

# Construction Soil and Water Management Plan

Moorebank Precinct East Stage 1 RALP No. 1

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Signature:					

## Details of Revision Amendments and Authorship

### Document Control

The Project Director is responsible for ensuring that this plan is reviewed and approved. The Environment Manager is responsible for updating this plan to reflect changes to legal and other requirements, as required.

### Amendments

Any revisions or amendments must be approved by the Project Director before being distributed / implemented.

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A	Initial draft for SIMTA review
B	Updated to address SIMTA comments
C	For SIMTA's second review
D	Updated to address final CoAs and for consultation
E	For submission to DP&E. Updated to address stakeholder consultation and ER review comments.
F	Updated to address DPI Water comments and to resubmit to DP&E
G	Updated to address comments from DP&E
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01	Updated following comments from the Site Auditor
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06	Updates following RfMA0018, RfMA0019, and RfMA0021

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# Construction Soil and Water Management Plan

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## 1. Overview

### 1.1 Purpose

This Construction Soil and Water Management Plan (CSWMP) addresses soil and water management on Sydney Intermodal Terminal Alliance's (SIMTA) Moorebank Precinct East (MPE) Stage 1 – Rail Access Land Package (RALP) No. 1 (the Project, the Rail Link) and the management of impacts to the environment and community.

This CSWMP addresses the following key requirements:

- Services Agreement – Schedule 5 Principal's Project Requirements
- Conditions of Approval under SSD-6766 SIMTA Intermodal Terminal Facility – Stage 1 (NSW)
- Stage 1 EIS (including Framework CEMP and Preliminary Erosion and Sediment Control Plans)
- Stage 1 Response to Submissions Report (including Final Compilation of Mitigation Measures)
- Conditions of Approval under MP10\_0193 SIMTA Moorebank Intermodal Terminal Facility – Concept Plan (NSW)
- NSW Concept Plan EIS
- NSW Concept Plan Submissions Report (including Revised Statement of Commitments)
- Conditions of Approval under EPBC 2011/6229 SIMTA Intermodal Terminal (Commonwealth)
- Commonwealth Concept Plan EIS (including Framework CEMP and Framework SWMP)
- Other applicable legislative obligations
- Address the requirements of the EPL.

### 1.2 Project Scope

SIMTA's MPE Stage 1 Development involves the construction and operation of the necessary infrastructure to support a container freight road volume of 250,000 twenty-foot equivalent units (TEU).

CPB Contractors' scope of work specifically applies to MPE Stage 1 RALP No. 1 which consists of a 2.8 kilometre rail line, along with its required infrastructure, to connect the Import-Export Terminal and Interstate Terminals to the Southern Sydney Freight Line (SSFL), and capable of accommodating trains up to 1,800m in length.

The SIMTA site is located in the Liverpool local government area. It is 27 kilometres south-west of the Sydney Central Business District (CBD), 26 kilometres west of Port Botany, 16 kilometres south of the Parramatta CBD, 0.6 kilometres from the M5 South-West Motorway, five kilometres east of the M5 South-West Motorway / Westlink M7 Motorway Interchange and connecting to the main north-south rail line via the Southern Sydney Freight Line.

The RALP No. 1 is the first package of Stage 1 of the overall MPE project and its construction will include:

- A northbound connection and a southbound connection to the SSFL
- Civil and earthworks, including remediation works and benching
- A Reinforced Earth Embankment (RE-Wall) through a section of the Glenfield Waste Services landfill site
- A bridge over the Georges River
- A culvert crossing over Anzac Creek
- Installation of new Moorebank Avenue overbridge
- Service relocation and protection
- Track work
- Signalling systems
- Security fencing

An indicative map of the Project is provided in Figure 1 below.

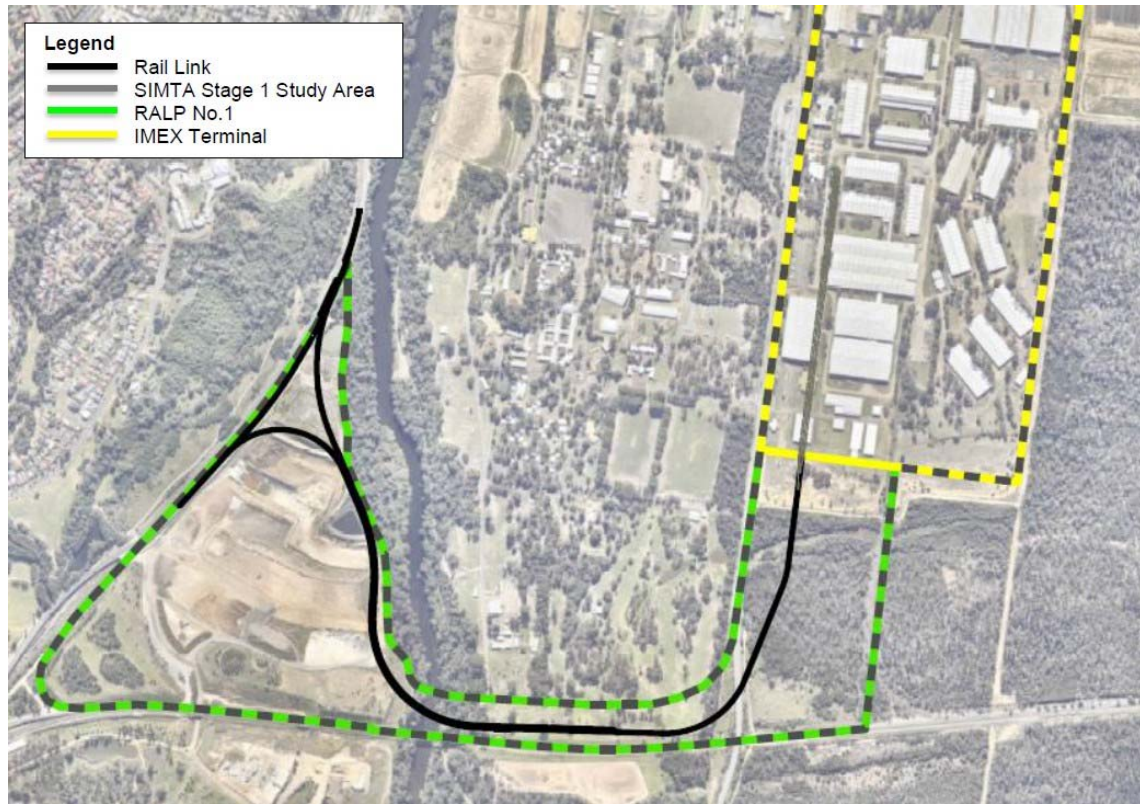


Figure 1: Indicative Project Map

### 1.3 Objectives

This Plan has the following objectives:

- Maintain existing water and soil quality of surrounding surface and ground water courses
- To protect the aquatic environment of downstream waterways
- To prevent bed and bank erosion and instability of waterways
- To provide sufficient flows to support aquatic environments and ecological processes
- Source construction water from non-potable sources, where reasonable and feasible
- Maximise opportunities for water re-use from captured stormwater and wastewater

### 1.4 Definitions

Definitions for terms used in this plan are contained in the Glossary in Attachment B.

### 1.5 Interactions with Other Management Plans

This Sub Plan is part of the Construction Environmental Management Plan (CEMP). Figure 2 below sets out interactions of this Sub Plan with the other environmental management documents implemented on the MPE Stage 1 RALP No. 1 project.

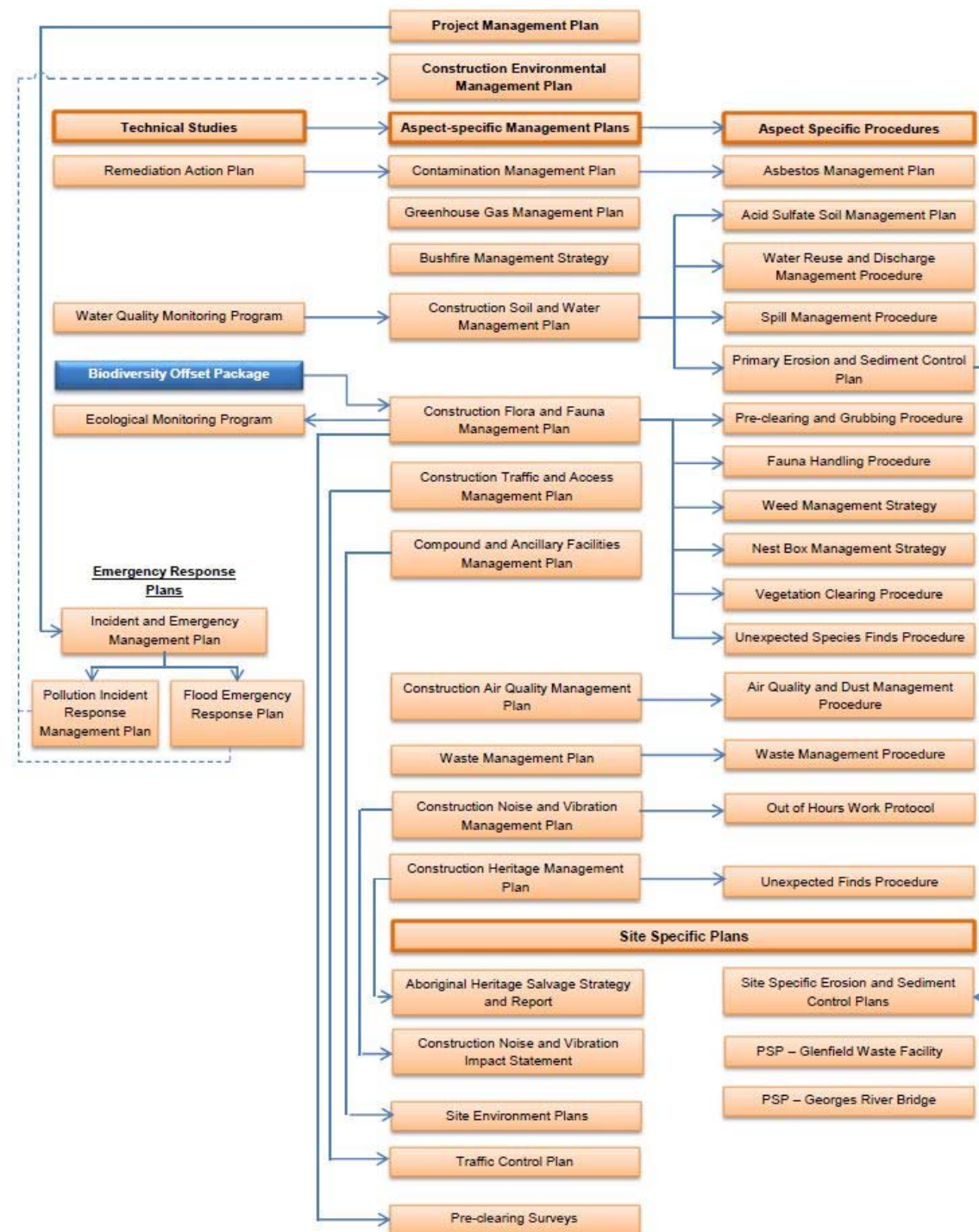


Figure 2: Environmental Documents Map



## 2. Legal and Other Requirements

### 2.1 Compliance Requirements

Conditions of project environmental compliance requirements that specifically address the management of soil and water quality are detailed in Attachment A.

### 2.2 Relevant Legislation

Local, State and Commonwealth legislation that apply criteria to the management of water quality on the project include:

- *Environmental Planning and Assessment Act 1979* (EP&A Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Commonwealth)
- *Contaminated Land Management Act 1997* (CLM Act)
- *Protection of the Environment Operations Act 1997* (POEO Act)
- *Fisheries Management Act 1994* (FM Act)
- *Water Management Act 2000* (WM Act)
- *Water Act 1912*
- Liverpool Local Environmental Plan 2008

### 2.3 Guidelines

Local, State and Commonwealth guidelines that apply criteria to the management of soil and water quality on the project include:

- ANZECC and ARMCANZ, 2000. National Water Quality Management Strategy. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. October 2000. Australian and New Zealand Environment and Conservation Council. Agriculture and Resource Management Council of Australia and New Zealand.
- ASRIS, 2015. Australian Soil Resource Information Resource System (ASRIS) <http://www.asris.csiro.au/contacts.html> (accessed 25 January 2016). CSIRO Land & Water. Canberra ACT.
- ASSMAC, 1998. Acid Sulfate Soil Manual. August 1998. Acid Sulfate Soil Management Advisory Committee. Wollongbar, NSW.
- DECCW, 2006. Georges River Water Quality and River Flow Objectives. <https://www.environment.nsw.gov.au/ieo/GeorgesRiver/report-02.htm> (accessed 28 January 2016). NSW Department of Environment, Climate Change and Water. Sydney.
- DLWC, 1997. Liverpool Acid Sulfate Soil Map 9030S2. Department of Land & Water Conservation. 1997.
- DPI, 2004. Policy and Guidelines for Fish Friendly Waterway Crossings. NSW Government, Sydney.
- DPI, 2013. Policy and guidelines for fish habitat conservation and management (Update 2013) Government, Wollongbar.
- EPA, 2016. Approved contaminated site guidelines under the CLM Act (<https://www.epa.nsw.gov.au/clm/guidelines.htm>) [inclusive of those published by the National Environment Protection (Assessment of Site Contamination) Measure and the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) and the Australian and New Zealand Environment and Conservation Council (ANZECC)]
- Fairfull and Witheridge, 2003. Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings. NSW Fisheries. Cronulla.
- Landcom, 2004. Managing Urban Stormwater: Soils and Construction, Volume 1 (4th Edition). NSW Government, Sydney.
- Liverpool City Council, 2014. LEP Amendment 2014 to Liverpool Local Environmental Plan 2008 (Amendment No 45) Acid Sulfate Soils Map – Sheet ASS-013.
- Liverpool City Council, 2008. Liverpool Local Environmental Plan 2008.
- DPI Water, 2012, Guidelines for Riparian Corridors on Waterfront Land
- DPI Water, 2012, Guidelines for Vegetation Management Plans Waterfront Land

- DPI Water, 2012, Guidelines for Watercourse crossings on Waterfront Land
- DPI Water, 2012, Guidelines for Instream Works on Waterfront Land
- DPI Water, 2012, Guidelines for Outlet Structures on Waterfront Land

## **2.4 Additional Permits and Approvals**

Environment Protection Licence requirements are identified in Attachment A.

No additional permits or licences are expected to be required in relation to the management of soil and water quality on the Project.



### 3. Consultation and Stakeholders

#### 3.1 Consultation on this Plan

The Stage 1 Conditions of Approval (CoA) require that the CSWMP be prepared in consultation with:

- Environment Protection Authority
- DPI Water (formerly the NSW Office of Water)
- DPI Fisheries
- Liverpool City Council.

Further, this CSWMP as a Sub Plan to the CEMP is required to be approved by Department of Planning and Environment (DP&E) prior to construction as required by the CoA. Consolidated management plan consultation and approval requirements are identified in the CEMP.

This consultation is intended to assist in development and finalisation of the plan. Evidence of consultation is included in Attachment C. In addition, the Project Specific Procedure for the Georges River Bridge was developed in consultation with DPI Water and DPI Fisheries, as per Final Compilation of Mitigation Measures #5B.

See appendix G to the CEMP for a full list of consultation with relevant agencies. Consultation will continue with the relevant agencies during construction as required.

Table 1 summarises relevant stakeholder comments as well as CPB Contractors' response including how we will address issues raised.

Table 1: Summary of Consultation

Agency	Status	Document Reference	Stakeholder Comment	CPB Response
Environmental Protection Authority (EPA)	Provided advice on 19/01/2017	N/A	EPA advised that they did not wish to comment	N/A
DPI Water	DPI Water provided CSWMP on 23/12/2017. DPI Water provided PSP for GRB on 31/01/2017. Comments provided on CSWMP on 17/02/2017. Comments provided on PSP for GRB on 7/03/2017.	1.3 Objectives	Section 1.3 indicates that one of the objectives of the plan is to source construction water from non-potable sources. It is suggested this section clarifies what the non-potable sources are, or the dot point is cross referenced to the relevant section in the SWMP that provides further details.	Further detail is provided in Section 7.3. This section has been updated to provide more clarity.
		2.3 Guidelines	As the Moorebank Precinct East Stage 1 - Rail Access Land Package (RALP) No. 1 project involves construction of a bridge over the Georges River and a culvert crossing over Anzac Creek it is suggested Section 2.3 of the SWMP lists the DPI Water (2012) Controlled Activity Guidelines on Waterfront land. The DPI Water (2012) guidelines include: - Guidelines for Riparian Corridors on Waterfront Land - Guidelines for Vegetation Management Plans Waterfront Land - Guidelines for Watercourse crossings on Waterfront Land - Guidelines for Instream Works	These guidelines have been added to section 2.3

Agency	Status	Document Reference	Stakeholder Comment	CPB Response
			on Waterfront Land - Guidelines for Outlet Structures on Waterfront Land.	
		7 Management Strategies and Mitigation Measures	Section 7 notes a Georges River Bridge Project Specific Procedure (PSP) provides details on the bridge construction impacts and mitigation measures (page 22). It is suggested the PSP is included in the SWMP as an Appendix. The SWMP should clarify if a PSP is to be prepared for the construction activities in and around Anzac Creek.	<p>The PSP for the Georges River Bridge (GRB) was provided to DPI Water for review on 31/01/2017.</p> <p>DPI Water provided comments on the PSP for GRB on 7/03/2017.</p> <p>It is not a requirement to incorporate the PSP for GRB in the CSWMP, according the Condition of Approval. The PSP incorporates all relevant requirements from the project approval as well as the mitigation measures relevant to the Georges River Bridge construction activities. It is a working document, subject to change as new risks are identified and the design is refined. Therefore it is a separate document and will not be included in the CSWMP.</p> <p>While CPB is developing a PSP / Environmental Work Method Statement (EWMS) for Anzac Creek, it is not required under the conditions of approval or Final Compilation of Mitigation Measures. This document, which is still in development and will be completed in consultation with the project's Environmental Representative prior to work commencing on the creek, has been developed as part of an internal risk management process in order to detail out construction methodology. Once it is complete, CPB will provide it to DPI Water for their information if requested. As this</p>

Agency	Status	Document Reference	Stakeholder Comment	CPB Response
				<p>document is subject to change as new risks are identified and the design is refined, it will not be included in the CSWMP.</p> <p>Key mitigation of the PSP for Georges River Bridge and EWMS for Anzac Creek Culvert have been incorporated into the CSWMP as required. See section 6.2 and 6.3 for further information.</p>
		7.3 Minimising Water Use	<p>Section 7.3 indicates the “reuse of groundwater and surface water on site for dust suppression” will be adopted to minimise the use of potable water (page 23). The SWMP needs to provide further details on the proposed reuse of groundwater and clarify whether the water to be reused only comprises groundwater that needs to be dewatered during construction, or if it is proposed to abstract groundwater as a water supply. In relation to dewatering activities, a licence will be required under Part 5 of the Water Act 1912. Any abstraction of groundwater for use will need a Water Access Licence.</p> <p>Section 7.3 should clarify whether the surface water that it is proposed to be reused consists of any clean surface water runoff, or runoff from disturbed areas. Based on Mitigation Measure (SW6) in Table 5 it would appear sediment laden (dirty water) that is captured on site is to be reused for dust control (see page 25). The collection of dirty water in sediment basins for a water supply is exempt from requiring a licence under the Water Management (General Regulation) 2011 but any collection of clean surface water runoff for a water supply is not exempt and must be in accordance with an appropriate Water Access Licence and a nominated work.</p>	<p>Groundwater reuse is only proposed if/when it is encountered during excavations, and if it meets the criteria for suitable reuse. If groundwater dewatering is required, a licence will be sought in consultation with DPI Water.</p> <p>Further consultation with DPI Water has indicated that a Groundwater Extraction licence is not required for the RALP project.</p> <p>Surface water runoff and collected within the construction footprint would be reused where possible, typically from sediment basins or excavations. Further clarity added on both groundwater and surface water.</p> <p>Further detail added into Section 7.3 to clarify.</p>

Agency	Status	Document Reference	Stakeholder Comment	CPB Response
		Table 5 Mitigation Measures	<p>Table 5 includes a Mitigation Measure (SW28) for the stabilisation of waterways including their bed and banks. Any long term stabilisation of the bed and banks of the Georges River and Anzac Creek should where possible use soft-engineering solutions that mimic a natural system. It is suggested SW28 is amended to reflect this.</p> <p>Mitigation Measure (SW31) indicates the construction site for Anzac Creek will be left in a condition that promotes native revegetation (page 27). Any riparian areas that are cleared for construction should be replanted using a diversity of native plant species from the relevant local native vegetation community either at, or near the area of disturbance. It is suggested SW31 is amended to reflect this.</p> <p>In order to minimise the extent of disturbance it is recommended the SWMP outlines the following:</p> <ul style="list-style-type: none"> <li>- areas along the watercourses which are adjacent to but not required to be disturbed by the works are to be clearly delineated with para-web fencing (or similar) to avoid potential impacts and disturbance of these areas.</li> </ul>	<p>SW28 updated to include as requested.</p> <p>SW31 (now SW35) is a direct quote from the Final Compilation of Mitigation Measures (FCMM) #5C. Revegetation requirements are incorporated into the CFFMP. The relevant requirements of the RVMP have been incorporated into the CFFMP. Link to CFFMP added to mitigation measure.</p> <p>The delineation requirements requested by DPI Water are listed as a requirement in to CFFMP.</p> <p>The final CFFMP can be provided to DPI Water for information.</p>
		8.1.1 General Site Monitoring	<p>The SWMP needs to clarify the frequency that all erosion and sediment control measures are to be inspected and monitored, for example:</p> <ul style="list-style-type: none"> <li>- Section 8.1.1 of the SWMP indicates that visual inspections will be undertaken "at least once a week during normal construction activities" (page28)</li> <li>- Section 5.2.11 of the Primary Erosion and Sediment Control Plan (PESCP) in Attachment D refers to inspecting and maintaining the control measures every day (page 16)</li> <li>- Section 6.1 of the PESCP states all erosion and sediment control measures are to be inspected and monitored "at least daily (when work is occurring on-site)" and "at least weekly (when work is not occurring on-site)" (page 23).</li> </ul> <p>It is suggested Section 8.1.1 of</p>	<p>Section 8.1.1 updated to include a reference to the PESCP, including section 6.1, with some additional detail added. Revegetation requirements are not covered in detail in this plan – reference added to CFFMP.</p>

Agency	Status	Document Reference	Stakeholder Comment	CPB Response
			<p>the SWMP is amended to be consistent with Section 6.1 of the PESCP.</p> <p>Section 8.1.1 should be amended to include:</p> <ul style="list-style-type: none"> <li>- riparian areas disturbed by construction should be re-vegetated and rehabilitated and the rehabilitated riparian areas must be monitored and maintained for a minimum period of at least 2 years after final planting</li> <li>- areas of disturbance near watercourses should be inspected particularly after major rainfall events to ensure any stabilisation works have been effective.</li> </ul>	
		Attachment D - Primary Erosion and Sediment Control Plan - Figure 2 Environmental Documents Map	It is suggested Figure 2 is amended to use a larger font size so the text is clear and legible.	Noted - in order to keep all the information on a single page, the font size had to be small.
		Attachment D - Primary Erosion and Sediment Control Plan - 5.2.7 Topsoil Management	<p>Section 5.2.7 includes a measure that topsoil within areas to be disturbed should be stockpiled for later resspreading on all exposed areas. It is suggested Section 5.2.7 adds the following additional measure to be consistent with Section 5.7 of the PESCP:</p> <ul style="list-style-type: none"> <li>- topsoil (and seedbank) collected from native vegetation areas that are to be cleared should be stockpiled and used in the rehabilitation of riparian land.</li> </ul>	<p>Seedbank management is covered in the CFFMP. The CFFMP also covers revegetation requirements for Riparian Vegetation, with relevant sections of the RVMP put into the CFFMP. The Final CFFMP can be provided to DPI Water. Link to CFFMP included in CSWMP.</p> <p>Section 5.2.7 is in reference to ensure that topsoil stockpiles are not causing potential sedimentation risk.</p>
		Attachment D - Primary Erosion and Sediment Control Plan - 5.4.4 Surface Mulching	It is suggested Section 5.4.4 outlines that mulch should not be placed within the banks of any watercourse as any bankful flows will remove the mulch and deposit it downstream.	Updated as requested. Sections 5.5.2 and 5.7 updated as well
		Attachment D - Primary Erosion and Sediment Control Plan	<p>It is suggested Section 5.4.5 specifically outlines the following:</p> <ul style="list-style-type: none"> <li>- riparian land along the Georges River and Anzac Creek that is disturbed during</li> </ul>	Commitment included to stabilize cleared areas in the riparian zone as soon as possible.

Agency	Status	Document Reference	Stakeholder Comment	CPB Response
		- 5.4.5 Vegetation	construction should be re-vegetated and rehabilitated using a diversity of native plant species from the relevant local native vegetation community either at, or near the area of disturbance. Sections 5.7, 5.8 and 5.9 should also include this as a specific management measure, - the primary stage should rapidly stabilise disturbed riparian areas and the second phase should establish a permanent cover of riparian vegetation, - riparian areas that are revegetated must be maintained for a minimum period of at least 2 years after final planting.	Revegetation requirements, including on banks, are specified in the CFFMP.  Some further detail on stabilisation of disturbed areas added to section 5.7
		Attachment D - Primary Erosion and Sediment Control Plan - 5.7 Work adjacent to Georges River	Section 5.7 refers to the clearing of work areas adjacent to the river (page 20). Native vegetation that is to be cleared during construction should be translocated into the riparian corridors where rehabilitation is required. The areas to be rehabilitated should be identified on a scaled plan. Section 5.9 (Work in and Adjacent to Anzac Creek) should also include this as a specific management measure.	Commitment included to stabilize cleared areas in the riparian zone as soon as possible.  Revegetation requirements, including translocation of native vegetation, are specified in the CFFMP. References to CFFMP added.
		Annexures A: Compliance Matrix	Annexure A refers to contract clauses and references which set limits and/or govern impacts to 'air quality' on the project and environmental approvals that address the management of 'air quality' (see page 25). Is the reference to 'air quality' correct?	Updated as requested
DPI Fisheries	CSWMP provided to DPI Fisheries on 22/12/2016. Comments provided on CSWMP on 18/01/2017. PSP for GRB provided to DPI Fisheries on 31/01/17. Comments provided on PSP for GRB on 1/02/2017.	Table 4	This needs to also include sediment laden runoff entering nearby waterways and stormwater systems, causing sedimentation of the waterways.	Table 4 has been updated to include additional risks identified.
		Section 7.1.1	Considering the clay soils at this site, the general principles should also include temporarily stabilising exposed areas prior to final stabilisation (where practical and possible), especially in areas adjacent to the Georges River.	Section 7.1.1 updated as specified. Table 5 in section 7.8 has been updated to address this as well.
		Section 7.8	This section should include a commitment to implementing the mitigation measures listed in Table 5.	The mitigation measures listed in the table will be incorporated into relevant on site documentation (e.g.

Agency	Status	Document Reference	Stakeholder Comment	CPB Response
				Site Environmental Plans) which are required to be complied with on site. This commitment has been added to the CSWMP
		Section 8.1.2 Table 8	The Georges River is important Class 1 Key Fish Habitat. It supports a diversity of fish populations. It is of utmost importance that best practice ERSED controls and environmental management procedures are used in the construction of the bridge and associated adjoining works, so that impacts to aquatic habitat are minimised. The nearest water monitoring location should be 50m upstream and 50m downstream of the bridge site. This will more accurately capture any inadequacies in the environmental mitigation strategies and will certainly minimise the area of potential impact to the Georges River. DPI Fisheries is not supportive of the 200m cumulative 'wide berth' to potential impacts on the Georges River as currently proposed in Table 8. Apart from distance from the construction site, no specific location has been identified for the proposed water quality monitoring activity. Water quality monitoring needs to be conducted from both banks of the river at the specified distance from the bridge works and this needs to be included in Table 8.	Distance changed to 50m up and down stream. Location now listed as both banks of the river, provided that access is possible (occasional restrictions may be in place from GWS or from the Golf Course side). Final locations to be detailed in on-site documentation
		General	The SWMP needs to include feedback loops from monitoring and visual inspections to the environmental management team to ensure that any concerns/ issues identified are rectified immediately or as soon as possible.	Section 8.1 updated to include requirement for monitoring/inspection results to be sent to the environment team if not conducted by them
		General	DPI Fisheries would like the opportunity to review site specific Erosion and Sediment Control Plans &/ EWMS for works within or adjacent to the Georges River, prior to implementation of these plans.	Comments on initial progressive erosion and sediment control plans (e.g. sediment curtains above riparian zones) are noted and will be provided to ERSED specialist prior to development of site specific ESCPs. Erosion and Sediment Control Plans for high

Agency	Status	Document Reference	Stakeholder Comment	CPB Response
				<p>risk areas (including Georges River work areas) will be developed by a certified ERSED specialist.</p> <p>The plans can be provided to DPI Fisheries for information.</p> <p>DPI Fisheries were provided with the PSP for GRB for consultation on 31/1/17 and provided comments on 1/2/17.</p>
		Progressive ESCP – CSWMP pages 80, 81, 82, 83, 84, 85, 86, 87, 88	<p>Some sediment curtains on both sides of the works above the riparian zone would be required to minimise sedimentation in overflow events. Also no information has been provided on any work platforms to be constructed within the Georges River and of what material these platforms will be constructed from. Also no information on river bank treatments to be used at the Bridge abutments has been provided. DPI Fisheries requested to review plans of the bridge works, including construction platforms. To minimise impact of gravel into the river system during flood events, work platforms within the river may need to be enclosed in a coffer dam structure.</p>	<p>Sediment curtains / fences will be installed up and down slope of the riparian zone. This has been included in the Mitigation Measures in CSWMP (Table 5 – SW29/ SW30) and Section 5.7 in the Primary Erosion and Sediment Control Plan (attachment D).</p> <p>Information on watercourse bank stability incorporated into CSWMP. Further detail available in PSP for GRB.</p> <p>Work methodology within the Georges River is detailed in the PSP - which was provided to DPI Fisheries for review on 31/1/17 as per the Final Compilation of Mitigation Measures (FCMM) 5B. DPI Fisheries provided comments on the PSP for GRB on 1/2/17.</p> <p>Design plans for the Georges River bridge were provided to DPI Fisheries for comment as per MCoA C21 on 31/1/17.</p> <p>Comments on initial progressive erosion and sediment control plans (e.g. sediment curtains above riparian zones) are noted and will be provided to ERSED specialist prior to development of site specific ESCPs.</p>



Agency	Status	Document Reference	Stakeholder Comment	CPB Response
Liverpool City Council (LCC)		CSWMP page 83	Silt curtains in a semi circular on each bank of the river around the disturbed part of the riparian zone will be required, as a final line of defence. More improved sed controls for works on the banks of the Georges River will be required and will need to consider construction access requirements. Potential for mulch berms on steep slopes would wash into the river under heavy rain events needs to be considered.	Comments on initial progressive erosion and sediment control plans (e.g. silt curtains on bank and no mulch bunds) are noted and will be provided to ERSED specialist prior to development of site specific ESCPs. Silt Curtains will be installed around works in the Georges River prior to works occurring and will remain until after works are finished. This has been incorporated into the mitigation measures of the CSWMP (see sections 6.2.1, 6.2.3.1 and 7.1.3, and table 5 – SW39), the Primary ESCP – Attachment D (Section 5.8) and the PSP for GRB. Mulch berms are no longer proposed for near the river bank.
	CSWMP provided to LCC on 23/12/16.	N/A	Liverpool City Council advised on 8/02/2017 that they do not wish to provide comments.	Noted

It is noted that no comments were received on the Acid Sulfate Soils Management Plan during consultation of the consolidated CSWMP.

## 4. Roles and Responsibilities

The role titles and responsibilities that are used in this plan are outlined in Table 2 below.

Table 2: Roles and Responsibilities

Role	Responsibilities
Project Director	<ul style="list-style-type: none"> <li>Ultimately responsible for the implementation of the plan.</li> <li>Contractor's Principal Representative.</li> <li>Manage the delivery of the construction process in relation to soil and water quality management at the site in conjunction with the Environment Manager.</li> </ul>
Environment Manager	<ul style="list-style-type: none"> <li>To oversee implementation of all soil and water quality management strategies.</li> <li>To ensure environmental reporting and monitoring is executed as per EPL requirements and this Plan.</li> <li>EPA liaison.</li> <li>Track and report performance metrics for the plan.</li> </ul>
Environmental Coordinator	<ul style="list-style-type: none"> <li>Manage the on-ground application of soil and water quality management measures during construction (e.g. erosion and sediment control, water treatment and monitoring).</li> <li>Monitor and report on soil and water management during construction.</li> </ul>
Engineering Manager	<ul style="list-style-type: none"> <li>Ensure relevant soil and water quality management requirements are addressed in design development.</li> </ul>
Project Engineer	<ul style="list-style-type: none"> <li>Ensure that soil and water quality management requirements considered as part of engineering design are implemented during the construction.</li> </ul>
Supervisor	<ul style="list-style-type: none"> <li>Manage the on-ground application of soil and water quality management measures during construction in conjunction with the Environmental Coordinator.</li> </ul>
Communications Manager	<ul style="list-style-type: none"> <li>Manage feedback and complaints from community and stakeholder groups and document how issues are rectified.</li> </ul>

### 4.1 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.)
- 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 reuse and discharge procedure
- Maintenance of environmental controls (e.g. erosion and sediment controls)
- Contamination and Unexpected Finds.

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

- Legislation as it applies to erosion and sediment control
- Basics of soil management, handling and stockpiling
- Sediment basin management and dewatering
- 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 stabilisers

- Preparing, reading and interpreting Erosion and Sediment Control Plans
- Typical controls around existing drains and maintenance of controls
- Water treatment, relevant testing and reporting.

Toolbox talks will also be used to further reinforce awareness of soil and water issues.

## 5. Existing Environment

The Stage 1 EIS prepared by Hyder (May 2015) describes the existing environment of the project. A summary is provided in the subsections below.

### 5.1 Geology

Based upon geological mapping information and a preliminary geotechnical field investigation (Hyder 2015), the stratigraphy of the rail construction corridor comprises alluvium with ironstone bands at the surface underlain by Ashfield Shale, which is underlain by Hawkesbury Sandstone. Ashfield Shale occurs in areas of higher elevation, where it forms a cap over the Hawkesbury Sandstone.

The depth to bedrock in the vicinity of the IMEX terminal is inferred to be 23 metres below ground level (m BGL). The type of bedrock was not identified, but is not likely to be encountered over the course of construction.

Adjacent to the Georges River the alluvial sediments are Quaternary age, and lay above a stratum of Tertiary age fluvial deposits, consisting of clayey quartzose sand and clay (Hyder 2015). This was evident on the eastern and western banks of the Georges River where various densities of sand were encountered at thicknesses up to 12 to 14 metres.

At Anzac Creek approximately 10 metres of weathered siltstone was found to overlie Hawkesbury Sandstone.

Subsurface conditions at the Glenfield Waste Facility are highly variable due to the operation of the waste facility. The entire alignment of the Rail link is underlain by fill of variable thickness and the composition fill within the facility generally comprised gravelly sand or sandy gravel with some sandy clay; however, some test pits encountered rubble, concrete, plastic, glass and wood. Where natural ground surface was encountered it comprised alluvial soils.

### 5.2 Soil Landscape

The alluvial soils of in the vicinity of the construction corridor are potentially erodible. Soil erosion has been observed on the western bank of the Georges River which infers that soils formed in the local area are prone to erosion when exposed to concentrated water flow or where not otherwise protected. The soils of the rail construction corridor are also likely to have been impacted by natural and human activities, including resource extraction at the Glenfield Waste Facility, deforestation for agricultural development and subsequent development as a military base. Further detail of known and potential contamination issues is provided in Section 5.8.

Regional soil mapping information suggests soils at the site are of the Berkshire Park Group (Hyder 2015). These are soils produced on alluvial plains and commonly on elevated Tertiary terraces. The soils comprise shallow clayey sand soils, with frequent ironstone nodules. The soils have a very high wind erosion potential if stripped of vegetation. Surface water erosion comprising gully, sheet and rill erosion can also occur in exposed areas.

Preliminary investigation in the vicinity of the IMEX terminal suggests there is 0.5 to 1.2 metres of sand and clayey sand fill, with underlying sands and clay to a depth of 23 m BGL. Topsoil has previously been imported to the area and overlies the fill material, ranging in depth between 60 mm and 400 mm.

Geological mapping information suggests soil deposits comprising sands, clays and silts of the Richmond Group are present on the terraces adjacent to the Georges River and other creeks in the area. Test pitting confirmed the presence of alluvial soils, characterised by very loose sands or silts and very soft to soft clays on the lower terraces of the Georges River and on the banks of the Georges River. At the proposed location of the Georges River Bridge soils were identified as loose to medium density, fine to medium grained sands with quartz and gravel present. Test pitting at the proposed bridge location confirmed that soils in this area are silty sands of fine to medium sized grains, with some organic matter observed in the sub layers.

Preliminary geotechnical investigation suggest soils in the vicinity of Anzac Creek are known to be stiff and hard alluvial clay.

At the Glenfield Waste Facility, Freemans Reach Group soils are mapped as the naturally occurring soil type. These are associated with active, level floodplains and are typically deep brown sands and loams, which have a high potential for stream bank erosion and are prone to flooding and/or high

water tables. As stated previously, entire alignment of the Rail link is underlain by highly variable fill both in terms of composition and thickness.

### 5.3 Acid Sulfate Soils

Construction activities associated with the construction of the Rail Link as it traverses the Georges River and the former Glenfield Waste Facility pass through 'Class 5' ASS according to Liverpool LEP 2008 Acid Sulfate Soils Map - Sheet ASS-013 (LEP Amendment 2014).

Class 5 relates to works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum (mAHD) by which the water table is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.

In this case, the mapped 'Class 1' ASS area is representative of the bed and lower bank of the Georges River (i.e. below 5 mAHD).

There is potential for ASS at the river bed and lower bank in vicinity of the proposed Georges River Bridge as it is within a few hundred metres of the Class 1 ASS area.

However, there is generally a low probability of occurrence of ASS within the entire construction corridor for the Project. This determination is based upon the assessment principles of the Acid Sulfate Soil Manual (ASSMAC 1998), specifically:

- Soils within the Project construction corridor (including the banks of the Georges River and Anzac Creek and the flood plain that traverses the former Glenfield Waste Facility) are predominated by alluvial sands, clays and silts with an absence of estuarine tertiary sediments (Hyder 2015).
- Neither the Georges River or Anzac Creek are subject to ongoing tidal inputs of sulphate required for current formation of sulphides within water course bank sediments and or surrounding floodplains.
- Soil logging and sampling suggested no visual indications of actual acid sulfate soils (AASS) or potential acid sulfate soils (PASS) (i.e. iron hydroxide or oxide staining, etc) in any areas in the vicinity of the Project construction corridor (Hyder 2015).
- Soil samples taken from banks of the proposed Georges River Bridge were analysed to determine their aggressivity exposure classification for the purpose of informing the proposed bridge design (Hyder 2015). The exposure classification for the soils ranged between 'Non-aggressive' and 'Moderate' with the majority of soil identified as 'Non-aggressive' for steel piles, with a low probability of occurrence of acid sulfate soils.
- The Glenfield Waste Facility area was evaluated as having a low probability of the presence of actual / potential sulfate soils as it is predominated by fill of variable thickness, overlying deep brown sands and loams (Hyder 2015).

### 5.4 Hydrology

The Project construction corridor is located entirely within the catchment area of the Georges River, which lies approximately 750m to the west of the IMEX terminal. The rail corridor is located within the mid-Georges River catchment and the Liverpool District sub-catchment. Flow from the Georges River enters the Liverpool LGA from the south on the western side of the Defence lands at Holsworthy and flows to the north, meeting with Glenfield Creek at Casula. The river then continues to flow north past the Liverpool City Centre, under Newbridge Road, past Lighthorse Park and over the Liverpool Weir. Downstream of the Liverpool Weir, the Georges River becomes brackish and is subject to tidal influences.

