings and outlets may not be possible in some circumstances, including:

- Where there are safety concerns, or access is restricted due to rail safe working requirements
- Where erosion and sediment controls prevent access to an outlet and removing those controls would present a risk to water quality (e.g. removing drain guards).

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.

7.4 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
- Inner West Council
- City of Canterbury Bankstown

The Independent ER and Sydney Metro will review the Construction Monitoring Report prior to submission to relevant agencies. JHLOR will participate in further consultation with these agencies where any relevant water quality issues are identified by the monitoring.

7.5 Adaptive Water Quality Monitoring Program

The proposed water quality monitoring program would be reviewed and further refined by SMC based on the information collated during the monitoring period.

Refinements to the water quality-monitoring program would typically include (although is not limited to):

- Assessing and revising inspection and condition survey methodologies

- Assessing and revising work methods and management practices if considered necessary
- Reducing or increasing monitoring frequency, if potential impacts attributable to SMC are identified

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

7.6 Review of Mitigation Measures

Where an inspection raises an issue with water quality that is likely a result of JHLOR Construction activities, 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. The review and will be based on the scale and type of works being undertaken by JHLOR in the area and will generally include:

- Is the water quality issue solely due to JHLOR works or are there other contributing factors?
- Are the current controls effective?
- Can current controls be bolstered to mitigate impacts further?
- Can further controls, that are feasible and reasonable, be implemented to mitigate impacts?
- Can activities be changed to mitigate impacts?

The type of additional mitigation measures implemented will be dependent on the site conditions and activity.

Further details of mitigation measures are presented in the CEMP Appendix 4.

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 SMC CEMP.

7.7 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.

Appropriate training will be provided to key personnel regarding erosion and sediment control. This training will likely take the form of a toolbox and 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 10 of the SMC CEMP for further information on environmental training.

9. Monitoring, Auditing and Reporting

JHLOR will regularly review SMC and BEW 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. Erosion and Sediment Control issues or actions to be recorded by exception.
- 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 (as per routine inspection)
  - prior to any major rainfall event forecasted (>20mm, in 24 hours)
  - Following a major rainfall event where >20mm in 24 hours, if safe to do so
  - prior to any site closure of greater than 48 hours

Typical records generated and maintained (on the Project SMC 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 DPE, Inner West Council 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 CMR 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 the 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 7.

Table 7 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 13 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.	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: Consultation required for CEMP Sub-plans Relevant government agencies to be consulted for CEMP Sub-plans Consultation required for CEMP Sub-plans Relevant government agencies to be consulted for CEMP Sub-plans (b) Soil and water Relevant council(s), DoI, OEH	Prior to Construction	S2B SSI 8256 COA – C3	Environment Manager	Section 1.5 Section 1.6 Appendix D
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 D
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 7
6.	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. Consultation required for Construction Monitoring Programs Relevant government agencies to be consulted for Construction Monitoring Programs (b) Water Quality Relevant council(s)	Prior to construction	S2B SSI 8256 COA – C8	Environment Manager	Section 1.5 Section 1.6 Section 7 Appendix D

No.	Measure	Timing	Requirement	Responsibility	Reference
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
	(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 D
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 D

No.	Measure	Timing	Requirement	Responsibility	Reference
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 7
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 7
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 4.9 Section 5 Section 6.2.4
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
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

No.	Measure	Timing	Requirement	Responsibility	Reference
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) 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.	During Construction	S2B SSI 8256 COA – E41		Section 6.3
	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
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	Section 4.3 Section 6.8
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	Section 4.5 Section 6.4
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
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

No.	Measure	Timing	Requirement	Responsibility	Reference
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	Although allocated to SMC within the Staging Report, JHLORs' scope between Marion Street and Stacey Street Bankstown is limited to overhead wire works. As such this REMM is not relevant
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:	Prior to and during construction	S2B SSI 8256 REMM FHW5	Environment Manager	Section 4 Section 6.2.4

No.	Measure	Timing	Requirement	Responsibility	Reference
	• 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				
33.	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.	Prior to and during construction	S2B SSI 8256 REMM FHW6	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 FHW7	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 FHW8	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 FHW9	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 FHW10	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.	**Flooding and hydrology** Construction is undertaken in a manner that minimises the potential for adverse flooding impacts, through staging of works and the implementation of mitigation measures.	During Construction	S2B EIS EPO – Flooding and hydrology	Environment Manager Project Engineer	Section 4 Section 6

No.	Measure	Timing	Requirement	Responsibility	Reference
	Construction compounds and work sites are laid out such that flows are not significantly impeded. The preferred project maintains existing flood levels within and adjacent to the rail corridor. The preferred project avoids long term impacts to surface water. Opportunities to reuse water resources are considered during the design process. The use of water during construction is minimised.				
40.	**Soils** Site-specific soil characteristics are taken into consideration during detailed design and construction. Contamination is managed in accordance with relevant regulatory requirements. Soil waste is assessed, classified, managed and disposed of in accordance with the Waste Classification Guidelines (EPA, 2014).	During Construction	S2B EIS EPO – Soils	Environment Manager Project Engineer	Section 4 Section 6
41.	**Water Quality** Impacts to water quality during construction and operation are minimised. 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). The preferred project would protect or contribute to achieving the Water Quality Objectives, during construction and operation. Construction water quality discharge would comply with the requirements of an environment protection licence issued to the project.	During Construction	S2B EIS EPO – Water	Environment Manager Project Engineer	Section 4 Section 6
Construction Environmental Management Framework					
42.	Soil and Water Management Objectives a. The following soil and water management objectives will apply to construction: • Minimise pollution of surface water through appropriate erosion and sediment control. • Maintain existing water quality of surrounding surface watercourses. • Source construction water from non-potable sources, where feasible and reasonable.	During Construction	CEMF Section 15.1)	Environment Manager Project Engineer Site Superintendent	Section 1.4

No.	Measure	Timing	Requirement	Responsibility	Reference
43.	Soil and Water Implementation 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: • 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. • Identification of locations where site specific Stormwater and Flooding Management Plans are required. • Compliance record generation and management.	During Construction	CEMF Section 15.2a)	Environment Manager Project Engineer Site Superintendent	1. Section 4, Section 6 2. Section 4, Section 5, Section6, Appendix F 3. Section 4, Section 6 4. Section 6 5. Section 6, Appendix C 6. Section 6, Appendix B 7. Section 6, Section 7, Section 9 8. Section 2.2 9. Section 3 10. Section 6 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 #5 in the Construction Environmental Management Plan

No.	Measure	Timing	Requirement	Responsibility	Reference
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. Any amendments to the ESCP will be approved by the Contractor's Environmental Manager (or delegate).	During Construction	CEMF Section 15.2c)	Environment Manager Project Engineer Site Superintendent	Section 6.1.4
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: • 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
48.	The following compliance records will be kept by the Principal Contractors: • 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

No.	Measure	Timing	Requirement	Responsibility	Reference
49.	The following water resources management objectives will apply to the construction of the project: i. Minimise demand for, and use of potable water; ii. Maximise opportunities for water re-use from captured stormwater, wastewater and groundwater; iii. Examples of measures to minimise potable water consumption include: • Water efficient controls, fixtures and fittings in temporary facilities; • Collecting, treating and reusing water generated in tunnelling operations, concrete • batching and casting facility processes; • Using recycled water or treated water from onsite sources in the formulation of • concrete; • Harvesting and reusing rainwater from roofs of temporary facilities; • Using water from recycled water networks; • Collecting, treating and reusing groundwater and stormwater; • Using water efficient construction methods and equipment; and • Providing designated sealed areas for equipment wash down	Prior to Construction	CEMF Section 15.2g)	Environment Manager Project Engineer Site Superintendent	Section 6.8
50.	Soil and Water Mitigation Examples of surface water and flooding mitigation measures include: • 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					

No.	Measure	Timing	Requirement	Responsibility	Reference
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 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.	During construction	O5.1	Environment Manager Project Engineer Site Superintendent	Section 6.1
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) Directly after 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:	During construction	O5.6	Environment Manager Project Engineer Site Superintendent	This plan Section 6.1.4