Anzac Creek is a small tributary of the Georges River, which flows to the north, discharging to the Georges River approximately three kilometres to the north-east of the IMEX terminal. At the closest point, Anzac Creek is located approximately 50m to the south-west of the IMEX terminal and runs through the rail corridor. Anzac Creek is classified as a first order stream, having a defined channel where water flows intermittently.

### 5.5 Surface Water Quality

There are no surface water quality data sets in the immediate vicinity of the Project construction corridor (i.e. within either the Georges River or Anzac Creek).

However, the section of the Georges River that the Project construction corridor intersects is classified as a 'Class 1 – Major Fish Habitat' under Why do Fish Need to Cross the Road? Fish Passage

Requirements for Waterway Crossings (Fairfull and Witheridge, 2003). This section of the Georges River is also classified as a 'waterway affected by urban development' according to Georges River Water Quality and River Flow Objectives (DECCW 2006). This classification is described as streams within urban areas that are frequently substantially modified and generally carry poor quality storm water.

Anzac Creek is heavily influenced by past development activities within the catchment and riparian zones. The creek is heavily degraded and is generally in poor condition. It is predominantly in a low flow state with sluggish to minimal water movement dependent upon local rainfall. An assessment of the potential for fish habitat within Anzac Creek determined that the creek met the definition of 'Class 3 – Minimal fish habitat' under Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (Fairfull and Witheridge, 2003). This classification was supported by the results of a fish survey which identified only one species, introduced *Gambusia* (*Gambusia holbrooki*). Furthermore, the overall Australian Rivers Assessment System (AUSRIVAS) rating for macroinvertebrates in the creek was 'B and B' indicating that the macroinvertebrate community was 'significantly impaired'.

## 5.6 Flooding

Flood risk mapping of the Project area is illustrated in Figure 3. This indicates that the Georges River flood prone areas extend to the west of the overbank of the Georges River through to the existing Glenfield Waste Facility which the proposed Rail link would traverse. It also shows an area of the Anzac Creek in the vicinity of the IMEX Terminal is prone to flooding.

Modelling work identified that upstream of the M5 Motorway flooding for events up to the 100-year ARI is generally confined to the main channel of Anzac Creek, resulting in very little floodplain inundation and no inundation of surrounding residential properties. It indicated that the 100 year ARI and larger events along Anzac Creek impact on the Project site and Rail Corridor however Liverpool City Council modelling confirmed that existing culverts beneath the M5 Motorway adequately convey flood waters to the downstream reaches of the catchment without significant retention and/or backwater accumulation.

This work also identified that downstream of the M5 Motorway there is extensive floodplain inundation for events in excess of the 5-year ARI, with flooding highly influenced by conditions in the Georges River. The backwater influence of Georges River extends flooding as far upstream as the M5 Motorway, resulting in extensive, albeit low velocity, inundation.



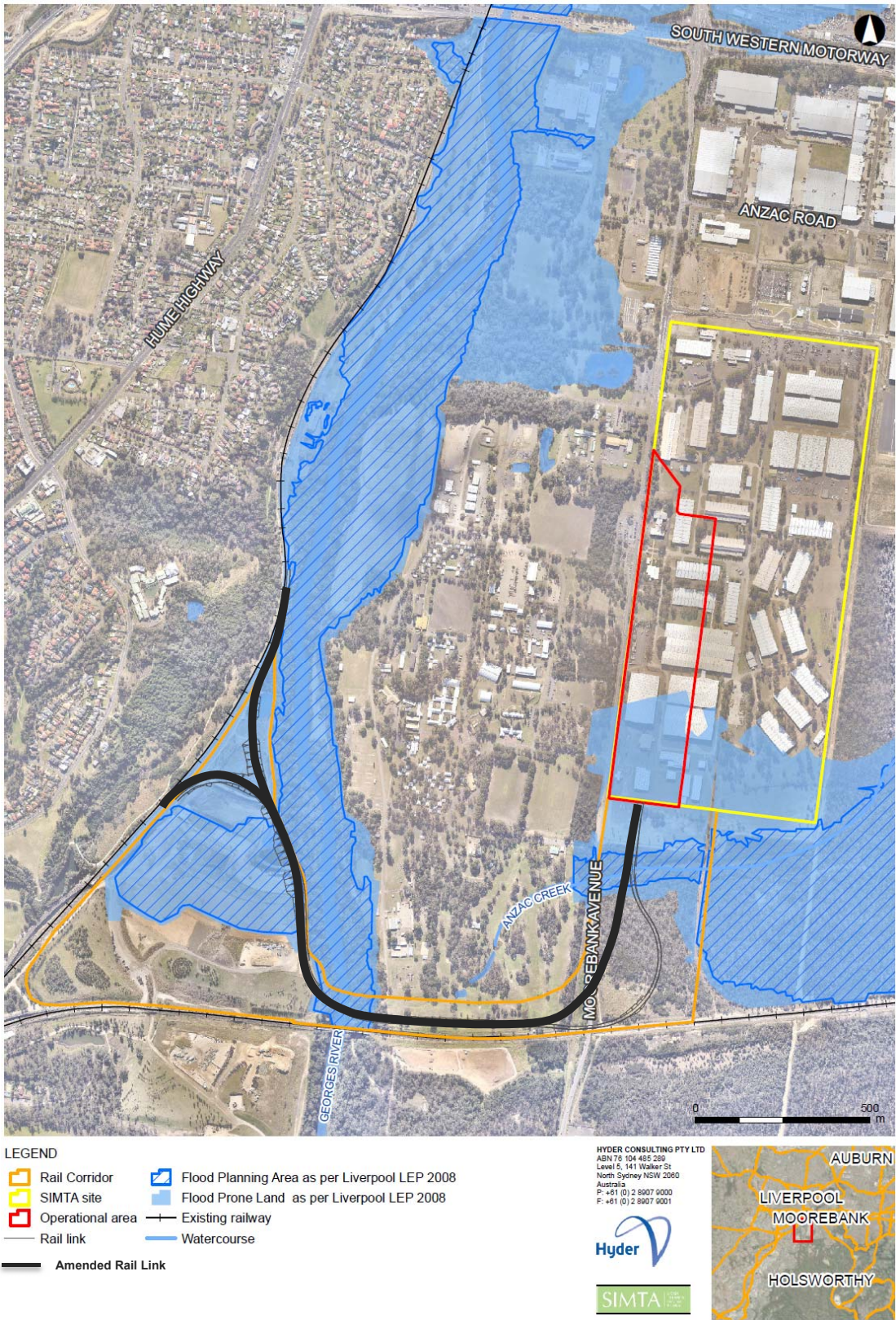


Figure 3: Flood Risk Mapping of the Project Area (Hyder 2015)

## 5.7 Groundwater

Regional groundwater is understood to flow within the shale and alluvial deposits in a north and westerly direction, towards the Georges River. A shallow and a deep aquifer has been reported within the vicinity of the Project area, with groundwater present at depths between 6 m BGL and 11 m BGL. Standing water levels for shallow groundwater in the vicinity of the IMEX terminal have been reported in a sandy clay horizon, between 5 and 7 m BGL.

Groundwater was observed flowing into geotechnical boreholes adjacent to the proposed Georges River Bridge at approximately 3 mAHD at a time when the water level in the Georges River was at 5.26 mAHD. This inferred that there is some loss of water from the river to the groundwater table via granular alluvium acting as a drainage layer.

Groundwater monitoring bores installed at the Glenfield Waste Facility and within the vicinity of the proposed Rail link, had standing water levels ranging between 3.48 m below the top of the well casing (TOC) and 11.98 m below TOC between 2013 and 2014. Groundwater flows within the Glenfield Waste Facility site are likely to have been influenced by the extraction and filling activities undertaken on the site, however, groundwater flows are understood to be generally in an easterly direction towards the Georges River. Review of groundwater data in 2013 and 2014 suggests: standing water levels range between 3.48 and 11.98 m below TOC; pH ranges between 5.18 and 7.86; and dissolved solids have a high level of variability ranging from 6.5 to 13,800 mg/L.

Deeper groundwater within the Project area is known to be highly saline and thus has little or no beneficial use. Shallow groundwater is known to have lower salinity, most likely as a result of surface recharge and its primary beneficial use in the Project area is the recharge of Anzac Creek and the Georges River.

Disturbance of groundwater during construction is generally not predicted, with the exception of the potential to encounter groundwater when piling for the Georges River bridge. Groundwater impacts associated with construction of the Georges River bridge would be of short duration and are unlikely to result in impacts beyond the duration of the construction period.

## 5.8 Contamination

A summary of potential contamination sources and contaminants of concern as identified in the Stage 1 EIS is provided in Table 3.

Table 3: Potential Contaminants of Concern (Hyder 2015)

Aspects of Environmental Concern	Location	Contaminants of Potential Concern
Uncontrolled fill and waste, potential soil and groundwater impacts from petrol, oil and lubricants and other dangerous goods storage, drainage collection and treatment areas, pest and weed control and military training.	RALP No. 1	<ul style="list-style-type: none"> <li>■ Asbestos</li> <li>■ Organo-chloro pesticides</li> <li>■ Herbicides</li> <li>■ Total petroleum hydrocarbons (TPH)</li> <li>■ Benzene, toluene, ethylbenzene, and xylenes (BTEX)</li> <li>■ Polycyclic aromatic hydrocarbons (PAH)</li> <li>■ Volatile organic compounds (VOC) and semi-volatile organic compounds (SVOC)</li> <li>■ Phenols</li> <li>■ Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)</li> <li>■ Unexploded ordnance</li> </ul>
Potential asbestos and lead paint impacts from illegal waste dumping and military training	Anzac Creek and RailCorp Land	<ul style="list-style-type: none"> <li>■ Asbestos</li> <li>■ Organo-chloro pesticides</li> <li>■ Herbicides</li> <li>■ Total petroleum hydrocarbons (TPH)</li> <li>■ Benzene, toluene, ethyl-benzene, and xylenes (BTEX)</li> <li>■ PAHs</li> <li>■ Phenols</li> <li>■ Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)</li> <li>■ Unexploded ordnance</li> </ul>



Aspects of Environmental Concern	Location	Contaminants of Potential Concern
Golf course and former military training area	Golf Course area that rail corridor traverses	<ul style="list-style-type: none"> <li>■ Acidity / hydroxide alkalinity</li> <li>■ Phosphate and sulfate fertilisers and soil conditioners</li> <li>■ Organo-chloro pesticides</li> <li>■ Herbicides</li> <li>■ Total petroleum hydrocarbons (TPH)</li> <li>■ Benzene, toluene, ethyl-benzene, and xylenes (BTEX)</li> <li>■ PAHs</li> <li>■ Phenols</li> <li>■ Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)</li> <li>■ Unexploded ordnance</li> <li>■ PFCs (perfluorinated compounds) – including perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA).</li> </ul>
Glenfield quarry and waste facility, uncontrolled filling and landfill gas	Glenfield Waste Facility	<ul style="list-style-type: none"> <li>■ Asbestos</li> <li>■ Landfill gas (e.g. methane)</li> <li>■ Acidity / hydroxide alkalinity</li> <li>■ Organo-chloro pesticides</li> <li>■ Herbicides</li> <li>■ Total petroleum hydrocarbons (TPH)</li> <li>■ Benzene, toluene, ethyl-benzene, and xylenes (BTEX)</li> <li>■ PAH</li> <li>■ Phenols</li> <li>■ VOCs and SVOCs</li> <li>■ Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)</li> </ul>

For further information on contamination on site, refer to the Contamination Management Plan and Remediation Action Plan.

## 6. Aspects and Potential Impacts

### 6.1 Activities, Hazards and Risks

The Project area has the following key environmental attributes:

- The Georges River that will be subject to construction of a bridge is subject to flooding predominantly beyond its west bank and currently show significant signs of erosion on its banks.
- The former Glenfield Waste Facility that will be subject to construction of embankments and bridging structures is subject to regular flooding and is comprised of contaminated fill of variable thickness that overlies alluvial flood plain soils.
- Anzac Creek that will be subject to construction of rail culverts is a heavily degraded ephemeral creek system that is subject to flooding in the vicinity of the IMEX facility and land areas further to the east.
- Former military training areas (currently vegetated open space and a golf course) that will be subject to construction of rail line of a similar elevation to current site levels are generally not prone to flooding, but may be contaminated as a result of its current and former land uses.
- A predominance of alluvial soils of in the vicinity of the entire construction corridor that are potentially erodible.
- Neither shallow alluvial and or deeper bedrock aquifers will be subject to significant dewatering activities across the Project construction corridor.

Table 4 provides an overview of key environmental hazards and risks that are associated with Project construction activities and their locations.

Table 4: Activities, Hazards and Risks

Project Activity (and Location)	Environmental Hazard	Environmental Risk
Clearing, grubbing and site establishment (Entire Rail Link construction area)	<ul style="list-style-type: none"> <li>■ Increased sediment load in run-off waters</li> <li>■ Modifications to topography and associated water catchment areas within construction areas (e.g. excavation / cutting below existing drainage lines)</li> <li>■ Sediment laden runoff during clearing and grubbing, and establishment of site compounds</li> <li>■ Bank erosion</li> </ul>	<ul style="list-style-type: none"> <li>■ Potential to increase surface water velocity</li> <li>■ Potential to expose reactive soils and increase surface water sediment loadings</li> <li>■ Potential to result in long term erosion areas</li> <li>■ Potential for uncontrolled surface water flows</li> <li>■ Potential to concentrate surface water flows</li> <li>■ Potential to cause localised pollution of waterways if appropriate mitigation or management measures are not adopted</li> <li>■ Potential loss of surface flow volumes to existing reception areas due to alternate flow paths</li> <li>■ Potential to expose reactive soils and increase surface water sediment loadings</li> <li>■ Potential to result in long term erosion areas</li> <li>■ Potential for sediment laden runoff entering nearby waterways and stormwater systems</li> </ul>
Excavation (Entire Rail Link construction area)	<ul style="list-style-type: none"> <li>■ Material stockpiles</li> <li>■ Sediment laden runoff during excavation works</li> <li>■ Potential Acid Sulfate Soils</li> </ul>	<ul style="list-style-type: none"> <li>■ Sediment laden/ contaminated runoff entering creeks and defined drainage lines, including storm water systems, causing pollution (including sedimentation)</li> <li>■ Potential fish kill/ distress/ disruption to fish passage</li> </ul>
Concreting (Entire Rail Link construction area, but mainly near Georges River and Anzac Creek)	<ul style="list-style-type: none"> <li>■ Material stockpiles</li> <li>■ Discharge of contaminated water from wheel wash areas and concrete washouts</li> </ul>	<ul style="list-style-type: none"> <li>■ Sediment laden/ contaminated runoff entering creeks and defined drainage lines, including storm water systems, causing pollution</li> </ul>

Project Activity (and Location)	Environmental Hazard	Environmental Risk
Storage and use of flammable and combustible liquids and solids (Compounds and active construction areas)	<ul style="list-style-type: none"> <li>Leaks or spillages of fuels, oils and grease from construction plant and equipment and at compounds</li> </ul>	<ul style="list-style-type: none"> <li>Potential for soil contamination as a result of a spill</li> <li>Potential impact to creeks/ defined drainage lines</li> <li>Potential for pollutants to wash into the storm water system, then into receiving waters</li> </ul>
Dust suppression (Glenfield Waste Facility, MIC Golf Course, Southern Boot Land)	<ul style="list-style-type: none"> <li>Use of water</li> </ul>	<ul style="list-style-type: none"> <li>Unnecessary load on water resources contributing to resource availability</li> </ul>
Bridge and culvert construction (Georges River and Anzac Creek) <i>For further information, see Project Specific Procedure (PSP) for the Georges River Bridge (GRB).</i>	<ul style="list-style-type: none"> <li>Sediment tracking onto public roads from vehicles leaving the construction area.</li> <li>Construction of the piers for the proposed Georges River bridge which are within a main waterway and placement of the culvert crossings within Anzac Creek which is within a natural drainage line.</li> <li>Construction of the causeway in Georges River in order to support the construction of the piers.</li> <li>Floodwaters impacting construction work areas.</li> <li>Potential Acid Sulfate Soils.</li> <li>Potential contamination near the Georges River.</li> </ul>	<ul style="list-style-type: none"> <li>Potential traffic safety from sediment and gravel on roads</li> <li>Potential for sediment to be washed into storm water systems, causing pollution</li> <li>Increase in the volume of sediments and other pollutants (e.g. fuels and/or chemicals) carried downstream and associated reduction in the suitability of aquatic environments for some aquatic flora and fauna species</li> <li>Impacts to river and creek bank stability which increases future erosion potential</li> <li>Potential for contamination of floodwaters by sewerage, fuels and/or chemicals onsite</li> <li>Potential fish kill/ distress/ disruption to fish passage</li> <li>Potential for contamination of waterways, including Georges River, from contamination present in Groundwater and/or soil.</li> </ul>

## 6.2 Georges River Bridge Construction

Below is a summary of the key construction activities, impacts and mitigation measures for the Georges River Bridge. The construction methodology and design detailed below is subject to change if, after site establishment, constructability assessments detail restrictions unknown at this stage. Further detail is available in the Project Specific Procedure for the Georges River Bridge, developed in consultation with DPI Water and DPI Fisheries in accordance with FCMM #5B.

### 6.2.1 General principles

To reduce the impacts on the existing environment, the following measures were taken into consideration during the development of the design and construction methodology:

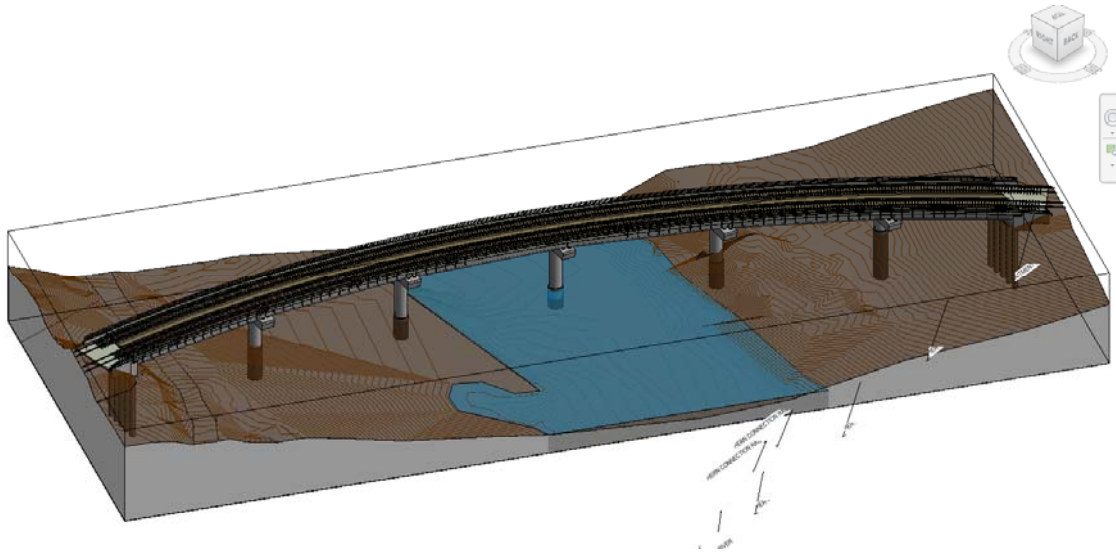
- Works across the bed of the Georges River will be managed to minimise the total disturbance at any given time and to allow the full bypassing of stream flows around the works to maintain fish passage.
- Access into the area will be designed and constructed to avoid channelling of surface flows to the river and any destabilisation of the riparian areas.
- Temporarily disturbed riparian areas in the Georges River will be revegetated with locally occurring native species as soon as practicable upon completion of bridge works.
- Revegetation and rehabilitation will be undertaken in accordance with the measures detailed in the CFFFMP and Riparian Vegetation Management Plan.
- Scour protection will be installed between the culvert structure and the existing creek line to promote creek stability.

- Silt curtains will be installed into the Georges River prior to any works occurring and will remain until all work is complete and all materials are removed from the river.

The 'Blue Book' indicates that the Georges River worksite is categorised Soil Loss Class 6 since it is waterfront land. As such, the site will be managed in accordance with the requirements of the Blue Book. Site specific Erosion and Sediment Control Plans and Site Environmental Plans will be developed in consultation with the project soil conservationist to manage the environmental impacts of the construction of the Georges River Bridge.

### 6.2.2 Current Bridge Design

A six-span Super T girder bridge was selected as the design as it met all the requirements of a rail bridge structure design while minimising impact on the river bed and riparian corridor. Figure 4 below provides the current design for the bridge.



**Figure 4 - Current Georges River Bridge Schematic**

### 6.2.3 Construction methodology

A construction platform in the Georges River is required in order to install piles, construct bridge pier, construct pier headstock and install bridge beams. Any structure constructed in the waterway has the potential to restrict flow in the waterway. This results in a rise in water levels upstream of the obstruction (afflux). The construction platform will therefore be designed such that restrictions to the river flow are minimised during both normal flow and high flow events.

#### 6.2.3.1 Causeway design and construction

A single stage causeway from the eastern side of the river was selected, as it minimises the amount of total river bed disturbance (compared to two stage) and was a shorter program. This methodology would maintain an 18m wide gap in the main channel to allow for water and fish passage. Sheet piling was ruled out due to shallow depth of underlying class 4/5 sandstone bedrock (hard), which would prevent the sheet piles from embedding properly. In addition, a barge was considered not suitable due to weight restrictions.

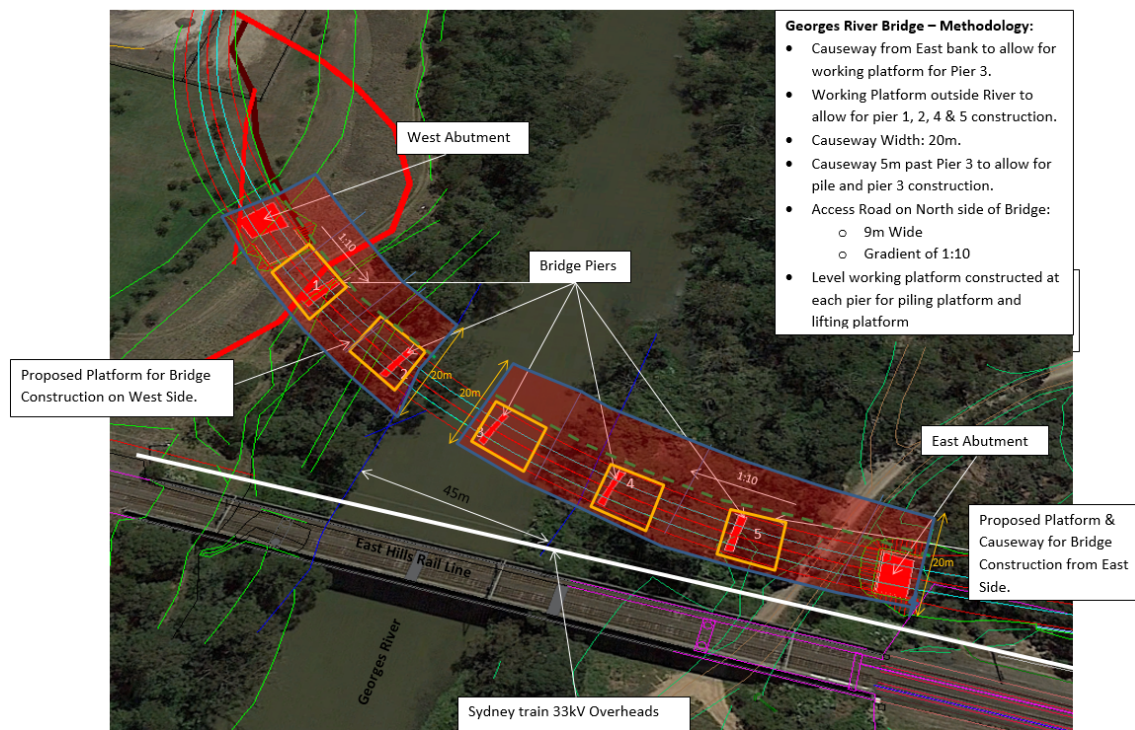
The construction platform will consist primarily of Basalt Gabion Rock containing minimal fines in the water. Rock causeway was determined as the only feasible option due to the inability to install sheet piles and due to the large loads required on top of the causeway during construction. It is a proven methodology for this type of construction and it provides confidence that construction loads and river flows can be accounted-for in the design. Furthermore the size of the causeway enables all work to be completed from one side of the river which reduces the amount of river bed disturbed. This option also reduces the timeframe of works in the river due to the time taken to install and remove sheet piles and the time taken to remove and reinstall another causeway on the adjacent side.

Rock would be of a size to resist scour during high flow events. Type of rock used will be Basalt with a wet strength greater than 100kN to prevent rock break down, particularly under load. Smaller rock would be used for filling within the perimeter. It is expected that geogrid or geotextile will be used to

interlock the filling material and add tensile strength to the platform to distribute surface loads evenly through the formation. The rock size internally will gradually reduce in size as it approaches the surface to create a smooth level platform in preparation to lay the geofabric on. This will prevent any rocks having the potential to tear the thick geofabric layer. A top surface of fine, compactable material would be placed over a layer of geotextile to provide a smooth and stable working surface. The geofabric layer between the rock and platform will be impenetrable. The platform is required to enable safe access for workers and plant.

The top layer will be compacted and sealed with a smooth drum roller to prevent scouring during large flood events. The rocks and geotextile apron around the edge of the perimeter will be left slightly higher than the platform to prevent sediment run off and reduce flow velocities onto the platform in extreme flood event greater than 1 in 20. The causeway is designed only to overflow in storms greater than 1 in 20 to prevent upstream from flooding. All plant and equipment will be removed from the causeway if an extreme flood event is predicted. The overflow design also reduces the velocity of water on the causeway preventing any movement during large flood events.

A silt curtain will be in place around the perimeter of the platform during its construction and throughout the bridge construction works. All works in the riparian zone will be completed within a 20m corridor, with no-go fencing installed and maintained along the project boundary. Figure 5 below provides a summary of the proposed bridge construction methodology – draft and subject to change during site establishment.



**Figure 5 - Proposed Bridge Construction Methodology**

Once all construction work has been completed on the causeway it will be removed from the water. The silt curtain will remain in the water until all the rock has been removed. Timing of works will be prioritised for a period of dry weather with minimal river velocity.

### 6.3 Anzac Creek Culvert Construction

Below is a summary of the key construction activities, impacts and mitigation measures for the Anzac Creek. The construction methodology and design detailed below is subject to change if, after site establishment, constructability assessments detail restrictions unknown at this stage. The methodology and mitigation measures provided below will be expanded upon in site documentation that will be developed prior to works in the creek. Applicable mitigation measures, such as those in Table 5 (Section 7.8) will be incorporated and implemented.



### 6.3.1 General principles

To reduce the impacts on the existing environment, the following measures were taken into consideration during the development of the design and construction methodology:

- Works across the bed of the Anzac Culvert will be managed to minimise the total disturbance at any given time and to allow the full bypassing of stream flows around the works to maintain fish passage.
- Access into the area will be designed and constructed to avoid channelling of surface flows to the creek and any destabilisation of the riparian areas.
- Temporarily disturbed riparian areas will be revegetated with locally occurring native species as soon as practicable upon completion of works.
- Revegetation and rehabilitation will be undertaken in accordance with the measures detailed in the CFFMP and Riparian Vegetation Management Plan.
- The width of vegetation clearance is to be no greater than 20m. The temporary diversion creek and causeway will be constructed within the 20m disturbance area.

The 'Blue Book' indicates that the Anzac Culvert worksite is categorised Soil Loss Class 6 since it is waterfront land. As such, the site will be managed in accordance with the requirements of the Blue Book. Site specific Erosion and Sediment Control Plans and Site Environmental Plans will be developed in consultation with the project soil conservationist to manage the environmental impacts of the construction of the Anzac Culvert.

### 6.3.2 Construction Methodology

The construction methodology for the new culvert at Anzac creek, which consists of an in situ concrete slab and pre-cast reinforced box culverts, will be completed in one phase, with the construction of the in situ slab and placement of the pre-cast box culverts both expected to take 10-14 weeks and is generally as follows:

- All works, particularly those impacting on clean/undisturbed areas, will prioritised to occur during dry weather periods with limited to no creek flow.
- To prevent water from entering the site while constructing the culvert, a temporary stabilised diversion channel will be excavated around the work site, so as to divert water in the creek from upstream to downstream of works. This will continue to allow water to flow past the construction site.
- Once the concrete slab is poured the temporary diversions can be removed and the water diverted into the new fish passage channel.
- All remaining works will be completed off the newly constructed slab, preventing further disturbance.

Details of the specific construction methodology will be listed in the Environmental Work Method Statement that will be created for the works at the Anzac Creek Culvert worksite.

## 7. Management Strategies and Mitigation Measures

The followings management strategies and mitigation measures are applicable to the construction activities in and around both the Georges River and Anzac Creek footprints. A Georges River Bridge Project Specific Procedure (PSP), in accordance with FCMM #5B, has also been prepared that provides greater detail on the Georges River Bridge construction, impacts and mitigation measures.

### 7.1 Erosion and Sediment Control

#### 7.1.1 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 and where feasible focusing on:

- Minimisation of soil erosion and mobilisation of sediment during rain events
- Diversion of 'clean' run-off from offsite around or through the worksite without it contacting exposed soils or mixing with 'dirty' onsite water
- 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 such as sediment basins
- Progressive rehabilitation and/or stabilisation of completed areas to minimise erosion hazard
- Inspection and maintenance of all erosion and sediment controls in sound working order.
- Where practicable, exposed areas close to waterways will be temporarily stabilised prior to final stabilisation.
- Prevention of bank erosion through stabilisation as required
- Install erosion and sediment controls near the border with the Georges River to minimise sediment discharge.

Erosion and sediment controls are to be implemented during construction according to the Progressive Erosion and Sediment Control Procedure in Attachment J. Further detail is also available in Sections 7.1.2 and 7.1.3 below and in attachment D.

#### 7.1.2 Erosion and Sediment Control Plans

The Primary Erosion and Sediment Control Plan (ESCP) provides recommendations and commitments for erosion and sediment control in accordance with the NSW Blue Book, including:

- Background data for erosion and sediment control design (e.g. sediment basin design criteria)
- Instructions for staged implementation of erosion and sediment controls
- Instructions for the preparation of Progressive ESCPs
- Dust control
- Access control (minimising disturbance)
- Sediment traps (e.g. sediment fences, straw bales, coir logs)
- Stockpile and soil management
- Dewatering and discharging water from site
- Stabilising and rehabilitating the site at various stages of construction
- Site inspection, monitoring and maintenance of erosion and sediment controls
- Watercourse bank stabilisation
- Water control devices and scour protection

The Primary ESCP is included in Attachment D.

#### 7.1.3 Watercourse bank stability mitigation measures

Below is a summary of the mitigation measures that have been developed to minimise impacts to watercourse bank stability. These are in addition to previously detailed erosion and sediment controls and those included in the Primary ESCP.

- Scour protection will be installed on the western embankment of Georges River to protect the workings of Pier construction and prevent possible scour of embankment associated with the placement of the causeway into the river from the eastern embankment.
- Silt curtains within the river will be installed prior to the construction of the causeway and will remain in service until the causeway is removed following completion of construction activities.
- Large rocks will be used around the edges of the causeway to minimise scouring of the banks.
- To prevent the river embankments and causeway from any scouring, large boulders will be placed over geotextile on each side of the river and around the perimeter of the causeway where the flow rate is the quickest.
- Scour protection will be installed between the proposed Anzac Creek culvert structure and the existing creek line during construction to promote creek stability.
- Sediment fences up and down slope where possible to minimise sediment discharge to the Georges River.

#### 7.1.4 Erosion and Sediment Controls in Areas of Potential Contamination

Where works are occurring in areas of potential contamination, erosion and sediment controls will be designed to prevent, as much as reasonable and feasible, the movement of sediment off site. This includes works near ecologically sensitive receivers, such as the Georges River.

## 7.2 Water Reuse and Discharge

Water discharge from sediment basins within the premises will be required to ensure that sufficient storage capacity is available in the event of wet weather. Where practicable, water from sediment basins will be reused within the Premises (e.g. dust suppression, watering retained vegetation, cooling). No contaminated water will be stored in sediment basins designated for normal construction water.

The Dewatering and Discharge Procedure is included in Attachment G. Prior to any discharge off the Premises or reuse within the Premises, the Environmental Coordinator is to complete a Permit to Dewater From (Attachment H) indicating that the water is suitable for reuse or discharge.

For onsite reuse the following criteria will be utilised:

- 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
- No visible fines (concrete washout water only)
- If transporting water to sediment basins, the sediment basin must not be overfilled
- No suspected contamination.

Testing and, where necessary, treatment of any construction water to be discharged offsite will occur within sediment basins, an excavation or in a sealed container(s). Water quality monitoring will be undertaken prior to discharge offsite in accordance with the EPL for the following parameters:

- Oil and grease = None visible,
- Turbidity (NTU) < 50 – or – Total Suspended Solids (TSS) < 50 mg/L
- pH = 6.5 to 8.5.

In addition, if contamination is suspected, then additional testing may be required. The locations of sediment basins will be indicated on Site Environment Plans.

Based on a 5-day 80th percentile rainfall depth (as per Table 6.3a of the Bluebook (Bankstown)), should rainfall received within a 5 day period exceed 24.4 mm, it is expected that sediment basins may discharge naturally over their spillway without an opportunity to flocculate and test basins for NTU/TSS, pH or the presence of oil and grease. It should also be noted that other types of sediment controls may also be overwhelmed during such an event and that repair work will be undertaken when it has been determined by the Site Supervisor that it is safe to do so.



Discharges from sediment basins will be pumped or where the geographic conditions allow syphons may be installed to the receiving waters (i.e. to adjacent waterways or stormwater systems) unless a suitable alternative receiver can be identified.

#### 7.2.1 Correlation between TSS and NTU

If deemed necessary, NATA-accredited laboratory testing will be undertaken in conjunction with field testing initially to establish a correlation between TSS and turbidity (NTU) for the Project.

### 7.3 Minimising Water Use

The following measures will be adopted to minimise overall water use and demand for potable water:

- Reuse of detained water in sediment basins wherever possible, providing sediment basin void capacity can be restored within the nominated maintenance interval (typically 5 days).
- Use of rainwater tanks to harvest and reuse roof runoff wherever possible.
- Reuse of groundwater (if encountered and that dewatering is required during construction) and surface water (from sediment basins or excavations) on site for dust suppression.

All water reused on site must comply with the Dewatering and Discharge Procedure (Appendix G) and the Permit to Dewater Form (Appendix H).

#### 7.3.1 Groundwater dewatering

If groundwater is encountered during excavations that needs to be dewatered for construction to continue, it will be tested for suitability for reuse (see section 7.2 above for applicable criteria) and the groundwater is not from an area of known contamination. If dewatering of encountered groundwater during excavation work is required and it is proposed for the water to be reused on site (provided the water meets the relevant criteria), a review of the relevant legislation (see section 2.2 above) will be undertaken as to whether a licence (e.g. Water Access Licence) is required. If a licence is required, DPI Water will be contacted to provide advice prior to any groundwater is dewatered. Further consultation with DPI Water has indicated that a Licence is not required.

Groundwater encountered in areas of potential contamination concerns will be tested prior to discharge and appropriately managed. If contaminated groundwater is uncovered during excavations or piling activities and dewatering is required, it will be stored in a separated container. It will not be mixed, diluted or reused on site without treatment. If treatment is not proposed, contaminated groundwater will be disposed of in an appropriately licenced facility.

Groundwater recharge is also to be investigated, in consultation with DPI Water as required, to minimise the net effect on the groundwater table. Groundwater is not to be used as a water supply source.

Refer to the Groundwater Reuse & Discharge Procedure in Attachment J for further information.

#### 7.3.2 Reuse of surface water run-off

Surface water collected on site in sediment basins or excavations is to be reused on site wherever possible provided that it meets the criteria set out in section 7.2 above. Clean surface water runoff is not to be used on site without an appropriate Water Access Licence in consultation with DPI Water.

Surface water collected on site in areas of potential contamination concerns will be tested prior to discharge and appropriately managed. If contamination of surface water is confirmed, it be stored in a separate container and appropriately managed. It will not be mixed, diluted or reused on site without treatment. If treatment is not proposed, contaminated surface water will be disposed of in an appropriately licenced facility.

### 7.4 Chemicals, Fuels and Spills

Chemicals, fuels, hazardous substances and dangerous goods will be stored and used onsite in accordance with the following protocols:

- Hazardous substances will be stored onsite in lockable containers, in their original receptacles only.
- All hazardous substances will be clearly labelled and will have Safety Data Sheets affixed or available nearby.

- A bund sized to 110% of the largest stored receptacle will be established around any storage area for hazardous substances.
- Storage and handling of flammable or combustible liquids will be in accordance with OEH guidelines for Bunding and Spill Management, as well as AS 1940-1993 – The Storage and Handling of Flammable and Combustible Liquids.
- An up-to-date register of hazardous substances will be kept onsite at all times.
- Hazardous substances will only be used onsite as required, in accordance with the manufacturer/supplier instructions. Use inside tunnels will be minimised as much as possible.
- Any substances with the potential to impact water quality will be assessed by the Environment Team to determine what environmental safeguards or procedures are required for that substance to minimise the risk of environmental harm.
- The use of any hazardous substance that could result in a spill will be undertaken away from drainage or stormwater lines and, wherever possible, within defined bunds.
- Any refuelling undertaken on site shall be undertaken in designated areas only, well away from waterways or stormwater system inlets.
- All spills or leakages will be immediately contained and absorbed. Ensuing waste material will be appropriately disposed.
- In the event of a spill the Spill Management Procedure included in Attachment F will be implemented.
- Environmental incidents where material harm to the environment is caused or threatened will be managed in accordance with the Pollution Incident Response Management Plan.

## 7.5 Acid Sulfate Soils

It is not expected that Acid Sulfate Soils (ASS) will be encountered during the Rail Link works. However, should any ASS be identified they will be managed in accordance with the Acid Sulfate Soils Management Plan (Attachment E).

## 7.6 Contamination

Contamination during construction will be managed under the project Contamination Management Plan and Remediation Action Plan as relevant. Unexpected contamination will be managed in accordance with the Unexpected Finds Protocol, which is attached to the Contamination Management Plan. Any asbestos encountered will be managed on accordance with the Asbestos Management Plan which forms part of the Contamination Management Plan.

Groundwater and surface water collected from areas of potential contamination concerns will be collected separately and tested prior to disposal – see section 7.3 above and the Contamination Management Plan for further information.

## 7.7 Flooding

Flood emergency response and management will be undertaken in accordance with the Flood Emergency Response Plan and Incident and Emergency Management Plan as required.

## 7.8 Mitigation Measures

Mitigation measures for soil and water are provided in Table 5. CPB commits to undertake the following:

Table 5: Mitigation Measures

No.	Control	Timing	Accountability	Source
SW1	Erosion and sediment controls must be designed, developed and implemented in consultation with the construction team and Environment Manager.	Pre-construction Construction	Construction Manager Project Engineer Environment Manager Soil Conservationist	CPB Contractors Mandatory Minimum

No.	Control	Timing	Accountability	Source
SW2	Clean water diversions must be installed prior to the commencement of work.	Pre-construction	Project Engineer Environmental Coordinator	CPB Contractors Mandatory Minimum
SW3	Erosion and sediment controls must be installed prior to or immediately upon any disturbance to vegetation or soil. These controls must remain in place until revegetation, stabilisation or hard scaping has occurred.	Pre-construction Construction	Construction Manager Project Engineer Environment Manager	CPB Contractors Mandatory Minimum
SW4	Cleared areas must be kept to a minimum and be progressively rehabilitated/revegetated as they become available.	Pre-construction Construction Post construction	Supervisor Project Engineer	CPB Contractors Mandatory Minimum
SW5	All materials must be stockpiled away from water flow paths.	Construction	Supervisor Project Engineer	CPB Contractors Mandatory Minimum
SW6	Sediment laden water (dirty water) captured onsite must be preferentially reused eg. dust control.	Construction	Supervisor Project Engineer	CPB Contractors Mandatory Minimum
SW7	Water discharged from site is in strict accordance with the site's dewatering procedure, which is approved by the Environment Manager.	Construction	Supervisor Project Engineer Environment Manager	CPB Contractors Mandatory Minimum
SW8	No transfer/discharge will be made without a Permit To Dewater approved by the Environment Manager.	Construction	Supervisor Project Engineer Environment Manager	CPB Contractors Mandatory Minimum
SW9	An adequate number of concrete washout facilities must be maintained at all times. The washout facilities will be isolated from surface water flows using bunds to prevent contamination of clean surface waters and will be lined to prevent contamination of soil and ground water.	Construction	Construction Manager Supervisor Project Engineer	CPB Contractors Mandatory Minimum
SW10	All hazardous substances (liquids and solids) are stored and managed according to AS1940.	Construction	Supervisor Project Engineer	CPB Contractors Mandatory Minimum
SW11	All re-fuelling points, including re-fuelling/lube trucks, will carry hydrocarbon spill kits.	Construction	Construction Manager Supervisor Project Engineer	CPB Contractors Mandatory Minimum
SW12	Opportunities to minimise the use of high quality water will be continually sought and adopted as appropriate.	Pre-construction Construction	Construction Manager Supervisor Project Engineer	CPB Contractors Mandatory Minimum

No.	Control	Timing	Accountability	Source
SW13	Area of soil disturbed and exposed to erosion at any one time will be minimised.	Construction	Supervisor Project Engineer	FCMM Framework SWMP
SW14	Priority will be given to strategies that minimise erosion rather than capture sediment down slope or at the catchment outlet.	Pre-construction Construction	Supervisor Project Engineer Soil Conservationist	FCMM
SW15	Clean water will be diverted around the construction site and or control of the flow of clean water at non-erodible velocities will be achieved through the construction site.	Construction	Supervisor Project Engineer Soil Conservationist	FCMM
SW16	Boundary treatments around the perimeter of construction areas will be implemented to minimise the migration of sediment offsite (e.g. sediment fences).	Construction	Supervisor Project Engineer Soil Conservationist	FCMM
SW17	Permanent or temporary drainage works will be installed as early as practical in the construction program to minimise uncontrolled drainage and associated erosion including the onsite detention (OSD) and flood conveyance works.	Construction	Supervisor Project Engineer Soil Conservationist	FCMM
SW18	Stockpiles will be located away from flow paths on appropriate impermeable surfaces to minimise potential sediment transportation.	Construction	Supervisor Project Engineer	FCMM
SW19	Where practicable, stockpiles will be stabilised if in place for more than ten days and will be formed with sediment filters in place immediately downslope.	Construction	Supervisor Project Engineer	FCMM
SW20	Existing catchments and sub-catchment boundaries will be maintained as far as practicable.	Pre-construction Construction	Project Engineer Soil Conservationist	FCMM
SW21	Site imperviousness and grades will be limited to the extent of existing imperviousness and grades under existing development conditions	Pre-construction Construction	Project Engineer Soil Conservationist	FCMM
SW22	Disturbed lands will be rehabilitated as soon as practicable.	Construction Post construction	Supervisor Project Engineer	FCMM
SW23	The wheels of all vehicles will be cleaned prior to exiting the construction site where excavation occurs to prevent the tracking of mud. Where this is not practical, or excessive soil transfer occurs onto paved areas, street cleaning will be undertaken when necessary.	Construction	Supervisor Project Engineer	FCMM

No.	Control	Timing	Accountability	Source
SW24	Erosion and sediment control structures will be cleaned, repaired and augmented as required.	Construction	Supervisor Project Engineer Environmental Coordinator	FCMM
SW25	Sediment basins have been sized to accommodate the 5 day, 80th percentile storm event, with sufficient size and capacity to manage Type F soils.	Pre-construction Construction	Project Engineer Soil Conservationist	FCMM
SW26	Sediment basins will be regularly cleaned to maintain the design capacity.	Construction	Supervisor Project Engineer Environmental Coordinator	FCMM
SW27	Sediment basins will be located clear of waterway bed and banks and no additional riparian vegetation will be cleared outside 20 metres from the Rail Link corridor.	Pre-construction Construction	Project Engineer Soil Conservationist	FCMM
SW28	Stabilisation of waterways including their beds and banks is to be commenced immediately after the completion of any works within these areas.  Long term stabilisation will use, where possible, soft-engineering solutions that mimic a natural system.	Construction	Supervisor Project Engineer Environmental Coordinator	Good practice
SW29	Sediment curtains / fences (not mulch berms, as they can wash away) will be installed at the bottom of each bank around the disturbed part of the riparian zone as a final line of defense, provided that it does not affect access.	Construction	Supervisor Project Engineer Environmental Coordinator	Good practice DPI Fisheries Consultation
SW30	Where practicable, sediment curtains / fences will be installed above the riparian zones to minimise sedimentation in overflow events.	Construction	Supervisor Project Engineer Environmental Coordinator	Good practice DPI Fisheries Consultation
SW31	Exposed areas will be temporarily stabilised during construction (prior to final stabilisation) where practicable, especially in areas adjacent to the Georges River.	Construction	Supervisor Project Engineer Environmental Coordinator	Good practice DPI Fisheries Consultation
SW32	Disturbed areas in the riparian zone will be stabilized through revegetation as soon as possible after completion of construction. Revegetation requirements included in CFFMP.	Construction	Supervisor Project Engineer Environmental Coordinator	Good practice DPI Water Consultation
SW33	Locate soil or mulch stockpiles will be located away from watercourses and key stormwater flow paths to limit potential transport of these substances into the watercourses via runoff.	Construction	Supervisor Project Engineer Environmental Coordinator	C'th MM RVMP

No.	Control	Timing	Accountability	Source
SW34	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.	Construction	Supervisor Project Engineer Environmental Coordinator	EPL
	<b>Anzac Creek</b>			
SW35	Temporary structures used for the construction of the culvert within Anzac Creek will be designed so that they can accommodate flows to minimise potential flooding impacts when prolonged or intense rainfalls are predicted. Any structures that impede flow will be readily removable or collapsible, to allow flood waters to flow within the channel, in the event of prolonged or intense rainfall.	Construction	Design Project Engineer Construction Manager	FCMM
SW36	All temporary works, flow diversion barriers and in-stream sediment control barriers will be removed as soon as practicable and in a manner that does not promote future channel erosion	Construction	Supervisor Project Engineer Construction Manager	FCMM C'th MM
SW37	The construction site will be left in a condition that promotes native re-vegetation. Re-vegetation requirements are addressed in the CFFMP.	Construction	Project Engineer Supervisor	FCMM
SW38	The management principles outlined in Managing Urban Stormwater (Landcom 2004) for sites with high erosion potential will be implemented.	Construction	Project Engineer Soil Conservationist	FCMM C'th MM
	<b>Georges River Bridge</b>			
SW39	Scour protection works around piers will be installed as early as possible, where required.	During Construction	Construction Manager Environment Manager	Stage 1 FCMM
SW40	Measures to contain potential pollutants should be installed in-stream, such as silt curtains to contain sediment	Pre-construction	Construction Manager Environment Manager	Stage 1 FCMM
SW41	Material for the formation of piling platforms must be clean material with minimal fines	Pre-construction	Construction Manager Project Engineer	Stage 1 FCMM
SW42	Measures to manage runoff from the bridge approaches / abutments must be established as early as possible	Construction	Construction Manager Project Engineer	Stage 1 FCMM



## 8. Review and Improvement

### 8.1 Monitoring

The following sections specify the monitoring requirements for this Plan. It is the accountability of the Environment Manager to ensure all monitoring is performed according to these requirements. Generally any monitoring performed would be recorded on the Daily Environmental Inspection Checklist and filed on site.

The results of any monitoring and visual inspections, if not completed by the Environment Team, must be provided to the Environment Team as soon as practicable.

#### 8.1.1 General Site Monitoring

A system of environmental monitoring will be implemented and undertaken. This will include:

- Recording of the quantity of water used from potable supplies or water obtained under an extraction licence or other regulatory authority or agreement, including recycled water obtained from outside the project
- Undertaking visual inspections:
  - At least once a week during normal construction activities
  - Prior to a possible storm event (rainfall of 5 mm or more)
  - After a storm event (within 24 hours if it is safe to do so)
  - Immediately prior to the closure of construction in any areas of the Project.
- Visual inspections to include:
  - Recording indicators of adverse site conditions (e.g. flooded areas, areas of waterway bank erosion, surface erosion, sediment load dispersion) on the Daily Environmental Inspection Checklist
  - Inspection of all permanent and temporary erosion and sedimentation controls (i.e. to verify compliance with this Plan and the ESCP)
  - Identification of any rectification measures that may need to be implemented

Inspections of erosion and sediment controls will be undertaken as per section 6.1 of the Primary Erosion and Sediment Control Plan (Appendix D). All drainage and erosion and sediment control measures must be inspected and monitored:

- At least daily (when work is occurring on-site)
- Daily during periods of rainfall greater than 10mm
- At least weekly (when work is not occurring on-site)
- Within 24 hours of expected rainfall
- Within 18 hours of a rainfall event of sufficient intensity and duration to cause runoff on-site

If required, works will be undertaken to repair and/or maintain these controls.

Areas of disturbance adjacent to watercourses will be an area of focus due to the increased risk. The above meets the requirements of EPL Condition O5.2.

#### 8.1.2 Water Quality Monitoring

The objectives for water quality management during construction are:

- The prevention of pollution and associated impacts to surface and ground water resources and ecosystems
- To provide a means to measure the performance of mitigation measures and triggers for management actions to rectify those mitigation measures
- To provide a means to determine whether potentially affected waterways have been rehabilitated to an acceptable condition.

An overview of the pre-works, works and post-works water quality monitoring requirements is provided in Table 6.

Table 6: Pre-construction, Construction and Post-Construction Monitoring Requirements

Waterway	Pre-construction	Construction
Georges River	<u>Monthly and after a rain event greater than 10 mm.</u> Methodology as per the water quality parameters, criteria, methods and sampling locations as detailed in the following paragraphs and Table 8.	<p>As per the 'Georges River Water Quality Monitoring Program' in the Acid Sulfate Soil Management Plan (Attachment E) when construction involves any potential disturbance of river bed sediments beneath the water column and or lower lying sediments of the river bank.</p> <p><u>Surface water monitoring at Georges River will be carried out during construction as follows:</u></p> <ul style="list-style-type: none"> <li>• <u>Daily during a high-risk construction event (e.g. concreting of piles).</u></li> <li>• <u>Monthly during periods of dry weather, and</u></li> <li>• <u>Minimum of one wet weather monitoring event each month following a rain event greater than 10 mm.</u></li> </ul> <p>Methodology for monitoring events is as per the water quality parameters, criteria, methods and sampling locations as detailed in the following paragraphs and Table 8.</p>
Anzac Creek	<u>After a rain event greater than 10 mm.</u> Methodology as per the water quality parameters, criteria, methods and sampling locations as detailed in the following paragraphs and Table 8.	<p><u>Minimum of one wet weather monitoring event each one where a rain event is greater than 10 mm.</u></p> <p>Methodology as per the water quality parameters, criteria, methods and sampling locations as detailed in the following paragraphs and Table 8.</p>

Water quality monitoring during pre-construction is highly unlikely to define background conditions and or suitable performance criteria based upon the following:

- Georges River water quality is highly variable and changes according to prevailing weather patterns and also day-to-day during rainfall.
- Anzac Creek is an ephemeral creek.

On that basis water quality criteria has been based upon Georges River Water Quality Objectives (DECCW. 2006), typical EPL requirements for construction projects in NSW and Part 5B h) of the Final Compilation of Mitigation Measures [adopting a pH range as per Low Land River guidelines (ANZECC and ARMCANZ 2000)].

Water quality criteria for discharge will comprise the following (subject to update upon finalisation of the EPL) as presented in Table 7 below.

Table 7: Water Quality Monitoring Criteria

Parameter	Limit
pH	6.5 to 8.5
Total Suspended Solids (TSS) – or – Nephelometric Turbidity Unit (NTU)	50 mg/L 50 NTU
Oil and grease	None visible (visible oil and grease approximates 10 mg/L)

Water quality monitoring locations, methods and frequency are shown in Table 8. All sampling procedures must be in accordance with AS/NZS 5667.1:1998 *Water quality – Sampling – Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples* as required by the Framework SWMP.

Response measures to non-compliances in water quality criteria are provided in Section 9.1. The following should be undertaken prior to enactment of the response measures:

- Where a non-compliance with water quality criteria is recorded, a sample is retaken the same day to confirm the non-compliance.

- Where downstream sampling locations for the Georges River and Anzac Creek report a non-compliance, there must be greater than a 20% difference in magnitude between the upper and downstream NTU/TSS value (e.g. if the downstream sampling location reported a TSS value of 55 mg/L and the upstream sampling location reported a TSS value of 48 mg/L, this represents a difference of 12.7% and thus such a downstream TSS value would not trigger response measures). pH would be considered a potential non-compliance if it is outside the 6.5-8.5 range only at the downstream samples.

Table 8: Water Quality Monitoring Program

Location	Parameter	Methodology	Frequency
In relation to Georges River Bridge construction activities: <ul style="list-style-type: none"> <li>50 metres upstream</li> <li>50 metres downstream</li> </ul> Monitoring to be conducted from eastern bank of river, the same side as the constructed causeway.	pH	Calibrated water quality meter and, if required, grab sample sent to a NATA registered laboratory.	Daily during a high risk construction event such as concreting, monthly during dry periods, and minimum of one event each month where a rainfall event is greater than 10 mm.
	Turbidity (NTU), or TSS	Calibrated water quality meter. If required, grab sample sent to a NATA registered laboratory to test for Total Suspended Solids (TSS).	
	Oil & Grease	Field observation or grab sample sent to a NATA registered laboratory.	
In relation to Anzac Creek culvert construction activities: <ul style="list-style-type: none"> <li>50 metres upstream</li> <li>50 metres downstream</li> </ul> In relation to discharges into Anzac Creek from sedimentation ponds: <ul style="list-style-type: none"> <li>As per EPL requirements.</li> </ul>	pH	Calibrated water quality meter and, if required, grab sample sent to a NATA registered laboratory.	Minimum of one event each month where a rain event is greater than 10 mm.
	Turbidity (NTU), or TSS	Calibrated water quality meter. If required, grab sample sent to a NATA registered laboratory to test for Total Suspended Solids (TSS).	
	Oil & Grease	Field observation or grab sample sent to a NATA registered laboratory.	

Water quality monitoring results will be recorded in site monitoring data sheets and then placed into a monitoring register to be developed during construction. Further detail is available in Part B – Element 3 and Part B – Element 11 of the CEMP.

### 8.1.3 Meteorological Monitoring

Meteorological monitoring data is collected to enable the following:

- Pre-warning of significant storm events to enable the preparation of mitigation measures within a sufficient time frame.
- Qualification of rainfall associated with higher surface water flows across the project site which may require adjustment of the rainfall associated with the water quality monitoring program.

An overview of the meteorological monitoring program is provided in Table 9.

Table 9: Meteorological Monitoring

Location	Parameter	Equipment Type	Frequency
Weather Radar	Cloud density and rate rain chart	Bureau of Meteorology website: <a href="http://www.bom.gov.au/">http://www.bom.gov.au/</a> or weatherzone.com.au (Bankstown Airport)	Daily

#### 8.1.4 Monitoring Records

The results of any monitoring required by this plan and the EPL must be recorded and retained as required by the EPL, specifically condition M1.

## 8.2 Reporting Schedule

Reporting is required as part of this Plan is to ensure project management is responsive and appropriate. Table 10 provides an overview of the reporting schedule.

Table 10: Reporting Schedule

Project Phase	Report Timing	Report Requirements
During Construction	Six-monthly	Audits of performance against the requirements of the Plan and the ESCP
		Collation and summary of General Site Monitoring
		Collation and summary of Water Quality Monitoring
		Collation and summary of Meteorological Monitoring
		Collation and summary of compliance with all discharges to the environment as per the EPL
		All non-conformances and follow up rectification actions
		An assessment of the appropriateness of discharge locations and design
Prior to Operation	Within one month of completion	Summaries of the six month reports
		Determination of the need to continue any aspect of monitoring for handover to the Principal

### 8.2.1 Recording Pollution Complaints

As per EPL requirement M2, all pollution complaints shall be recorded and be made available to the EPA upon request. The records shall include:

- Date and time of the complaint
- Method the complaint was made
- Personal details of the complainant (if available)
- Nature of the complaint
- Action taken in response to the complaint

Records shall be kept for a minimum of 4 years

## 8.3 Auditing

Audits will be undertaken to assess the effectiveness of environmental controls, compliance with this CSWMP, Conditions of Approval and any other relevant approval and licence requirements. Audit requirements are described in the CEMP.

## 8.4 Continuous Improvement

### 8.4.1 Non-compliances and Corrective / Preventative Action

Environmental inspection and monitoring results are interpreted to identify actual and potential non-compliances and events that may result in nuisance, environmental harm and unacceptable loss of amenity or community complaints. The Environmental Representative or a public authority may also raise a non-compliance or improvement notice.

Following the identification of a non-compliance, corrective and/or preventative actions will be identified and assigned to the appropriate person with set timeframes. Timeframes will be set to ensure any damage incurred is rectified and any chance of recurrence is eliminated as soon as practicable.

Refer to the CEMP (Part B, Section 3) for detailed NCR and corrective action management.

#### 8.4.2 Revision of this Plan

Continual improvement is achieved through constant measurement and evaluation, audit and review of the effectiveness of this Plan and the Primary ESCP.

This plan will be updated as required, such as:

- To take into account changes to the environment or generally accepted environmental management practices, new risks to the environment, or changes in law
- Where requested or required by the Department of Planning and Environment or any other Authority
- Repeated non-compliances
- In response to internal or external audits

As per Part B – Element 12 of the CEMP, the CSWMP will be reviewed every 6 months to ensure it is applicable to works on site. Any updates to the CSWMP will be in accordance with the criteria set out in the CEMP.

The updated plan must be endorsed by the Environmental Representative and approved internally by the Project Director. Minor changes may be approved by the Environmental Representative. Minor changes would typically include those that:

- Are editorial in nature (e.g. staff and agency/authority name changes)
- Do not increase the magnitude of impacts on the environment when considered individually or cumulatively
- Do not compromise the ability of the project to meet approval or legislative requirements

Where the Environmental Representative deems it necessary, the Plan will be provided to the Secretary of DP&E for approval.



## 9. Incident Response

The immediate incident response will be managed as per the Incident and Emergency Management Plan (IEMP). The following generally summaries the incident response strategies will be implemented:

- In the event of a flood, remedial measures as per the Flood Emergency Response Plan and Incident and Emergency Management Plan will be implemented as required
- In the event of a spill, remedial measures as per the Spill Management Procedure (refer to Attachment F) will be implemented
- Incidents where material harm to the environment is caused or threatened will be managed in accordance with a Pollution Incident Response Management Plan (PIRMP) and as per the EPL requirements.

The CEMP (Part B, Element 9) covers the broader incident management, including incident notifications, classification, corrective actions and reporting.

The Environment Manager will notify the Environmental Representative as per section 6.5 of the CEMP. DP&E will be notified if the incident is likely to cause material harm on-site or off-site on human health or the biophysical environment, as per Condition of Approval E10.

### 9.1 Incident Response Measures

In the event that an adverse impact on surface water quality is identified as a result of construction activities, the incident will be managed according to the IEMP and PIRMP. The following general response will be implemented:

- Stop works in accordance with incidence response procedures
- Review and amend construction methodology with particular note to management strategies / mitigation measures intended to protect water and soil quality
- Implement amended construction methodology
- Increase the frequency of monitoring until the amended construction methodology has been validated as effective (i.e. compliance with monitoring criteria)
- Where required:
  - The Project Director or Environment Manager will report any pollutant release to the surrounding environment to the EPA
  - Remediation of impacted areas in consultation with the EPA, NSW Office of Water and Liverpool City Council
  - Recommence construction once corrective actions have been implemented and preventative actions are determined and agreed

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## Attachments

### Attachment A: Compliance Matrix

#### Contract Clauses

Specific contract clauses and references which set limits and/or govern impacts to soils and water quality on the project include:

Table 11: Principal's Project Requirements

Contract Document Reference	Requirement	Where Addressed
1.4 p)	Contractor daily inspections of the Site to ensure compliance with all relevant approvals and project specific management plans is being achieved.	Section 8.1

#### Conditions of Project Planning Approvals

Conditions of project environmental approvals that specifically address the management of soil and water quality include:

#### Stage 1 Conditions of Approvals

Table 12: Stage 1 Conditions of Approval

Stage 1 CoA Ref	Requirement	Where Addressed
E6	Soil and water management measures consistent with <i>Managing Urban Stormwater - Soils and Construction Vols 1 and 2, 4th Edition</i> (Landcom, 2004) shall be employed during construction to minimise soil erosion and the discharge of sediment and other pollutants to land and/or waters.	Section 7 Attachment D (Primary ESCP)
E7	Construction shall be undertaken to comply with section 120 of the <i>Protection of the Environment Operations Act 1997</i> , which prohibits the pollution of waters.	Section 7 Attachment D (Primary ESCP)
E9	All activities taking place in, on or under waterfront land, as defined in the <i>Water Management Act 2000</i> should be conducted generally in accordance with the NSW Office of Water's Guidelines for Controlled Activities.	Section 5.5 Section 7.8, Table 5 Progressive Erosion and Sediment Control Plans
E10	The Applicant shall notify the Secretary and relevant public authorities of any incident with actual or potential significant on-site or off-site impacts on human health or the biophysical environment within 24 hours of becoming aware of the incident. The Applicant shall provide full written details of the incident to the Secretary within seven days of the date on which the incident occurred. Note: Where an incident also requires reporting to the EPA and/or OEHL, the incident report prepared for the purposes of notifying the EPA and/or OEHL would meet this requirement.	Section 7 Section 9 CEMP (Part B, Element 9) PIRMP IEMP
E11	The Applicant shall meet the requirements of the Secretary or relevant public authority (as determined by the Secretary) to address the cause or impact of any incident, as it relates to this approval, reported in accordance with condition E11, within such period as the Secretary may require.	Section 9 CEMP (Part B, Element 9)
E34 f)	Preparation of a Construction Soil and Water Management Plan to manage surface and groundwater impacts during construction. The plan shall be developed in consultation with, EPA, DPI Water, DPI Fisheries and relevant Councils, and include, but not necessarily be limited to:	This Plan Section 3

## Attachments

Stage 1 CoA Ref	Requirement	Where Addressed
E34 f)	(i) details of construction activities and their locations, which have the potential to impact on water courses, storage facilities, stormwater flows, and groundwater, including identification of all pollutants that may be introduced into the water cycle;	Section 6 Section 7.6 Contamination Management Plan
E34 f)	(ii) potential impacts on watercourse bank stability and the development of appropriate mitigation measures as required;	Section 6 Section 7.1 Table 5 Attachment D (Primary ESCP) Progressive ESCPs
E34 f)	(iii) emergency response procedures addressing potential flood impacts or spill incidents;	Section 7.7 Section 9 FERP IEMP Attachment F (Spill Management Procedure)
E34 f)	(iv) an Erosion and Sediment Control Plan, detailing measures to manage any erosion and sedimentation impacts into the Georges River or Anzac Creek;	Section 7.1 Attachment D (Primary ESCP) Progressive ESCPs
E34 f)	(v) an Acid Sulfate Soils Management Plan, if required, including measures for the management, handling, treatment and disposal of acid sulfate soils, including monitoring of water quality at acid sulfate soils treatment areas, should construction activities impact on acid sulfate soils;	Attachment E (ASSMP)
E34 f)	(vi) 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; and	Section 8
E34 f)	(vii) mechanisms for the monitoring, review and amendment of this plan.	Section 8.4 CEMP (Part B, Element 12)

## Stage 1 Final Compilation of Mitigation Measures

Table 13: Stage 1 Final Compilation of Mitigation Measures

Stage 1 FCMM Ref	Requirement	Where Addressed
0A c)	Erosion and Sediment Control Plans (ESCPs) and Bulk Earthworks Plans, within the Stormwater Drainage Design Drawings.	Attachment D (Primary ESCP) SEP Progressive ESCPs
0A e)	Soil and Water Management Plan (SWMP), prepared in accordance with Managing Urban Stormwater, 4 <sup>th</sup> Edition, Volume 1 (2004) as part of the Construction Environmental Management Program (CEMP) for the Project.	This Plan

## Attachments

Stage 1 FCMM Ref	Requirement	Where Addressed
5A	A Soil and Water Management Plan (SWMP) and Erosion and Sediment Control Plan (ESCP), or equivalent, will be implemented, in accordance with the Preliminary Erosion and Sediment Control Plans (PESCPs), included within the Stormwater and Flooding Environmental Assessment Report (Appendix P of the Environmental Impact Statement (EIS)). The following aspects will be addressed within the SWMP and ESCPs:	Section 1.1 Attachment D (Primary ESCP)
5A a)	The guiding principles for erosion and sediment control within the Blue Book will be adopted in the SWMP and when planning construction works, being:	Section 7 Attachment D (Primary ESCP)
5A a) (i)	Minimise the area of soil disturbed and exposed to erosion at any one time.	Table 5 Attachment D (Primary ESCP)
5A a) (ii)	Priority should be given to management practices that minimise erosion, rather than to those that capture sediment downslope or at the catchment outlet.	Table 5 Attachment D (Primary ESCP)
5A a) (iii)	Divert clean water around the construction site or control the flow of clean water at non-erodible velocities through the construction site.	Table 5 Attachment D (Primary ESCP)
5A a) (iv)	Provision of boundary treatments around the perimeter of construction areas to minimise the migration of sediment offsite.	Table 5 Attachment D (Primary ESCP)
5A a) (v)	Permanent or temporary drainage works will be installed as early as practical in the construction program to minimise uncontrolled drainage and associated erosion, including the onsite detention (OSD) and flood conveyance works.	Table 5 Attachment D (Primary ESCP)
5A a) (vi)	Stockpiles will be located away from flow paths on appropriate impermeable surfaces, to minimise potential sediment transportation. Where practicable, stockpiles will be stabilised if in place for more than ten days and will be formed with sediment filters in place immediately downslope.	Table 5 Attachment D (Primary ESCP)
5A a) (vii)	Existing catchments and sub-catchment boundaries will be maintained as far as practicable.	Table 5 Attachment D (Primary ESCP)
5A a) (viii)	Site imperviousness and grades should be limited to the extent of existing imperviousness and grades under existing development conditions.	Table 5 Attachment D (Primary ESCP)
5A a) (ix)	Rehabilitate disturbed lands as soon as practicable.	Table 5 Attachment D (Primary ESCP)
5A a) (x)	The wheels of all vehicles will be cleaned prior to exiting the construction site where excavation occurs to prevent the tracking of mud. Where this is not practical, or excessive soil transfer occurs onto paved areas, street cleaning will be undertaken when necessary.	Table 5 Attachment D (Primary ESCP)
5A a) (xi)	Inspection of all permanent and temporary erosion and sedimentation control works prior to and post rainfall events and prior to closure of the construction site.	Section 8.1 Table 5 Attachment D (Primary ESCP)

## Attachments

Stage 1 FCMM Ref	Requirement	Where Addressed
5A a) (xii)	Erosion and sediment control structures to be cleaned, repaired and augmented as required.	Table 5 Attachment D (Primary ESCP)
5A b)	Where required, construction sediment basins and their outlets will be designed to be stable in the peak flow from at least the 10-year ARI (Average Recurrence Interval) time of concentration event. Sediment basins should be sized to accommodate the 5 day, 80 <sup>th</sup> percentile storm event, with sufficient size and capacity to manage Type F soils. Sediment basins must be regularly cleaned to maintain the design capacity. Sediment basins will be located clear of waterway bed and banks and no additional riparian vegetation will be cleared outside the 20 metre Rail link to accommodate sediment basins. Prior to discharge from sediment basins, water will be tested for the following parameters to identify construction impacts: <ul style="list-style-type: none"> <li>■ pH</li> <li>■ Turbidity (NTU) / Total Suspended Solids (TSS)</li> <li>■ Oil and grease</li> </ul>	Section 7.1 Attachment D (Primary ESCP)
5A c)	An assessment of acid sulphate soils within the Georges River would be undertaken in accordance with the Acid Sulphate Soils Assessment Guideline (NSW Acid Sulfate Soils Management Advisory Committee, 1998) prior to commencement of works within the vicinity of the Georges River. Where acid sulfate soils are identified, an Acid Sulphate Soil Management Plan would be prepared in accordance with the guidelines.	Section 7.5 Attachment E (ASSMP)
5C	The following management measures will be implemented during works in and adjacent to Anzac Creek to mitigate potential impacts on water quality during construction: <ul style="list-style-type: none"> <li>■ Temporary structures used for the construction of the culvert within Anzac Creek will be designed so that they can accommodate flows to minimise potential flooding impacts when prolonged or intense rainfalls are predicted. Any structures that impede flow will be readily removable or collapsible, to allow flood waters to flow within the channel, in the event of prolonged or intense rainfall.</li> <li>■ All temporary works, flow diversion barriers and in-stream sediment control barriers will be removed as soon as practicable and in a manner that does not promote future channel erosion</li> <li>■ The construction site will be left in a condition that promotes native re-vegetation</li> <li>■ The management principles outlined in Managing Urban Stormwater (Landcom 2004) for sites with high erosion potential will be implemented.</li> </ul>	This Plan Table 5 Attachment D (Primary ESCP)
12A a)	Emergency response protocols and procedures for implementation in the event of a contaminant spill or leak	IEMP PIRMP Section 7.3.1 Attachment F (Spill Management Procedure)
12A b)	Provision of spill kits	Table 5 Attachment F (Spill Management Procedure)

## NSW Concept Plan Conditions of Approval

There are no specific NSW Concept Plan Conditions of Approval requirements for soil and water management.



## Attachments

### NSW Concept Plan Revised Statement of Commitments

Table 14: NSW Concept Plan Revised Statement of Commitments

NSW Concept Plan Revised SoC Ref	Requirement	Where Addressed
1.81	The Proponent will incorporate stormwater quantity and quality management measures into the detailed applications in accordance with the objectives and performance standards outlined in the Stormwater and Flooding Environmental Assessment report and including:	Stage 1 EIS
1.81 a)	Preparation of a Soil and Water Management Plan (SWMP) and Erosion and Sediment Control Plan (ESCP) for both the construction and operation phases.	This Plan Attachment D (Primary ESCP) Progressive ESCPs
1.81 b)	Implementation of management plan strategies prior to commencement of the staged construction phase.	Stage 1 EIS
1.81 c)	Monitoring and review performance of sediment and water control structures during construction and operation phases.	Section 8 Attachment D (Primary ESCP)

### Commonwealth Concept Plan Conditions of Approval

Table 15: Commonwealth Concept Plan Conditions of Approval

Commonwealth CoA Ref	Requirement	Where Addressed
7 b)	The CEMP must include in relation to construction of the proposed facility identification and quantification of all potential impacts associated with noise, vibration, air quality, traffic, light spill, hydrological changes, contamination, and indigenous heritage (including cumulative impacts associated with the DoF's proposed intermodal) upon Commonwealth land. Consideration must be given to people and communities at SME, DNSDC, Defence housing, and the environment more generally in neighboring bushland areas.	Section 6 Section 7 Section 8

### Commonwealth Concept Plan Mitigation Measures

Table 16: Commonwealth Concept Plan Mitigation Measures

C'th Concept Plan MM Ref	Requirement	Where Addressed
7.4.3.1	The following mitigation measures will be adopted for the SIMTA proposal to mitigate potential impacts on hydrology, water quality and flooding resulting from construction and operation of the SIMTA proposal.	Section 7 Table 5
7.4.3.1 f)	During construction of the Georges River bridge the following management approaches will be adopted: <ul style="list-style-type: none"> <li>Works across the bed of the Georges River will be staged to minimise the total disturbance at any given time and to allow the full bypassing of stream flows around the works to maintain fish passage.</li> <li>The management principles outlined in Managing Urban Stormwater (Landcom 2004) for sites with high erosion potential will be implemented.</li> </ul>	Section 7 PSP – Georges River Bridge Attachment D (Primary ESCP)

## Attachments

C'th Concept Plan MM Ref	Requirement	Where Addressed
7.4.3.1 h)	The following management measures will be implemented during works in and adjacent to Anzac Creek to mitigated potential impacts on water quality during construction:	–
	All temporary works, flow diversion barriers and in-stream sediment control barriers will be removed as soon as practicable and in a manner that does not promote future channel erosion.	This Plan Table 6 Attachment D (Primary ESCP)
	The management principles outlined in Managing Urban Stormwater (Landcom 2004) for sites with high erosion potential will be implemented.	Attachment D (Primary ESCP)
7.4.3.1 j)	A Soil and Water Management Plan (SWMP) and Erosion and Sediment Control Plan (ESCP) will be implemented for the construction and operation phases of the development, with monitoring and review performance of sediment and water control structures during construction and operation phases. The SWMP and ESCPs will be developed in accordance with the principles and requirements of Managing Urban Stormwater (Landcom, 2004).	This Plan Attachment D (Primary ESCP)

## Other Conditions of Project Planning Approvals

Table 17: Framework Soil and Water Management Plan from the Commonwealth Concept Plan EIS

Framework SWMP (C'th EIS) Ref	Requirement	Where Addressed
3.1	Erosion and sediment control	Section 7.1 Attachment D (Primary ESCP)
3.1.1	Erosion and sediment control planning	Section 7.1 Attachment D (Primary ESCP)
3.1.2	Erosion and sediment control measures <ul style="list-style-type: none"> <li>■ Erosion control principles</li> <li>■ Sediment control</li> <li>■ Site stabilisation</li> </ul>	Section 7.1 Attachment D (Primary ESCP)
3.1.3	Construction of culverts, bridges and temporary crossings	PSP – Georges River Bridge This Plan
3.1.4	Mud tracking	Section 7.1 Attachment D (Primary ESCP)
3.2	Stockpile management	Section 7.1 Table 6 Attachment D (Primary ESCP)
3.3	Water quality and works in or adjacent to waterways	Section 8.1 PSP – Georges River Bridge
3.3.1	Works in or adjacent to waterways	PSP – Georges River Bridge Table 6

## Attachments

Framework SWMP (C'th EIS) Ref	Requirement	Where Addressed
3.3.2	Spill response	Section 9 Attachment F (Spill Response Procedure) PIRMP
3.3.3	Water quality monitoring	Section 8.1
3.4	Water extraction	Section 7.2.1
4	Sediment basins Design Sediment basin discharge water quality Maintenance	Section 7.1 and 7.2 Attachment D (Primary ESCP)
5	Inspection and maintenance	Section 8

## Environment Protection Licence

Environment Protection Licence clauses that are relevant to the management of soil and water during construction are included in Table 18.

Table 18: Environment Protection Licence

EPL Ref	Requirement	Where Addressed
L1.1	<b>Pollution of waters</b> Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.	Section 7
O1.1	<b>Activities must be carried out in a competent manner</b> Licensed activities must be carried out in a competent manner. This includes: a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity	Section 1.3 Section 7.4 Section 7.8
O3.1	<b>Dust</b> The licensee must ensure that construction work is carried on by such practicable means as may be necessary to minimise dust emissions on the premises, and implement all reasonable and feasible measures to prevent the release of dust from the premises	Section 7.1.2 Section 7.2 Section 7.3 Section 7.8 (SW6)
O4.4	<b>Waste Management</b> The licensee must ensure that: b) mud, splatter, dust and other material likely to fall from or be cast off the wheels, underside or body of any vehicle, trailer or motorised plant leaving the premises, is removed to the greatest extent practicable before the vehicle, trailer or motorised plant leaves the premises; and c) road surfaces subject to the tracking of material by vehicles leaving the premises are effectively cleaned at the end of each work day.	Section 7.8 (SW23)
O5.1	<b>Erosion and Sediment Control</b> The licensee must, before undertaking any construction work (including any earthmoving or vegetation removal works),	Section 7.1 Attachment D (Primary ESCP)

## Attachments

EPL Ref	Requirement	Where Addressed
O5.2	implement all soil and water management works required to minimise pollution of waters.	
	<b>Erosion and Sediment Control</b> All erosion and sediment control measures installed on the Premises must be inspected and works undertaken to repair and/or maintain these controls: a) Weekly during normal construction hours outlined in condition L3.1 b) Daily during periods of rainfall greater than 10mm c) Within 24 hours of the cessation of a rainfall event causing runoff to occur on or from the Premises.	Section 7.2 Section 7.8 (SW24) Section 8 Attachment D (Primary ESCP)
	<b>Monitoring Records</b> The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition	Section 8.2
	<b>Monitoring Records</b> All records required to be kept by this licence must be: a) in a legible form, or in a form that can readily be reduced to a legible form; b) kept for at least 4 years after the monitoring or event to which they relate took place; and c) produced in a legible form to any authorised officer of the EPA who asks to see them	Section 8.1.4
M1.2		
M1.3	<b>Monitoring Records</b> The following records must be kept in respect of any samples required to be collected for the purposes of this licence: a) the date(s) on which the sample was taken; b) the time(s) at which the sample was collected; c) the point at which the sample was taken; and d) the name of the person who collected the sample.	Section 8.1.4
M2.1	<b>Recording of pollution complaints</b> The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.	Section 8.2.1
M2.2	<b>Recording of pollution complaints</b> The record must include details of the following: a) the date and time of the complaint; b) the method by which the complaint was made; c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect; d) the nature of the complaint; e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and f) if no action was taken by the licensee, the reasons why no action was taken.	Section 8.2.1
M2.3	<b>Recording of pollution complaints</b> The record of a complaint must be kept for at least 4 years after the complaint was made.	Section 8.2.1
M2.4	<b>Recording of pollution complaints</b> The record must be produced to any authorised officer of the EPA who asks to see them.	Section 8.2.1

**Attachments**

EPL Ref	Requirement	Where Addressed
R2.1	<b>Notification of environmental harm</b> Notifications must be made by telephoning the Environment Line service on 131 555 Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.	Section 4.1 Section 7.4 Section 8.4.1 Section 9
R2.2	<b>Notification of environmental harm</b> The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred	Section 4.1 Section 7.4 Section 8.4.1 Section 9

## Attachment B: Glossary

The following table outlines key terms used in this document and associated procedures:

Term	Definition
Amended Rail Link	The Rail link alignment provided within this Response to Submissions (RtS), which includes an amendment from that provided within the Stage 1 EIS. The amendment relates to a shift of the rail alignment (to the west) within the Southern Boot Lands.
ANZECC	Australian and New Zealand Environment Conservation Council
ARI	Average Recurrence Interval
ARTC	Australian Rail Track Corporation
ASS	Acid Sulfate Soil
ASSMP	Acid Sulfate Soil Management Plan
BGL	Below Ground Level
BoM	Bureau of Meteorology
CBD	Central Business District
CAP	Construction Area Plan – The main document prepared during the construction planning for that work area. Includes construction methodology, risk assessment, constructability reviews and Work Pack listing.
CCC	Campbelltown City Council
CCS	Community Communication Strategy
CEMP	Construction Environmental Management Plan
CLM Act	<i>Contaminated Land Management Act 1997</i>
CMP	Contamination Management Plan
CoA	Condition of Approval
CSWMP	Construction Soil and Water Management Plan
DNSDC	Defence National Storage and Distribution Centre
DotE	Department of the Environment (Commonwealth)
DP&E	Department of Planning and Environment
DPI (Fisheries)	Department of Primary Industries – Fishing and Aquaculture
EIS	Environmental Impact Statement
EMS	Environmental Management System
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPA	Environment Protection Authority
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)



## Attachments

Term	Definition
EPBC Approval	Approval (No. 2011/6229) granted under the EPBC Act on March 2014 by the Commonwealth Department of the Environment for the development of the SIMTA IMT Facility at Moorebank.
EPL	Environment Protection Licence
ESCP	Erosion and Sediment Control Plan
FCMM	Final Compilation of Mitigation Measures
FM Act	<i>Fisheries Management Act 1994</i>
IMEX	Import / Export
LCC	Liverpool City Council
LEP	Local Environmental Plan
LGA	Local Government Area
mAHD	Metres Australian Height datum
MIC	Moorebank Intermodal Company
MIC Project	Moorebank Intermodal Terminal Project (SSD-5066) approved under Part 4, Division 4.1 of the <i>Environmental Planning and Assessment Act 1979</i>
MIC Site	Refers to the former School of Military Engineering site, which is currently the subject of an approval, under Part 4, Division 4.1 of the <i>Environmental Planning and Assessment Act 1979</i> for the development of an intermodal facility, associated commercial infrastructure (warehousing) and a rail link (3 options have been provided).
NOW	NSW Office of Water (renamed DPI Water)
NSW	New South Wales
OEH	Office of Environment and Heritage
PIRMP	Pollution Incident Response Management Plan
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
Previous Rail Link	The Rail link alignment provided within the Stage 1 EIS dated May 2015
Rail Link	The rail link including the area on either side to be impacted by the construction works included in the Stage 1 Proposal.
RailCorp Land	Lot 1 DP 825352 (part of the Rail Corridor) and owned by RailCorp
RALP No. 1	Rail Access Land Package No. 1 (this Project)
SEH	Significant Environmental Hazard – For the purposes of this CEMP an Environmental Hazard is taken to be the same as an Environmental Aspect (ISO 14001:2004). It is an element of the project's activities or products or services that can interact with the environment. Significant environmental hazards are those environmental hazards that have the potential to have a significant adverse impact on the environment and that require persistent and multiple levels of controls.
SIMTA	Sydney Intermodal Terminal Alliance – a consortium comprising Qube Holdings and Aurizon
SME	School of Military Engineering

**Attachments**

Term	Definition
Southern Boot Land	Southern Boot Land includes Commonwealth owned land (Lot 4, DP 1197707) to the south of the former DNSDC south, and to the north of the EHPL (part of the Boot Land as described in the MIC proposal).
SSD	State Significant Development
SSFL	Southern Sydney Freight Line
TEU	Twenty-foot Equivalent Unit
TOC	Top of the well Casing
Work Area	A separable portion of work that is identified early in construction planning to help drive early definition of construction methodology and alignment of design activities. Work Areas should be listed in the overall construction methodology. The planning document for a work area is called a Construction Area Plan.
Work Pack	A pack of relevant construction documents that contains relevant information for Site Engineers and foremen to manage the works. There will be multiple Work Packs contained in a CAP. A Work Pack contains work method statements, risk assessments, ITPs, drawings, site instructions, environmental controls, etc.
Work Procedure	A document that provides a detailed step-by-step description for how work activities will be carried out. May document Risks & Controls associated with each step

**Attachments**

**Attachment C: Stakeholder Consultation Response**

**Attachments**

**Attachment D: Primary Erosion and Sediment Control Plan**

# Primary Erosion and Sediment Control Plan

Moorebank Precinct East Stage 1 RALP No. 1

<b>Project number:</b>	N01031
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## Document Approval

Rev.	Date	Prepared by	Reviewed by	Approved by	Remarks
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Signature:					

## Details of Revision Amendments

### Document Control

The Project Director is responsible for ensuring that this plan is reviewed and approved. The Environment Manager is responsible for updating this plan to reflect changes to legal and other requirements, as required.