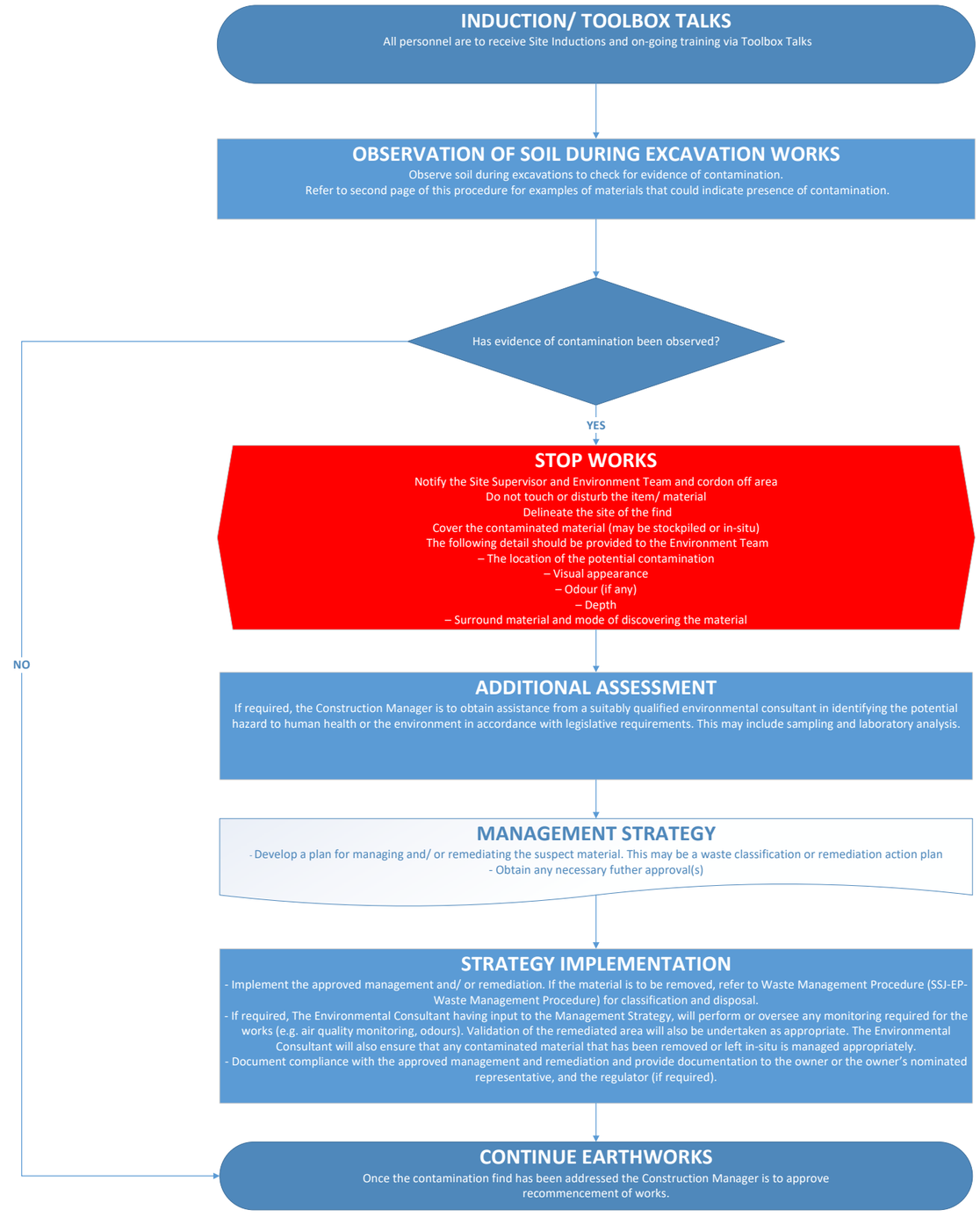
No.	Measure	Timing	Requirement	Responsibility	Reference
	a) The document describes all erosion and sediment controls (including those relating to the minimisation of mud tracking from the premises) to be implemented at the site; and b) The document is prepared before the controls are implemented; and 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, 7 and 8 (note: points 1, 2, 3 and 4 are related to SSJ works)	During construction	M2.2	Environment Manager	Section 6.2

No.	Measure	Timing	Requirement	Responsibility	Reference
	<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>				
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><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><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></table>	During construction	L2.4	Environment Manager	Section 6.2
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

No.	Measure	Timing	Requirement	Responsibility	Reference
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
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

CONTAMINATION AND ACID SULPHATE SOIL UNEXPECTED FINDS PROCEDURE



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

CONTAMINATION AND ACID SULPHATE SOIL UNEXPECTED FINDS PROCEDURE

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)

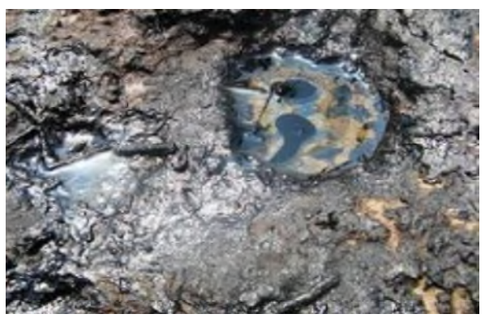
Asbestos
Asbestos finds are to be managed in accordance with the Project WHS Management Plan

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 Consturction Spil and Wster 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.

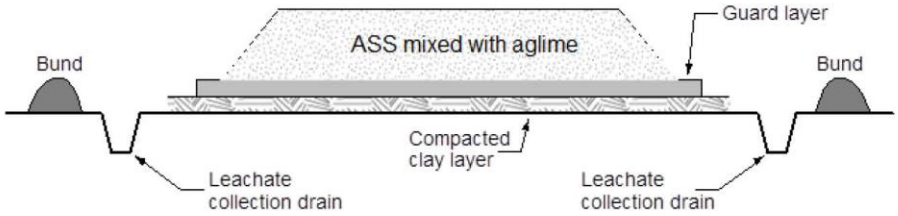


Figure 8-1: Schematic cross-section of a treatment pad, including a compacted clay layer, guard layer, leachate collection system and containment with bunding

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.

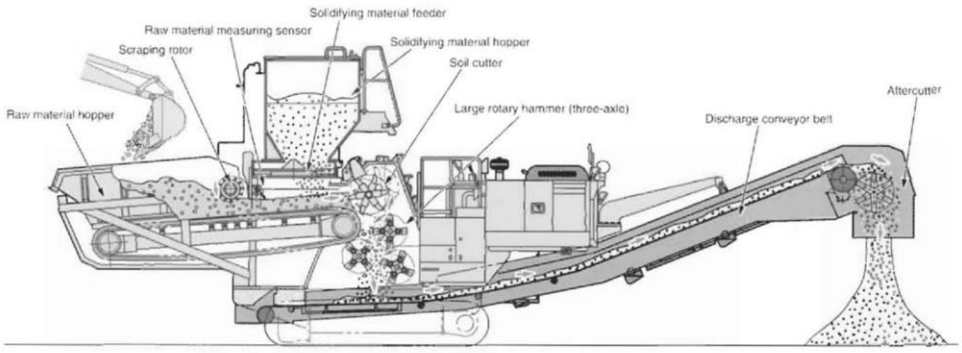


Figure 8-2: Cross-sectional view of soil mixing machinery (Komatsu, 2003). Note that soil treatment with such machinery should be carried out in an appropriately contained area, including bunding and measures to prevent leachate infiltration.

Appendix D – Consultation Register

Agency	Comment	JHLOR Response
Department of Planning and Environment - Water	1. Section 7.6 notes that additional management measures would be considered, but a procedure to identify and implement any additional mitigation measures is not provided. It is expected this procedure would step through what to consider in determining the appropriate mitigation measure and how to implement that measure. 2. Please include what consultation would occur should there be any exceedance of criteria, e.g. notify ER etc. 3. As the construction locations are not included in the SWMP, the ER is to review and agree the proposed locations of construction compounds, ensuring the requirements of E8 and FHW5 have been considered and met. 4. For clarity, suggest updating procedure to include Asbestos in the title (not just ASS and contamination). 5. Where the 80th percentile, five day rainfall event is not able to be achieved due to space available, include reference to the implementation of Section 6.3.4 (g) of Managing Urban Stormwater Vol 1 instead 6. It is appropriate that this be considered in detailed design, however DPE is unable to confirm compliance with this condition based on this document. Please make more explicit. 7. It is appropriate that this be considered in detailed design, however DPE is unable to confirm compliance with this condition based on this document. Please make more explicit. 8. Same as comment 3. 9. Same as comment 3. 10. Same as comment 3. 11. Section 6.2.2 details the criteria permitting re-use on site. Please explain what will happen if the water does not meet this criteria, i.e. will it be treated and re-tested until ok to reuse? Will it be transported from site and disposed elsewhere? What treatment would be used? 12. Same as comment 11 13. It is noted the ER responsibilities are considerably more detailed than all other positions. While these may be correct, the SWMP should focus on the project team's responsibilities and provide a more detailed breakdown. 14. if Stormwater and Flooding Management Plans are required, they are to be provided to the ER for review.	1. The process for considering additional mitigation measures is included in Section 7.6 and involves the Environmental Manager consulting with the construction team within 24hours of the inspection. This process has been further detailed, however it is noted that the particular controls will depend on the activities being undertaken and site conditions. Reference to the CEMP Appendix 4 (ERAPs) has been included in Section 7.6. 2. Consultation regarding the project Monitoring Program is presented in Section 1.5 and Appendix D. In the event of non-compliance with the Water Quality Monitoring Program, details are included in Section 9. 3. Section 4.9 amended to include details of ER review. 4. Asbestos is considered to be included under the heading Contamination. Clarification has been included in Section 6.9 5. Section 6.1 updated 6. Section 4.9 updated 7. Section 4.9 updated 8. Section 4.9 amended to include details of ER review. 9. Section 4.9 amended to include details of ER review. 10. Section 4.9 amended to include details of ER review. 11. Section 6.2.2 updated 12. Section 6.2.2 updated 13. Further details on the project team's Roles and Responsibilities is provided in the CEMP (Table 6). Reference will be included in the CSWMP to the CEMP table. 14. Stormwater and Flooding Management Plan to be provided to the ER as per the requirements of the CEMF.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (formerly EESG)	The DCCEEW will not be providing comments on the sub-plan.	N/A
Natural Resources Access Regulator (NRAR) (formerly Department of Industry) (also a requirement of REMM FHW4)	NRAR do not have any comments on the Plans provided. NRARs jurisdiction is water licencing and approvals and controlled activities.	N/A
City of Canterbury-Bankstown	CoCB do not have any comments on the CSWMP. CoCB do not have any comments on the update for Bankstown Early Works scope added to the CSWMP. CoCB do not have any comments on the update for Bankstown & Additional Corridor Works scope added to the CSWMP.	No comments
Inner West Council	Provision of Water Balance Study	The Water Balance Study forms part of the Sustainability Management Plan. The Strategy will be provided to Council for information.
	Water quality testing - targets should use those from Botany Bay and Catchment Water Quality Improvement Plan	Details have been included in Section 6.2.3 in the event that discharge is required by the project.
	The plan references the 'draft Overland Flow Study Canterbury LGA Cooks River Catchment (Cardno 2016)'. Is there a more current Flood Management Study?	Study has been referenced as per the EIS. No further studies appear to have been published.
	IWC prefers green infrastructure/WSUD rather than the Stormfilter cartridges proposed.	Section 6.1.4 updated
	Seedbank from remnant vegetation in soil at Dulwich Hill Station. Refer ''Missing Jigsaw Pieces of the Cooks River Valley' (Ondinea, D., Benson, D. and Bear, V.) Dulwich Hill Station is in the Wildlife Corridor and Bandicoot Protection Area as per Marrickville LEP and DCP. Inner West population of Long-nosed Bandicoots is listed as threatened in the Biodiversity Conservation Act (2016). * Refer Biodiversity section, Marrickville DCP. Bandicoot protection measures must be put in place. * Add potential impact of loss of seedbank in topsoil	Details included in the CEMP/flora and fauna procedure for protected species. Section 6.1.1 and 6.1.4 have been updated in regards to the protection of seeds within the topsoil. It is noted that Dulwich Hill Station is outside of the scope of the SMC works.