### Amendments

Any revisions or amendments must be approved by the Project Director before being distributed / implemented.

### Revision Details

Revision	Details
A	Initial draft for SIMTA review
B	Updated to address SIMTA comments
C	For SIMTA's second review
D	Updated to address final CoAs and for consultation
E	Updated to address comments and for submission to DP&E
F	Updated in response to comments from DP&E
G/00	Final DP&E Update Approved by DP&E
01	EPL update
02	Updated to respond to comments from the Environmental Representative
03	Updated to include more flexibility in water monitoring requirements Updated following RfMA0011, RfMA0012, RfMA0015 and RfMA0016

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## 1. Overview

### 1.1 Purpose

This Primary Erosion and Sediment Control Plan (ESCP) describes the intentions and fundamental principles for the duration of Sydney Intermodal Terminal Alliance's (SIMTA) Moorebank Precinct East (MPE) Stage 1 – Rail Access Land Package (RALP) No. 1 (the Project, the Rail Link).

The purpose of this Primary ESCP is to provide measures to manage erosion and sedimentation impacts, particularly into the Georges River and Anzac Creek, as a result of the construction works. It will be complemented by the preparation of detailed Progressive (site, activity and/or phase specific) ESCPs.

This Primary ESCP addresses the following key requirements:

- Services Agreement – Schedule 5 Principal's Project Requirements
- Conditions of Approval under SSD-6676 SIMTA Intermodal Terminal Facility – Stage 1 (NSW)
- Stage 1 EIS (including Framework CEMP and Preliminary Erosion and Sediment Control Plans)
- Stage 1 Response to Submissions Report (including Final Compilation of Mitigation Measures)
- Conditions of Approval under MP10\_0193 SIMTA Moorebank Intermodal Terminal Facility – Concept Plan (NSW)
- NSW Concept Plan EIS
- NSW Concept Plan Submissions Report (including Revised Statement of Commitments)
- Conditions of Approval under EPBC 2011/6229 SIMTA Intermodal Terminal (Commonwealth)
- Commonwealth Concept Plan EIS (including Framework CEMP and Framework SWMP)
- CPB Contractors' Environmental Management System
- Other applicable legislative obligations.

### 1.2 Project Scope

SIMTA's MPE Stage 1 Development involves the construction and operation of the necessary infrastructure to support a container freight road volume of 250,000 twenty-foot equivalent units (TEU).

CPB Contractors' scope of work specifically applies to MPE Stage 1 RALP No. 1 which consists of a 2.8 kilometre rail line, along with its required infrastructure, to connect the Import-Export Terminal and Interstate Terminals to the Southern Sydney Freight Line (SSFL), and capable of accommodating trains up to 1,800m in length.

The SIMTA site is located in the Liverpool local government area. It is 27 kilometres south-west of the Sydney Central Business District (CBD), 26 kilometres west of Port Botany, 16 kilometres south of the Parramatta CBD, 0.6 kilometres from the M5 South-West Motorway, five kilometres east of the M5 South-West Motorway / Westlink M7 Motorway Interchange and connecting to the main north-south rail line via the Southern Sydney Freight Line.

The RALP No. 1 is the first package of Stage 1 of the overall MPE project and its construction will include:

- A northbound connection and a southbound connection to the SSFL
- Civil and earthworks, including remediation works and benching
- A Reinforced Earth Embankment (RE-Wall) through a section of the Glenfield Waste Services landfill site
- A bridge over the Georges River
- A culvert crossing over Anzac Creek
- Installation of new Moorebank Avenue overbridge
- Service relocation and protection
- Track work
- Signalling systems
- Security fencing

An indicative map of the Project is provided in Figure 1 below.

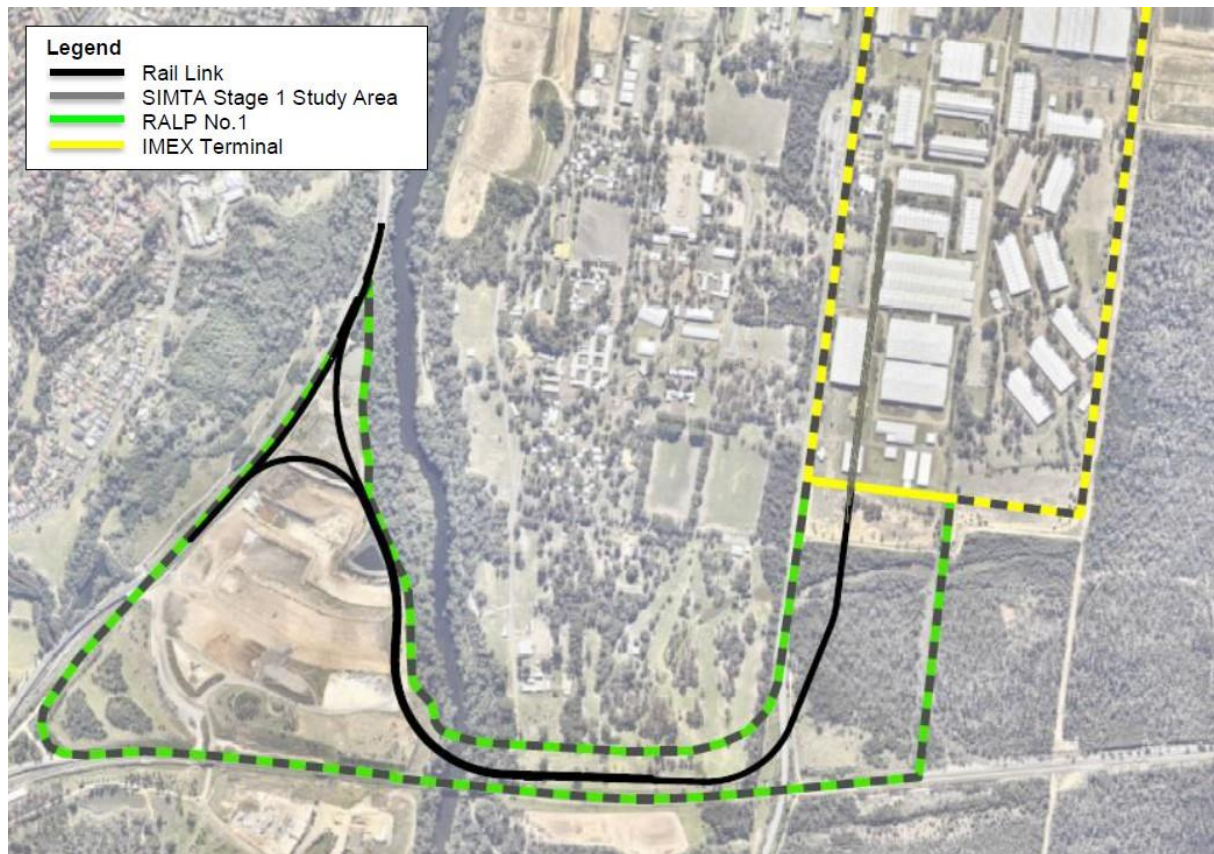


Figure 1: Indicative Project Map

### 1.3 Objectives

This Plan has the following objectives:

- Prevent pollution of waters by implementing effective control measures
- Maintain water quality levels in surrounding waterways
- Provide an organised, integrated and systematic approach to effectively address erosion and sedimentation throughout construction
- Make staff aware of erosion and sediment issues and management practices to manage the risk of erosion and sedimentation.

### 1.4 Interactions with Other Management Plans

This Primary ESCP is an attachment to the Construction Soil and Water Management Plan (CSWMP), which is itself a Sub Plan to the Construction Environmental Management Plan (CEMP). Figure 2 below sets out interactions of this Sub Plan with the other environmental management documents implemented on the Project.

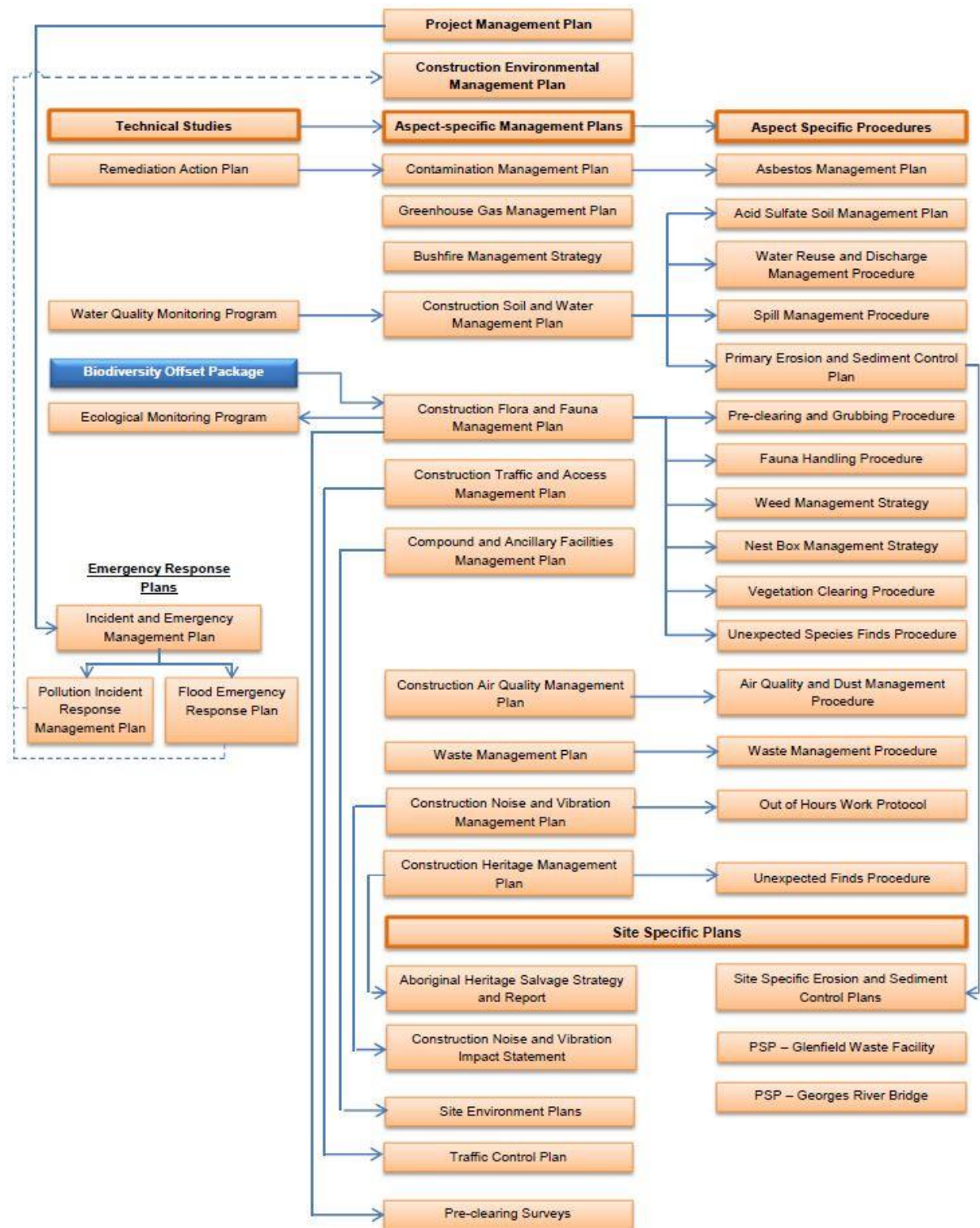


Figure 2: Environmental Documents Map

## **2. Legal and Other Requirements**

### **2.1 Compliance Requirements**

Conditions of project environmental compliance requirements that specifically address erosion and sediment control are detailed in Annexure A.

### **2.2 Relevant Legislation**

Local, State and Commonwealth legislation that apply criteria to the management of erosion and sediment control on the project include:

- *Environmental Planning and Assessment Act 1979* (EP&A Act)
- *Protection of the Environment Operations Act 1997* (POEO Act)
- *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Commonwealth)

### **2.3 Guidelines**

Additional guidelines and standards relating to the management of erosion and sediment control include:

- A Resource Guide for Local Councils: Erosion and Sediment Control (DEC 2006)
- Managing Urban Stormwater: Soils and Construction Volume 1 (4th Edition) (Landcom 2004)
- Managing Urban Stormwater: Soils and Construction Volume 2 (DEC 2006)

### **2.4 Additional Permits and Licences**

Environment Protection Licence requirements are identified in Annexure A.

No additional permits or licences are expected to be required in relation to erosion and sediment control on the Project.



### 3. Existing Environment

#### 3.1 Surface Water

The Project is wholly located within Georges River catchment. Anzac Creek is the largest sub-catchment of the Georges River.

Anzac Creek is a watercourse with intermittent flow supporting semi-permanent to permanent water in pools and, as such, is classified as Class 3 (Minimal Fish Habitat) in accordance with Fairfull and Witheridge (2003).

Georges River is a major permanently flowing river and as such, is classified as Class 1 (Major Fish Habitat) in accordance with Fairfull and Witheridge (2003). It is also mapped as 'Key Fish Habitat' on the Department of Primary Industry's Key Fish Habitat map for the Sydney Metropolitan area.

The EPBC Act Protected Matters Search identified Macquarie Perch *Macquaria australasica* as Endangered (EPBC Act and *Fisheries Management Act 1994*), with the potential to occur or potential habitat existing within 10km of the study area. Georges River in proximity to the study area does not provide preferred breeding habitat (riffles over cobble and gravel substrates) though it supports potential foraging and refuge habitat. The species was recorded in 2008 in the Georges River near Campbelltown, approximately 15 km upstream of the study area, the first record from the river since 1894 (Atlas of Living Australia 2015).

Information in relation to the aquatic environment has been provided in the Construction Flora and Fauna Management Plan.

The Environmental Impact Statement (Section 11.2.3 Surface Water Quality) prepared for the Project indicates that the Georges River catchment at the Proposal site is identified as 'affected by urban development', which is described as streams within urban areas are frequently substantially modified and generally carry poor quality stormwater.

It indicates an objective to assess opportunities to achieve water quality that is appropriate for primary contact recreation within 10 years, although it is noted that this may not be possible (DECCW, 2006).

The table below presents the Water quality objectives exist for this section of the Georges River.

Table 1: WQO Indicators for Lowland Rivers of the Georges River (DECCW, 2006)

Analyte	Lowland rivers
Total phosphorous (TP) (µg/L)	25
Total nitrogen (TN) (µg/L)	350
Turbidity (NTU)	6-50
Dissolved oxygen (% saturation)	85 - 110

The EIS notes that Anzac Creek is "heavily degraded and is in generally poor condition".

#### 3.2 Groundwater Dependent Ecosystems

A search of the Australian Government's Atlas of Groundwater Dependent Ecosystems (GDE) was undertaken and it was noted that no data on subterranean GDEs is available for the locality, although several GDEs with potential reliance on subsurface groundwater were identified in the locality and the study area (Bureau of Meteorology 2015). The riparian woodland vegetation of Anzac Creek and the Georges River has been identified as having a high potential for groundwater interaction. Other woodland vegetation in the Southern Boot Land was identified as having a moderate potential for groundwater interaction.

The EIS for the project indicates that Disturbance of groundwater during construction and operation of the Proposal is generally not predicted, with the exception of the potential to encounter groundwater when piling for the Georges River bridge and groundwater remediation near the underground petroleum storage system (UPSS). These remediation works are not addressed within this PESCP. Groundwater impacts associated with construction of the Georges River Bridge would be of short duration and are unlikely to result in impacts beyond the duration of the construction period.



### 3.3 Topography

The Rail Link alignment has a general west-east orientation and is intersected by the Georges River and Anzac Creek.

Topography is variable throughout the alignment with the elevation at the highest point approximately 18 metres and at the lowest point approximately 4 metres.

Where alignment approaches and crosses the Georges River the landform slopes steeply towards the river at approximately 15-20%.

Whereas the area adjacent to Anzac Creeks is very flat with the land sloping to the Creek at approximately 2%.

### 3.4 Soil Types

The underlying geology of the eastern extent of the Rail Link has been identified as Tertiary alluvium, with the western extent of the Rail link project underlain by Quaternary deposits of medium grained sand, clay and silt.

Soils of the site were identified from the *Soil Landscapes of the Penrith 1:100 000* Sheet (Bannerman and Hazelton, 1990) and are shown in Table 2 and Annexure B.

Table 2: Project Soils Types and Descriptions

Soil Name	Description	Location
Berkshire Park	Fluvial soil landscape on gently undulating Tertiary terraces of the Georges River. Soils are weakly pedal orange heavy clays and clayey sands, often mottled. Ironstone nodules are common and large, silcrete boulders may be present where drainage is poor. Red podzolic and chocolate soils are present on flats and drainage lines.	Rail Link project areas east of the Georges River
Luddenham	Erosional soil landscape of undulating to rolling low hills on Wianamatta Group shales. Narrow ridges, hillcrests and valleys. Soils are shallow, dark podzolic soils or massive clays on crests, moderately deep, red podzolic soils on upper slopes and moderately deep yellow podzolic soils on lower slopes and drainage lines.	Rail Link project areas to the west of the Georges River
Freemans Reach	Fluvial soil landscape on the active floodplain of the Georges River. Soils are deep brown sands and loams, apedal to moderately structured and usually friable.	Rail Link project areas to the west of the Georges River
Richmond	Fluvial soil landscape on Quaternary terraces of the Nepean and Georges Rivers. Relatively flat and level landscape. Soils are poorly structured orange to red clay loams, clays and sands, with texture increasing at depth. Plastic clays are present in drainage lines.	Rail Link project areas east and west of the Georges River

All soils are susceptible to water and wind erosion. A high erosion hazard will exist where concentrated flows impact on works, especially in steeper areas. A detailed explanation of the erosion hazard of the study area is outlined in Section 4.

### 3.5 Rainfall

The mean monthly rainfall data from the nearest open Bureau of Metrology (BoM) recording station (located at Milperra Bridge on the Georges River, approximately 6 km north-east of the Rail Link).

Table 3: Mean Monthly Rainfall Data Statistics (Source: BoM)

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean rainfall (mm) for years 2000-2016	73.2	100.3	54.6	67.4	54.1	56.8	23.8	24.9	26.7	59.4	56.4	73.2

As seen in Table 3, fluctuations in rainfall occur throughout the year. July to September are typically the driest months of the year. Where possible, land disturbances activities are to be undertaken in drier months.

The rainfall erosivity (R) value adopted for the project location is 2750. Discussion of rainfall erosivity and implications on potential for soil loss is included in Section 4.

### **3.6 Site Constraints**

Constraints within the Rail Link project area for erosion and sediment control include:

- Georges River
- Anzac Creek
- Glenfield Waste Facility
- Linear site limits the treatment of sediment-laden runoff in singular systems
- Topography
- Relatively high rainfall during certain months of the year
- Multiple soil landscapes

## 4. Erosion Risk

Erosion risk refers to the risk of causing significant soil movement within a site and overall soil loss off the site as a result of either disturbance during the construction phase or altered land management practices.

### 4.1 Prediction of Soil Loss

The predicted soil loss has been determined for ground disturbing construction activities at the site.

The predicted Soil Loss Rate (A) was calculated using the Revised Universal Soil Loss Equation (RUSLE) as per Managing Urban Stormwater Vol. 1 (Landcom, 2004) guidelines:

$$A = R \times K \times LS \times P \times C$$

Where:

A = Estimated Soil Loss in Tonnes per Ha per Year, and

R = Rainfall erosivity factor

K = Soil erodibility factor

LS = Slope length/gradient factor

P = Erosion control practice factor

C = Ground cover and management factor

The values in Table 4 below have been adopted within this Primary ESCP.

Table 4: Project RUSLE Factor Values

Parameter	Name	Value/Range	Comment
R	Rainfall erosivity factor	2750	-
K	Soil erodibility factor	0.025-0.059	Dependant on soil landscape
SL	Slope length/gradient factor	0.4-3.75	-
P	Erosion control practice factor	1.3	Maximum value used
C	Ground cover and management factor	1.0	Maximum value used

The above parameters have been derived from:

- R factor Maps Managing Urban Stormwater Vol. 1 (Landcom 2004)
- Site soil landscape information
- Site survey information
- Assumed site conditions during construction

## 5. Erosion and Sediment Control

### 5.1 Progressive Erosion and Sediment Control Plans

The preparation of more detailed Progressive ESCPs (specific) will be required for the following:

- The different stages of construction (e.g. site establishment - clearing, stripping and stockpiling of topsoil; earthworks; drainage; paving).
- Various work areas (e.g. construction compounds; service installations; sediment basins)

The Progressive ESCPs will be prepared in consultation with construction personnel and will identify risk and be prepared prior to construction activity commencing. Plans will typically be prepared over A3 drainage drawings and indicate (where relevant):

- Catchment areas
- Construction boundaries
- Exclusion zones and sensitive areas
- Maintenance of buffer zones where possible
- Assumed catchment boundaries
- Access points and tracks
- Compounds and storage areas
- Stockpile sites
- Temporary work areas
- Material processing areas
- Concrete washout pit sites
- Permanent and temporary controls (including order of implementation)
- Notes specific to high risk activities if applicable

In some instances, more than one (1) Progressive Plan may be required for an activity due to:

- Staging rendering the process complicated
- Change in the construction process, scope of work or work method
- Controls are found to be ineffective following rainfall

Progressive Plans will be prepared by the Project's Soil Conservationist or CPB Contractors' environmental and field personnel (in consultation with the Soil Conservationist where required) to formulate practical documents for field reference. Additionally, Plans will be developed in consideration of other environmental aspects (e.g. sensitive vegetation).

PESCPs will be prepared for works in sensitive areas such as around drainage features or waters.

In some instances these Plans may be developed jointly with Sensitive Area Plans and Construction Area Plans where works are complex.

The Plans will be electronically recorded with hardcopies present on site for reference by site personnel and available for agency inspections or similar.

The Progressive ESCPs will be prepared according to the 'Blue Book' and are to be read in conjunction with the Primary ESCP, CSWMP and the CEMP.

Initial Progressive ESCPs have been prepared and included in Annexure D.

### 5.2 Key Strategies

The following subsections outline the methods that should be undertaken to minimise the erosion potential of the site and controls for capture of any subsequent sediment. Identified below are works considered "high risk" in terms of erosion potential and the following management practices shall be implemented as a minimum to reduce this risk. Construction will be undertaken to comply with section 120 of the *Protection of the Environment Operations Act 1997*, which prohibits the pollution of waters.

#### 5.2.1 Professional Expertise

A qualified Soil Conservationist with experience in rail construction will be engaged. The Soil Conservationist will be a Certified Professional in Erosion and Sediment Control (CPESC) and will coordinate and oversee all erosion and sediment control aspects during construction.

#### 5.2.2 Training

All site personnel will be trained to recognise erosion and sediment concerns and understand what needs to be done and who needs to be contacted in the event of an erosion and sediment control failure.

All site personnel have a responsibility to contact the Supervisor if any erosion and sediment control failures are identified or when maintenance is required. The issues identified should be noted and corrected as per monitoring and maintenance requirements identified in Section 6.

#### 5.2.3 Construction and Staging

Works will be planned and staged to facilitate the achievement of effective erosion and sediment control. Strategies include;

- Ensuring perimeter surface water controls are in place prior to disturbance
- Ensuring primary sediment control structures are in place prior to work in each catchment
- Planning to minimise site disturbance, construction footprint and duration between commencement and stabilisation works.
- Installation of permanent drainage as soon as practical
- Identification of high risk areas and work planning in this areas to achieve stabilisation as soon as possible

#### 5.2.4 Minimising Extent and Duration of Disturbance

The following measures will be implemented to minimise extent and duration of disturbance:

- Marking clearing limits
- Sediment basins, diversion drains, sediment and erosion controls will be installed prior to the commencement of clearing and construction
- Staging of clearing operations
- Initially clearing and grubbing to leave the soil surface in a reasonably rough condition with some surface vegetative cover
- Minimising disturbance of vegetation along the road corridor with special emphasis on management of construction activities adjacent to creeks or areas of concentrated flows (e.g. drains)
- Clearing of vegetation will not to be undertaken during overland flow events
- Minimise disturbance at intermittent water courses where possible by implementing the following methods where possible:
  - Minimise disturbance to grasses
  - Minimise disturbance to small understorey
  - Use the cut-stump method for larger trees instead of stump removal.

#### 5.2.5 Access

The following access controls will apply on this Project:

- All access to and within the construction site should be controlled, restricting vehicle and plant access to a single, well-defined area to avoid excessive ground disturbance
- All-weather access surfaces shall be provided, and care should be taken that this material itself does not become eroded
- Vehicle wheel washers and/or other devices to remove soil materials from wheels, where appropriate, should be placed at access points
- Access points should be stabilised with aggregate or similar.

#### 5.2.6 Stockpiles

The following measures will apply to the management of stockpiles:

- At least 5 m away from roads, existing rail corridors, channelised flow, sensitive vegetation etc.
- Not located within the 20 year flood zone for defined water courses or within 20m of defined drainage channels.
- Once formed cover within 10 days
- An earth bank is to be installed on the upslope and a sediment fence is to be installed on the downslope.

#### 5.2.7 Topsoil Management

The following measures will be implemented with respect to topsoil management:

- Prior to stripping, confirm topsoil is free of weed materials. Refer to project weed management strategy for appropriate management.
- If topsoil within the area is to be disturbed, it should be stockpiled for later respreading on all exposed areas once final land shaping has been completed
- The stockpile should not be located within 5 metres to a roadway, rail corridor, access way, waterway nor within a drainage line
- Low, flat, elongated mounds of no more than 2 metres in height
- Once formed cover, spray with polymer and/or re-vegetate within 10 days.

#### 5.2.8 Surface Water Management – Non Site water

Stormwater flowing onto areas disturbed as a result of construction activities should be intercepted and diverted around the disturbed areas.

Diversions may include temporary banks or drains and are to be appropriately stabilised with consideration to the duration of the diversion and the erosion control required and will include a stable outlet area.

As far as practicable:

- Existing catchment and sub-catchment boundaries will be maintained
- Surface water diversions will not change arrangements or volumes of water being managed into landfill areas.

Adjoining landholders would need to approve in writing any runoff proposed to be redirected to their property.

#### 5.2.9 Surface Water Management – Site water

The following dirty water diversion practices will be utilised on this Project as required:

- Separating 'clean' run-on water from 'dirty' construction area run-off
- Constructing permanent drainage structures early in the project including:
  - Detention/sediment basins and traps catch drains with linings (e.g. concrete, rock, geotextile or jute mesh)
  - Culverts and associated inlet and outlet protection (e.g. dissipaters)
  - Directing water from areas disturbed by construction to sediment controls (sediment basins or traps)
- Controlling run-off during the construction of embankments (e.g. fill shaping and the construction of temporary dykes and batter drains)
- Managing for reduced catchment sizes and volumes through diverting formation run-off through sediment controls and into the stormwater drainage system as soon as practical
- Managing surface flows through use of temporary diversions to reduce slope length and grade of flow.

#### 5.2.10 Dust Control

Dust control will be managed in accordance with the project Air Quality Management Plan. Dust control measures include:

- Dust suppression via water carts, restricting plant and vehicle movements to designated routes and limiting vehicle speeds etc.
- Minimising disturbance
- Applying ground cover
- Water from sediment basins will be reused on site for dust management, where appropriate.

Refer to the project Air Quality Management Plan for further management measures.

#### 5.2.11 Staged Implementation of Erosion and Sediment Controls

Erosion and sediment control will be staged according to the following principles:

- Control erosion before controlling sediment – sediment is only generated when erosion occurs
- Minimise the extent and duration of disturbance
- Control stormwater flows onto, through and from the site
- Use erosion control in accordance with the Blue Book (2004) to prevent on-site damage
- Use sediment controls in accordance with the Blue Book (2004) to prevent off-site damage
- Control erosion and sediment at the source
- Stabilise disturbed areas progressively
- Inspect and maintain control measures every day
- Site works will not start until the erosion and sediment controls are installed and functional.

### 5.3 Sediment Basin Design Criteria

The following criteria will apply to the design of sediment basins if used within this project.

- Managing Urban Stormwater Vol 1 (2004) Section 6.3.2 General Recommendations (d) provides that for local catchments with an average annual soil loss from the total area of land disturbance less than 150 m<sup>3</sup> per year or (or ~195 tonnes per year) construction of sediment basin(s) may be considered unnecessary.
- Flood assessments should distinguish between local overland flooding and mainstream flooding. Sediment basins should not be constructed below the 2-year ARI flood level.
- Sediment basins will be constructed with a defined and stable outlet
- Design sediment basins and outlets to be stable in the peak flow from at least the 10-year ARI time of concentration event.
- Sediment basins will be designed to accommodate runoff from type F and D soils. Where possible flow length will be maintained within controls at 3:1 (length to width) to facilitate capture of coarse sediments.
- Sediment basin management of turbid water will be in accordance with the Managing Urban Stormwater Vol. 1 2004 after cessation of rainfall with one (1) or a combination of:
  - Flocculation with gypsum (or approved alternative flocculant)
  - Pump-out for construction purposes or dust control
- Water is not to be released from sediment basins prior to achieving acceptable water quality standards as required by the Environmental Protection Licence (EPL), administered by the Environment Protection Authority (EPA). Unless stipulated otherwise The following discharge criteria is assumed:
  - No visible oil and grease on the water surface
  - pH = 6.5 – 8.5
  - Turbidity (NTU) <50 – or – Total Suspended Solids (TSS) < 50mg/L
- Sediment basin water will be reused or discharged in accordance with the Dewatering and Discharge Procedure (attached to the CSWMP).

### 5.4 Design Guidance for Erosion Controls

This section provides a comprehensive list of measures that can be used for erosion control. Not all of these controls will be appropriate for the type of construction activity that is being undertaken. As such the progressive ESCPs would outline what controls are appropriate for the construction activity and any surrounding constraints.



#### 5.4.1 Surface Water Diversions

Description: management of surface water as a mechanism of reducing the catchment size (and hence volume) and also the flow path (grade and velocity) of flows. This is a primary method of erosion control during construction.

Surface water management is also critical in separation of site and non-site water.

Application: surface water diversions may consist of formed and compacted berms or shallow drains or swale. More temporary diversions may be achieved using gravel or sand bags or shallow scratch (herringbone) drains within work areas

Design/construction aspects: diversions should be suitable for the size of catchment and volume of flow to be managed. They should be placed to facilitate movement and construction activities.

Potential issues: diversions may fail if incorrectly placed or aligned. Consideration should be given to stability of outlets and requirement/opportunity for sediment controls at outlets of diversions.

#### 5.4.2 Turf

Description: A layer of topsoil and grass harvested from the field by specialist machinery. Reinforced turf is similar to conventional turf except that the grass is grown through an artificial two-dimensional polypropylene grid to provide additional strength.

Application: Turf and reinforced turf can be used where there is both sheet flow and concentrated flow. It is often used as a 'softer' alternative to 'hard' channel linings such as rock and concrete in urban situations.

Design/construction aspects: Turf is capable of withstanding only relatively low flow velocities. Reinforced turf can withstand higher flow velocities than ordinary turf. Deposited sediment can kill turf and so upstream erosion protection and sediment detention measures should be installed before the turf can be placed. As turf and reinforced turf rely on the grass root system for strength, the underlying soil must be suitable for plant growth – i.e. fertile and with good structure. The edges of the turf must be installed flush with the existing soil surface to avoid erosion along the turf/soil interface.

Potential issues: Turf can be killed by significant amounts of deposited sediment. Reinforced turf may become 'root bound' and therefore may take longer to bind into the soil surface. Turf should be watered until adequately established.

#### 5.4.3 Erosion Mats and Blankets

See also Managing Urban Stormwater 2004 SD 5.2 (Sheet flow on batters) and 5-28 (Concentrated flow in channels) for notes on installation.

Description: A rolled mat or blanket made from jute, coconut fibre, wool, nylon and polypropylene that is placed on the soil surface to protect it from raindrop impacts and low velocity sheet and concentrated flows.

Application: Erosion control blankets and mats have different applications. Erosion control blankets are used on batters and embankments and other sheet-flow environments to protect the soil from erosion and promote vegetation. They are generally temporary measures and are designed to degrade, being composed of wood fibre, wool and jute. Erosion control mats are designed to be used in concentrated flow environments and are therefore made from more durable materials such as coconut fibre, nylon and polypropylene, as well as jute.

Within active construction areas geotextile is often used to provide immediate and temporary protection to both batters and areas of channelised flow.

Design/construction aspects: Due to the many types of proprietary products available, independent advice should be sought on the appropriate mat or blanket for a particular situation. Manufacturers provide specifications and installation guidelines with their products.

Potential issues: Problems can occur when blankets are placed in concentrated flow areas. A blanket is designed to protect the ground from raindrop impact, while a mat is a heavier product designed for concentrated flow.

#### 5.4.4 Surface Mulching

Description: Mulching involves placing a cover of (usually) coarse organic material to protect the soil surface from the erosive effects of raindrop impact and shallow sheet flows. Common mulch materials include wood chips, straw, wood fibre, paper pulp, bagasse, brush matt and bitumen emulsion.

Application: The type of mulch used will depend on a number of factors: the environment to be protected, the climatic conditions, the location and the type of mulch material available.

Design/construction aspects: Commonly, flows should be diverted away from the area to be protected. The mulch material should be applied evenly and uniformly.

Potential issues: Mulch will be washed away where flow diversion fails. Soils can erode where insufficient mulch or soil binding agent is used. Some mulch can cause weed infestation (e.g. where hay is used instead of clean straw). Mulch is not to be placed in close proximity to the banks of water courses, as bankful flows will remove the mulch and deposit downstream.

#### 5.4.5 Vegetation

Description: Vegetation planted to prevent erosion may include native and introduced grasses, ground covers, shrubs and trees.

Application: Any erosion control program will benefit from temporary and permanent vegetation cover. Vegetation protects the soil from raindrop impact, slows flow velocities and traps eroded soil particles. Roots bind the soil surface and thus help prevent erosion.

Potential issues: Weed infestations may occur where contaminated seed is used or where soil is disturbed. Climatic/soil constraints may impede vegetation establishment.

### 5.5 Design Guidance for Sediment Controls

This section provides a comprehensive list of measures that can be used for sediment control. Not all of these controls will be appropriate for the type of construction activity that is being undertaken. As such the progressive ESCPs would outline what controls are appropriate for the construction activity and any surrounding constraints.

Sediment controls will be used at various locations around the project. Perimeter controls will be used where appropriate to treat sheet flows from small catchments and allow water to pass out of the project area.

Controls may be used to direct surface water within work areas or at the perimeter to sediment control traps or sediment basins.

Small controls will be used where appropriate to trap sediment close to its source and also at storm water outlet points.

#### 5.5.1 Sediment Fences

See also Managing Urban Stormwater 2004 SD 6-8

Description: A sediment fence is a temporary barrier of permeable geotextile, partially installed in a trench and supported by posts.

Design/construction aspects: Sediment fences are not to be used in areas of concentrated flow. The fence should be installed on the contour with the ends turned up, anchored in a 150 mm deep compacted, backfilled trench. The sediment fence posts must be on the down-slope side of the fabric otherwise the fabric will come away from the peg when put under pressure.

Problems: Water will run around the ends of the fence if returns are omitted at either end. If the trench is too shallow, the fabric may pull out of the ground. Water will tunnel under the fence if the trench is not compacted after installation.

#### 5.5.2 Mulch berm

Description: A mulch berm is a temporary barrier of mulched vegetation shaped as a perimeter sediment control. Mulch berms can also be used as sediment traps.

Design/construction aspects: Mulch is not to be used in areas of concentrated flow. The berm should be installed on the contour with returns provided as the end to prevent water being directed out of the control. Berms may be strengthened and improved with addition of mesh to maintain its shape and

form. Mulch berms may also be formed in front of sediment fence to greatly improve performance of sediment control at perimeter. Mulch berms have the benefit over sediment fence that they utilise site material and can be spread as erosion control over surfaces when no longer required.

Problems: Water will run around the ends of the berm if returns are not provided. Care should be taken that excessive tannin is not generated by berms and leached to waters or over concrete surface as it stains. Berms may fail if excessive volumes of water is directed to the control at single points or is made to pond in single locations. Mulch is not to be placed in close proximity to the banks of water courses, as bankful flows will remove the mulch and deposit downstream.

#### 5.5.3 Sediment Traps

Description: Sediment traps capture eroded particles by slowing the velocity of water so that the soil particles settle out. They generally consist of a stable inlet and outlet, and some form of pond.

Sediment traps typically allow the bulk of water to pass over or through the permeable wall and as such do not hold great volumes of water.

Application: Their function is to trap coarse sediments in concentrated flow situations. They should be located immediately downstream of disturbed areas.

Fine sediments may also be trapped if detention time is suitably long.

Design/construction aspects: Sediment traps do not need to be formally designed. They can be formed by excavating an earthen pond, or by constructing some form of structure to form a pond using materials such as rocks, logs, sandbags, reinforced geotextiles or concrete barriers.

Problems: Common problems include insufficient capacity, inlet and outlet erosion due to inadequate erosion protection, and poor location and design causing difficulty in cleaning out sediment.

#### 5.5.4 Sandbags

See also Managing Urban Stormwater 2004 SD 5-4 for notes on shape and placement of control.

Description: Sandbags, used to form a temporary sediment trap, capture eroded sediments by slowing the water so that the soil particles settle out. They also provide a function as an erosion control.

Application: Sandbags trap coarse sediments in both concentrated and (less commonly) sheet flow areas. They should be located immediately downstream of disturbed areas.

Design/construction aspects: Sandbags or other materials (such as rocks, straw bales or coir logs) can be used to form a pond to act as a sediment trap.

Problems: Commonly, the structures are too small to contain all the water washed from the site. Poor location and design can cause difficulty in cleaning out sediment. A defined spillway is also required when constructing these controls.

#### 5.5.5 Site Access Control

See also Managing Urban Stormwater 2004 SD 6-14.

Description: Stabilised site access are used to provide a stable all weather access point into project areas as a means of reducing the tracking and transport of sediment out of project areas

Application: A stable hardened material is placed to facilitate the removal of sediment from wheels (such as via a shaker grid or rubble pad) or simply a hardened entrance to prevent the surface being churned.

Design/construction aspects: access points may consist of bitumen or compacted, hardened surfaces leading to cattle grid or rubble grid. The access point often may include a trafficable berm as a diversion with associated sediment control to prevent site water exiting via the gate area. Alternatively gravel bags may be placed across access points at shut down.

Problems: Material selected for access points is critical as gravels or grids may rapidly become clogged with transported sediment and require maintenance or replacement. Material should not be readily moved onto public roads creating traffic hazards.

### 5.6 Design Guidance for Rehabilitation

Rehabilitation of worksites will be undertaken in accordance with the following principles:

- Ensuring the success of the later revegetation program by utilising a good topsoil management program.
- Keying of topsoil to batters. Topsoil depth to be 5 to 10 centimetres.
- Progressively revegetating disturbed areas utilising appropriate species.
- For non-channelised areas of erosion achieve 60% stabilisation within 20 days and for channelised areas achieve 70% stabilisation within 10 days.
- Specific rehabilitation and stabilisation planning for riparian areas.

## 5.7 Work Adjacent to Georges River

The following specific management measures will also apply to works in and adjacent to Georges River:

- Care will be taken to avoid water being directed and channelised to riparian areas. Site water will be progressively taken to sediment controls above and as far as practical distant from riparian areas.
- Specific sediment controls will be used to treat water works areas immediate to Georges River. These may consist of compacted bunds covered with geotextile set below the works or otherwise Sediment fences.
- Progressive ESC Plans will be prepared for these works and include specific procedures for elevated shut down.
- Progressive ESC Plans will reference stabilisation and revegetation works required to restore riparian vegetation and provide natural sediment control prior to the river surface flows and drop sediment before it reaches the waterways
- Access tracks leading to the riparian areas will be constructed to minimise loss of sediment from track surfaces.
- Once works are complete, areas will be stabilised and rehabilitated as soon as practicable.
- Sediment fences to be places along the border (up and down slope) of cleared areas in riparian zones

The following general staging is expected for the works adjacent to Georges River for piers and abutment works:

- Set out and define limit of works and access areas required
- Establish access and clear work areas – comply with any requirements of the CFFMP. As required gravel will be imported to provide a stable access to abutment sites and pier works.
- Place erosion and sediment controls (e.g. sediment fence) at the lower perimeter of work areas and secure other areas with geotextile or mesh as appropriate
- Strip topsoil and remove to an approved stockpile area. Soil to be kept separate for re use in rehabilitation works in riparian areas.
- Ensure that water from upper slopes are diverted around the work areas. Water from track to be directed to separate sediment controls.
- Cap work areas with compacted gravel to create a stable work surface.
- Undertake works. Load out excavated material directly to designated stockpile area.
- Ensure materials are on site for required works and emergency shut down provisions.

## 5.8 Work within Georges River

The following specific management measures will also apply to works in and adjacent to Georges River:

- Care will be taken to avoid water being directed and channelised to riparian areas including any construction pads extending into the river zone.
- Stable causeway or similar with rubble pads will be used to provide safe and stable access into the river zone
- Progressive ESC Plans will be prepared for these works and include specific procedures for elevated shut down in preparation of potential floods

- Progressive ESC Plans will reference stabilisation and revegetation works required to restore riparian vegetation post works and provide natural sediment control prior to the river surface flows and drop sediment before it reaches the waterways
- Access tracks leading to the riparian areas will be constructed to minimise loss of sediment from track surfaces.
- Photographic record of creek bank areas adjacent and opposite will be taken prior to work to identify any impacts from construction activities

The following general staging is expected for the works to create access for the central bridge pier. See also work staging for bridge abutment works.

- Set out and define limit of works and access areas required
- Install silt curtains around proposed work areas prior to commencement of works.
- Establish access and clear work areas – comply with any requirements of the CFFMP. As required gravel will be imported to provide a stable access to the edge of the river bank on the eastern side.
- Include drainage on track leading down to river area. Access to be constructed with clean sandstone and capped with rubble.
- Ensure that water from upper slopes are diverted around the work areas. Water from track to be directed to separate sediment controls.
- Undertake causeway works per Project Specific Procedure, including using clean rock to provide work platform for piling works.
- Work platform to be formed in accordance with approved flood studies.
- Undertake works. Load out excavated material directly to designated stockpile area.
- Ensure materials are on site for required works and emergency shut down provisions.

## 5.9 Work in and Adjacent to Anzac Creek

The following specific management measures will also apply to works in and adjacent to Anzac Creek:

- All reasonable efforts will be taken to program construction activities during those periods when flood flows and fish passage is not likely to occur
- Any temporary side track crossings will be constructed from clean fill (free of fines) and where required to maintain flows, will use appropriately sized pipe or box culvert cells, or a temporary bridge structure
- Temporary structures used for the construction of the culvert within Anzac Creek will be designed so that they can accommodate flows to minimise potential flooding impacts when prolonged or intense rainfalls are predicted. Any structures that impede flow will be readily removable or collapsible, to allow flood waters to flow within the channel, in the event of prolonged or intense rainfall.
- All temporary works, flow diversion barriers and in-stream sediment control barriers will be removed as soon as practicable and in a manner that does not promote future channel erosion
- The construction site will be left in a condition that promotes native revegetation and restoration to maintain ecological function.
- Sediment controls will be selected and placed to allow these to be maintained until riparian areas are stabilised.
- Increased erosion controls will be used during works to reduce erosion potential, these include;
  - As far as possible limiting areas disturbed to allow works
  - Surrounding works areas with low berms, covered with geotextile, to limit inflow of water into the work sites.
  - Covering and stabilising work area with gravel or similar
  - Managing site materials so no excess material is retained near the creek.

The following general staging is expected for the works around Anzac Creek:

- Set out and define limit of works and access areas required
- Refer to Environmental Work Method Statement for the works.

- Establish access and clear work area – comply with any requirements of the CFFMP. As required gravel will be imported to the road surface to provide a stable access. Site access controls will be provided at main gates to public areas.
- Push topsoil material stripped from work area and shape to low berms at perimeter of works and secure with geotextile and stakes. Excess material to be taken to a designated stockpile site
- Place a membrane (geotextile) over the main work area and cap with a compacted gravel to create a work surface
- Form dam at upper limit of work area within creek. Dam to be formed from sealed bulker bags filled with site ENM and wrapped in geotextile. Include central section that may be removed readily if required to accommodate low flows.
- Provide stable pick up point for pump around (via 6 inch pump) above dam. Provide pick up point for smaller pump below dam for seepage.
- Form similar but smaller dam at downstream limit of works.
- Establish stable discharge point for pump arounds below limit of works. Discharge point may consist of wide level geotextile apron covered with clean ballast as spreader.
- Confirm weather conditions and undertake clearing works and excavation of channel for base slab. Load out excavated material directly to designated stockpile area.
- Ensure materials are on site for required works and emergency shut down provisions.
- Undertake works to create slab including central low flow.
- When complete the lower dam may be removed and low flow may be engaged to allow water to pass through work area.



## 6. Review and Improvement

### 6.1 Monitoring

Site inspections will be undertaken by site personnel at the frequencies outlined below. All drainage and erosion and sediment control measures must be inspected and monitored:

- At least daily (when work is occurring on-site)
- Daily during periods of rainfall greater than 10mm
- At least weekly (when work is not occurring on-site)
- Within 24 hours of expected rainfall
- Within 18 hours of a rainfall event of sufficient intensity and duration to cause runoff on-site.

If required, works will be undertaken to repair and/or maintain these controls.

A record book is to be kept on site to record details of inspections and maintenance of erosion and sediment control elements. Details to be recorded include:

- Capacity of controls (must have minimum capacity of 75%)
- Severity and location of any erosion
- Location of sediment deposition in drainage paths
- If controls need repairing or replacing
- Evidence of any fuel, oil or chemical spill
- Date and time
- Photographs
- Name of person conducting the inspection
- If actions required from the last audit occurred.

Table 5: Monitoring Frequency

Task	Frequency
Check potential discharge point(s) for sediment discharges	During rainfall events and each day discharge from site occurs
Take photos	During rainfall events and each day discharge from site occurs
Visual inspection of discharge	During rainfall events and each day discharge from site occurs

### 6.2 Maintenance

The following maintenance principles should be adopted onsite:

- Maintenance of erosion and sediment control measures must continue until the site has been permanently stabilised and further disturbance of soil by erosion is prevented.
- Sufficient supplies of mulch, geotextile and/or other materials required for erosion and sediment control must be available throughout the works period to enable on-going erosion control.
- Sediments shall be removed from erosion and sediment control devices as required, and as soon as possible after storm events.
- Sediment removed from erosion and sediment control devices must be disposed of in an approved environmentally safe manner.

### 6.3 Corrective Action

If non-compliances are identified in terms of erosion and sediment control (e.g. loss of sediment from the site, discharge of sediment to waterways or drainage line etc.) the following corrective actions should be implemented where appropriate:

- Review of the erosion and sediment control measures for effectiveness and check of maintenance record
- Use of bunds and containment areas onsite



- The contractor shall immediately notify the Supervisor of any incident that has the potential to decrease water quality onsite
- An incident/accident report form shall be filled out if any non-conformances are found
- All non-compliances shall be corrected as soon as possible and strategies implemented to reduce the likelihood of the incident occurring again.

#### 6.4 Incident Response

Incidents will be managed in accordance with the Incident and Emergency Management Plan (IEMP). The following generally summaries the incident response strategies will be implemented:

- In the event of a flood, remedial measures as per the Flood Emergency Response Plan and Incident and Emergency Management Plan will be implemented as required
- In the event of a spill, remedial measures as per the Spill Management Procedure (refer to Attachment F) will be implemented
- Incidents where material harm to the environment is caused or threatened will be managed in accordance with a Pollution Incident Response Management Plan (PIRMP) per the EPL requirements.

Further information is provided within the Construction Environmental Management Plan (CEMP) Part B, Element 9 which covers the broader incident management, including incident notifications, classification, corrective actions and reporting.

##### 6.4.1 Incident Response Measures

In the event that an adverse impact on surface water quality is identified as a result of construction activities, the incident will be managed according to the IEMP and PIRMP. The following general response will be implemented:

- Stop works in accordance with incidence response procedures
- Review and amend construction methodology with particular note to management strategies / mitigation measures intended to protect water and soil quality
- Implement amended construction methodology
- Increase the frequency of monitoring until the amended construction methodology has been validated as effective (i.e. compliance with monitoring criteria)
- Where required:
  - The Project Director or Environment Manager will report any pollutant release to the surrounding environment to the EPA
  - Remediation of impacted areas in consultation with the EPA, DPI Water, DPI Fisheries and Liverpool City Council
  - Recommence construction once corrective actions have been implemented and preventative actions are determined and agreed

## Annexures

### Annexure A: Compliance Matrix

#### Contract Clauses

Specific contract clauses and references which set limits and/or govern impacts to and management of erosion and sediment controls on the project include: Table 6: Principal's Project Requirements

Contract Document Ref	Requirement	Where Addressed
1.3	<b>General Requirements (Services Phase and Works Phase)</b>	
u)	All relevant environmental safeguards and measures necessary to mitigate environmental impacts which may arise including installation, maintenance and removal of erosion and sediment control as required. Adequate drainage, erosion and sediment control including sediment fences and kerb inlet sediment traps. Maintain for the duration of the Works and remove and make good of land and assets impacted by these services upon completion of the Works;	CSWMP This Plan Annexure D

#### Conditions of Project Environmental Approvals

Conditions of project environmental approvals that specifically address the management of erosion and sediment controls include:

#### Stage 1 Conditions of Approval

Table 7: Stage 1 Conditions of Approval

Stage 1 CoA Ref	Requirement	Where Addressed
	<b>Construction Soil and Water Management</b>	
E6	Soil and water management measures consistent with Managing Urban Stormwater - Soils and Construction Vols 1 and 2, 4th Edition (Landcom, 2004) shall be employed during construction to minimise soil erosion and the discharge of sediment and other pollutants to land and/or waters.	CSWMP This Plan
E7	Construction shall be undertaken to comply with section 120 of the <i>Protection of the Environment Operations Act 1997</i> , which prohibits the pollution of waters.	Section 1.3
	<b>Construction Environmental Management Plan</b>	
E33 e)	(iii) measures to monitor and manage waste generated during construction including but not necessarily limited to: general procedures for waste classification, handling, reuse, and disposal; use of secondary waste material in construction wherever feasible and reasonable; procedures or dealing with green waste including timber and mulch from clearing activities; and measures for reducing demand on water resources (including potential for reuse of treated water from sediment control basins);	Section 5.3
E34 f)	a Construction Soil and Water Management Plan to manage surface and groundwater impacts during construction. The plan shall be developed in consultation with, EPA, DPI Water, DPI Fisheries, and relevant Councils, and include, but not necessarily be limited to:	CSWMP
E34 f)	(iv) an Erosion and Sediment Control Plan, detailing measures to manage any erosion and sedimentation impacts into the Georges River or Anzac Creek;	This Plan Annexure D

**Annexures****Stage 1 Final Compilation of Mitigation Measures**

Table 8: Stage 1 Final Compilation of Mitigation Measures

Stage 1 FCMM Ref	Requirement	Where Addressed
<b>0</b>	<b>General Environmental Management</b>	
0A	A Preliminary Construction Environmental Management Plan (PCEMP) has been prepared for the Proposal. The purpose of this PCEMP is to provide the preliminary, overarching framework for the management of potential environmental impacts resulting from construction activities. A number of other construction related management plans have also been prepared for the Proposal, including:	Noted
c)	Erosion and Sediment Control Plans (ESCPs) and Bulk Earthworks Plans, within the Stormwater Drainage Design Drawings	This Plan
e)	Soil and Water Management Plan (SWMP), prepared in accordance with Managing Urban Stormwater, 4th Edition, Volume 1, (2004).	CSWMP This Plan
5A	A Soil and Water Management Plan (SWMP) and Erosion and Sediment Control Plan (ESCP), or equivalent, will be implemented, in accordance with the Preliminary Erosion and Sediment Control (PESCPs), included within the Stormwater and Flooding Environmental Assessment Report (Appendix P of this EIS). The following aspects will be addressed within the SWMP and ESCPs:	CSWMP This Plan Annexure D

## Annexures

Stage 1 FCMM Ref	Requirement	Where Addressed
a)	<p>The guiding principles for erosion and sediment control within the Blue Book will be adopted in the SWMP and when planning construction works, being:</p> <ul style="list-style-type: none"> <li>Minimise the area of soil disturbed and exposed to erosion at any one time.</li> <li>Priority should be given to management practices that minimise erosion, rather than to those that capture sediment downslope or at the catchment outlet</li> <li>Divert clean water around the construction site or control the flow of clean water at non-erodible velocities through the construction site</li> <li>Provision of boundary treatments around the perimeter of construction areas to minimise the migration of sediment offsite.</li> <li>Permanent or temporary drainage works will be installed as early as practical in the construction program to minimise uncontrolled drainage and associated erosion, including the onsite detention (OSD) and flood conveyance works</li> <li>Stockpiles will be located away from flow paths on appropriate impermeable surfaces, to minimise potential sediment transportation. Where practicable, stockpiles will be stabilised if in place for more than ten days and will be formed with sediment filters in place immediately downslope</li> <li>Existing catchments and sub-catchment boundaries will be maintained as far as practicable</li> <li>Site imperviousness and grades should be limited to the extent of existing imperviousness and grades under existing development conditions.</li> <li>Rehabilitate disturbed lands as soon as practicable</li> <li>The wheels of all vehicles will be cleaned prior to exiting the construction site where excavation occurs to prevent the tracking of mud. Where this is not practical, or excessive soil transfer occurs onto paved areas, street cleaning will be undertaken when necessary.</li> <li>Inspection of all permanent and temporary erosion and sedimentation control works prior to and post rainfall events and prior to closure of the construction site.</li> <li>Erosion and sediment control structures to be cleaned, repaired and augmented as required.</li> </ul>	Section 5
b)	<p>Where required, construction sediment basins and their outlets will be designed to be stable in the peak flow from at least the 10-year ARI time of concentration event. Sediment basins should be sized to accommodate the 5 day, 80th percentile storm event, with sufficient size and capacity to manage Type F soils. Sediment basins must be regularly cleaned to maintain the design capacity. Sediment basins will be located clear of waterway bed and banks and no additional riparian vegetation will be cleared outside the 20 metre Rail link to accommodate sediment basins. Prior to discharge from sediment basins, water will be tested for the following parameters to identify construction impacts:</p> <ul style="list-style-type: none"> <li>pH</li> <li>Turbidity / Total Suspended Solids (TSS)</li> <li>Oil and grease</li> </ul>	Section 5.3
5C	The following management measures will be implemented during works in and adjacent to Anzac Creek to mitigated potential impacts on water quality during construction:	–
5C	<ul style="list-style-type: none"> <li>All reasonable efforts will be taken to program construction activities during those periods when flood flows and fish passage is not likely to occur</li> </ul>	Construction Management Plan CSWMP Section 5.7

**Annexures**

Stage 1 FCMM Ref	Requirement	Where Addressed
5C	<ul style="list-style-type: none"> <li>Any temporary sidetrack crossings will be constructed from clean fill (free of fines) and where required to maintain flows, will use appropriately sized pipe or box culvert cells, or a temporary bridge structure</li> </ul>	Section 5.7
5C	<ul style="list-style-type: none"> <li>Temporary structures used for the construction of the culvert within Anzac Creek will be designed so that they can accommodate flows to minimise potential flooding impacts when prolonged or intense rainfalls are predicted. Any structures that impede flow will be readily removable or collapsible, to allow flood waters to flow within the channel, in the event of prolonged or intense rainfall.</li> </ul>	Section 5.7
5C	<ul style="list-style-type: none"> <li>All temporary works, flow diversion barriers and in-stream sediment control barriers will be removed as soon as practicable and in a manner that does not promote future channel erosion</li> </ul>	Section 5.7
5C	<ul style="list-style-type: none"> <li>The construction site will be left in a condition that promotes native revegetation</li> </ul>	Section 5.7
5C	<ul style="list-style-type: none"> <li>The management principles outlined in Managing Urban Stormwater (Landcom 2004) for sites with high erosion potential will be implemented.</li> </ul>	Section 5

**NSW Concept Plan Conditions of Approval**

There are no specific NSW Concept Plan Conditions of Approval that apply to the management of erosion or sediment control for this Project.

**NSW Concept Plan Revised Statement of Commitments**

Table 9: NSW Concept Plan Revised Statement of Commitments

NSW Concept Plan Revised SoC Ref	Requirement	Where Addressed
<b>1.5</b>	<b>Biodiversity</b>	
<b>1.56</b>	<b>Riparian</b>	
c)	Riparian corridors will be appropriately revegetated to restore and/or maintain ecological, functional and habitat values and impede surface flows and drop sediment before it reaches the waterways.	CFFMP Section 5
d)	Water quality and quantity issues will be managed during the construction phase through the implementation, inspection and maintenance of best practice soil and water management techniques which will be defined in the CEMP for sedimentation and erosion control during construction.	Section 5
<b>1.8</b>	<b>Stormwater and Flooding</b>	
1.81	The Proponent will incorporate stormwater quantity and quality management measures into the detailed applications in accordance with the objectives and performance standards outlined in the Stormwater and Flooding Environmental Assessment report and including:	–
a)	Preparation of a Soil and Water Management Plan (SWMP) and Erosion and Sediment Control Plan (ESCP) for both the construction and operation phases.	CSWMP This Plan Annexure D

**Annexures**

NSW Concept Plan Revised SoC Ref	Requirement	Where Addressed
b)	implementation of management plan strategies prior to commencement of the staged construction phase	Section 5
c)	Monitoring and review performance of sediment and water control structures during construction and operation phases	Section 6

**Commonwealth Concept Plan Approval**

Table 10: Commonwealth Concept Plan Approval

Commonwealth CoA Ref	Requirement	Where Addressed
2	For the better protection of the Macquarie Perch, the person taking the action must:	–
b)	implement all feasible and practicable measures that ensure sedimentation and/or erosion (as a result of the proposed action) do not lead to any further reductions in the water quality, or degradation of, Macquarie Perch habitat.	Section 5 PSP – Georges River Bridge

**Commonwealth Concept Plan Mitigation Measures**

Table 11: Commonwealth Concept Plan Mitigation Measures

Commonwealth MM Ref	Requirement	Where Addressed
<b>7.4.1</b>	<b>Biodiversity</b>	
7.4.1.3	Mitigate	–
a)	Install appropriate drainage infrastructure (e.g. sediment basins, diversion drains), sediment and erosion controls prior to the commencement of construction.	Section 5 Annexure D
b)	Clearing of vegetation is not to be undertaken during overland flow events.	Section 5.2.3
d)	Locate soil or mulch stockpiles away from watercourses and key stormwater flow paths to limit potential transport of these substances into the watercourses via runoff.	Section 6
f)	Stabilisation of disturbed areas, including revegetation in accordance with the VMP, is to be undertaken as soon as practicable after disturbance.	Section 6
ae)	Install appropriate drainage infrastructure (e.g. sediment basins, diversion drains), sediment and erosion controls prior to the commencement of construction.	Section 5.2.3
<b>7.4.3</b>	<b>Hydrology</b>	
7.4.3.1	The following mitigation measures will be adopted for the SIMTA proposal to mitigate potential impacts on hydrology, water quality and flooding resulting from construction and operation of the SIMTA proposal.	–
h)	The following management measures will be implemented during works in and adjacent to Anzac Creek to mitigated potential impacts on water quality during construction:	–

## Annexures

Commonwealth MM Ref	Requirement	Where Addressed
	<ul style="list-style-type: none"> <li>All temporary works, flow diversion barriers and in-stream sediment control barriers will be removed as soon as practicable and in a manner that does not promote future channel erosion.</li> </ul>	Section 5.7
	<ul style="list-style-type: none"> <li>The management principles outlined in Managing Urban Stormwater (Landcom 2004) for sites with high erosion potential will be implemented.</li> </ul>	Section 5
j)	A Soil and Water Management Plan (SWMP) and Erosion and Sediment Control Plan (ESCP) will be implemented for the construction and operation phases of the development, with monitoring and review performance of sediment and water control structures during construction and operation phases. The SWMP and ESCPs will be developed in accordance with the principles and requirements of Managing Urban Stormwater (Landcom, 2004).	CSWMP This Plan Annexure D

## Environment Protection Licence

Environment Protection Licence clauses that specifically address erosion and sediment control are included in Table 12 below.

Table 12: Environment Protection Licence

EPL Ref	Requirement	Where Addressed
L1.1	<b>Pollution of waters</b> 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.	This plan
O5.1	<b>Erosion and Sediment Control</b> The licensee must, 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.	This plan
O5.2	<b>Erosion and Sediment Control</b> All erosion and sediment control measures installed on the Premises must be inspected and works undertaken to repair and/or maintain these controls: a) Weekly during normal construction hours outlined in condition L3.1 b) Daily during periods of rainfall greater than 10mm c) Within 24 hours of the cessation of a rainfall event causing runoff to occur on or from the Premises.	Section 6.1 Section 6.2
M2.1	<b>Recording of pollution complaints</b> The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies	Section 6.4
M2.2	<b>Recording of pollution complaints</b> The record must include details of the following: a) the date and time of the complaint b) the method by which the complaint was made c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect d) the nature of the complaint e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and	Section 6.4

**Annexures**

EPL Ref	Requirement	Where Addressed
	f) if no action was taken by the licensee, the reasons why no action was taken	
R2.1	<b>Notification of environmental harm</b> Notifications must be made by telephoning the Environment Line service on 131 555 Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.	Section 6.4
R2.2	<b>Notification of environmental harm</b> The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred	Section 6.4



**Annexures**

**Annexure B: Soil Landscapes**

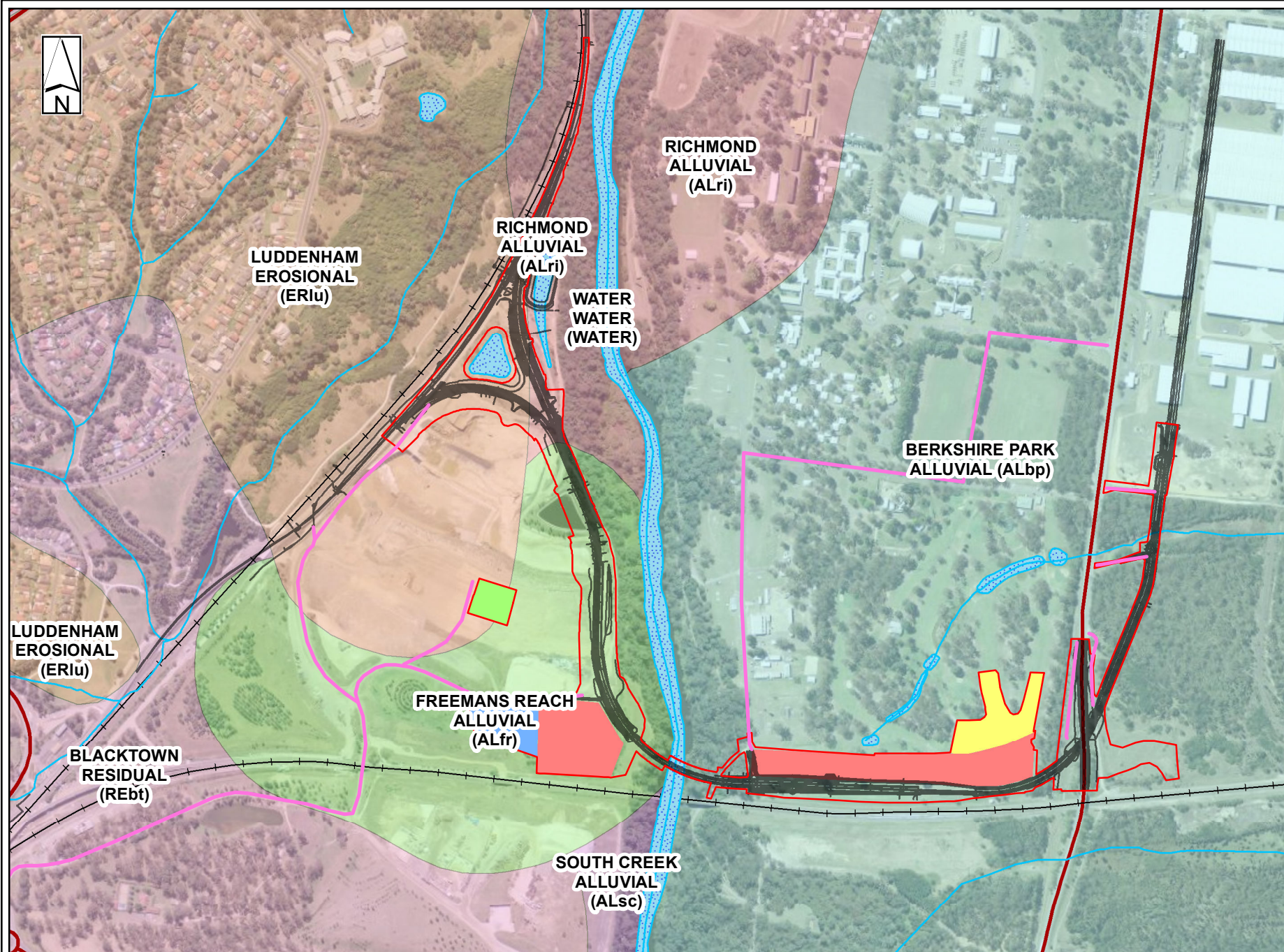


## LEGEND

- Project Access Roads
- Construction Boundary
- Rail Link
- NSW Rail Line
- NSW Road Line
- Water Course
- Crushing stockpile site
- GWS Temporary Stockpile
- RAE Stockpile Site
- RALP Compounds

## Penrith Soil Landscapes

- BERKSHIRE PARK
- BIRROING
- BLACKTOWN
- DISTURBED TERRAIN
- FAULCONBRIDGE
- FREEMANS REACH
- GLENORIE
- GYMEA
- HAWKESBURY
- LUCAS HEIGHTS
- LUDDENHAM
- PICTON
- RICHMOND
- SOUTH CREEK



290 145 0 290  
Metres

Coordinate System: GDA 1994 MGA Zone 56  
Projection: Transverse Mercator  
Datum: GDA 1994  
Date: 6/12/2018  
Service Layer Credits:  
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**SIMTA Moorebank Intermodal Terminal - Stage 1 - Rail Link**  
**Soil Landscapes**

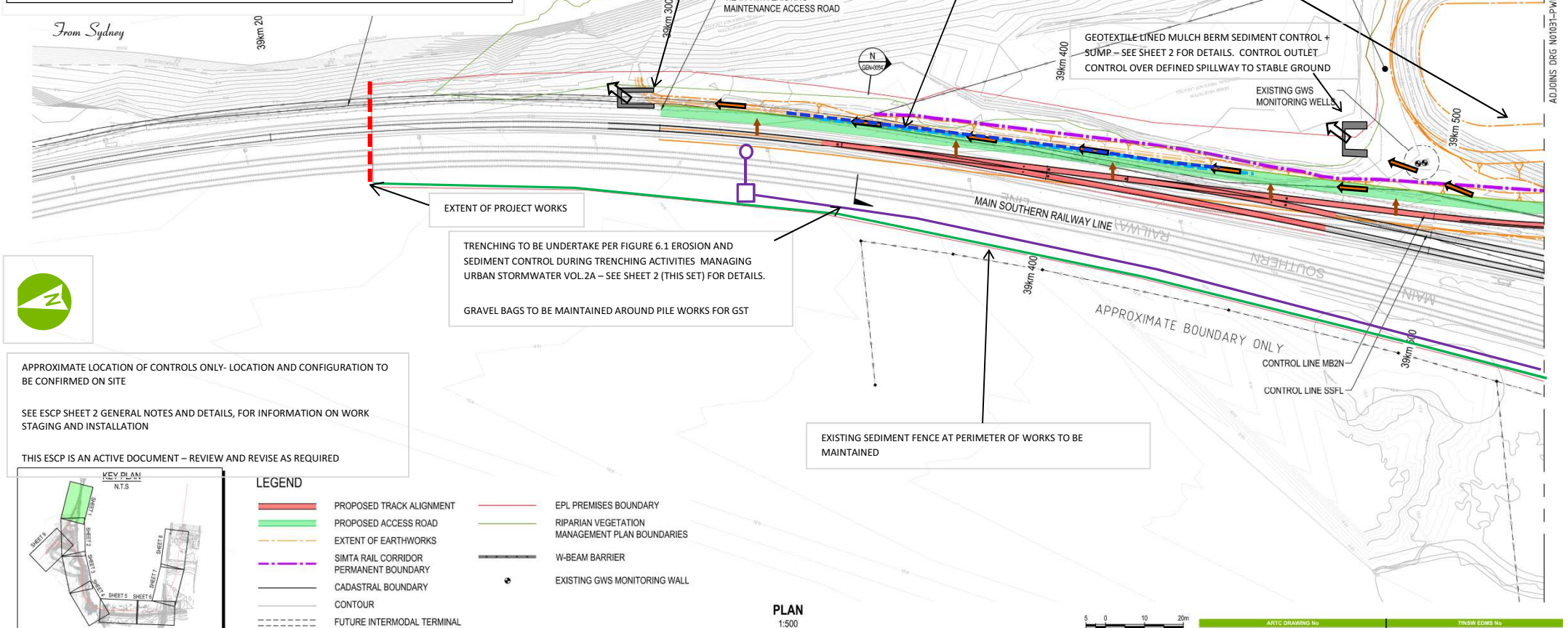
**Annexures**

**Annexure C: Initial Progressive Erosion and Sediment Control Plans**

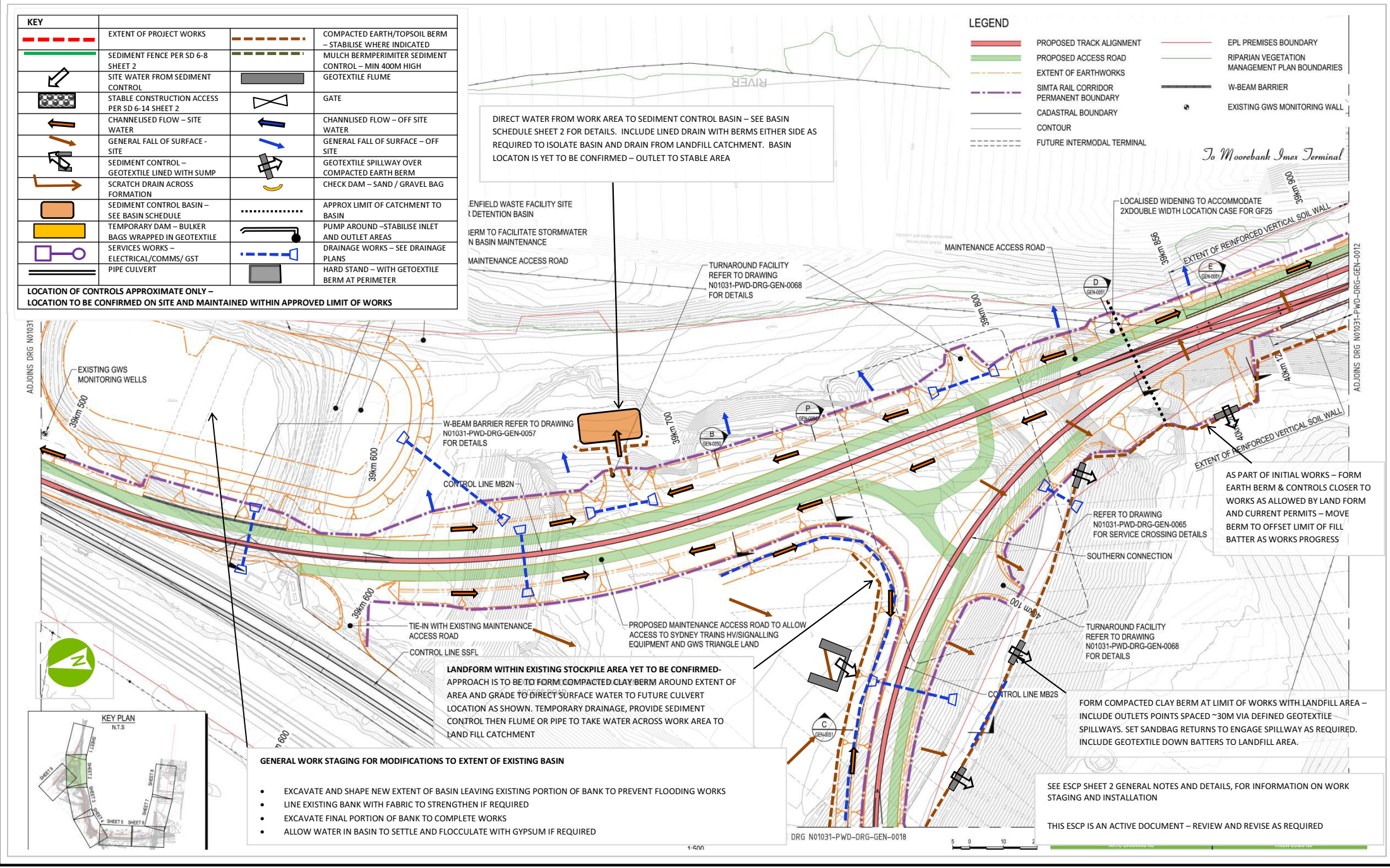


KEY	EXTENT OF PROJECT WORKS		COMPACTED EARTH/TOPSOIL BERM - STABILISE WHERE INDICATED
	SEDIMENT FENCE PER SD 6-8 SHEET 2		MULCH BERM PERIMETER SEDIMENT CONTROL - MIN 400M HIGH
	SITE WATER FROM SEDIMENT CONTROL		GEOTEXTILE FLUME
	STABLE CONSTRUCTION ACCESS PER SD 6-14 SHEET 2		GATE
	CHANNELISED FLOW - SITE WATER		CHANNELISED FLOW - OFF SITE WATER
	GENERAL FALL OF SURFACE - SITE		GENERAL FALL OF SURFACE - OFF SITE
	SEDIMENT CONTROL - GEOTEXTILE LINED WITH SUMP		GEOTEXTILE SPILLWAY OVER COMPACTED EARTH BERM
	SCRATCH DRAIN ACROSS FORMATION		CHECK DAM - SAND / GRAVEL BAG FORMATION
	SEDIMENT CONTROL BASIN - SEE BASIN SCHEDULE		APPROX LIMIT OF CATCHMENT TO BASIN
	TEMPORARY DAM - BULKER BAGS WRAPPED IN GEOTEXTILE		PUMP AROUND - STABILISE INLET AND OUTLET AREAS
	SERVICES WORKS - ELECTRICAL/COMMS/ GST		DRAINAGE WORKS - SEE DRAINAGE PLANS
	PIPE CULVERT		HARD STAND - WITH GEOTEXTILE BERM AT PERIMETER