	Erosion and sediment control: General principles * Add dot point: Minimise loss of topsoil and collect seed from soil before removing off site Erosion and sediment control: Erosion and Sediment Control Plans * Add dot point: Minimise loss of topsoil and collect seed from soil before removing off site	Sections 6.1.1./6.1.4 have been updated.
	Add use targets from Botany Bay & Catchment Water Quality Improvement Plan Criteria for offsite discharge - what about TP and TN? Use targets from Botany Bay and Catchment Water Quality Improvement Plan	Section 6.2.3 has been updated in reference to the Botany Bay and Catchment Water Quality Improvement Plan in the event of discharge
	Consultation not required for BEW. Consultation for BAC	No comments on the update
NSW EPA	The EPA's position on post approval management plans, including the Construction Environmental Management Plan and the Construction Soil and Water Management Plan, is to encourage the development of such plans to ensure that proponents have determined how they will meet their statutory obligations and designated environmental objectives. The EPA do not approve or endorse these and will not be providing comments on the CEMP and associated sub-plans.	N/A

Appendix E – Example ESCP for Initial Construction Works

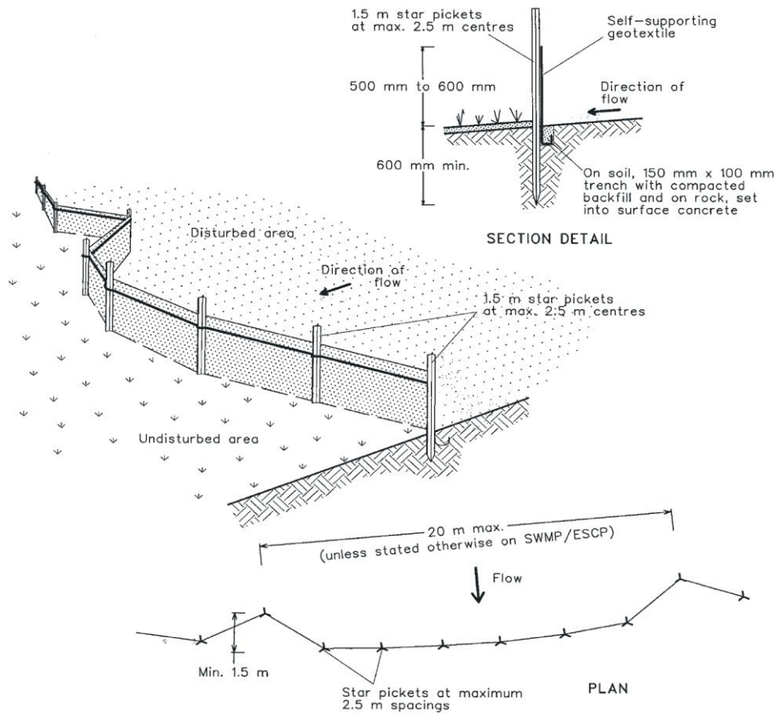
Note; The intention of this Appendix is to provide an example of how Erosion and Sediment Control Plans will be developed on the Project. The attached is an example only.

ESCP

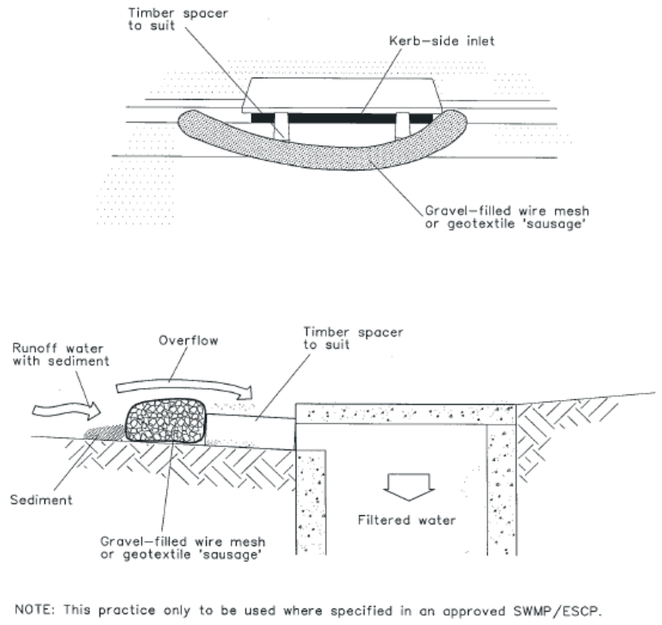
SMC-ESCP-001-Campsie Stockpile Locations Rev00

General Procedures to be implemented in accordance with *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004)

Sediment Fence Install



Stormwater drain protection – alternative options include coir logs or geofabric and sandbags



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

Cover Stockpiles during inclement weather or when not in use

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

Role	Name	Signature	Date
Environment Manager	D Keegan		20/11/2020

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 (>20mm 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