LOCATION OF CONTROLS APPROXIMATE ONLY - LOCATION TO BE CONFIRMED ON SITE AND MAINTAINED WITHIN APPROVED LIMIT OF WORKS





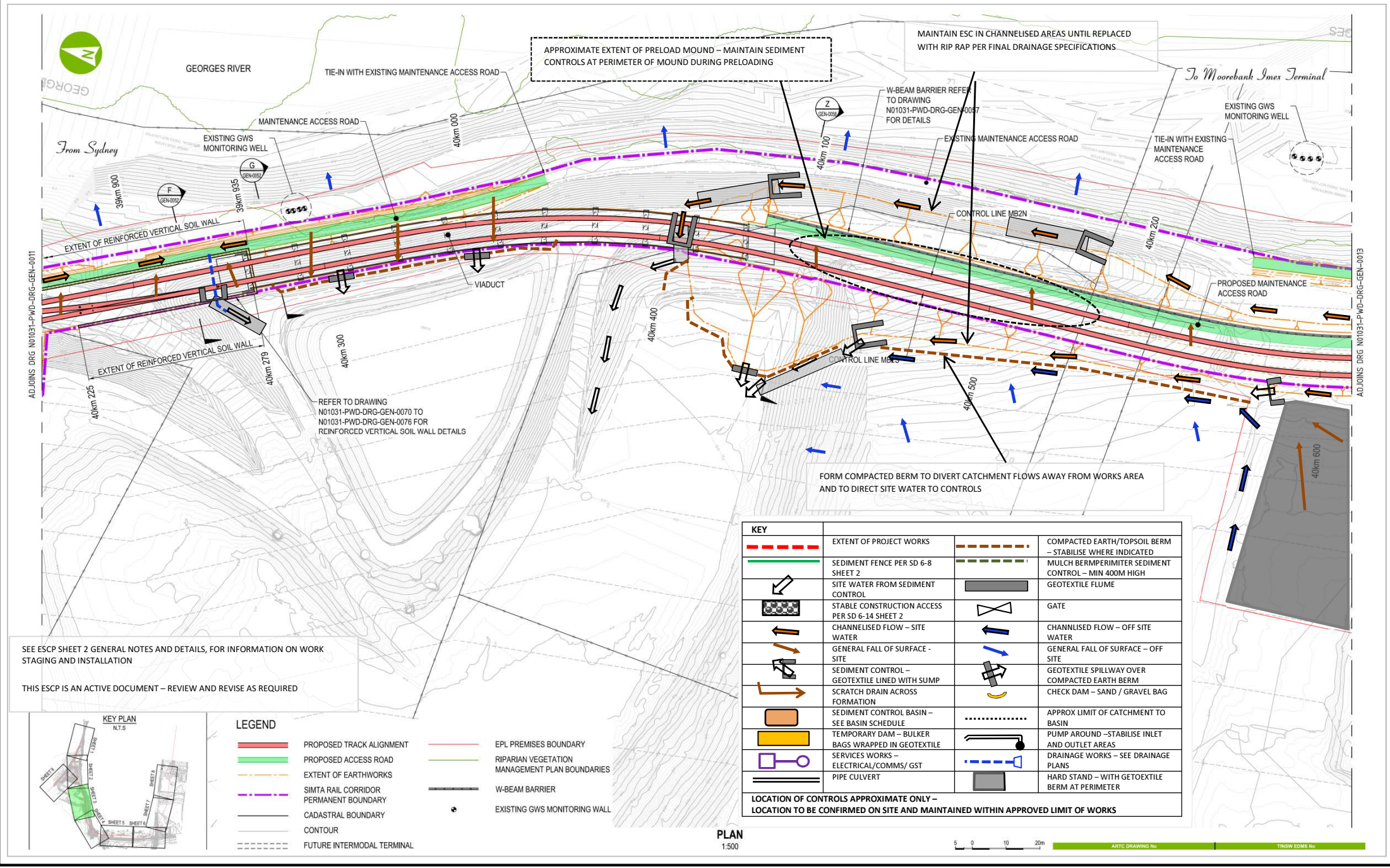


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LEGEND			
	PROPOSED TRACK ALIGNMENT		EPL PREMISES BOUNDARY
	PROPOSED ACCESS ROAD		RIPARIAN VEGETATION MANAGEMENT PLAN BOUNDARIES
	EXTENT OF EARTHWORKS		SIMTA RAIL CORRIDOR PERMANENT BOUNDARY
	CADASTRAL BOUNDARY		W-BEAM BARRIER
	CONTOUR		EXISTING GWS MONITORING WALL
	FUTURE INTERMODAL TERMINAL		

- GENERAL WORK STAGING FOR MODIFICATIONS TO EXTENT OF EXISTING BASIN**
- EXCAVATE AND SHAPE NEW EXTENT OF BASIN LEAVING EXISTING PORTION OF BANK TO PREVENT FLOODING WORKS
  - LINE EXISTING BANK WITH FABRIC TO STRENGTHEN IF REQUIRED
  - EXCAVATE FINAL PORTION OF BANK TO COMPLETE WORKS
  - ALLOW WATER IN BASIN TO SETTLE AND FLOCCULATE WITH GYPSUM IF REQUIRED

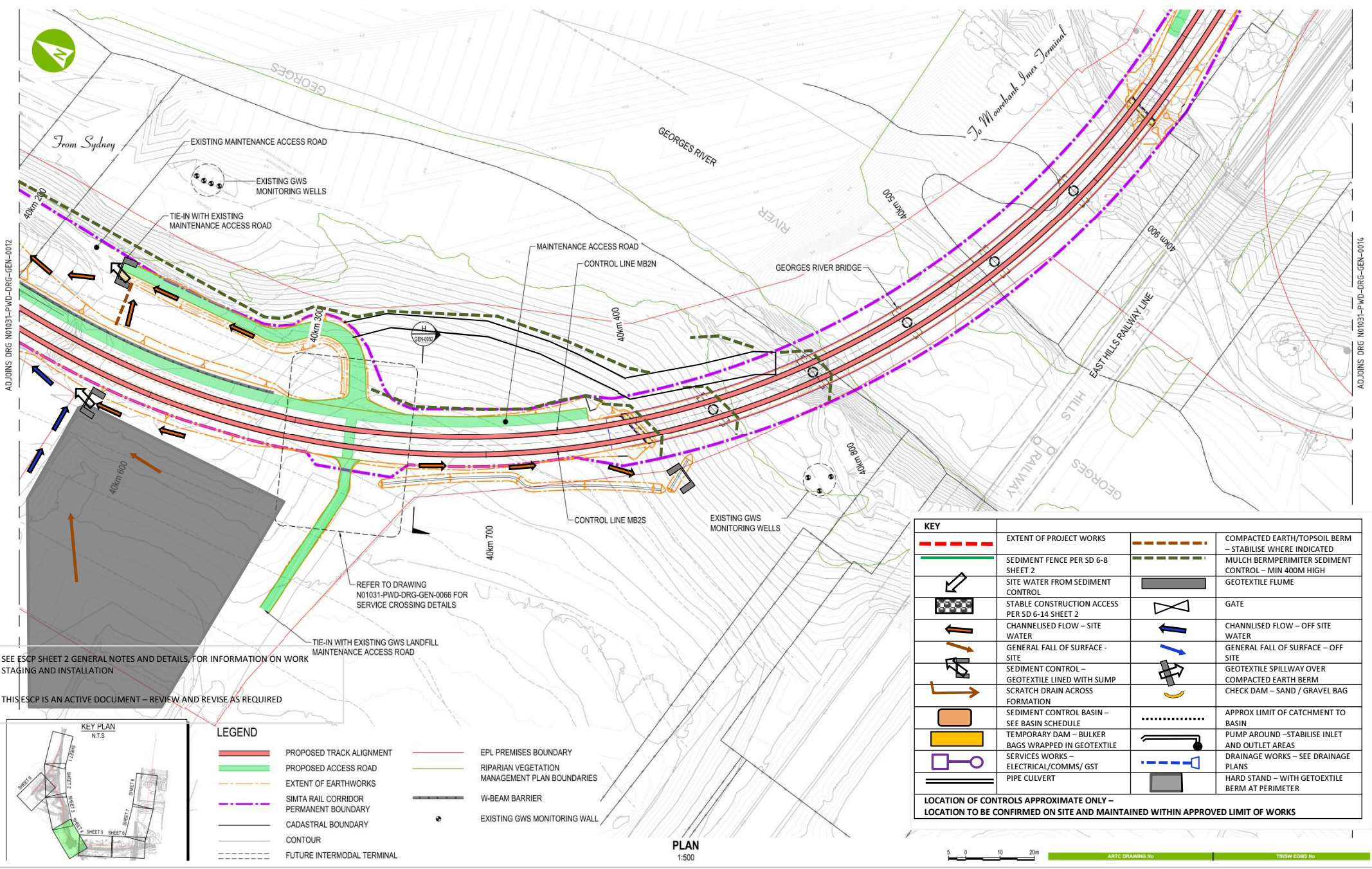






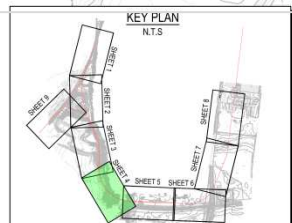
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ADJOINS DRG N01031-PWD-DRG-GEN-0014



SEE ESCP SHEET 2 GENERAL NOTES AND DETAILS, FOR INFORMATION ON WORK STAGING AND INSTALLATION

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LEGEND

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- PROPOSED ACCESS ROAD
- EXTENT OF EARTHWORKS
- SIMTA RAIL CORRIDOR PERMANENT BOUNDARY
- CADASTRAL BOUNDARY
- CONTOUR
- FUTURE INTERMODAL TERMINAL
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- W-BEAM BARRIER
- EXISTING GWS MONITORING WELL

KEY			
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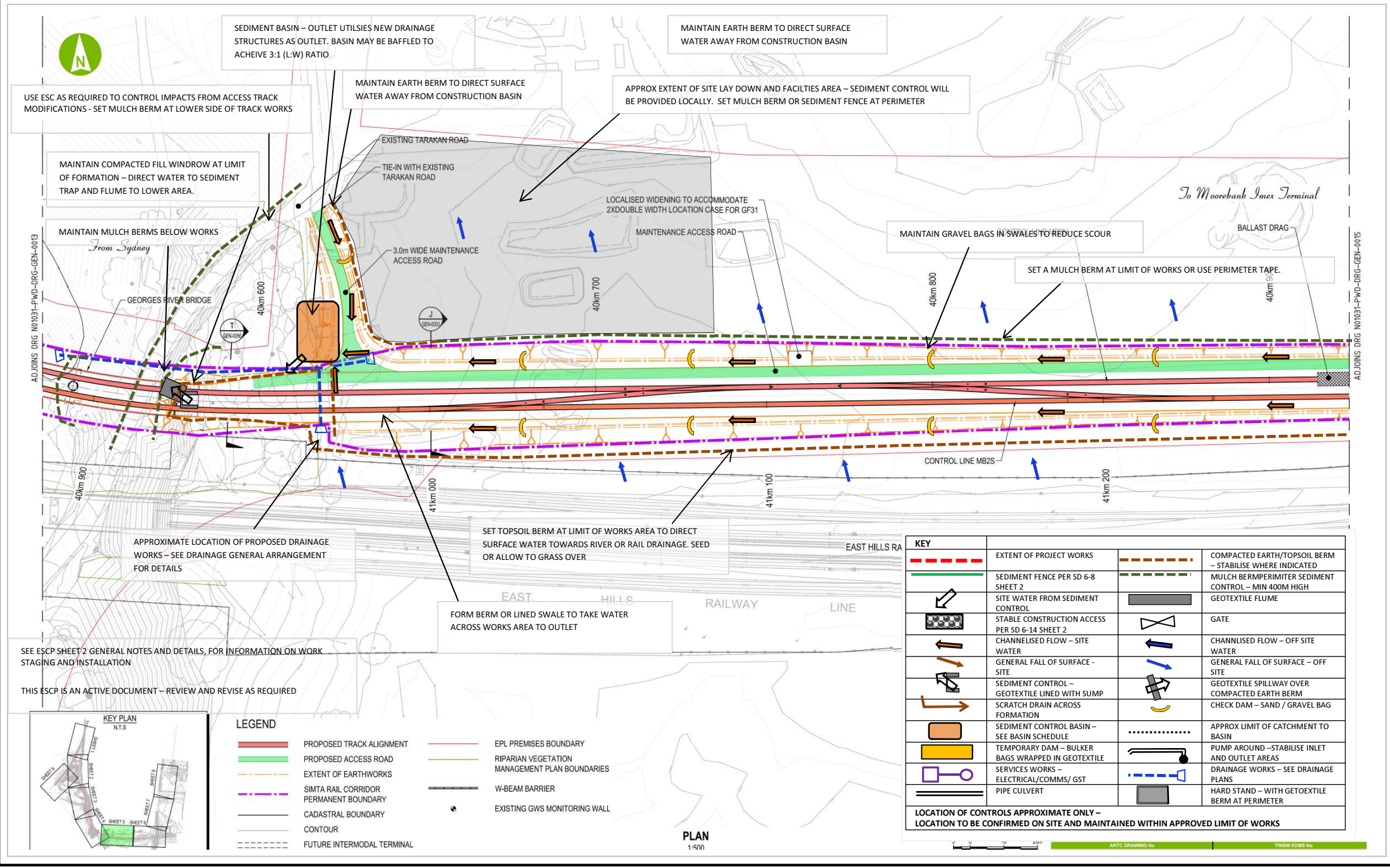


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SHEETS IN THIS PLAN SET  
1. GENERAL ARRANGEMENT – 1001-1009  
2. GENERAL NOTES AND DETAILS TO ESCP - 2001-2002

ERSED REF:	16006	PRIMARY EROSION AND SEDIMENT CONTROL PLAN		
DRAWN	CV	GENERAL ARRANGEMENT- SIMTA MOOREBANK INTERMODAL TERMINAL STAGE 1 – RAIL LINK		
CREATED	AUG 2016			
DATE THIS AMDT	14 SEPT 16	PESCP 1004	1 of 9	0
CLIENT	CPB	PREFIX NUMBER	SHEET	AMDT



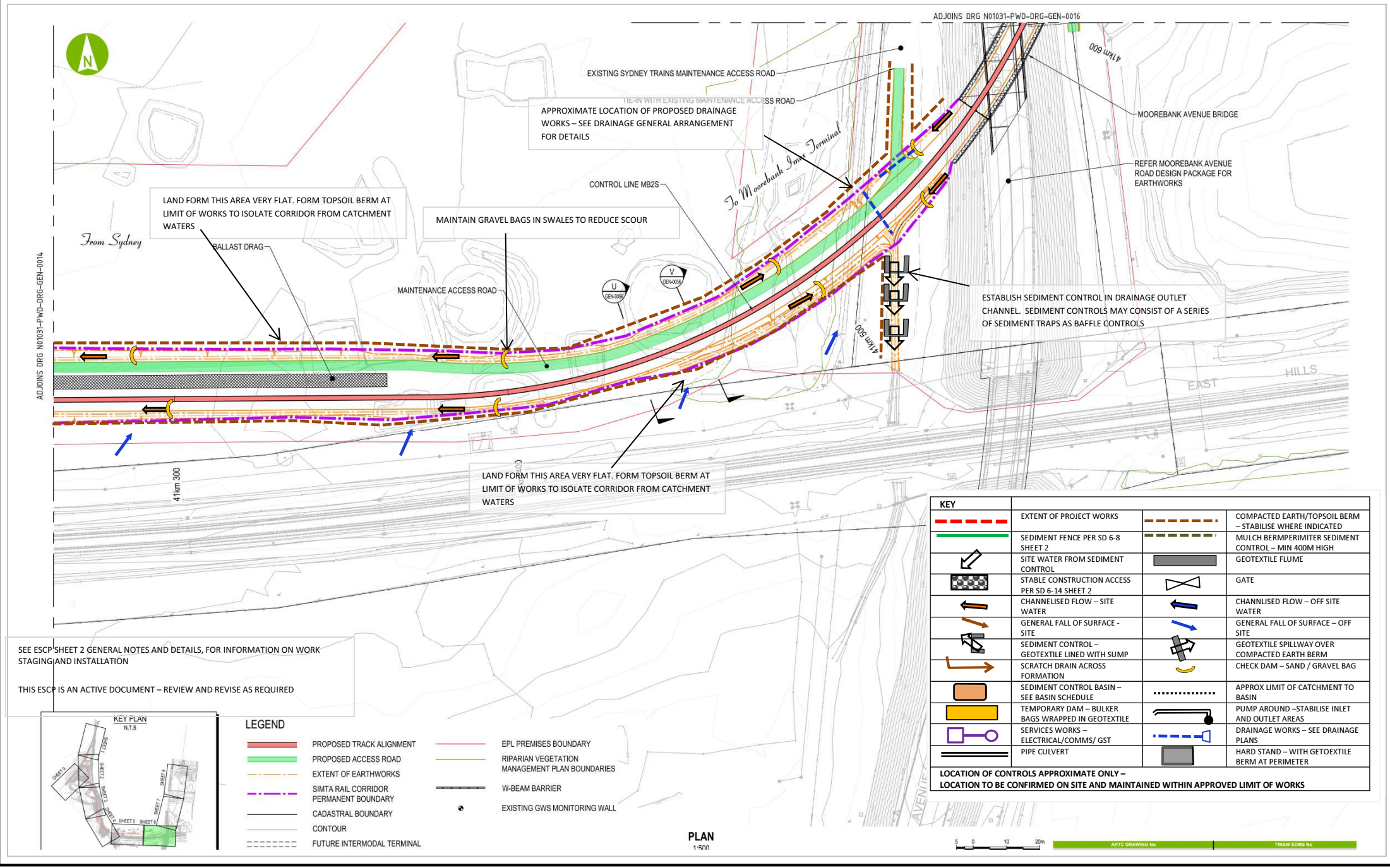


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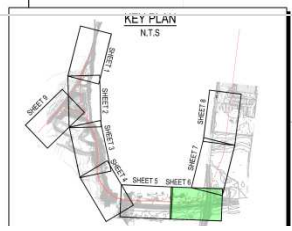
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CREATED	AUG 2016			
DATE THIS AMDT	14 SEPT 16	PESCP 1005	1 of 2	0
CLIENT	CPB	PREFIX NUMBER	SHEET	AMDT





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- LEGEND**
- PROPOSED TRACK ALIGNMENT
  - PROPOSED ACCESS ROAD
  - EXTENT OF EARTHWORKS
  - SIMTA RAIL CORRIDOR PERMANENT BOUNDARY
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  - CONTOUR
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KEY			
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PLAN  
1:500



AISC DRAWING No. TENDR ECOMS No.



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- SHEETS IN THIS PLAN SET**
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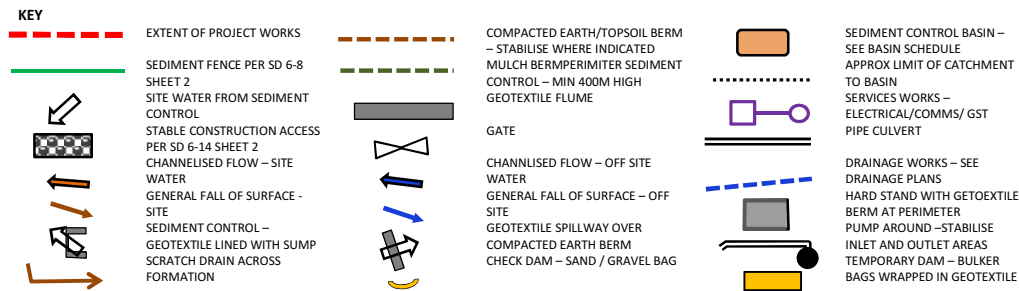
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CREATED	AUG 2016			
DATE THIS AMDT	14 SEPT 16	PESCP 1006	1 of 9	0
CLIENT	CPB	PREFIX NUMBER	SHEET	AMDT





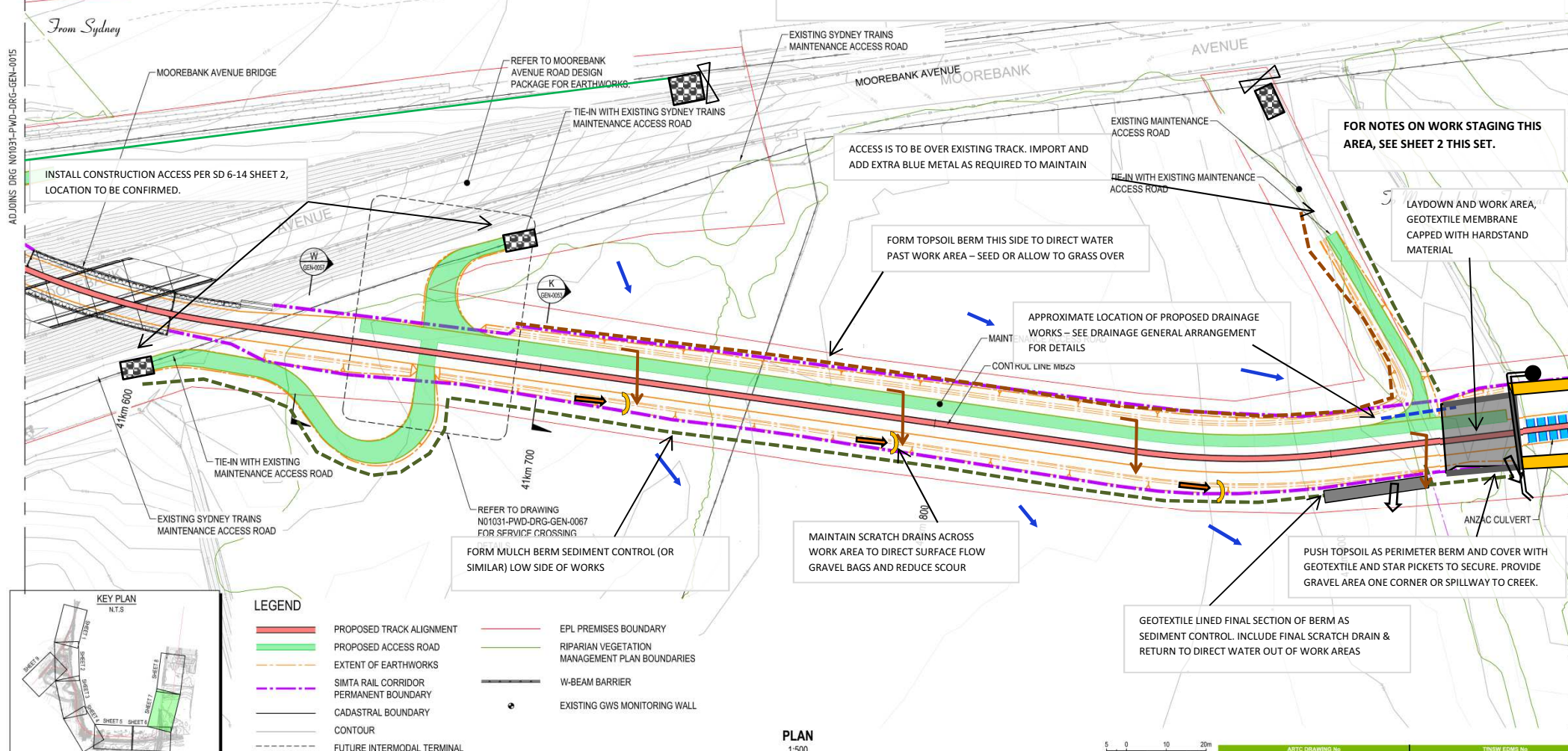
SEE ESCP SHEET 2 GENERAL NOTES AND DETAILS, FOR INFORMATION ON WORK STAGING AND INSTALLATION

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ADJOINS DRG N01031-PWD-DRG-GEN-0017

**LEGEND**

- PROPOSED TRACK ALIGNMENT
- PROPOSED ACCESS ROAD
- EXTENT OF EARTHWORKS
- SIMTA RAIL CORRIDOR PERMANENT BOUNDARY
- CADASTRAL BOUNDARY
- CONTOUR
- FUTURE INTERMODAL TERMINAL
- EPL PREMISES BOUNDARY
- RIPARIAN VEGETATION MANAGEMENT PLAN BOUNDARIES
- W-BEAM BARRIER
- EXISTING GWS MONITORING WALL

PLAN  
1:500

0 5 10 20m

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ERSED REF:

16006

DRAWN

CV

CREATED

AUG 2016

DATE THIS AMDT

14 SEPT 16

CLIENT

CPB

**PRIMARY EROSION AND SEDIMENT CONTROL PLAN**

GENERAL ARRANGEMENT- SIMTA MOOREBANK INTERMODAL  
TERMINAL STAGE 1 – RAIL LINK

PESCP 1007

1 of 9

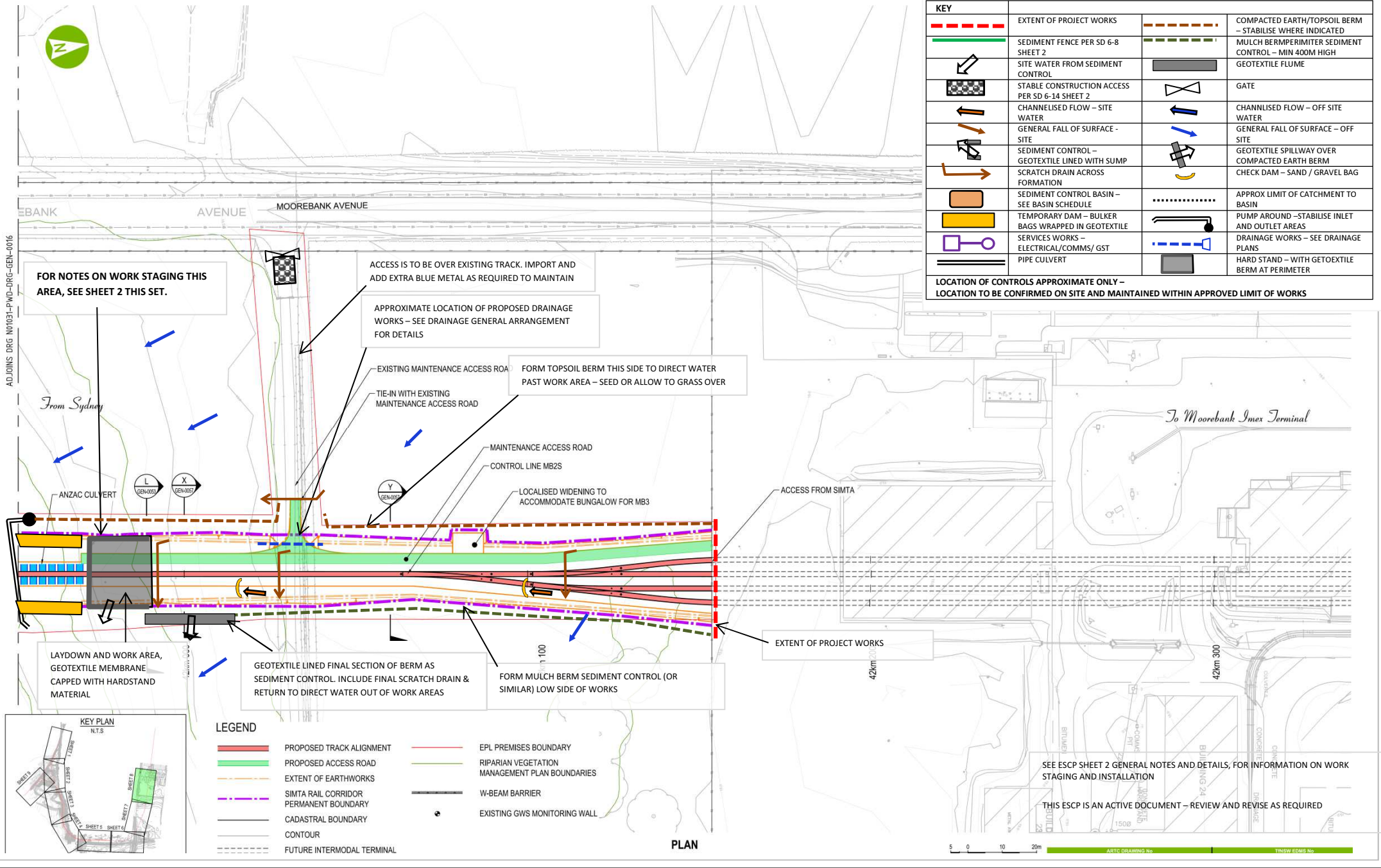
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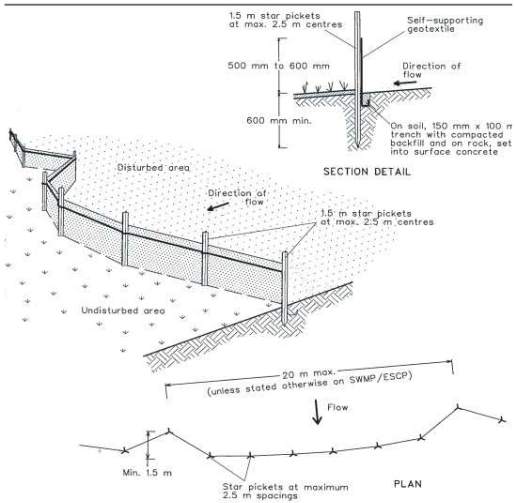
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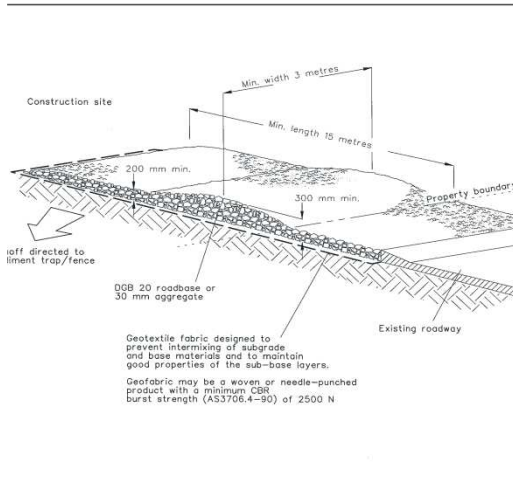


#### Construction Notes

- Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
- Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
- Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
- Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
- Join sections of fabric at a support post with a 150-mm overlap.
- Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

#### SEDIMENT FENCE

SD 6-1

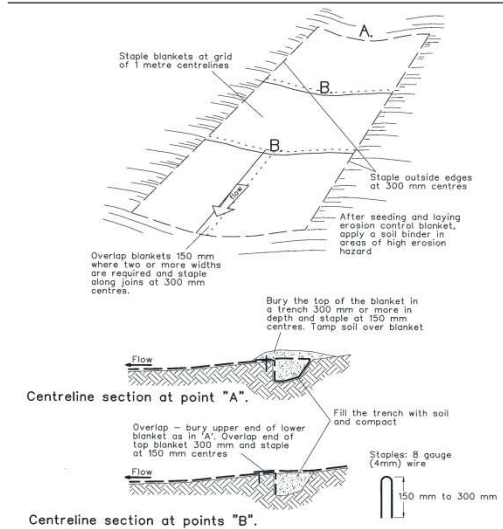


#### Construction Notes

- Strip the topsoil, level the site and compact the subgrade.
- Cover the area with needle-punched geotextile.
- Construct a 200-mm thick pad over the geotextile using road base or 30-mm aggregate.
- Ensure the structure is at least 15 metres long or to building alignment and at least 3 metres wide.
- Where a sediment fence joins onto the stabilised access, construct a hump in the stabilised access to divert water to the sediment fence

#### STABILISED SITE ACCESS

SD 6-1



#### Construction Notes

- Remove any rocks, clods, sticks or grass from the surface before laying matting
- Ensure that topsoil is at least 75 mm deep.
- Complete fertilising and seeding before laying the matting.
- Ensure fabric will be continuously in contact with the soil by grading the surface carefully first.
- Lay the fabric in "shingle-fashion", with the end of each upstream roll overlapping those downstream. Ensure each roll is anchored properly at its upslope end (Standard Drawing 5-7b).
- Ensure that the full width of flow in the channel is covered by the matting up to the design storm event, usually in the 10-year ARI time of concentration storm event.
- Divert water from the structure until vegetation is stabilised properly.

#### RECP : CONCENTRATED FLOW

SD 5-1

## BASIN SCHEDULE

### SOIL LOSS CALCULATIONS:

#### CALCULATION OF STORAGE ZONE VOLUME (A) (M3/HA)

#### REVISED SOIL LOSS EQUATION (A= R X K X LS X C X P)

#### WHERE

R = 2750 K=0.048<sup>1</sup> LS=1.2<sup>2</sup> C= 1.0 P= 1.3

#### GIVES:

- ANNUAL SOIL LOSS AT 206 TONNES PER HA
- ANNUAL SOIL LOSS AT 158 M3 PER HA AT 1.3 TONNE/M3
- 2 MONTH STORAGE VOLUME = 26.5 M3 PER HA AT 1.3 TONNE/M3

#### NOTES

- MAXIMUM VALUE ADOPTED - BERKSHIRE PARK SOIL LANDSCAPE VALUE
- MAXIMUM UPPER VALUE ADOPTED IS EQUIVALENT TO 5% SLOPE & 8M MAX LENGTH OR 25M AT 10%
- SOIL HYDROLOGICAL GROUP D ADOPTED FOR COMPACTED CONSTRUCTION AREAS
- RAINFALL VALUE FOR LIVERPOOL (FROM TABLE 6.3 – MANAGING URBAN STORMWATER 2004)

### RUNOFF CALCULATIONS :

#### CALCULATION OF SETTLING ZONE VOLUME (B) (M3/HA)

VOLUME (M3/HA) = CV X R(X%ILE YDAY) X 10

#### WHERE

CV=0.64<sup>3</sup> R(85%/5 DAY) =32.2<sup>4</sup>

SETTLING ZONE = 206M3 PER HA

#### TOTAL BASIN VOLUME PER HA

=A + B

= 26.5 + 206

=232.5M3

#### ADOPT VALUE

= 240M3/HA

### BASIN VOLUMES:

CATCHMENT AREAS ARE APPROXIMATE ONLY AND ARE TO BE CONFIRMED ON SITE OR VIA SURVEY

B1  
PESCP 002 CATCHMENT (APPROXIMATE)  
= LENGTH X AV. WIDTH = 250M X40M  
= (CH39600 – CH39850) X (40M) =1.0 HA

BASIN VOLUME REQUIRED  
= 1.0X240 = 240M3

B2  
PESCP 001 CATCHMENT (APPROXIMATE)  
= LENGTH X AV. WIDTH = 550M X 25M  
= (CH40950 – CH41500) X (25M) =1.4 HA

BASIN VOLUME REQUIRED  
=1.4 X 240 = 336M3

#### GENERAL ORDER OF WORKS – WORKS AROUND ANZAC CREEK

- SET OUT AND DEFINE LIMIT OF WORKS AND ACCESS AREAS REQUIRED
- ESTABLISH ACCESS AND CLEAR WORK AREA. IMPROVE TRACK SURFACE AS REQUIRED WITH GRAVEL
- STRIP TOPSOIL FROM WORK AREA AND FORM AS A LOW BERMS AT PERIMETER OF WORKS. SECURE WITH GEOTEXTILE AND STAKES. EXCESS TO BE TAKEN TO DEFINED STOCKPILE AREA
- ESTABLISH WORK AREA – GEOTEXTILE UNDER HARDSTAND CAPPING
- INSTALL DAM AND PUMP AROUND ARRANGEMENT TO CREEK. INCLUDE STABLE PICK UP AND OUTLET POINTS FOR PUMP AROUND.
- CONFIRM WEATHER CONDITIONS PRIOR TO CLEARING AND EXCAVATION OF CHANNEL FOR BASE SLAB. LOAD OUT EXCAVATED MATERIAL DIRECTLY TO DESIGNATED STOCKPILE AREA
- ENSURE MATERIALS ARE ON SITE FOR REQUIRED WORKS AND EMERGENCY SHUT DOWN PROVISIONS
- UNDERTAKE WORKS TO CREATE SLAB INCLUDING CENTRAL LOW FLOW
- WHEN SLAB WORKS ARE COMPLETE THE CENTRE OF THE DAM BE REMOVED TO PROVIDE LOW FLOW THROUGH THE WORKS

#### GENERAL ORDER OF WORKS – WORKS AROUND GEORGES RIVER

- SET OUT AND DEFINE LIMIT OF WORKS AND ACCESS AREAS REQUIRED
- ESTABLISH ACCESS AND CLEAR WORK AREAS. CUT SURFACE FOR TRACK AREAS AND PLACE TOPSOIL AS BERM ON UP SIDE OF TRACK FOR REHABILITATION TO DIVERT WATER AROUND WORK AREAS
- IMPORT TO PROVIDE A STABLE ACCESS TO WORK SITES DRAIN TRACK TO SEDIMENT CONTROLS
- FORM MULCH BERMS AT THE LOWER PERIMETER OF WORKS AREAS AND SECURE WITH GEOTEXTILE OR MESH.
- STRIP TOPSOIL AND REMOVE TO AN APPROVED STOCKPILE AREA. SOIL TO BE KEPT SEPARATE FOR RE USE IN REHABILITATION WORKS IN RIPARIAN AREAS.
- CAP WORK AREAS WITH COMPACTED GRAVEL TO CREATE A STABLE WORK SURFACE
- UNDERTAKE WORKS. LOAD OUT EXCAVATED MATERIAL DIRECTLY TO DESIGNATED STOCKPILE AREA
- ENSURE MATERIALS ARE ON SITE FOR REQUIRED WORKS AND EMERGENCY SHUT DOWN PROVISIONS

#### GENERAL ORDER OF WORKS – PILING WORKS IN GEORGES RIVER

- SET OUT AND LIMIT OF WORKS AND ACCESS AREAS REQUIRED.
- ESTABLISH ACCESS AND CLEAR WORK AREAS. IMPORT GRAVEL WILL BE IMPORTED TO PROVIDE A STABLE ACCESS TO THE EDGE OF THE RIVER BANK ON THE EASTERN SIDE.
- INCLUDE DRAINAGE ON NEW TRACK AND DIRECT SURFACE WATER SEDIMENT CONTROLS
- INSTALL DIVERSION TO DIRECT WATER FROM UPPER SLOPES ARE AROUND THE AREAS.
- UNDERTAKE SHEET PILE WORKS AND BACK FILL WITH CLEAN ROCK TO PROVIDE WORK PLATFORM INTO RIVER
- WORK PLATFORM TO BE FORMED IN ACCORDANCE WITH APPROVED FLOOD STUDIES.
- UNDERTAKE WORKS. LOAD OUT EXCAVATED MATERIAL DIRECTLY TO DESIGNATED STOCKPILE AREA
- ENSURE MATERIALS ARE ON SITE FOR REQUIRED WORKS AND EMERGENCY SHUT DOWN PROVISIONS



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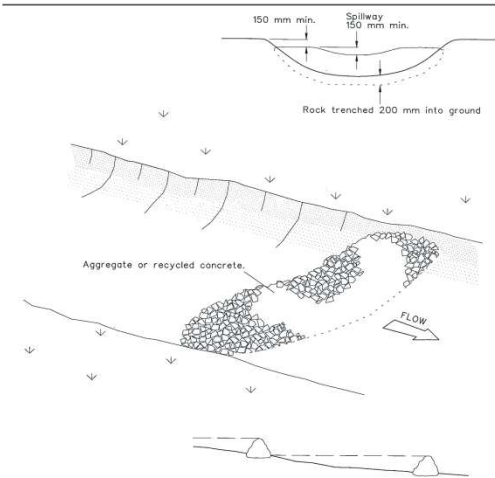
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#### SHEETS IN THIS PLAN SET

- GENERAL ARRANGEMENT – 1001-1009
- GENERAL NOTES AND DETAILS TO ESCP - 2001-2002

ERSED REF:	16006	PRIMARY EROSION AND SEDIMENT CONTROL PLAN		
DRAWN	CV	GENERAL NOTES AND DETAILS TO ESCP		
CREATED	AUG 2016	SIMTA MOOREBANK INTERMODAL TERMINAL		
DATE THIS AMDT	16 SEPT 16	PESCP 2001	1 of 2	0
CLIENT	ULSC	PREFIX NUMBER	SHEET	AMDT



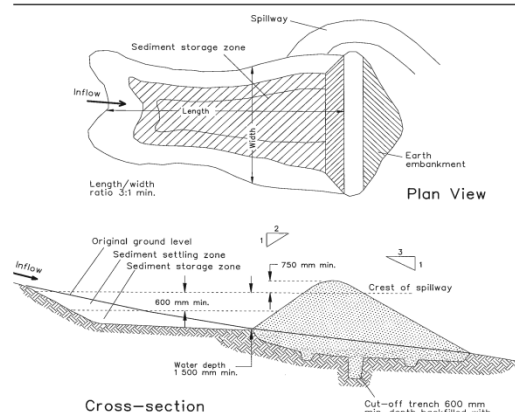


### Construction Notes

- Check dams can be built with various materials, including rocks, logs, sandbags and straw bales. The maintenance program should ensure their integrity is retained, especially where constructed with straw bales. In the case of bales, this might require their replacement each two to four months.
- Trench the check dam 200 mm into the ground across its whole width. Where rock is used, fill the trenches to at least 100 mm above the ground surface to reduce the risk of undercutting.
- Normally, their maximum height should not exceed 600 mm above the gully floor. The centre should act as a spillway, being at least 150 mm lower than the outer edges.
- Space the dams so the top of the upstream dam is level with the spillway of the next downstream dam.

### ROCK CHECK DAM

SD 5-



### Construction Notes

- Remove all vegetation and topsoil from under the dam wall and from within the storage area.
- Construct a cut-off trench 500 mm deep and 1,200 mm wide along the centreline of the embankment extending to a point on the gully wall level with the riser crest.
- Maintain the trench free of water and recompact the materials with equipment as specified in the SWMP to 95 per cent Standard Proctor Density.
- Select fill following the SWMP that is free of roots, wood, rock, large stone or foreign material.
- Prepare the site under the embankment by ripping to at least 100 mm to help bond compacted fill to the existing substrate.
- Spread the fill in 100 mm to 150 mm layers and compact it at optimum moisture content following the SWMP.
- Construct the emergency spillway.
- Rehabilitate the structure following the SWMP.

### EARTH BASIN - WET

APPLIES TO 'TYPE D' AND 'TYPE F' SOILS ONLY)

SD 6-

### NOTES TO APPLICATION

FOR SUCCESSFUL TREATMENT WITH GYPSUM (CALCIUM SULFATE) IT IS ESSENTIAL TO ACHIEVE EVEN APPLICATION OVER THE ENTIRE BASIN SURFACE TO MAXIMISE CONTACT BETWEEN THE AGENT AND THE SUSPENDED PARTICLES.

NORMALLY, GYPSUM SHOULD BE APPLIED AT A RATE OF ABOUT 30 KILOGRAMS PER 100 CUBIC METRES OF STORED WATER. AS GYPSUM IS CONSIDERED INERT REPEATED TREATMENTS OR TREATMENTS WITH HIGHER DOSES (EG 50KG-X0KG/100M3) IS NOT PROBLEMATIC.

NE GROUND GYPSUM (NOT AGRICULTURAL GYPSUM) IS PREFERRED FOR USE IN BASIN TREATMENTS.

### SUGGESTED METHOD OF GYPSUM APPLICATION

- GYPSUM IS TO BE TAKEN UP ALONG WITH BASIN WATER BY PUMP TO CREATE A SUITABLE SLURRY FOR APPLICATION
- THIS CAN BE ACHIEVED BY SUCKING FROM WITHIN A CONFINED PORTION OF THE BASIN SUCH AS WITHIN A PERFORATED DRUM OR SMALL GRAVEL BAG ENCLOSURE
- THE GYPSUM IS ADDED SLOWLY TO THE INLET OF THE PUMP
- A SECOND PERSON SPRAYS THE GYPSUM EVENLY OVER BASIN SURFACE.

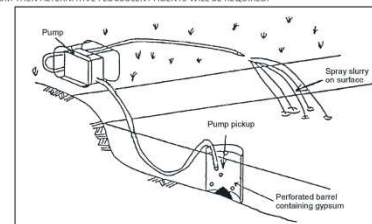
SAMPLING OF SITE SOIL MATERIAL CAN BE USED TO INFORM RECOMMENDED APPLICATION RATES. SETTLING OF SUSPENDED SEDIMENTS SHOULD BE OBSERVED WITHIN 2-3 DAYS. IF SUCCESSFUL TREATMENT IS NOT ACHIEVED THEN RE APPLICATION IS RECOMMENDED.

IT IS COMMON FOR TREATMENT OF BASINS TO BECOME MORE SUCCESSFUL WITH EACH APPLICATION AS DESTRUCTION TEAMS BECOME MORE ADEPT AND ALSO AS RESIDUAL GYPSUM IS RETAINED WITHIN INVERT OF BASIN.

PRIOR TO DEWATERING THE BASIN WATER SHOULD BE TESTED AND CONFIRMED AS MEETING WATER QUALITY REQUIREMENTS STATED IN THE PROJECT ENVIRONMENTAL PROTECTION LICENCE OR OTHERWISE

- TOTAL SUSPENDED SOLIDS 50MG/L
- PH 6.5 - 8.5
- OIL AND GREASE NO VISIBLE TRACE

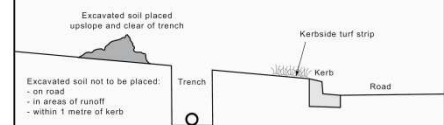
IF HERE BASIN WATER DOES NOT MEET SUITABLE WQ REQUIREMENTS - RE TREATMENT OR CORRECTION OF PH MAY BE REQUIRED. WHERE BASINS ARE REQUIRED TO BE TREATED AND DEWATERED IN PERIODS LESS THAN MAY BE ACHIEVED WITH GYPSUM THEN ALTERNATIVE FLOCCULENT AGENTS WILL BE REQUIRED.



### MANUAL DOSING OF BASINS USING GYPSUM

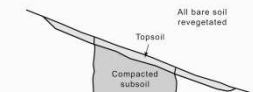
ADAPTED FROM E4.1 MANAGING URBAN STORMWATER (2004)

### When excavating trench...

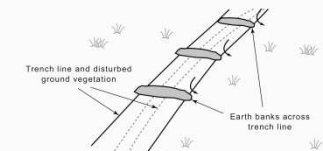


### When backfilling trench...

Trench backfilled, compacted to 95 per cent standard compaction, toppedsoiled, levelled and topped up as necessary should subsidence occur



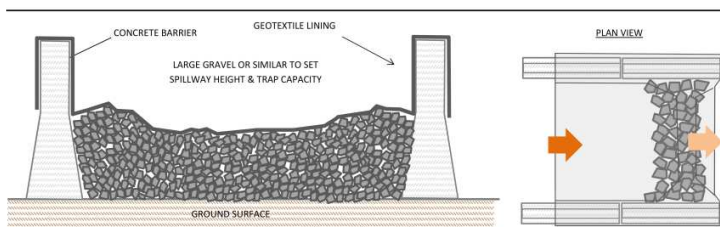
### On steep and/or long sections of trench...



### Construction notes for figure 6.1

- Do not open any trench unless it is likely to be closed in three days
- Place excavated material up-slope of the trench
- Stockpile topsoil separately from subsoil
- Divert runoff from the line of the cut with diversions as directed by SD 5-2
- Rehabilitate in accordance with specification

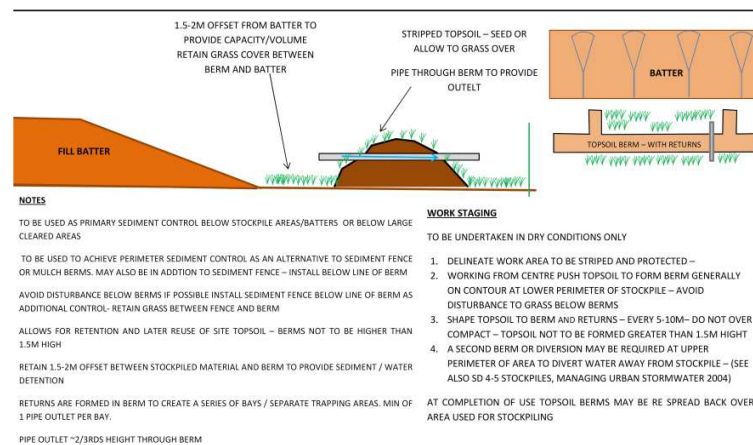
ESC DURING TRENCHING ACTIVITIES: (MANAGING URBAN STORMWATER VOL 2A. 2008)



### DESCRIPTION & USE

- F TYPE OR CONCRETE BARRIERS TO CREATE MEDIUM SIZE AND PRIMARILY ABOVE GROUND SEDIMENT CONTROL
- RUBBLE BERM AT END SETS SPILLWAY AND DEFINES CAPACITY - PROVIDE MINIMUM 200MM HEIGHT BETWEEN SPILLWAY AND HEIGHT OF BARRIER WALLS
- HEIGHT OF SPILLWAY MUST BE LOWER THAN THE HEIGHT OF GROUND LEVEL AT INLET TO BARRIERS OR CONTROL WILL BE BYPASSED
- SPILLWAY MAY ALSO CONSIST OF F TYPE BARRIER SET INTO GROUND OR LAID ON ITS SIDE
- USE EARTH BERM OR SWALE DRAIN TO DIRECT SITE WATER TO CONTROL - PROVIDE SCOUR PROTECTION AT INLET IF REQUIRED
- OUTLET CONTROL TO GRASS OR OTHER STABLE SURFACE
- CONTROL IS LINED WITH GEOTEXTILE TO SEAL GAPS BETWEEN AND UNDER BARRIERS AND ALLOW CONTROL TO FREE DRAIN
- OUTLET TO STABLE AREA
- VOLUME OF CONTROL MAY BE INCREASED WITH ADDITION OF BARRIERS TO LENGTHEN WALLS OR THROUGH EXCAVATED INTERNAL SUMP
- GENERALLY CONTROL NEEDS TO BE INSTALLED ON SLOPING GROUND SO THAT CAPACITY IS INCREASED WITHIN CONTROL BEHIND GRAVEL BERM
- CONTROL MAY ALSO BE USED AS ENERGY DISSIPATOR AND LEVEL SPREADER

### F TYPE /CONCRETE BARRIER - SEDIMENT TRAP



### TOPSOIL BERM AND PIPE SEDIMENT CONTROL ("RETICULATED BERM") PLUS SEDIMENT FENCE



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### SHEETS IN THIS PLAN SET

- GENERAL ARRANGEMENT - 1001-1009
- GENERAL NOTES AND DETAILS TO ESCP - 2001-2002

ERSD REF:

16006

DRAWN

CV

CREATED

AUG 2016

DATE THIS AMDT

14 SEPT 16

CLIENT

ULSC

### PRIMARY EROSION AND SEDIMENT CONTROL PLAN

GENERAL NOTES AND DETAILS TO ESCP

SIMTA MOOREBANK INTERMODAL TERMINAL

STAGE 1 - RAIL LINK

PESCP 2002

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**Attachments**

**Attachment E: Acid Sulfate Soils Management Plan**

# Acid Sulfate Soils Management Plan

Moorebank Precinct East Stage 1 RALP No. 1

<b>Project number:</b>	N01031
<b>Document number:</b>	EN-PLN-0025
<b>Revision date:</b>	30 October 2018
<b>Revision:</b>	02

## Document Approval

Rev.	Date	Prepared by	Reviewed by	Approved by	Remarks
A	9 Mar 2016	A Botfield	S Pathammavong T Doczy	T Pruscino	Initial draft
B	29 Apr 2016	A Smith	S Pathammavong	T Pruscino	Updated to address SIMTA comments
C	19 Jul 2016	A Smith	S Pathammavong	R Styles	For SIMTA's second review
D	21 Dec 2016	A Major	S Pathammavong	R Styles	Updated to address final CoAs and for consultation
E/00	3 Apr 2017	A Major	A Noonan	A Massoud	Updated in response to comments – Approved by DP&E
01	30 Nov 2017	A Major	A Noonan	A Massoud	EPL update
02	30 Oct 2018	N Eisenlohr	A Noonan	A Massoud	Consultation update
Signature:					

## Details of Revision Amendments and Authorship

### Document Control

The Project Director is responsible for ensuring that this plan is reviewed and approved. The Environment Manager is responsible for updating this plan to reflect changes to legal and other requirements, as required.

### Amendments

Any revisions or amendments must be approved by the Project Director before being distributed / implemented.

### Revision Details

Revision	Details
A	Initial draft for SIMTA review
B	Updated to address SIMTA comments
C	For SIMTA's second review
D	Updated to address final CoAs and for consultation
E/00	Updated in response to comments from DP&E Approved by DP&E
01	Updated in response to EPL
02	Consultation update

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# Acid Sulfate Soils Management Plan

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## 1. Introduction

### 1.1 Purpose

This Acid Sulfate Soils Management Plan (ASSMP) addresses acid sulfate soils management on Sydney Intermodal Terminal Alliance's (SIMTA) Moorebank Precinct East (MPE) Stage 1 – Rail Access Land Package (RALP) No. 1 (the Project, the Rail Link) and the management of impacts to the environment and community.

This ASSMP addresses the following key requirements:

- Conditions of Approval under SSD-6676 SIMTA Intermodal Terminal Facility – Stage 1 (NSW)
- Stage 1 EIS (including Framework CEMP)
- Stage 1 Response to Submissions Report (including Final Compilation of Mitigation Measures)
- Conditions of Approval under MP10\_0193 SIMTA Moorebank Intermodal Terminal Facility – Concept Plan (NSW)
- NSW Concept Plan EIS
- NSW Concept Plan Submissions Report (including Revised Statement of Commitments)
- Liverpool Local Environmental Plan 2008
- Other applicable legislative obligations.

### 1.2 Acid Sulfate Soils

Acid Sulfate Soils (ASS) are naturally occurring sediments that are deposited in estuarine environments within the Holocene age (i.e. the last 10,000 years). Such estuarine environments include estuaries, mangrove flats, salt marshes, tea-tree swamps and within rivers, lakes and low lying floodplains that have been the subject of tidal inputs of sulfate rich water. As such, ASS areas are usually less than 5 metres Australian Height Datum (mAHD) (ASSMAC 1998).

Actual Acid Sulfate Soils (AASS) are soils containing highly acidic soil horizons or layers as a result of the oxidation of iron sulfides such as pyrite ( $\text{FeS}_2$ ). AASS are most often found above the water table where the presence of oxygen in the soil profile has enabled the oxidation of iron sulfides and the release of significant loadings of acidity, sulfate salinity and metals.

Potential Acid Sulfate Soils (PASS) are soils that contain iron sulfides that have yet to oxidise. PASS occurs in an oxygen limited environment such as beneath the water table in the soil profile. The iron sulfide content of PASS is prone to oxidation when either the water table is lowered (e.g. via dewatering) or the material is extracted from beneath the water table (e.g. via excavation and stockpiling upon the land surface).

The disturbance of such AASS or PASS materials may lead to the release of poor quality drainage water and adverse impacts to the surrounding environment.

ASS are not expected to be uncovered during the construction of the Rail Link works. Section 12.2.2 of the Stage 1 EIS notes that ASS have an “extremely low to low probability of occurring at or in the vicinity of the proposal site”. This Plan has been developed as a precaution should they be suspected or identified. Should ASS be confirmed, this Plan would be reviewed and updated (if necessary) to reflect the revised site conditions and any additional ASS management requirements.

### 1.3 Objectives

The objective of this ASSMP is to provide methods and strategies for the identification, management, treatment, monitoring and disposal of ASS that may be encountered during Project construction. The key objective is to avoid impacts to PASS/ASS wherever possible.

### 1.4 Definitions

Definitions for terms used in this plan are contained in the Glossary in Annexure B.



## 1.5 Interactions with Other Management Plans

The ASSMP is an attachment to the CSWMP which is part of the Construction Environmental Management Plan (CEMP). Figure 1 below sets out interactions of this Sub Plan with the other management plans implemented on the MPE Stage 1 RALP No. 1. The specific linkages that exist between management plans are addressed thoroughly in the Construction Environmental Management Plan.

The following environmental management documents are to be read in conjunction with the ASSMP:

- Construction Soil and Water Management Plan (CSWMP)
- Project Specific Procedure (PSP) for the Georges River Bridge
- Flood Emergency Response Plan (FERP)
- Contamination Management Plan (CMP)
- Waste Management Plan (WMP)

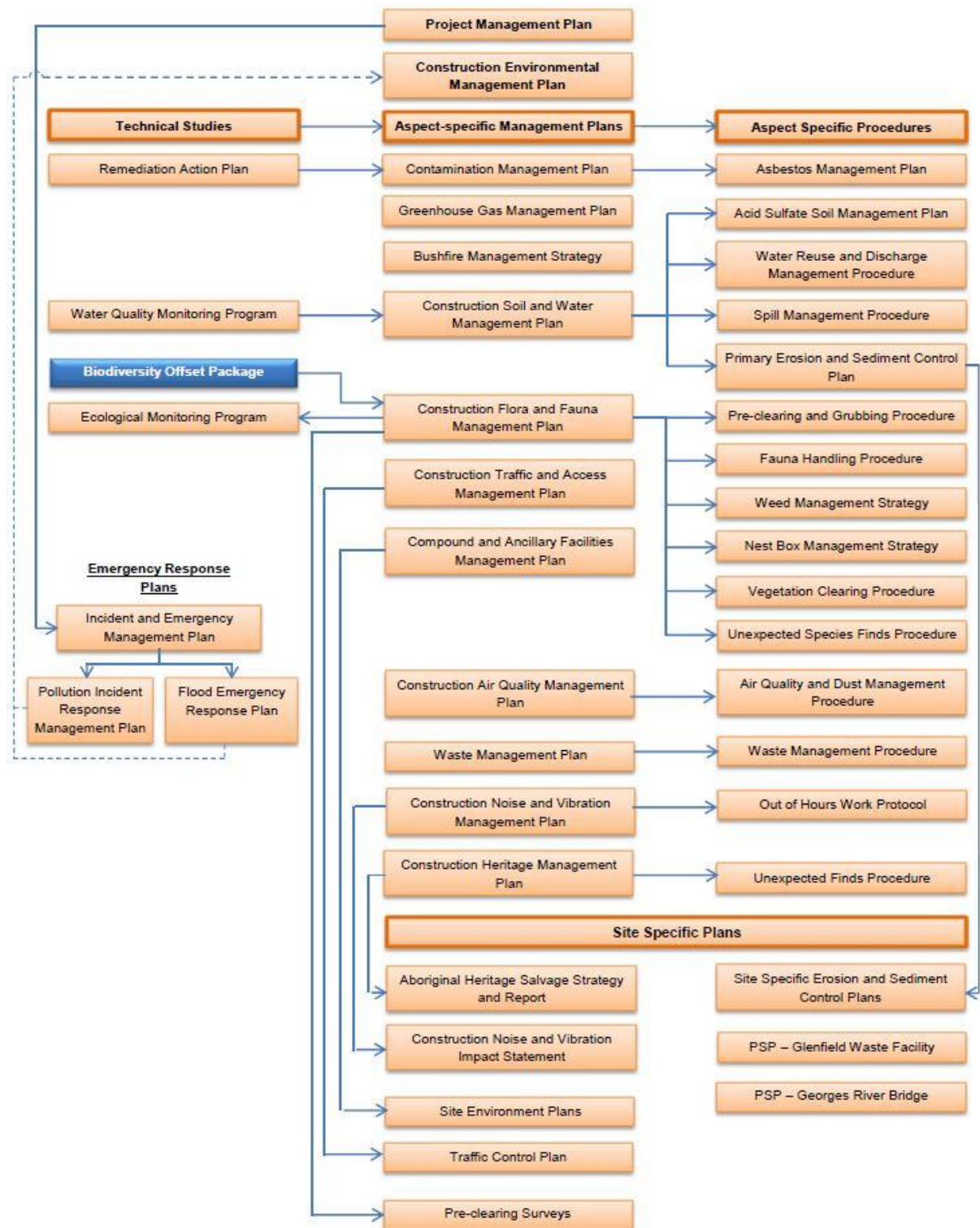


Figure 1: Environmental Documents Map

## 2. Legal and Other Requirements

### 2.1 Compliance Requirements

A compliance matrix against the relevant Conditions of Approval and other Acid Sulfate Soils management requirements is detailed in Annexure A.

### 2.2 Liverpool LEP 2008

Clause 7.7 of the Liverpool Local Environmental Plan (LEP) 2008 is intended to ensure that development does not disturb, expose or drain acid sulfate soils and cause environmental damage.

Construction activities associated with the construction of the Rail Link as it traverses the Georges River and the former Glenfield Waste Facility pass through 'Class 5' ASS according to Liverpool LEP 2008 Acid Sulfate Soils Map – Sheet ASS-013 (LEP Amendment 2014).

Class 5 relates to works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum (mAHD) by which the water table is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.

In this case, the mapped 'Class 1' ASS area is representative of the bed and lower bank of the Georges River (i.e. below 5 mAHD).

The Class 1 ASS area is situated to the north of the proposed construction footprint of the Georges River Bridge and east of the SSFL and a set of culverts and embankments that traverse the Glenfield Waste Facility.

Under Part (3) of this clause development consent for the works requires the following:

- An Acid Sulfate Soils Management Plan has been prepared for the works in accordance with the Acid Sulfate Soils Manual and has been provided to the consent authority; and
- A copy of the plan and a copy of the development application have been provided to the Director-General of the Department of Environment and Climate Change and the consent authority has considered any comments of the Director-General made within 21 days after these copies were provided to the Director General.

This ASSMP has been prepared to address the requirements of the Liverpool LEP, and as a contingency measure to provide a framework in case ASS is encountered.

### 2.3 Relevant Legislation

Local, State and Commonwealth legislation that apply criteria to the management of acid sulfate soils on the project include:

- *Environmental Planning and Assessment Act 1979* (EP&A Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Commonwealth)
- *Contaminated Land Management Act 1997* (CLM Act)
- *Protection of the Environment Operations Act 1997* (POEO Act)
- *Water Management Act 2000* (WM Act).

### 2.4 Guidelines

Local, State and Commonwealth guidelines that apply criteria to the management of soil and water quality on the project include:

- ANZECC and ARMCANZ, 2000. National Water Quality Management Strategy. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. October 2000. Australian and New Zealand Environment and Conservation Council. Agriculture and Resource Management Council of Australia and New Zealand.
- ASSMAC, 1998. Acid Sulfate Soil Manual. August 1998. Acid Sulfate Soils Management Advisory Committee. Wollongbar, NSW.
- EPA, 2014. Waste Classification Guidelines Part 4: Acid sulfate soils. November 2014. NSW EPA.
- EPA, 2014a. Waste Classification Guidelines Part 1: Classifying waste. November 2014. NSW EPA.

- Hyder, 2015. SIMTA Intermodal Terminal Facility – Stage 1 Environmental Impact Assessment. Sydney Intermodal Terminal Alliance, Part 4, Division 4.1, State Significant Development. May 2015. Hyder Consulting Pty Ltd. North Sydney.
- Liverpool City Council, 2014. LEP Amendment 2014 to Liverpool Local Environmental Plan 2008 (Amendment No 45) Acid Sulfate Soils Map – Sheet ASS-013.
- RMS, 2005. Guidelines for the Management of Acid Sulfate Materials: Acid Sulfate Soils, Acid Sulfate Rock and Monosulfidic Black Ooze.

## **2.5 Additional Permits and Licences**

Environment Protection Licence requirements are identified in Annexure A.

No additional permits or licences are expected to be required in relation to the management of acid sulfate soils on the Project.

### 3. Consultation and Stakeholders

#### 3.1 Consultation on this Plan

The ASSMP is required to be prepared in consultation with:

- Environment Protection Authority
- DPI Water (formerly the NSW Office of Water)
- DPI Fisheries
- Liverpool City Council

Further, this ASSMP as an attachment to the Construction Soil and Water Management Plan (CSWMP) which in turn is a Sub Plan to the CEMP is required to be approved by Department of Planning and Environment (DP&E) prior to construction as required by the CoA.

Consolidated management plan consultation and approval requirements are identified in the CEMP.

This consultation is intended to assist in development and finalisation of the plan, and was conducted as part of the CSWMP consultation process. Evidence of consultation is included in Attachment C of the CSWMP. For full details of consultation, see appendix G to the CEMP.

Table 1 summarises relevant stakeholder comments as well as CPB Contractors' response including how we will address issues raised.

Table 1: Summary of Consultation

Agency	Status	Comment	Response
EPA	CSWMP (including ASSMP) sent to EPA on 22/12/16. EPA advised on 19/1/17 that they did not wish to comment on the CSWMP.	Advised on 19/01/2017 that they did not wish to comments	Noted
DPI Water	CSWMP (including ASSMP) sent to DPI Water on 23/12/16. DPI Water provided comments on CSWMP on 17/02/17	No comments on the CSWMP related to the ASSMP.	Noted
DPI Fisheries	CSWMP (including ASSMP) sent to DPI Fisheries on 22/12/16. DPI Fisheries provided comments on CSWMP on 18/1/16	No comments on the CSWMP related to the ASSMP.	Noted
LCC	CSWMP (including ASSMP) sent to LCC on 23/12/16. LCC advised on 8/2/16 that they did not wish to comment.	Advised on 8/02/2017 that they did not wish to comments	Noted

## 4. Roles and Responsibilities

Roles and responsibilities for the ASSMP are shown in Table 2.

Table 2: Roles and Responsibilities

Role	Responsibilities
Project Director	<ul style="list-style-type: none"> <li>Ultimately responsible for the implementation of the ASSMP</li> <li>Contractor's Principal Representative</li> </ul>
Environment Manager	<ul style="list-style-type: none"> <li>Ensuring that ASS related management controls are implemented; and</li> <li>Providing assistance and advice to all Project personnel to fulfil the requirements of the ASSMP</li> <li>Undertaking audit inspections and reporting</li> <li>Providing project-wide advice to ensure consistent approach and outcomes are achieved</li> <li>Ensuring training for project personnel covering ASS management</li> <li>Liaising with relevant authorities and organisations as necessary via regular communication and meetings (as required)</li> </ul>
Environmental Coordinator	<ul style="list-style-type: none"> <li>Manage the on-ground application of ASS management measures during construction</li> <li>Monitor and report on ASS management during construction</li> </ul>
Engineering Manager	<ul style="list-style-type: none"> <li>Consider location and management requirements of ASS in the design of the Rail Link</li> </ul>
Construction Manager	<ul style="list-style-type: none"> <li>Liaising with the Environment Manager to ensure effective ASS management</li> <li>Liaising with the Environment Manager to ensure appropriate corrective and preventative actions are developed and implemented in accordance with the ASSMP</li> </ul>
Supervisor	<ul style="list-style-type: none"> <li>Providing assistance to the Environment Manager to fulfil the requirements of the ASSMP</li> <li>Ensuring that appropriate ASS management measures are implemented and maintained on site</li> </ul>

### 4.1 Training

Project personnel will be informed of the requirements of the ASSMP. Training will include:

- Project inductions identifying environmental and compliance obligations specific to ASS management
- Toolbox talks
- Targeted training as required (e.g. Identification of PASS, specific treatment procedures).

## 5. Existing Environment

### 5.1 Location of ASS

The Liverpool LEP Acid Sulfate Soil mapping information has identified the bed and lower bank of the Georges River as Class 1 ASS area in terms of potential for acid sulfate soils (see Figure 2).

There is potential (low) for ASS at the river bed and lower bank in vicinity of the proposed Georges River Bridge as it is within a few hundred metres of the Class 1 ASS area.

However, there is generally a low probability of occurrence of ASS within the entire construction corridor for the Project. This determination is based upon the assessment principles of the Acid Sulfate Soil Manual (ASSMAC 1998), specifically:

- Soils within the Project construction corridor (including the banks of the Georges River and Anzac Creek and the flood plain that traverses the former Glenfield Waste Facility) are predominated by alluvial sands, clays and silts with an absence of estuarine tertiary sediments (Hyder 2015).
- Neither the Georges River nor Anzac Creek are subject to ongoing tidal inputs of sulfate required for current formation of sulfides within water course bank sediments and or surrounding floodplains.
- Soil logging and sampling suggested no visual indications of Actual Acid Sulfate Soils (AASS) or Potential Acid Sulfate Soils (PASS) (i.e. iron hydroxide or oxide staining, etc.) in any areas in the vicinity of the Project construction corridor (Hyder 2015).
- Intrusive investigation of the Stage 1 site found that fill across the site was 0.5 m to 1.2 m thick, comprising mainly sand and clayey sand. Interbedded sand and clay is predicted to be present beneath the fill to depths of up to 23 m BGL. There is a low probability of occurrence of acid sulfate soils beneath the SIMTA site.
- Soil samples taken from banks of the proposed Georges River Bridge were analysed to determine their aggressivity exposure classification for the purpose of informing the proposed bridge design (Hyder 2015). The exposure classification for the soils ranged between 'Non-aggressive' and 'Moderate' with the majority of soil identified as 'Non-aggressive' for steel piles, with a low probability of occurrence of acid sulfate soils.
- The Glenfield Waste Facility area was evaluated as having a low probability of the presence of actual / potential sulfate soils as it is predominated by fill of variable thickness, overlying deep brown sands and loams (Hyder 2015).

Further, the Stage 1 EIS (Section 12.2.2) notes the probability of uncovering ASS in the proposal site is extremely low to low.



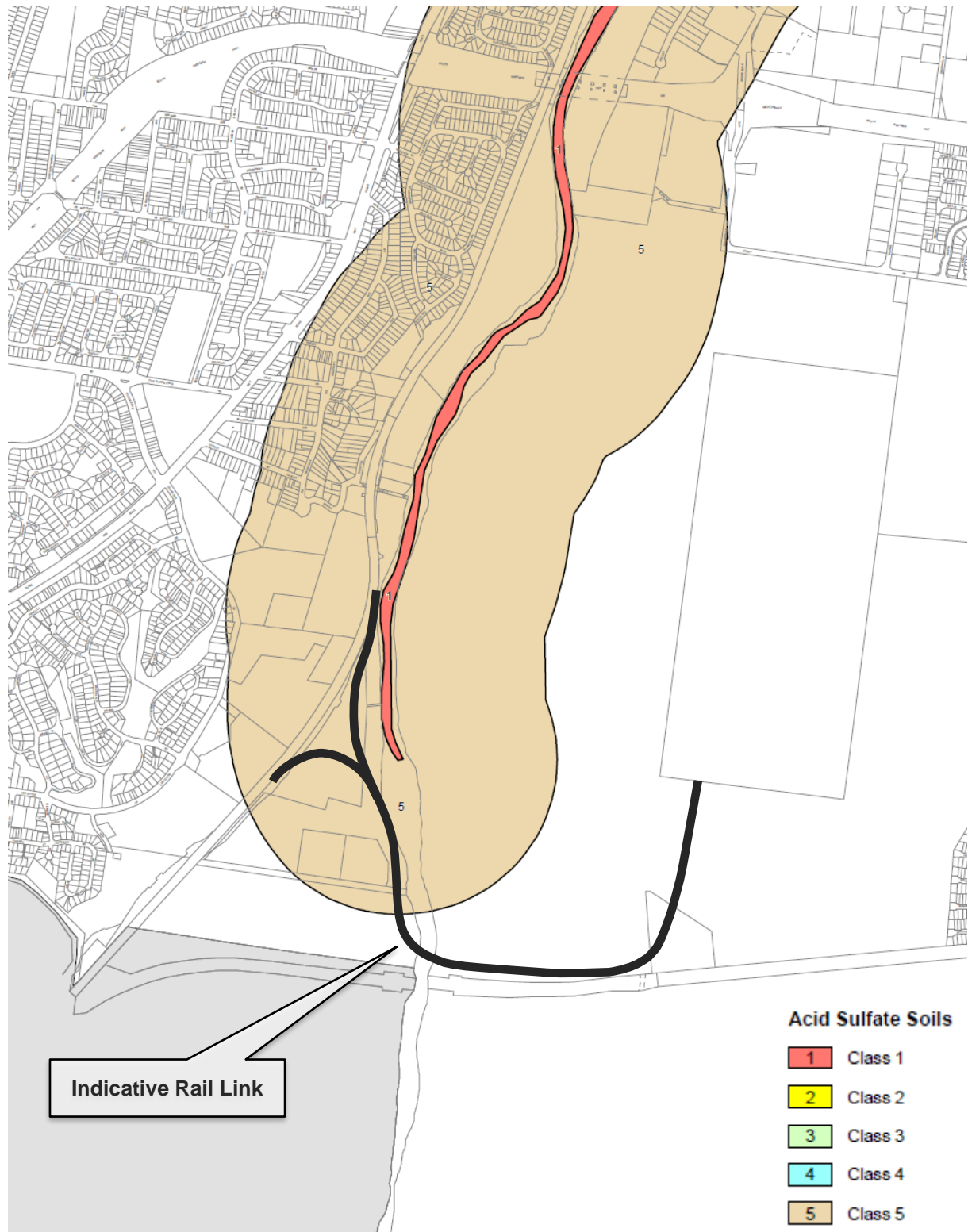


Figure 2: Location of Known Acid Sulfate Soils (Source: Liverpool LEP 2008)



## 6. Aspects and Potential Impacts

Environmental Aspects and Impacts associated with disturbance of ASS are shown in Table 3.

Table 3: Environmental Aspects and Impacts

Construction Zone	Aspects	Impacts
Georges River Bridge	<ul style="list-style-type: none"> <li>■ Installation of piling structures into river bed:               <ul style="list-style-type: none"> <li>— Disturbance of river bed sediments into water column when piling</li> <li>— Supplementary blasting / dredging that maybe required that mobilises river bed sediments into water column or requires extraction from the water column</li> <li>— Stockpile storage exposed to air and rainfall</li> </ul> </li> <li>■ Installation of piling and other structures into river banks and approaches to the bridge:               <ul style="list-style-type: none"> <li>— Excavation beneath the water table</li> <li>— Dewatering excavations</li> <li>— Stockpile storage exposed to air and rainfall</li> <li>— Geotechnical settlement of materials.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>■ Detrimental effects upon surrounding fresh water and marine ecosystems (i.e. Georges River and Anzac Creek)</li> <li>■ Degradation of water resource quality</li> <li>■ Detrimental effects upon terrestrial fauna and flora within the flood plain of disturbed ASS materials</li> <li>■ Corrosion of concrete, roads, steel structures such as rail lines and geotechnical piles</li> <li>■ Differential settlement as a result of oxidation of the crystalline sulfide content of the material</li> <li>■ Loss of visual amenity as a result of staining of ground surfaces in the vicinity of disturbed ASS materials.</li> </ul>
Former Glenfield Waste Facility	<ul style="list-style-type: none"> <li>■ Excavation beneath the water table</li> <li>■ Dewatering excavations</li> <li>■ Stockpile storage exposed to air and rainfall</li> <li>■ Geotechnical settlement of materials.</li> </ul>	
Other Construction Areas	<ul style="list-style-type: none"> <li>■ Excavation beneath the water table</li> <li>■ Dewatering excavations</li> <li>■ Stockpile storage exposed to air and rainfall</li> <li>■ Geotechnical settlement of materials.</li> </ul>	

## 7. Management, Controls and Mitigation Measures

### 7.1 General Principles

A set of procedures for the identification and management of ASS issues associated with Georges River water quality and ASS solids and leachate that may be encountered across the Project construction corridor is provided in Annexures D, E and F.

### 7.2 Identification of ASS Issues

The method for identifying ASS is provided in Annexure D. This is derived from the Acid Sulfate Soil Manual (ASSMAC 1998). If an area is suspected of containing ASS, the Environment Manager or Environmental Coordinator will be notified immediately for confirmation.

### 7.3 Method for ASS Field Screening Tests

The procedure for field screening tests for ASS is provided in Annexure E. This derived from the Acid Sulfate Soil Manual (ASSMAC 1998). The ASS Field Screening tests will be performed by the Environment Manager, Environmental Coordinator or other appropriately trained personnel.

### 7.4 Adverse River Water Quality

In the event that adverse river water quality is identified as a result of construction activities refer to the incident response measures in the IEMP, PIRMP and CSWMP.

### 7.5 Immediate Re-use of PASS Solids

In the case of immediate reuse on site (e.g. trenching and backfilling within a day), there is a reduced likelihood that PASS will be exposed long enough to oxidise and become ASS. Immediate reuse (same day) may be appropriate if PASS are of low to moderate strength. Lime application will occur prior to backfilling as a precautionary measure.

Further, the soil material will be backfilled in the reverse order of excavation (i.e. last out, first in).

Note: the majority of situations are not conducive for immediate reuse and as such the decision for immediate reuse can ONLY be made by the Environment Manager.

### 7.6 Dewatering

The following strategies for dewatering will be followed:

- Minimise the dewatering depth required for installation (i.e. as close as practicable to the invert level of the excavation)
- Minimise the time and volume of exposed acid sulfate soils (i.e. stage excavation and dewatering)
- Collection of extracted groundwater for temporary storage and treatment as necessary prior to appropriate disposal / release
- Dose the base of the excavation at a rate of approximately 1 kg/m<sup>2</sup> of agricultural lime in order to counteract the generation of acidic leachate following groundwater recovery.

The following inspection and monitoring procedures are recommended:

- Background groundwater pH should be confirmed prior to the commencement of dewatering where practicable
- pH monitoring of extracted water should be undertaken over the duration of the dewatering period
- pH should be measured within the excavation after neutralisation. Appropriate pH should be within 1 pH unit below and above background surface / groundwater pH. Where no background pH data exists, use target range: 6.5 to 8.5.

### 7.7 Permanent Drain Construction

The following strategies for permanent drain construction are recommended:

- Minimise the design depth of permanent drainage channels by constructing wide, shallow drains where possible;

- Installation of in-drain water control structures, such as drop-boards or weirs (to maximise water coverage of ASS materials); and
- The base and sides of permanent drains or basins in ASS areas should have one or more of the following implemented:
- Installation of an impervious water shedding cover upon the exposed walls and base; and
- Use of limed sand bags upon the exposed walls and base.

## 7.8 On-Site Treatment of ASS

In most instances, on-site treatment of ASS is the preferred option utilising the treatment pad (as shown on the Site Environmental Plan). Annexure F has been prepared to provide a containment and treatment procedure for ASS. Should the ASS not be able to be treated on site, refer to Section 7.9 for off-site disposal options.

## 7.9 Off-Site Disposal of ASS Solids

The following protocols must be followed in relation to off-site disposal of ASM to an EPA licensed landfill.

- Landfills shall be licensed to receive the type of waste.
- Consult the EPA for facilities able to accept this waste (telephone 131 555).
- PASS may be disposed, in accordance with the Waste Classification Guidelines Part 4: Acid sulfate soils (EPA 2014), below the water table at a facility licensed to accept the material provided the following conditions are met:
  - The material must meet the definition of virgin excavated natural material (VENM) under the Protection of the Environment Operations Act 1997 notwithstanding the material contains sulfidic ores or soils.
  - The material must be kept wet at all times during excavation, handling, transport and storage.
  - The material must be received at the proposed disposal location within 16 hours of excavation.
  - The material must be disposed within 8 hours of arrival at the facility (i.e. within 24 hours of excavation) and kept wet until burial at a level more than 2 m below the lowest recorded historical groundwater level at the disposal location.
- PASS that has dried out, undergone any oxidation of sulfidic minerals or has a pH less than 5.5 must be treated and disposed as ASS.
- If the PASS cannot be classified as VENM, or if a suitable underwater disposal site at a licensed landfill is not available, the PASS must be treated and disposed in the same manner as ASS.
- ASS may be disposed at a licensed landfill providing:
  - The ASS must be treated in accordance with the neutralisation techniques identified in ASSMAC 1998 prior to off-site disposal.
  - Following neutralisation, the waste material must be chemically assessed in accordance with the Waste Classification Guidelines Part 1: Classifying Waste (EPA 2014a). Once classified in accordance with EPA 2014a, the material must be disposed at a facility licensed to accept the waste type.
  - It is the responsibility of the waste generator to inform the disposal facility that the ASS has been neutralised in accordance with ASSMAC 1998 and classified in accordance with EPA 2014a.

## 7.10 Mitigation Measures

Mitigation measures for the management of acid sulfate soils are listed in Table 4 below.