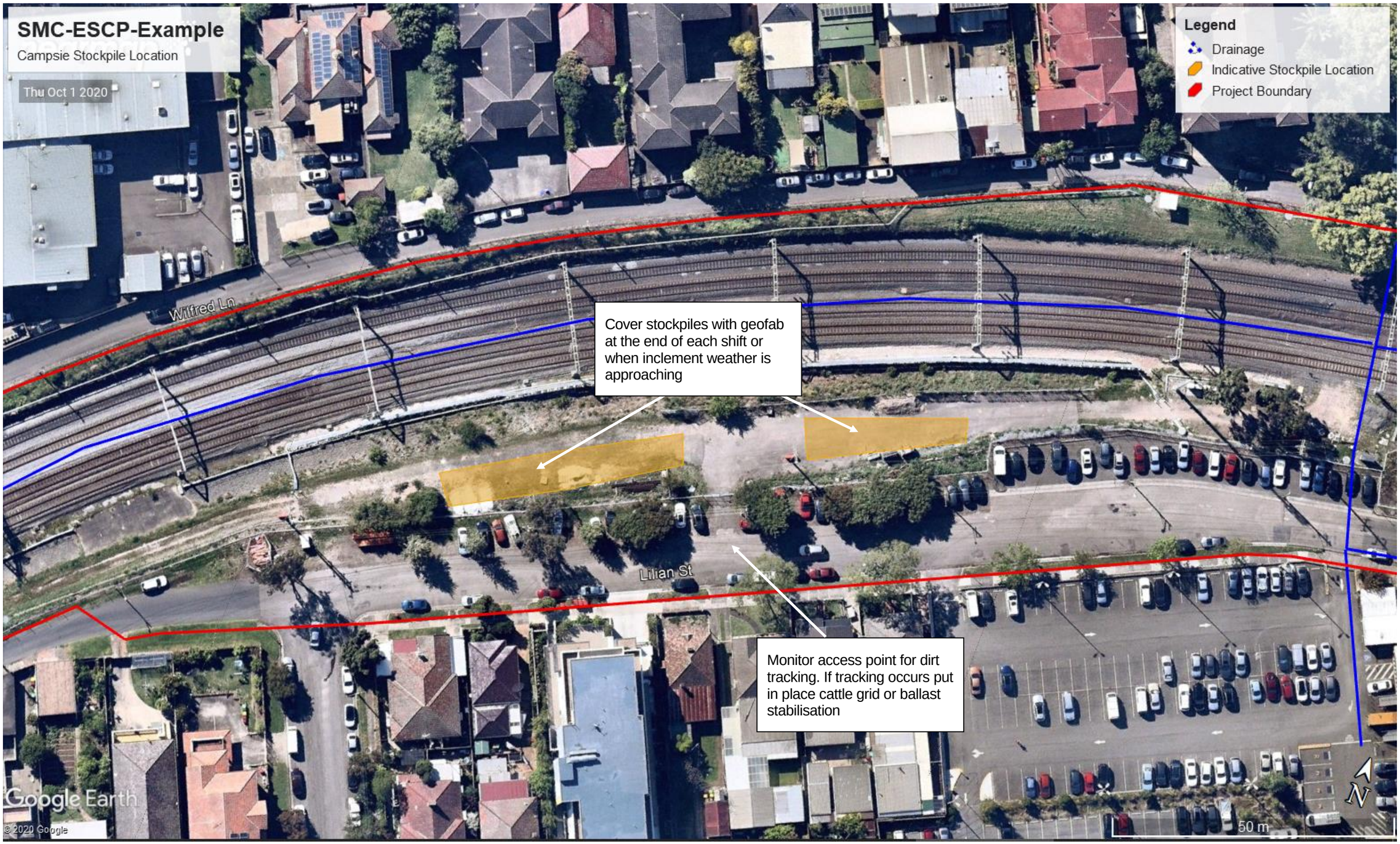
NO PERMIT NO PUMP

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

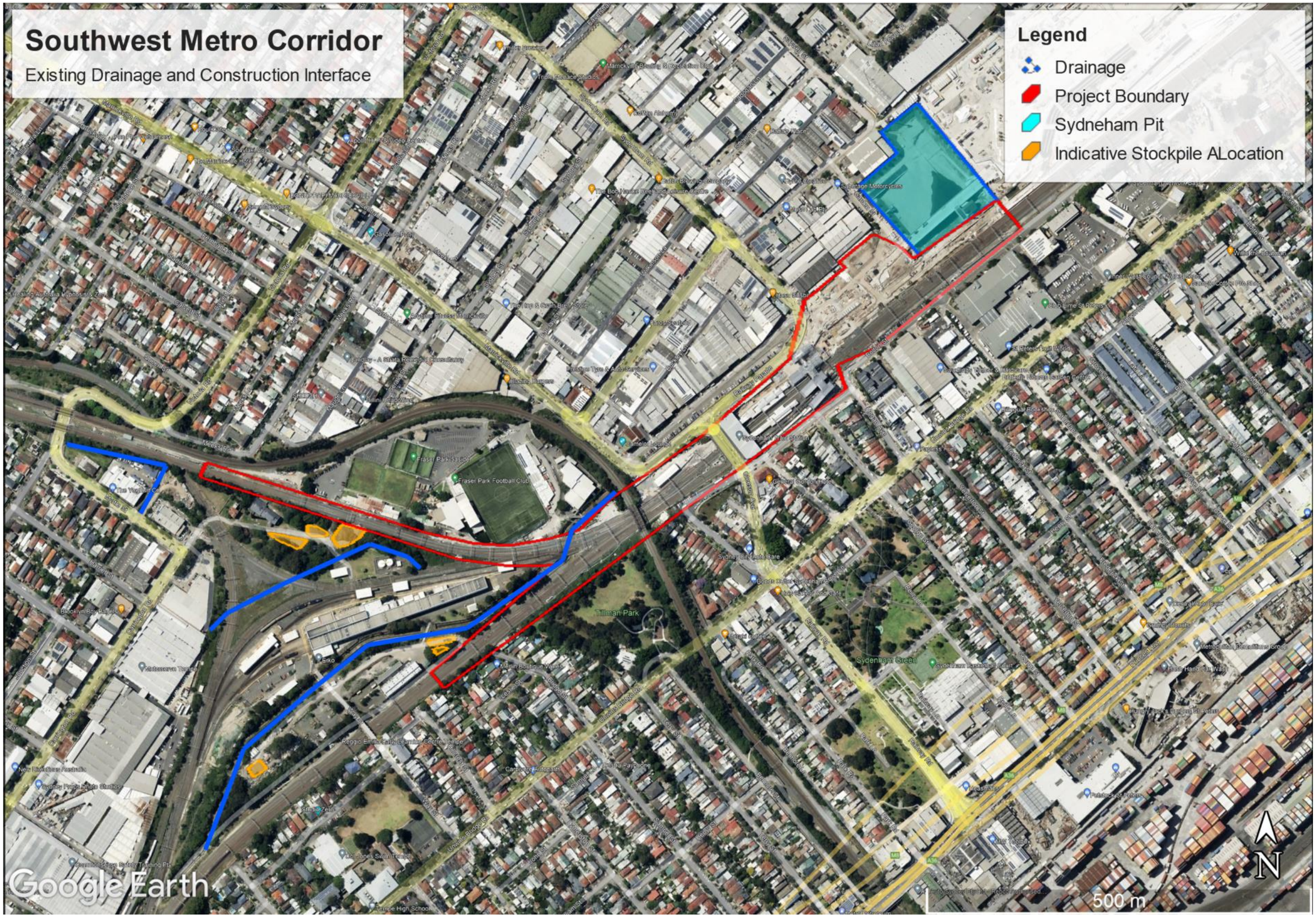
ESCP

SMC-ESCP-001-Campsie Stockpile Locations Rev00



Appendix F – Construction Activity Analysis Maps

Note: Stockpile locations, drainage lines, monitoring points and overland flow paths are indicative only and are subject to further refinement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Existing Drainage and Construction Interface
Legend
Drainage
Project Boundary
Sydneham Pit
Indicative Stockpile ALocation
Google Earth
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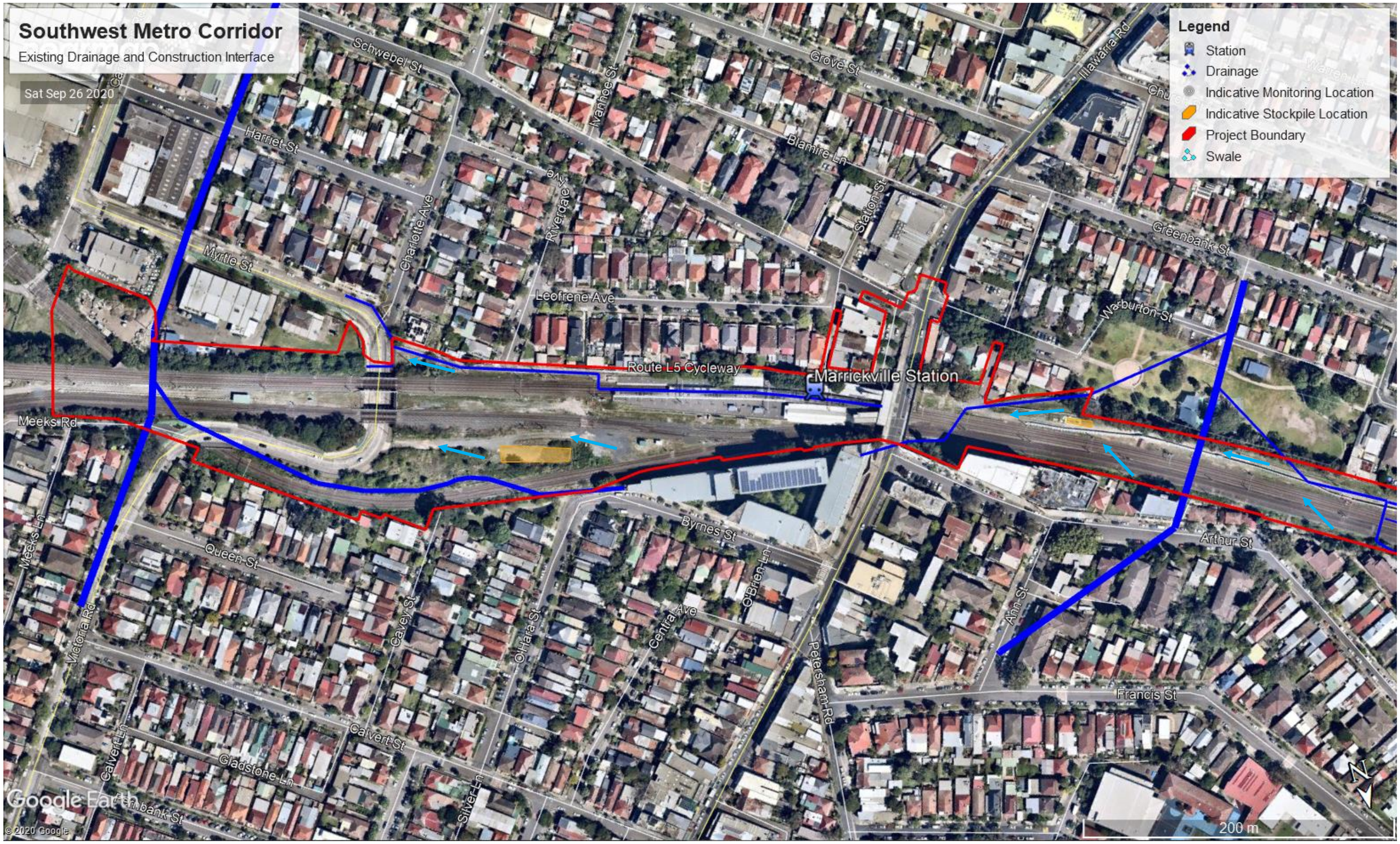
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Existing Drainage and Construction Interface
Sat Sep 26 2020
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Station
Drainage
Indicative Monitoring Location
Indicative Stockpile Location
Project Boundary
Swale
Schwebel St
Harriet St
Myrtle St
Charlotte Ave
Riverdale Ave
Nannine St
Grove St
Illawarra Rd
Blamire Ln
Station St
Greenbank St
Warburton St
Leofrene Ave
Route L5 Cycleway
Marrickville Station
Meeks Rd
Meeks Ln
Queen St
Victoria Rd
Calvey St
O'Hara St
Byrnes St
O'Brien Ln
Central Ave
Petersham Rd
Ann St
Arthur St
Francis St
Calvert St
Calvert Ln
Gladstone Ln
Silver Ln
Google Earth
© 2020 Google
200 m
N


Southwest Metro Corridor
Existing Drainage and Construction Interface
Thu Oct 1 2020
Legend
Station
Drainage
Indicative Monitoring Location
Indicative Stockpile Location
Project Boundary
Swale
Warren Rd
Beauchamp St
Wrights Ave
Moyes St
Greenbank St
Moncur St
Tamar St
Osgood Ave
Wicks Ave
School Parade
Dudley St
Wardell Rd
Kays Ave E
Albermarle St
Jersey St
Livingstone Rd
Randall St
Route L9 Cycleway
Wilga Ave
Kays Ave W
Keith St
Arthur St
Marrickville Ave
Hollands Ave
Robert Ln
Robert St
Pine St
Challis Ave
Margaret St
Google Earth
© 2020 Google
200 m


Southwest Metro Corridor
Existing Drainage and Construction Interface
Thu Oct 1 2020
Legend
Station
Drainage
Indicative Monitoring Location
Indicative Stockpile Location
Project Boundary
Swale
Riverside Crescent
Tennyson St
Garnet St
Balfour St
Murray Ln
Ewart St
Dulwich Hill Station
Ewart Ln
Foss St
Crispin St
Duntroon St
Indicative Monitoring Location
Bedford Crescent
Wargeil Ln
Keith Ln
Keith St
Ness Ave
The Parade
Hampden St
Hercules St
Terrace Rd
Terrace Ln
Myra Rd
Garnet Ln
Google Earth
© 2020 Google
200 m
N


Southwest Metro Corridor
Existing Drainage and Construction Interface
Thu Oct 1 2020
Legend
Station
Drainage
Indicative Monitoring Location
Indicative Stockpile Location
Project Boundary
Swale
Indicative Monitoring Location
Hurlstone Park Station
Hurlstone Ave
Smith Ave
Keri Ave
Starkey St
Duntroon St
Hopetoun St
Burnett St
Foord Ave
Railway St
Hutton St
Canberra St
Kilbride St
Crinan St
Marcia Ln
Mill Ln
Mill St
Dunstaffenage St
Acton St
Canterton St
Mefford St
Euston Rd
Marcia St
Fernhill St
Floss St
Church St
Google Earth
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200 m
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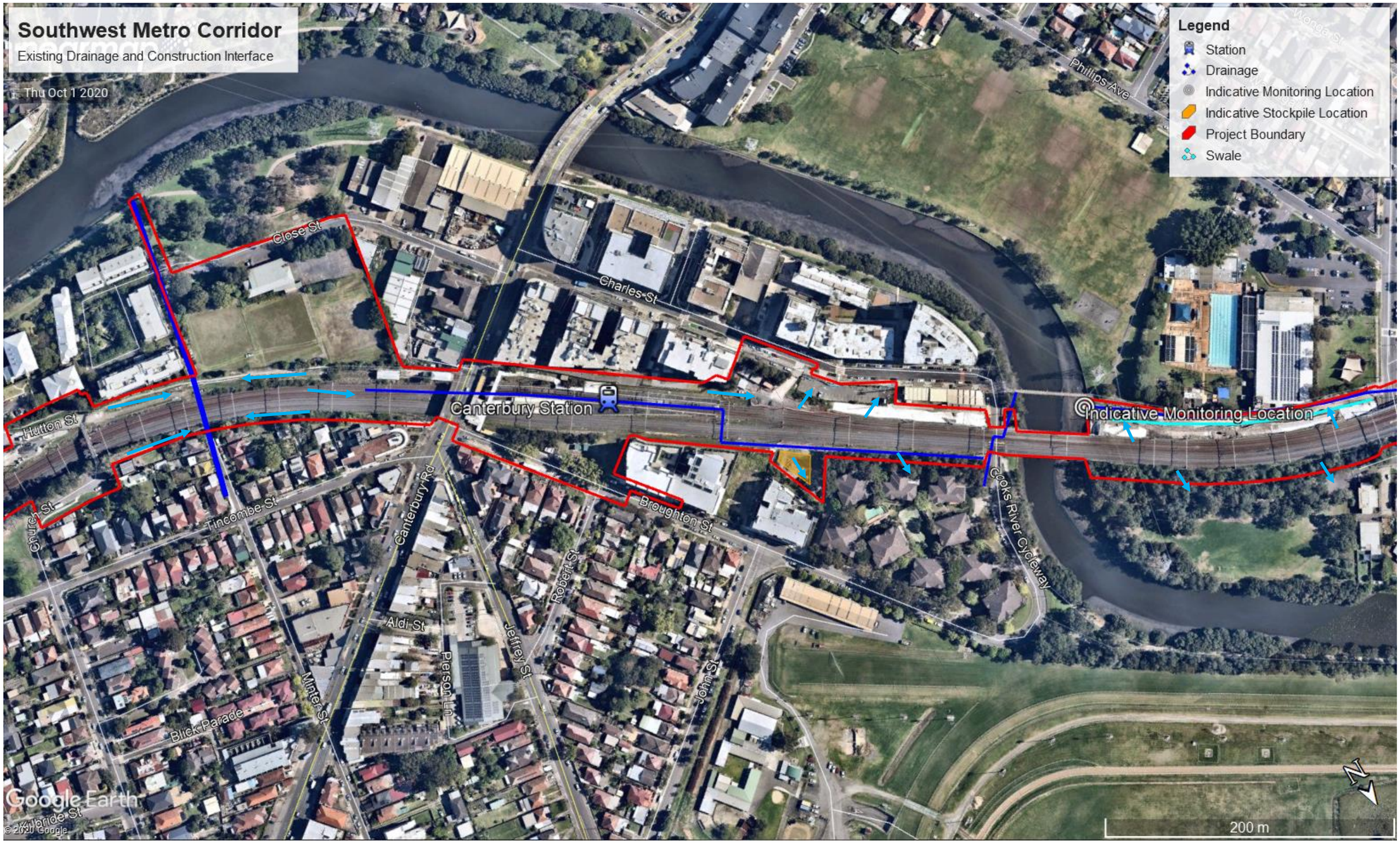
Southwest Metro Corridor
Existing Drainage and Construction Interface
Thu Oct 1 2020
Legend
Station
Drainage
Indicative Monitoring Location
Indicative Stockpile Location
Project Boundary
Swale
Close St
Charles St
Phillips Ave
Canterbury Station
Indicative Monitoring Location
Hutton St
Tincombe St
Canterbury Rd
Broughton St
Cooks River Cycleway
Robert St
Aldi St
Jeffrey St
John St
Pierson Ln
Minter St
Blick Parade
Kilbride St
Google Earth
© 2020 Google
200 m
N


Southwest Metro Corridor
Existing Drainage and Construction Interface
Thu Oct 1 2020
Legend
Station
Drainage
Indicative Monitoring Location
Indicative Stockpile Location
Project Boundary
Swale
Indicative Monitoring Location
Warrigal St
Redman St
Park St
Phillips Ave
Warringa Ln
Oswald Ln
Oswald St
Charles St
Evaline St
Gould St
Duke St
Wairoa St
Wairoa Ln
Campsie Ln
Wonga Ln
S Parade
E Parade
N Parade
Nowra Ln
Nowra St
Bellombi St
Moore St
Frederick St
Clissold Parade
Browning St
Cooks River Cycleway
Google Earth
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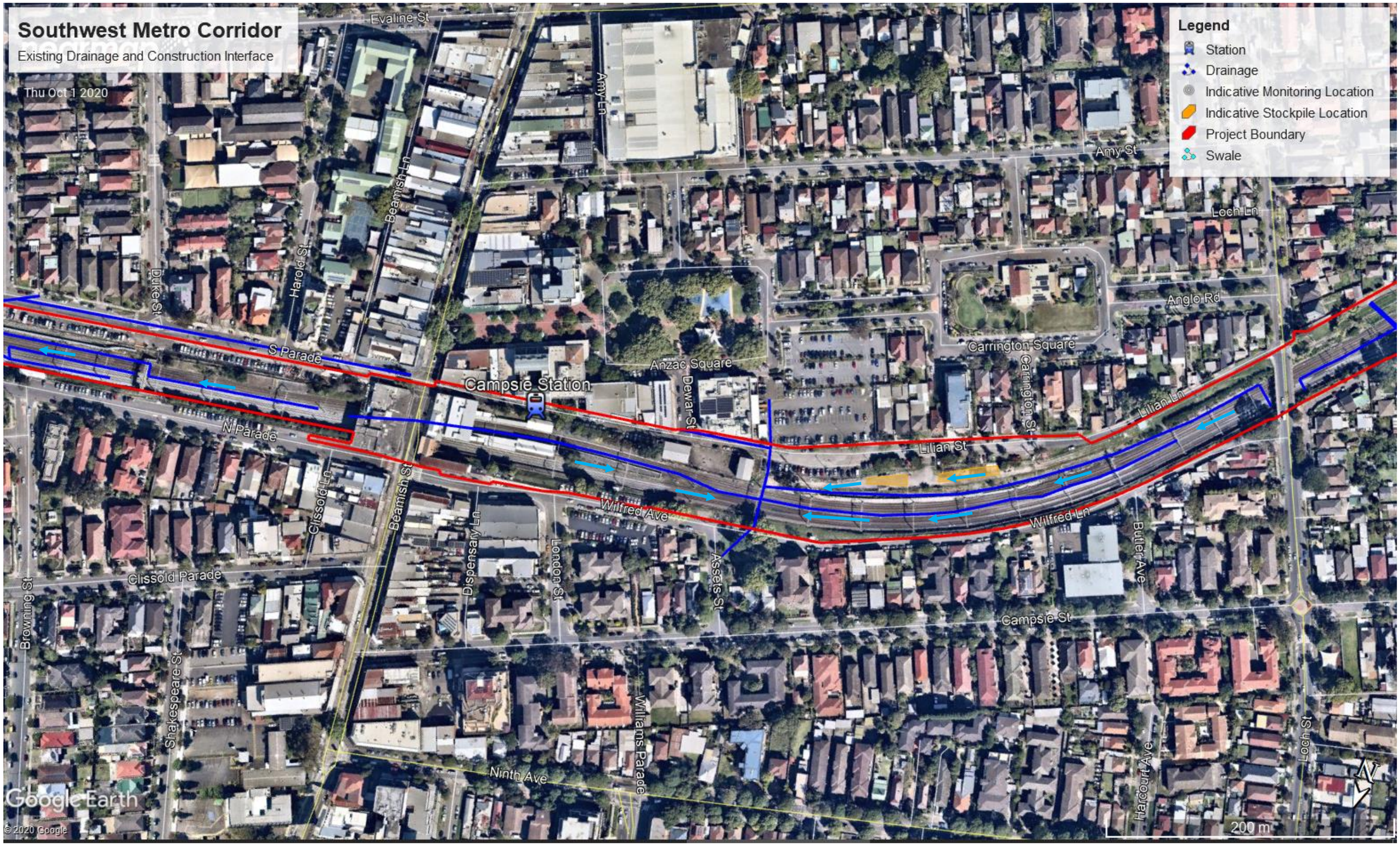
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Thu Oct 1 2020
Legend
Station
Drainage
Indicative Monitoring Location
Indicative Stockpile Location
Project Boundary
Swale
Evaline St
Amy Ln
Amy St
Beamish Ln
Loch Ln
Harold St
Duke St
Anglo Rd
S Parade
Carrington Square
Anzac Square
Campsie Station
Dewar St
Carrington St
Lilian Ln
N Parade
Lilian St
Clissold Ln
Beamish St
Wilfred Ave
Wilfred Ln
Butler Ave
Dispensary Ln
London St
Assets St
Clissold Parade
Browning St
Shakespeare St
Campsie St
Williams Parade
Ninth Ave
Harcourt Ave
Loch St
Google Earth
© 2020 Google
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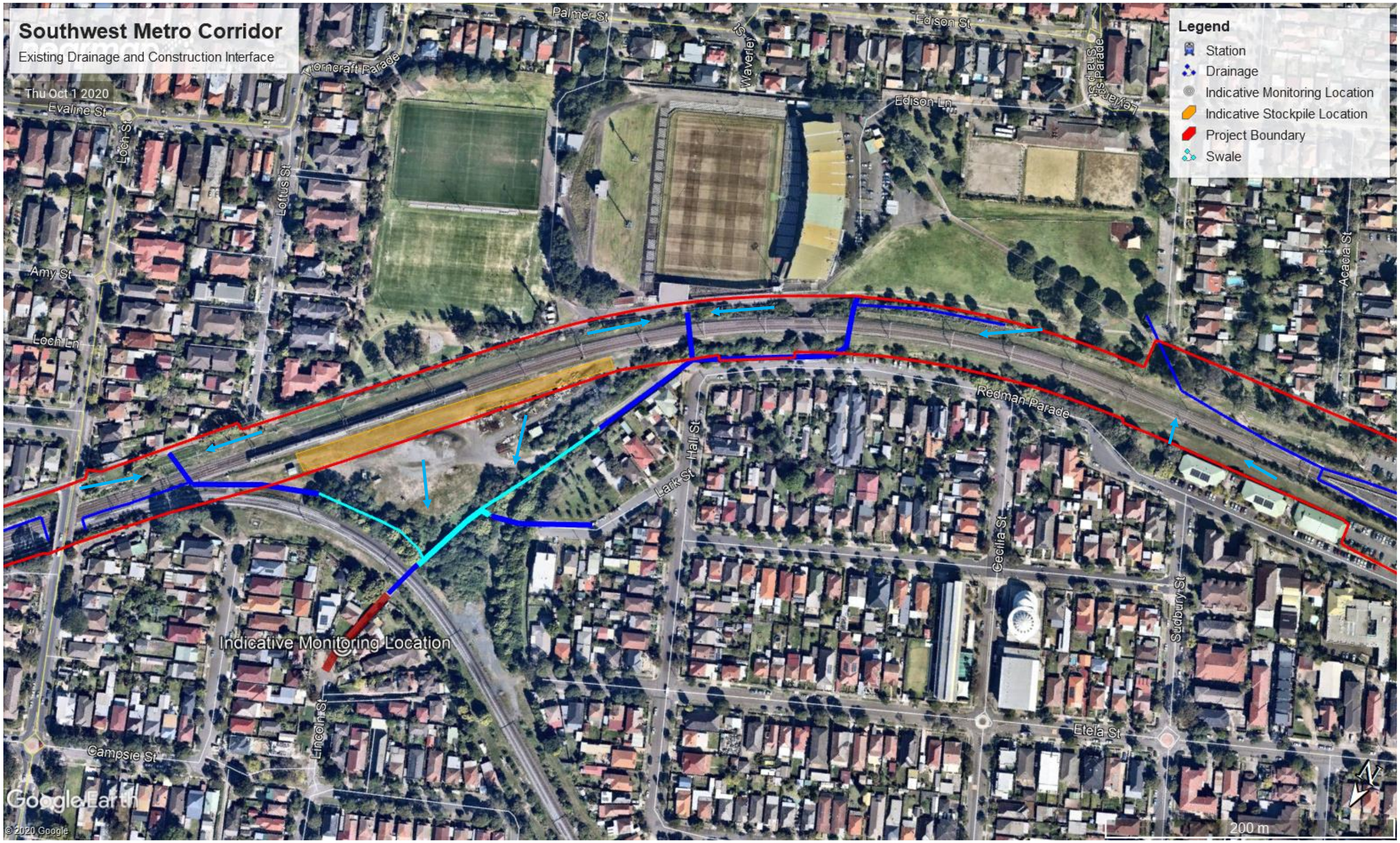
Southwest Metro Corridor
Existing Drainage and Construction Interface
Thu Oct 1 2020
Legend
Station
Drainage
Indicative Monitoring Location
Indicative Stockpile Location
Project Boundary
Swale
Palmer St
Edison St
Edison Ln
Evaline St
Loch St
Loftus St
Amy St
Loch Ln
Redman Parade
Lark St
Hall St
Cecilia St
Stanley St
Acacia St
Etela St
Campsie St
Lincoln St
Indicative Monitoring Location
Google Earth
© 2020 Google
200 m


Southwest Metro Corridor
Existing Drainage and Construction Interface
Thu Oct 1 2020
Legend
Station
Drainage
Indicative Monitoring Location
Indicative Stockpile Location
Project Boundary
Swale
Belmore Station
Marie St
Gillies St
Collins St
Paragon Ln
Gladstone St
Bridge Ln
Bridge Rd
Moreton St
Dennis St
The Blvd
Burwood Rd
Railway Parade
Wortley Ave
Rachel Ln
Ceary Ave
Ceary Ln
Brande St
Station Rd
Taylor St
Redman Ln
Belmore Ave
Etela St
St Clair Street
Oxford St
Lakemba St
Yarrick Rd
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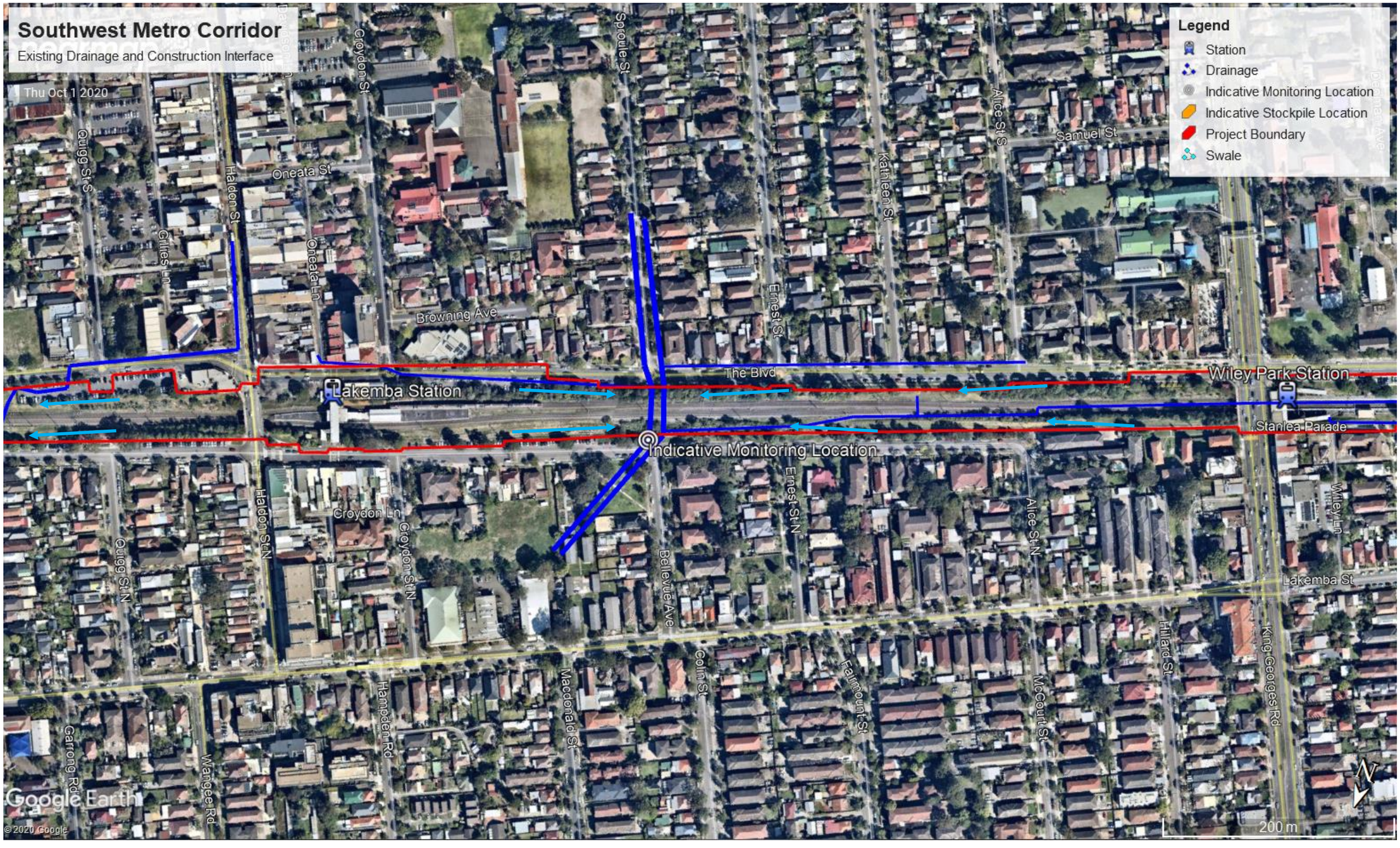
Southwest Metro Corridor
Existing Drainage and Construction Interface
Thu Oct 1 2020
Legend
Station
Drainage
Indicative Monitoring Location
Indicative Stockpile Location
Project Boundary
Swale
Croydon St
Sproule St
Alice St S
Samuel St
Quigg St S
Haldon St
Oneata St
Giles Ln
Oneata Ln
Browning Ave
Kathleen St
Ernest St
The Blvd
Lakemba Station
Wiley Park Station
Stanlea Parade
Indicative Monitoring Location
Haldon St N
Croydon Ln
Croydon St N
Ernest St N
Alice St N
Wiley Ln
Quigg St N
Bellevue Ave
Lakemba St
Hilard St
King Georges Rd
Hampden Rd
Macdonald St
Colin St
Fairmount St
McCourt St
Garrong Rd
Wangee Rd
Google Earth
© 2020 Google
200 m


Southwest Metro Corridor
Existing Drainage and Construction Interface
Thu Oct 1 2020
Legend
Station
Drainage
Indicative Monitoring Location
Indicative Stockpile Location
Project Boundary
Swale
Hillcrest St
Renown Ave
Faux St
Robinson St S
Rosemont St S
Dudley St
The Broadway
Matthews St
Rossmore Ave
Stanlea Parade
Indicative Monitoring Location
Van Dyke Pl
Turner Ln
Urunga Parade
The Blvd
Punchbowl Station
Punchbowl Rd
Rickard St
Highclere Ave
Breust Pl
Quine Ln
Kelly St
Lakemba St
Shadforth St
Connella St
Gyn St
Defoe Ln
Defoe St
Robinson St N
Rosemont St N
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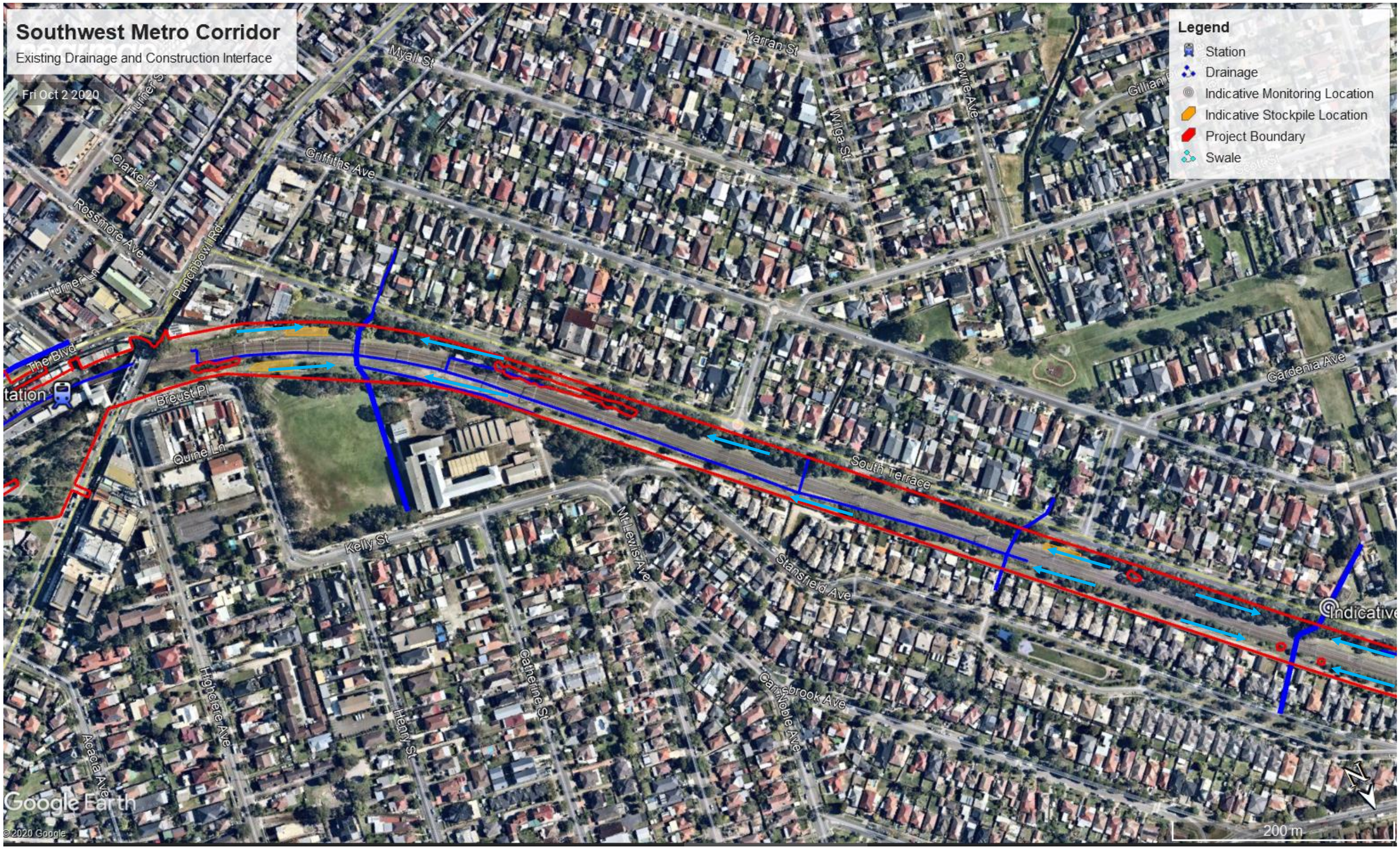
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Drainage
Indicative Monitoring Location
Indicative Stockpile Location
Project Boundary
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Myall St
Yarran St
Gowrie Ave
Wiga St
Griffiths Ave
Clarke Pl
Rossmore Ave
Punchbowl Rd
Turner Ln
The Blvd
Breust Pl
Quine Ln
South Terrace
Gardenia Ave
Kelly St
Mt Lewis Ave
Stansfield Ave
Carbrook Ave
Carr Noble Ave
Catherine St
Henry St
Highclere Ave
Acacia Ave
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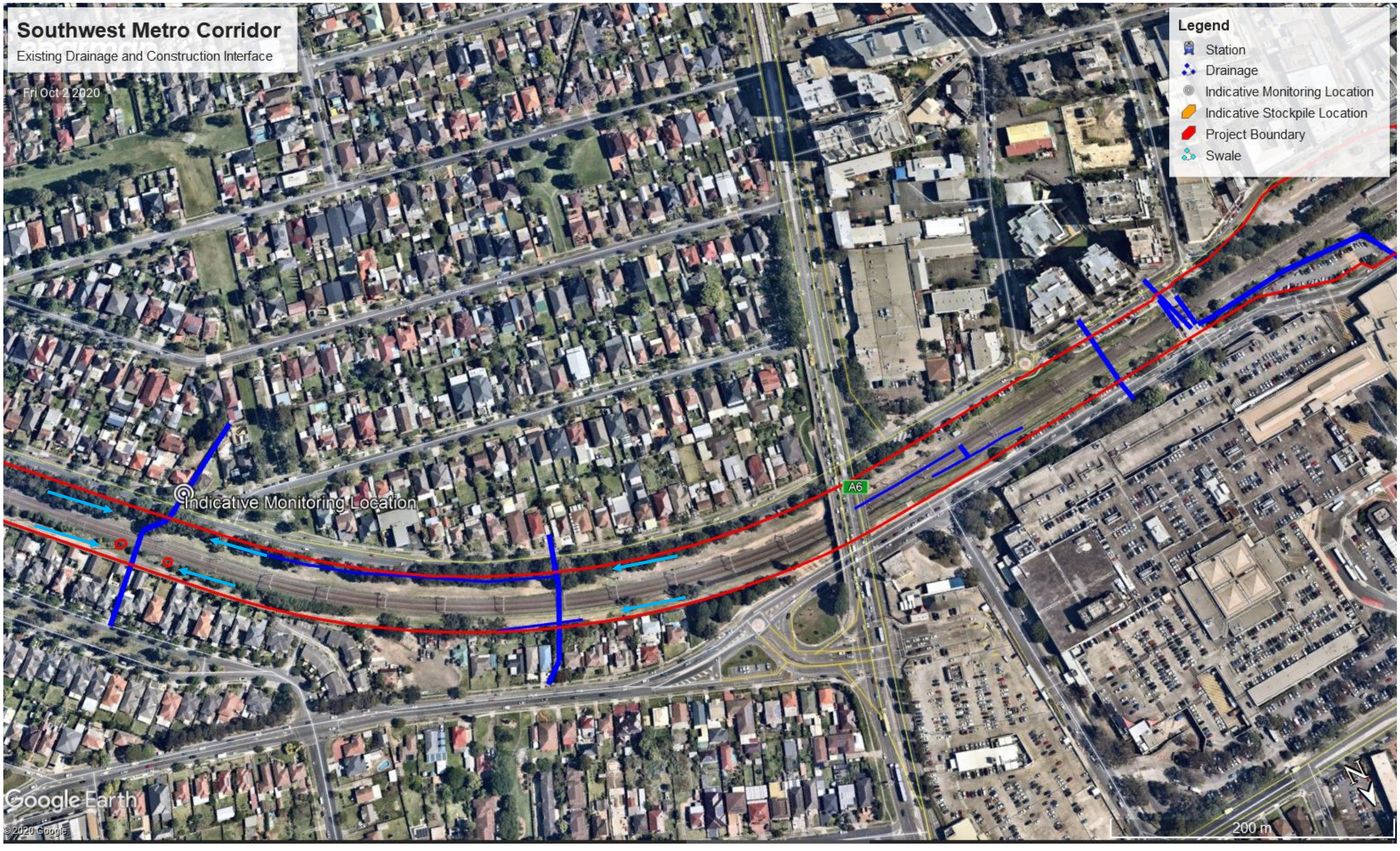
Southwest Metro Corridor
Existing Drainage and Construction Interface
Fri Oct 2 2020
Legend
Station
Drainage
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Indicative Stockpile Location
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Swale
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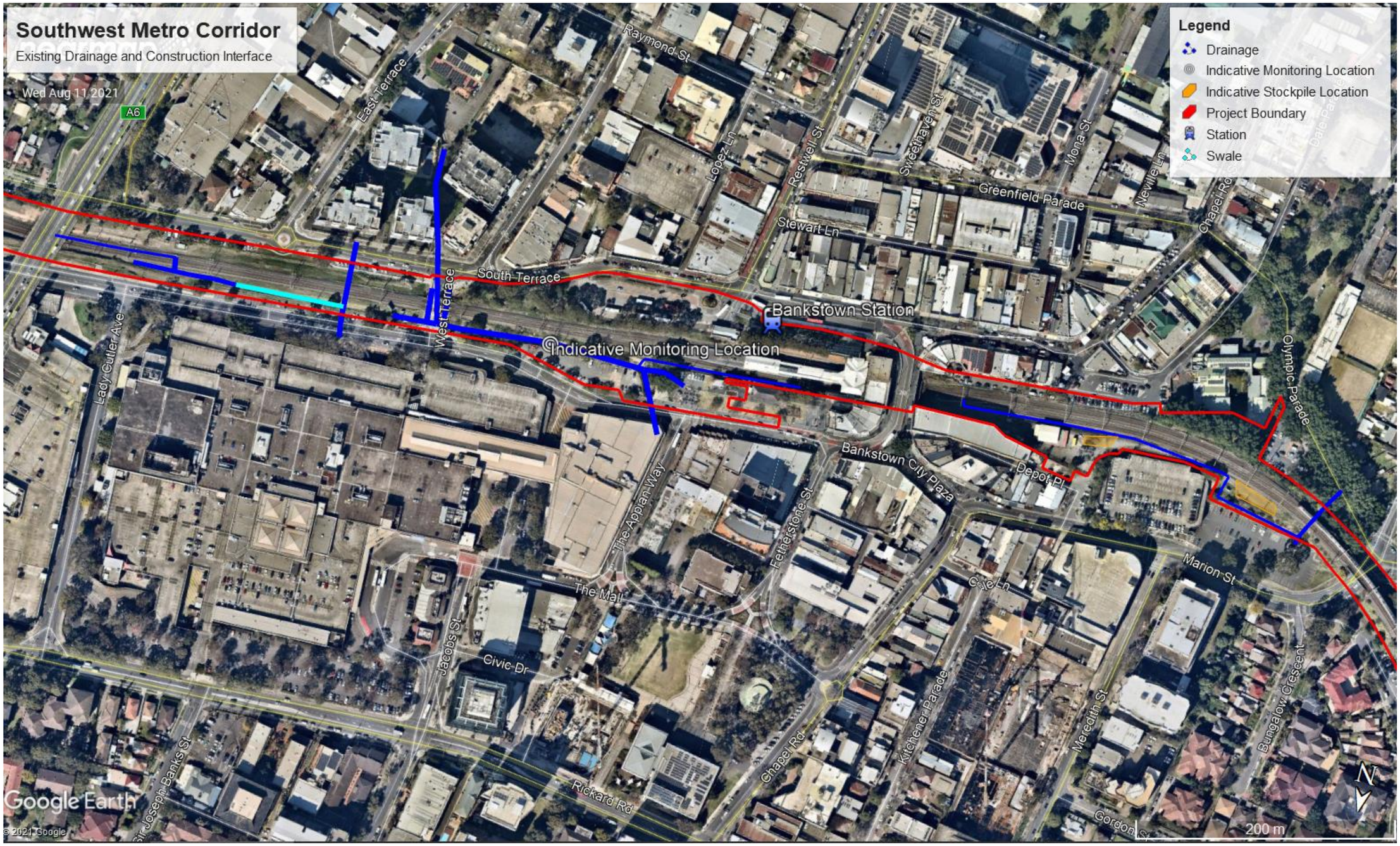
Southwest Metro Corridor
Existing Drainage and Construction Interface
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Indicative Monitoring Location
Indicative Stockpile Location
Project Boundary
Station
Swale
Bankstown Station
Indicative Monitoring Location
Raymond St
East Terrace
Lopez Ln
Reswell St
Sweetnaven St
Mona St
Greenfield Parade
Stewart Ln
South Terrace
West Terrace
Lady Cutler Ave
Olympic Parade
Bankstown City Plaza
Depot Pl
The Appian Way
Fetherstone St
Marion St
The Mall
Jacobs St
Civic Dr
Chapel Rd
Kitchener Parade
Meredith St
Bungalow Crescent
Rickard Rd
Sir Joseph Banks St
Gordon St
Google Earth
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N

Appendix G – Remediation Action Plan - Sustainability Appraisal Template

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)		Indicators (Choose minimum of 1 indicator from Env, Social & Economic)						GO or NO GO	Justification		Remedial Solution	Longevity of Remedial Solution	Maintenance Requirements	Monitoring Requirements	Evidence
		Environmental	Impact i.e. High / Medium / Low	Social	Impact i.e. High / Medium / Low	Economic	Impact i.e. High / Medium / Low								
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 Soil Impacts on Water Impacts on Ecology Use of natural resources & generation of wastes Intrusiveness		Impacts on human health & safety Ethical & equity considerations Impacts on neighbourhoods or regions Community involvement & satisfaction Compliance with policy objectives & strategies Uncertainty & evidence		Direct economic costs & benefits Indirect economic costs & benefits Employment & capital gain Gearing Life-span and 'project risks' Project flexibility				IF NO GO, MOVE TO NEXT STEP					
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 Soil Impacts on Water Impacts on Ecology Use of natural resources & generation of wastes Intrusiveness		Impacts on human health & safety Ethical & equity considerations Impacts on neighbourhoods or regions Community involvement & satisfaction Compliance with policy objectives & strategies Uncertainty & evidence		Direct economic costs & benefits Indirect economic costs & benefits Employment & capital gain Gearing Life-span and 'project risks' Project flexibility				IF NO GO, MOVE TO NEXT STEP					
3	Consolidation and isolation of the soil on site by containment with a property designed barrier.	Impacts on Air Impacts on Soil Impacts on Water Impacts on Ecology Use of natural resources & generation of wastes Intrusiveness		Impacts on human health & safety Ethical & equity considerations Impacts on neighbourhoods or regions Community involvement & satisfaction Compliance with policy objectives & strategies Uncertainty & evidence		Direct economic costs & benefits Indirect economic costs & benefits Employment & capital gain Gearing Life-span and 'project risks' Project flexibility				IF NO GO, MOVE TO NEXT STEP					
4	Removal of contaminated material to an approved site of facility, followed, where necessary, by replacement with appropriate material.	Impacts on Air Impacts on Soil Impacts on Water Impacts on Ecology Use of natural resources & generation of wastes Intrusiveness		Impacts on human health & safety Ethical & equity considerations Impacts on neighbourhoods or regions Community involvement & satisfaction Compliance with policy objectives & strategies Uncertainty & evidence		Direct economic costs & benefits Indirect economic costs & benefits Employment & capital gain Gearing Life-span and 'project risks' Project flexibility				IF NO GO, MOVE TO NEXT STEP					
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 strategy.	Impacts on Air Impacts on Soil Impacts on Water Impacts on Ecology Use of natural resources & generation of wastes Intrusiveness		Impacts on human health & safety Ethical & equity considerations Impacts on neighbourhoods or regions Community involvement & satisfaction Compliance with policy objectives & strategies Uncertainty & evidence		Direct economic costs & benefits Indirect economic costs & benefits Employment & capital gain Gearing Life-span and 'project risks' Project flexibility									