Table 4: Mitigation Measures

No.	Control	Timing	Accountability	Source
<b>General</b>				
AS1	Ensure all workers likely to be involved with the management of ASS/PASS are trained in the identification and management of the material.	Pre-construction Construction	Construction Manager Environment Manager	CPB Contractors Mandatory Minimum
AS2	Ensure work ceases whenever unexpected ASS/PASS material is suspected or discovered.	Construction	Construction Manager Supervisor Project Engineer	CPB Contractors Mandatory Minimum
AS3	Communicate all known or discovered areas of ASS/PASS to all workers involved via inductions, toolbox talks, pre starts and Site Environmental Plans.	Pre-construction Construction	Construction Manager Environmental Coordinator	CPB Contractors Mandatory Minimum
AS4	Minimise the disturbance of surface and subsurface soils in potential ASS/PASS areas.	Design Construction	Engineering Manager Supervisor Project Engineer	CPB Contractors Mandatory Minimum
AS5	Ensure all movement of ASS/PASS materials off site is tracked.	Construction	Supervisor Project Engineer	CPB Contractors Mandatory Minimum
AS6	Ensure all water runoff from ASS/PASS stockpiles is contained, treated or disposed of appropriately to ensure there is no pollution of land or waterways.	Construction	Supervisor Project Engineer	CPB Contractors Mandatory Minimum
AS7	Ensure all vehicles, plant and other machinery operating in contact with ASS/PASS is decontaminated prior to leaving site.	Construction	Supervisor Project Engineer	CPB Contractors Mandatory Minimum
AS8	Notify the Supervisor and/or Environment Manager immediately if: <ul style="list-style-type: none"> <li>■ Unexpected ASS/PASS material is suspected or discovered</li> <li>■ There is a spill of ASS/PASS material outside the ASS/PASS storage and/or treatment areas</li> <li>■ There is evidence of impacts on waterways</li> </ul>	Construction	Project Engineer Environmental Coordinator	CPB Contractors Mandatory Minimum
<b>Design Management</b>				
AS9	The design of the Project will minimise the disturbance of ASS and PASS. Strategies that will be used will include using wider, shallow drains instead of deep drains and limiting excavation into natural soils during pipe placement.	Design Pre-construction Construction	Engineering Manager Construction Manager	ASSMAC 1998
AS10	The design and location of impermeable (non ASS/PASS material) bunded containment areas for ASS treatment areas will be attached to SEP as required.	Design Pre-construction Construction	Project Engineer Environmental Coordinator	Good practice

No.	Control	Timing	Accountability	Source
AS11	Leachate ponds in ASS treatment areas will, where the alignment geometry permits, be built up and bunded rather than excavated, to further minimise the disturbance of ASS or PASS.	Design Pre-construction Construction	Supervisor Project Engineer Environmental Coordinator	Good practice
AS12	Agricultural lime or other ASS treatment material suppliers and storage locations will be finalised prior to construction and stores of these materials will be established for on site ASS treatment	Pre-construction	Supervisor Project Engineer Environmental Coordinator	Good practice
<b>Disturbance</b>				
AS13	<p>The time of exposure of ASS and PASS will be minimised to reduce acid production and resulting impacts by:</p> <ul style="list-style-type: none"> <li>■ Programming excavations to ensure that excavations in ASS/PASS areas are left open for the minimum time possible with the objective of having temporary excavations refilled within 24hours. Application of guard lime still required.</li> <li>■ All ASS/PASS stockpiles that require more than 24 hrs (temporary storage) will be stabilised with lime to prevent acid generation. Temporary stockpiling can only occur if prior approval is obtained from the Environment Manager.</li> </ul>	Construction	Supervisor Project Engineer	ASSMAC 1998
AS14	Non-compliant waters will be treated prior to release. Limestone or ag lime will be used to neutralise acidic runoff if required. Non-compliant waters can also be pumped out with water carts and used as dust suppression or disposed off-site at a licensed facility.	Construction	Supervisor Project Engineer	ASSMAC 1998
AS15	Disturbed ASS / PASS areas will be capped with clean fill or covered with agricultural lime (1-5kg/m <sup>2</sup> ) to reduce exposure of soils and reduce the generation of acid.	Construction	Supervisor Project Engineer	ASSMAC 1998
<b>Testing</b>				
AS16	Testing of treated ASS / PASS in treatment areas will be undertaken as required using the chromium suite of analysis.	Construction	Supervisor Project Engineer Environmental Coordinator	ASSMAC 1998
AS17	Prior to discharge of water from ASS treatment areas, the water quality criteria will be met. Water that does not comply with offsite disposal criteria will be reused as dust suppression (if suitable) or taken to a licensed facility off site.	Construction	Supervisor Project Engineer Environmental Coordinator	ASSMAC 1998

No.	Control	Timing	Accountability	Source
<b>Storage and Management</b>				
AS18	The ASS treatment areas will be designed to treat the estimated ASS or PASS for the Project construction period.	Design Construction	Supervisor Project Engineer	Good practice
AS19	A supply of agricultural lime or other suitable treatment material will be stored in the treatment areas in adequate quantities to treat the planned volumes of disturbed ASS soils.	Construction	Supervisor Project Engineer	Good practice
AS20	Diversion banks or bunds around the ASS treatment areas will be established to prevent run-on or lowland waters entering the ASS bunded area.	Pre-construction Construction	Supervisor Project Engineer	ASSMAC 1998
AS21	Short to medium term stockpiling of ASS and PASS will only be undertaken when transport to or treatment in the treatment area is not possible and prior approval is obtained from the Construction Manager.	Construction	Construction Manager Supervisor Project Engineer	ASSMAC 1998
AS22	Prior to operation of an ASS treatment pad, written confirmation that the pad is impermeable is required from the Construction Manager.	Construction	Construction Manager Supervisor Project Engineer	Good practice
<b>Treatment</b>				
AS23	Treatment (neutralising) of confirmed ASS or PASS will be carried out with agricultural lime ( $\text{CaCO}_3$ ), or suitable approved alternative, at rates determined by test results.	Construction	Supervisor Project Engineer Environmental Coordinator	ASSMAC 1998
AS24	ASS / PASS material will be thoroughly mixed with agricultural lime using appropriate equipment, including PPE for staff.	Construction	Supervisor Project Engineer Environmental Coordinator	ASSMAC 1998
AS25	Treatment of low pH water by neutralising with agricultural lime or hydrated lime (pH 12) or suitable alternative will be carried out.	Construction	Supervisor Project Engineer Environmental Coordinator	ASSMAC 1998
AS26	ASS or PASS spoil will be transported to a waste disposal facility in accordance with EPA requirements where ASS or PASS cannot be neutralised or stockpiled. The Construction Manager will approve off-site ASS disposal sites prior to commencement of construction in ASS/PASS areas.	Construction	Construction Manager Supervisor Project Engineer Environmental Coordinator	ASSMAC 1998
<b>Additional Management Measures</b>				
AS27	Organic matter will be progressively removed from drains and excavations in ASS areas to limit the potential for Monosulfidic Black Ooze formation.	Construction	Supervisor Project Engineer	RMS 2005



No.	Control	Timing	Accountability	Source
AS28	Any Monosulfidic Black Ooze or other contaminants would be treated as an unexpected find and the contamination unexpected find procedure implemented.	Pre-construction Construction	Supervisor Project Engineer Environmental Coordinator	RMS 2005
AS29	Any formed Monosulfidic Black Ooze / contamination would be contained through the bunding of drains or other formation points so that it would not escape to local waterways. Validation testing of the area will be undertaken following removal of the material and in accordance with advice provided by a specialist.	Pre-construction Construction	Supervisor Project Engineer Environmental Coordinator	RMS 2005
AS30	No ASS or PASS will be imported to site.	Construction	Project Director Construction Manager Supervisor Project Engineer	Good practice

## 8. Review and Improvement

### 8.1 Georges River Water Quality Monitoring

A water quality monitoring program would be developed should ASS be encountered (or a high probability) on the project.

The monitoring criteria would be based upon background levels (where available) and/or the following:

- pH, Dissolved Oxygen and TDS –as specified by the Water Quality Performance Criteria in the Acid Sulfate Manual (ASSMAC 1998)
- Iron – as specified in Section 8.3.7 (Detailed descriptions of chemicals) for iron, Chapter 8 of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000)
- Aluminium – as specified in Table 3.4.1, 90% level of protection of a freshwater ecosystem, Chapter 3 of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000)

Should ASS be suspected, the following would be undertaken to confirm the cause of the impact to water quality:

- Five measurements of these three parameters within a 15 minute period with a calibrated water quality metre at both the upstream sampling location and the non-compliant downstream sampling location
- Calculation pH / TDS / dissolved oxygen and re-evaluate against the background water quality
- Grab samples taken at both the upstream and downstream sampling location for pH, TDS and filterable iron and aluminium (noting in-situ pH sampling with a probe is a more reliable measure)
- If upon re-measurement of these three parameters exceedance of the background is confirmed, refer to Section 7.8 and 7.9 for treatment options.
- If upon re-measurement of these three parameters compliance is confirmed, no further action is required
- All grab samples must be submitted to a NATA registered laboratory for analysis regardless of the outcome.

### 8.2 Site Inspection

The key areas that require site inspection are:

- The Georges River water column in the vicinity of where bridge piling activities will occur
- The Georges River banks and approaches to the bridge where piling and other structures will be installed
- The lower banks and water column of the Georges River within a distance of 500 metres north of bridge construction activities (in light of the mapped Class 1 ASS area to the north)
- Other project areas that require dewatering and or excavation below the water table in close proximity to the Georges River (i.e. within 200 metres).

Site inspections of these areas will be undertaken on a daily basis when construction activities are occurring and on a weekly basis during construction activities. Site inspections will focus on key indicators of sulfide oxidation, which includes:

- Unexplained scalding, degradation or death of surrounding vegetation
- Unexplained death or disease in aquatic organisms
- Formation of the mineral jarosite and other acidic salts in exposed or excavated soils
- Areas of green-blue water or extremely clear water indicating high concentrations of aluminium
- Rust coloured deposits on plants and on the banks of drains, water bodies and watercourses indicating iron precipitates
- Black to very dark coloured waters indicating de-oxygenation
- Hydrogen sulfide (“rotten egg gas”) odours
- Evidence of etching or chemical attack on metal or concrete structures

- Area of black ooze (potentially indicating Monosulfidic Black Oozes) typically in drains and low lying areas.

### 8.3 Reporting Environmental Incidents

If an incident occurs that causes or threatens environmental harm (e.g. significant acid water release or fish kill), the EPA and other agencies shall be notified immediately. The project Pollution Incident Response Management Plan (PIRMP) associated with the Environmental Protection Licence (EPL) should be followed under such circumstances.

### 8.4 Record Keeping

Records of the following should be kept:

- Inspections and monitoring
- Time, date and volumes of excavated/impacted ASS materials
- Time, date and volumes of treated ASS materials
- Treatment process undertaken and associated pH monitoring
- Off-site disposal waste classification and landfill weighbridge dockets
- pH monitoring and remedial liming associated in situ reuse activities, dewatering activities and surface water drainage areas
- All documentation associated with incident investigations and remedial corrective work.

### 8.5 Auditing

Both internal and external audits will be undertaken to assess the effectiveness of environmental controls, compliance with this Plan, Conditions of Approval and any other relevant approval and licence. Audit requirements are described in the CEMP.

### 8.6 Continuous Improvement

Continual improvement is achieved through constant measurement and evaluation, audit and review of the effectiveness of the plan, and adjustment and improvement of the CEMP, project environmental outcomes and CPB Contractors' Environmental Management System.

This plan will be updated as required:

- To take into account changes to the environment or generally accepted environmental management practices, new risks to the environment or changes in law
- Where requested or required by the NSW Department of Planning and Environment or any other Authority
- In response to internal or external audits or six-monthly management reviews

The updated plan must be endorsed by the Environment Manager and approved internally by the Project Director. Minor changes may be approved by the Environmental Representative. Minor changes would typically include those that:

- Are editorial in nature (e.g. staff and agency/authority name changes)
- Do not increase the magnitude of impacts on the environment when considered individually or cumulatively
- Do not compromise the ability of the project to meet approval or legislative requirements.

Where the Environmental Representative deems it necessary, the plan will be forwarded to the Secretary of DP&E for approval.

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## Annexures

### Annexure A: Compliance Matrix

#### Contract Clauses

There are no specific contractual requirements with respect to the management of acid sulfate soil for this Project.

#### Conditions of Project Environmental Approvals

Conditions of project environmental approvals that specifically address the management of acid sulfate soil are provided below. No other environmental planning approval requirements apply to the Project.

#### Stage 1 Conditions of Approvals

Table 5: Stage 1 Conditions of Approval

Stage 1 CoA Ref	Requirement	Where Addressed
C7	The approved works (including any excavation required for remediation) must not occur below 5 metres AHD and lower the watertable below 1m AHD on adjacent class 1, 2, 3, 4 land in accordance with the Liverpool Local Environmental Plan 2008.	Section 2.2 Design Report
E34 (f) (v)	an Acid Sulfate Soils Management Plan, if required, including measures for the management, handling, treatment and disposal of acid sulfate soils, including monitoring of water quality at acid sulfate soils treatment areas, should construction activities impact on acid sulfate soils;	This Plan
E34 (f) (vi)	a description of how the effectiveness of these actions and measures would be monitored during the proposed works, clearly indicating how often this monitoring would be undertaken, the locations where monitoring would take place, how the results of the monitoring would be recorded and reported, and, if any exceedance of the criteria is detected how any noncompliance can be rectified;	Section 7

#### Stage 1 Final Compilation of Mitigation Measures

Table 6: Stage 1 Final Compilation of Mitigation Measures

Stage 1 FCMM Ref	Requirement	Where Addressed
5A c)	An assessment of acid sulphate soils within the Georges River would be undertaken in accordance with the Acid Sulphate Soils Assessment Guideline (NSW Acid Sulfate Soils Management Advisory Committee, 1998) prior to commencement of works within the vicinity of the Georges River. Where acid sulphate soils are identified, an Acid Sulphate Soil Management Plan would be prepared in accordance with the guidelines.	Section 5.1 This Plan
6B	Excavated material will be reused on site where possible. Any excavated material that requires disposal will be subject to waste classification under the <i>Waste Classification Guidelines 2014</i> (NSW EPA, 2014) and will be disposed of at an appropriate licensed facility.	Section 7.8

#### Other Planning Approvals Requirements

There are no other of project environmental approvals that specifically relating to acid sulfate soils that are required to be addressed in this plan.

## Annexures

## Environment Protection Licence

Environment Protection Licence clauses that specifically address the management of acid sulfate soils are included in Table 7 below.

Table 7: Environment Protection Licence

EPL Ref	Requirement	Where Addressed
L1.1	<b>Pollution of waters</b> Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.	Section 7
M1.1	<b>Monitoring Records</b> The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition	Section 8
M1.2	<b>Monitoring Records</b> All records required to be kept by this licence must be: a) in a legible form, or in a form that can readily be reduced to a legible form; b) kept for at least 4 years after the monitoring or event to which they relate took place; and c) produced in a legible form to any authorised officer of the EPA who asks to see them	Section 8
M1.3	<b>Monitoring Records</b> The following records must be kept in respect of any samples required to be collected for the purposes of this licence: a) the date(s) on which the sample was taken; b) the time(s) at which the sample was collected; c) the point at which the sample was taken; and d) the name of the person who collected the sample.	Section 8
M2.1	<b>Recording of pollution complaints</b> The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies	Section 8
M2.2	<b>Recording of pollution complaints</b> The record must include details of the following: a) the date and time of the complaint b) the method by which the complaint was made c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect d) the nature of the complaint e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and f) if no action was taken by the licensee, the reasons why no action was taken	Section 8
R2.1	<b>Notification of environmental harm</b> Notifications must be made by telephoning the Environment Line service on 131 555	Section 8
R2.2	<b>Notification of environmental harm</b> The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred	Section 8



**Annexures**

## Annexure B: Glossary

The following table outlines key terms used in this document.

Term	Definition
AASS	Actual Acid Sulfate Soils
Amended Rail Link	The Rail link alignment provided within this Response to Submissions (RtS), which includes an amendment from that provided within the Stage 1 EIS. The amendment relates to a shift of the rail alignment (to the west) within the Southern Boot Lands.
ANZECC	Australian and New Zealand Environment Conservation Council
ARI	Average Recurrence Interval
ARTC	Australian Rail Track Corporation
ASS	Acid Sulfate Soil
ASSMAC	Acid Sulfate Soils Management Advisory Committee
ASSMP	Acid Sulfate Soils Management Plan
CAP	Construction Area Plan – The main document prepared during the construction planning for that work area. Includes construction methodology, risk assessment, constructability reviews and Work Pack listing.
CEMP	Construction Environmental Management Plan
CLM Act	<i>Contaminated Land Management Act 1997</i>
CMP	Contamination Management Plan
CoA	Condition of Approval
CSWMP	Construction Soil and Water Management Plan
DoD	Department of Defence (Commonwealth)
DotE	Department of the Environment (Commonwealth)
DP&E	Department of Planning and Environment
DPI (Fisheries)	Department of Primary Industries, Fishing and Aquaculture
DPI Water	Formerly the NSW Office of Water
EIS	Environmental Impact Statement
EMS	Environmental Management System
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPA	Environment Protection Authority
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
EPBC Approval	Approval (No. 2011/6229) granted under the EPBC Act on March 2014 by the Commonwealth Department of the Environment for the development of the SIMTA IMT Facility at Moorebank.

## Annexures

Term	Definition
EPL	Environment Protection Licence
ESCP	Erosion and Sediment Control Plan
HSP	Health and Safety Plan
IMEX	Import / Export
LCC	Liverpool City Council
LEP	Local Environmental Plan
LGA	Local Government Area
mAHD	Metres Australian Height datum
MIC	Moorebank Intermodal Company
MIC Project	Moorebank Intermodal Terminal Project (SSD-5066) approved under Part 4, Division 4.1 of the <i>Environmental Planning and Assessment Act 1979</i>
MIC Site	Refers to the former School of Military Engineering site, which is approved under Part 4, Division 4.1 of the <i>Environmental Planning and Assessment Act 1979</i> for the development of an intermodal facility, associated commercial infrastructure (warehousing) and a rail link (3 options have been provided).
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
PASS	Potential Acid Sulfate Soils
PIRMP	Pollution Incident Response Management Plan
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
Previous Rail Link	The Rail link alignment provided within the Stage 1 EIS dated May 2015
Rail Link	The rail link including the area on either side to be impacted by the construction works included in the Stage 1 Proposal.
RALP No. 1	Rail Access Land Package No. 1 (this Project)
SIMTA	Sydney Intermodal Terminal Alliance – a consortium comprising Qube Holdings and Aurizon
Southern Boot Land	Southern Boot Land includes Commonwealth owned land (Lot 4, DP 1197707) to the south of the former DNSDC south, and to the north of the EHPL (part of the Boot Land as described in the MIC proposal).
SSD	State Significant Development
SSFL	Southern Sydney Freight Line
TEU	Twenty-foot Equivalent Unit
WHS Act	<i>Work Health and Safety Act 2011</i>
Work Area	A separable portion of work that is identified early in construction planning to help drive early definition of construction methodology and alignment of design activities. Work Areas should be listed in the overall construction methodology. The planning document for a work area is called a Construction Area Plan.

**Annexures**

Term	Definition
Work Pack	A pack of relevant construction documents that contains relevant information for Project Engineers and foremen to manage the works. There will be multiple Work Packs contained in a CAP. A Work Pack contains safe work method statements, risk assessments, ITPs, drawings, site instructions, environmental controls, etc.
Work Procedure	A document that provides a detailed step-by-step description for how work activities will be carried out. May document Risks & Controls associated with each step.

## **Annexures**

### **Annexure C: Stakeholder Consultation Response**

This plan was consulted on as part of the Construction Soil and Water Management Plan, see Attachment C of the CSWMP for details of consultation.

## Annexure D: Procedure for Identifying ASS Soils

### Procedure for Identifying ASS Solids

The procedure for identification of ASS is provided in Figure 3 and Table 8. This procedure is based upon the central principles of the Acid Sulfate Soil Manual (ASSMAC 1998). Details of the methodology for the ASS field screening tests ( $pH_{\text{field}}$  and  $pH_{\text{fox}}$ ) are provided in Annexure E.

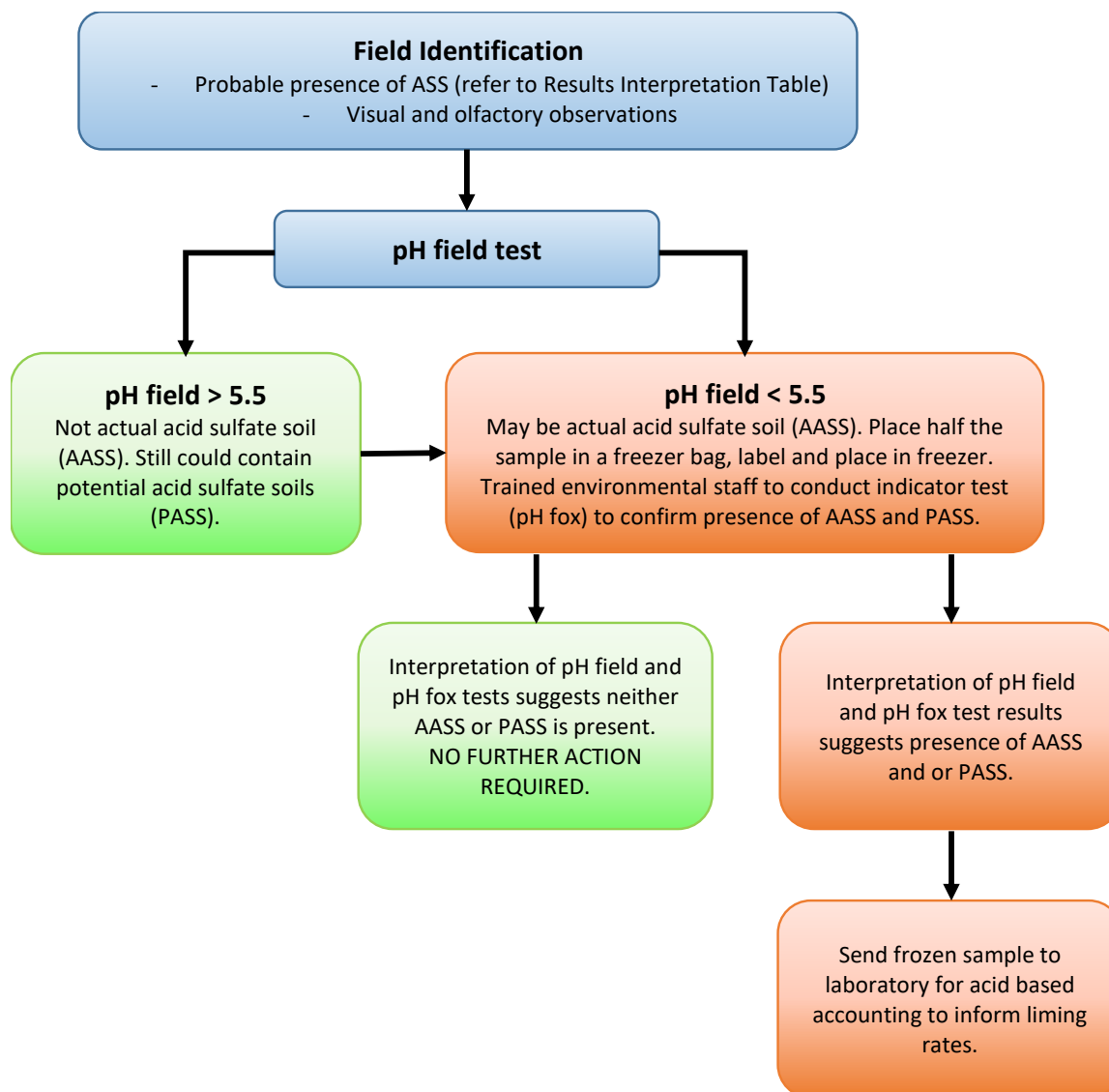



Figure 3: Procedure for Identification of ASS Solids



Table 8: Methods for Identifying ASS Solids

Element	Detail																																		
Image Examples																																			
	A – Yellow / Orange stained upper sediments	B – Orange / brown residue in surface water	C- Orange / brown staining of surfaces.	D- Exposed ASS material in excavation	E – Orange stained upper layer (oxic zone) and grey / black lower layer (reduced zone)																														
Visual and Olfactory Observations	<ul style="list-style-type: none"><li>Yellow / Orange / Red stained upper sediments and surrounding surfaces</li><li>Water logged soils with a hydrogen sulfide, ‘rotten egg’ smell</li><li>Distinct colour change with depth, where lower water logged soils become blue-green / grey / black</li><li>Orange / brown residue forming within excavations and surface water run-off areas</li><li>Orange / brown staining of surfaces.</li></ul>																																		
Field Methods to Screen Potential ASS	<ul style="list-style-type: none"><li>pH<sub>field</sub> and pH<sub>fox</sub> test as prescribed by the Acid Sulfate Soil Manual (ASSMAC 1998). A pH<sub>field</sub> value below 5.5 and a pH<sub>fox</sub> value below 3 is the screening criteria for probable presence of ASS. It should be noted this should be used as a preliminary screening tool to identify materials that require laboratory test work (i.e. not to be solely relied upon to inform management or treatment options). Sampling and tests should be undertaken by an appropriately qualified person.</li></ul>																																		
Laboratory Test Methods to Confirm as ASS	<ul style="list-style-type: none"><li>Full acid-base accounting methods [Potential Acidity (TPA or S<sub>CR</sub>), Actual Acidity (s-TAA) and Acid Neutralising Capacity (ANC)] as prescribed by the Acid Sulfate Soil Manual (ASSMAC 1998). Sampling should be undertaken by an appropriately qualified person. Laboratory test work should be undertaken by a NATA accredited laboratory.</li></ul>																																		
Action Criteria (i.e. a management strategy or treatment is required)	<table><tr><th colspan="2">Type of Material</th><th colspan="2">Action Criteria 1-1000 tonnes disturbed</th><th colspan="2">Action Criteria if more than 1000 tonnes disturbed</th></tr><tr><th>Texture range. McDonald et al. (1990)</th><th>Approx. clay content (% &lt; 0.002 mm)</th><th>Sulfur trail % S oxidisable (oven-dry basis) eg S<sub>tos</sub> or S<sub>pos</sub></th><th>Acid trail mol H<sup>+</sup>/tonne (oven-dry basis) eg, TPA or TSA</th><th>Sulfur trail % S oxidisable (oven-dry basis) eg S<sub>tos</sub> or S<sub>pos</sub></th><th>Acid trail mol H<sup>+</sup>/tonne (oven-dry basis) eg, TPA or TSA</th></tr><tr><td>Coarse Texture Sands to loamy sands</td><td>≤5</td><td>0.03</td><td>18</td><td>0.03</td><td>18</td></tr><tr><td>Medium Texture Sandy loams to light clays</td><td>5 - 40</td><td>0.06</td><td>36</td><td>0.03</td><td>18</td></tr><tr><td>Fine Texture Medium to heavy clays and silty clays</td><td>≥40</td><td>0.1</td><td>62</td><td>0.03</td><td>18</td></tr></table>					Type of Material		Action Criteria 1-1000 tonnes disturbed		Action Criteria if more than 1000 tonnes disturbed		Texture range. McDonald et al. (1990)	Approx. clay content (% < 0.002 mm)	Sulfur trail % S oxidisable (oven-dry basis) eg S <sub>tos</sub> or S <sub>pos</sub>	Acid trail mol H <sup>+</sup> /tonne (oven-dry basis) eg, TPA or TSA	Sulfur trail % S oxidisable (oven-dry basis) eg S <sub>tos</sub> or S <sub>pos</sub>	Acid trail mol H <sup>+</sup> /tonne (oven-dry basis) eg, TPA or TSA	Coarse Texture Sands to loamy sands	≤5	0.03	18	0.03	18	Medium Texture Sandy loams to light clays	5 - 40	0.06	36	0.03	18	Fine Texture Medium to heavy clays and silty clays	≥40	0.1	62	0.03	18
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	Reference: Table 4.4, Section 4.3 of the Acid Sulfate Soil Manual (ASSMAC 1998).																																		

## Annexure E: Method for ASS Field Screening Tests

The following methodology should only be performed by appropriately trained personnel and under the supervision of the Environment Manager.

### pH<sub>field</sub> Test

1. Place a small amount of soil (approx. 5-15 grams) in a beaker
2. Add distilled water to make up a soil :water paste
3. Use a calibrated pH meter to ascertain pH value.

Field pH readings of 4 or less, indicate that actual acid sulfate soils are present with sulfides having been oxidised in the past, resulting in acid soils and acidic soil pore water. Readings greater than 4 but less than 5.5 are acid and may be the result of some previous or limited oxidation of sulfides, but is not confirmatory of actual acid sulfate soils; therefore an indicator test is required.

It should be noted that substantial exchangeable/soluble aluminium and hydrogen ions usually exist at these pH values. Other factors such as excessive fertiliser use, organic acids or strong leaching can cause pH values greater than 4 but less than 5.5.

### pH<sub>fox</sub> Test

The Indicator Test measures the existing acidity of a soil/water paste, and is therefore used to help identify AASS.

#### Taking the Sample

1. Visually assess the soil for colour, texture, vegetation, porosity etc. Write down the description along with the soil location, depth, date, time and sample number onto results sheet, and onto the sampling container.
2. If you see a yellow jarosite component aim for that in your sample, otherwise, take a representative samples either in an airtight plastic bag or soil jar.

Note: Freezing the sample prevents oxidation but it is best to use samples which have been thawed; therefore if testing is not to be undertaken immediately, freeze samples.

Equipment Set Up: Follow calibration and maintenance instructions recommended by the equipment manufacturer.

#### The pH<sub>fox</sub> Test (ASSMAC 1998)

1. Place a small amount of soil (approx. 15 grams) in two heat resistant beakers (one shall be used as a control);
2. Cover the Control sample in distilled water and the Test sample with 30% hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) and observe the reactions, make notes on reaction intensity, speed and temperature changes. To increase reaction, place test sample in the sun/near heat.  
Note: Please undertake this in a very well ventilated area.
3. The reaction should be observed and rated. Continue to observe the reaction until it is complete; from 20 mins to 24 hours. Greater reaction indicates that the soil sample was more likely to have a lower pH, i.e.; super foamy reaction expects a pH of about 2.
4. While the Test sample is reacting, take the pH reading for the Control sample.
5. When reaction of test sample is complete, take pH of the solution. If required add distilled water to increase volume of solution in order to cover the pH probe.

Note: The handling and storage of H<sub>2</sub>O<sub>2</sub> is an OH&S issue and must be managed in accordance with relevant regulations and the MSDS. Conduct this test in a well ventilated area.

## Annexures

## Results Interpretation

Refer to Table 9 for results interpretation (derived from ASSMAC 1998).

Table 9: Results Interpretation

pH <sub>i</sub>	pH <sub>FOX</sub> (at completion of reaction)	Δ pH	Reaction rate	Result (e.g. **PASS or ***AASS)	Comments / Possible Explanation
3.5	3.3	0.2	L	AASS present	Oxidation has occurred and sulfuric acid has formed in the past. This soil may not have much more potential to oxidise further as the pH <sub>i</sub> and pH <sub>FOX</sub> are similar.
3.7	1.4	2.3	X or V	AASS present PASS – strong indication	Oxidation has occurred in the past. This soil has the potential to oxidise further indicated by the strong reaction, appreciable pH unit difference (pH <sub>FOX</sub> is significantly lower than the pH <sub>F</sub> ) and the very low final pH <sub>FOX</sub> .
6.5	2.1 (1.9)*	4.4	X or V	No AASS PASS – strong indication	This soil is not yet oxidised but has the ability to produce sulfuric acid if exposed. Little buffering capacity in soil. Laboratory analysis using SPOCAS could confirm this.
8.5	3.0 (3.2)*	5.5	H	No ASS PASS – likely	The initial pH may be reflecting a strong seawater influence (pH 8.2) or some form of dissolved carbonates. The large ΔpH indicates a strong likelihood of PASS even through the pH <sub>FOX</sub> is borderline. Here, the ΔpH and the reaction gives strength to the argument. Laboratory analysis using SPOCAS and reacted calcium (Ca <sub>A</sub> ) could confirm this (see Ahern & McElnea (1999)).
8.0	2.0 (6.0)*	?	H	No AASS PASS – strong indication Considerable buffering capacity	The initial alkaline pH <sub>i</sub> indicates a seawater influence. The initial large decrease in pH indicates the soil is likely to contain sulfides. The pH measured after 20 minutes may indicate a large % of shell dissolving into solution as the acid contacts it (a small amount of HCl added to a sample of soil could confirm its presence). Laboratory analysis using SPOCAS and Ca <sub>A</sub> could confirm this (see Ahern & McElnea (1999)).
5.5	5.4 (5.3)*	0.2	X or V	No AASS PASS – unlikely	The strong reaction is probably due to the presence of manganese in the soil sample.
5.5	3.8 (3.5)*	2.0	H (slow froth)	No AASS PASS – possible	The strength of the reaction indicates possible organic matter. There may be some sulfides present also. Laboratory analysis using the S <sub>CR</sub> could confirm this.
Notes:		* pH <sub>FOX</sub> after 20 minutes (or overnight)			
		** PASS – Potential Acid Sulfate Soils			
		*** AASS – Actual Acid Sulfate Soils			
		L = Low reaction M = Medium reaction	H = High reaction V = volcanic reaction	X = Extreme reaction (very vigorous, gas evolution and heat generation)	

## Annexure F: On Premises Containment and Treatment

### Containment

Containment areas shall meet the following requirements:

- Receive ASS within 24 hours of excavation from beneath the water table
- All ASS solids should be contained within a bunded area with an impermeable base and appropriately neutralised
- Any leachate produced in the bunded area should be captured and sent to disposal and/or water treatment prior to discharge (either via a Trade Waste Agreement or approved discharge area)
- Where practicable the bunded area should be located at least 50 metres from waterways and above the 1 in a 20 year ARI flood levels
- The leachate sump should be designed to store enough water for a 1 in 10 year (1 hour) storm event.

The containment requirements are illustrated in Figure 4 below.

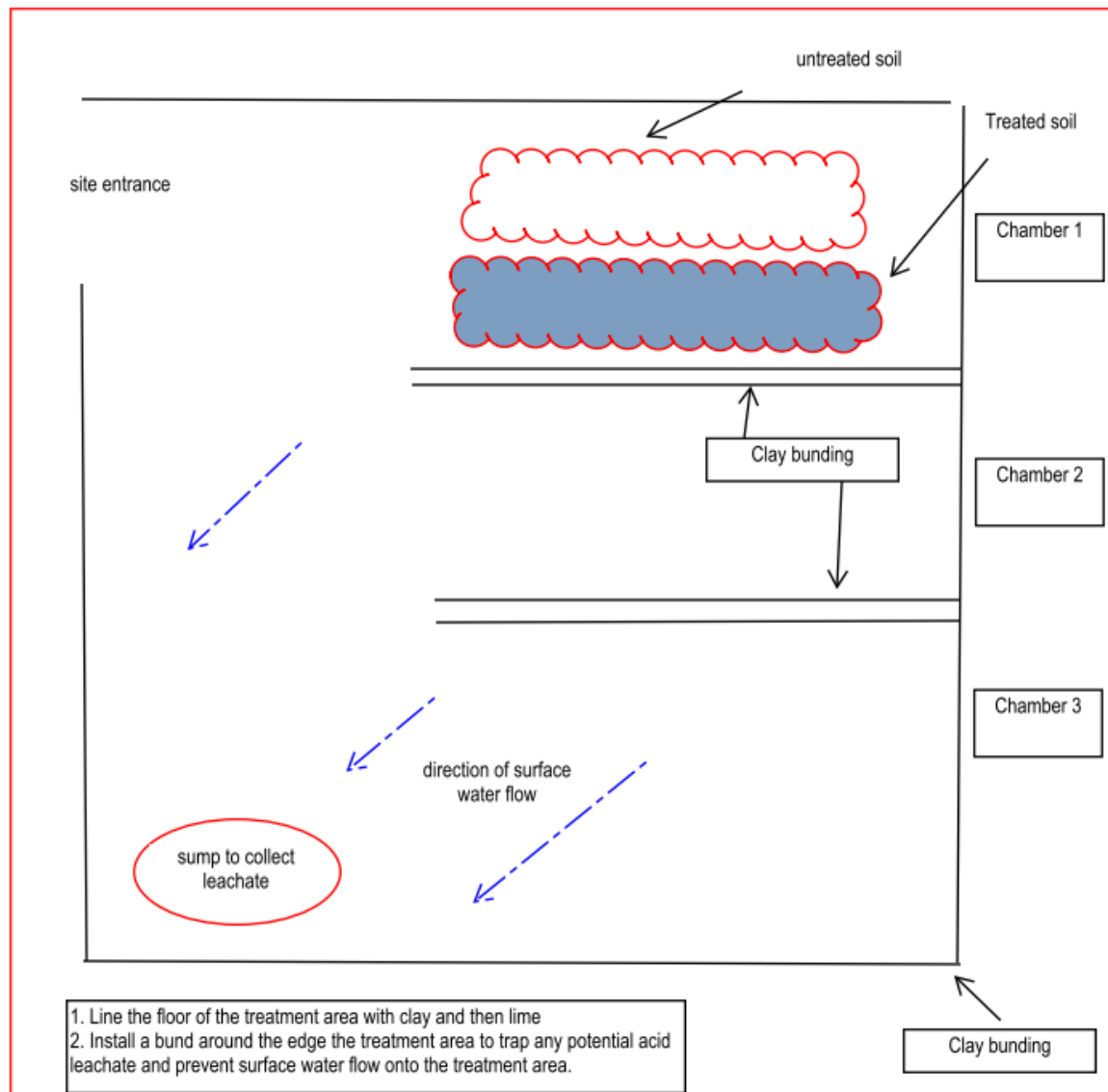


Figure 4: Containment of ASS



### Neutralisation of Solids

Suitable neutralisation agents include: natural alkaline materials such as agricultural lime ( $\text{CaCO}_3$ ) and dolomite; and more concentrated synthetic alkaline agents such as calcined magnesite ( $\text{MgO}$  or  $\text{Mg}(\text{OH})_2$ ) and slaked lime ( $\text{Ca}(\text{OH})_2$ ). Natural alkaline materials are generally cheaper and less hazardous than synthetic alkaline agents, however use of natural alkaline materials will represent greater off-site disposal tonnages as a result of significantly greater amounts required to achieve neutralisation.

Determination of the dosing rate required for neutralisation should be determined preferably by laboratory analysis. Alternatively a jar test can be performed on site by an appropriately qualified person.

For the purpose of ball park probable dosage rates, the following equation can be used:

**Alkaline Agent Required (kg) per unit volume of soil ( $\text{m}^3$ )**

$$= [(\%S \times 623.7)/19.98] \times [100/\text{ENV}(\%)] \times D \times \text{FOS}$$

Where:             $\%S$  = net acidity equivalent

$D$  = Bulk Density ( $\text{t}/\text{m}^3$ )

$\text{FOS}$  = Factor of safety (usually 1.5)

<sup>1</sup>ENV = Effective Neutralisation Capacity (e.g. 80% for agricultural lime)

<sup>1</sup>The ENV is a calculated value based upon relative molar neutralisation capacity of the reactive agent, particle size distribution and purity of the material (ASSMAC 1998)

The following protocols are recommended for when neutralising materials:

- A soil pH targeted to be in the range: 6.5 to 8.5
- Thoroughly mixing and aeration using, for example, an agricultural lime spreader and excavator. The soil should be treated in layers up to 300 mm thick to encourage aeration
- Periodic monitoring of soil pH and adjustment of the liming rate to ensure target pH is reached prior to off-site disposal
- Validation that there is no net acidity present prior to re-use (i.e. via laboratory analysis of acid-base accounting procedure)

### Neutralisation of Leachate

Treated water target pH should be within 1 pH unit below and above background surface / groundwater pH. Where no background pH data exists, use target range: 6.5 to 8.5.

Calcined magnesite (magnesium hydroxide, burnt magnesite, or magnesite) is the recommended neutralising agent as it produces a two-step reaction, which proceeds rapidly at acidic pH and slows down as higher pH is approached, and hence reduces the potential for over-neutralisation.

It should be added to the leachate as a slurry and mixing achieved via use of an agitator.

For the purpose of ball parking probable alkaline reagent dosage rates, the following equation can be used (ASSMAC 1998):

**Annexures**

$$\text{Alkaline Agent Required (kg)} = [(M_{\text{ALKALI}} \times 10^{-\text{pH initial}}) / (2 \times 10^3)] \times V$$

Where:  $\text{pH initial}$  = initial pH of the leachate;

$V$  = volume of leachate (litres)

$M_{\text{ALKALI}}$  = molecular weight of the alkaline agent

**Neutralisation Monitoring**

The following inspection and monitoring procedures are recommended:

- Daily inspection of liming operations by an appropriately qualified person during excavation
- Daily visual monitoring of stockpiles for signs of ASS affected seepage (e.g. red/yellow/orange staining)
- Daily pH testing of any seepage from stockpiles by an appropriately qualified person. Appropriate pH should be between 6.5 and 8.5
- Sampling and testing after lime treatment by an appropriately qualified person (i.e. measurements of soil pH in distilled water), undertaken initially at a frequency of at least one sample per 100m<sup>3</sup> excavated soil or daily (whichever is greater), to verify the neutralisation treatment. Appropriate pH should be between 6.5 and 8.5.

**Contingency Measures**

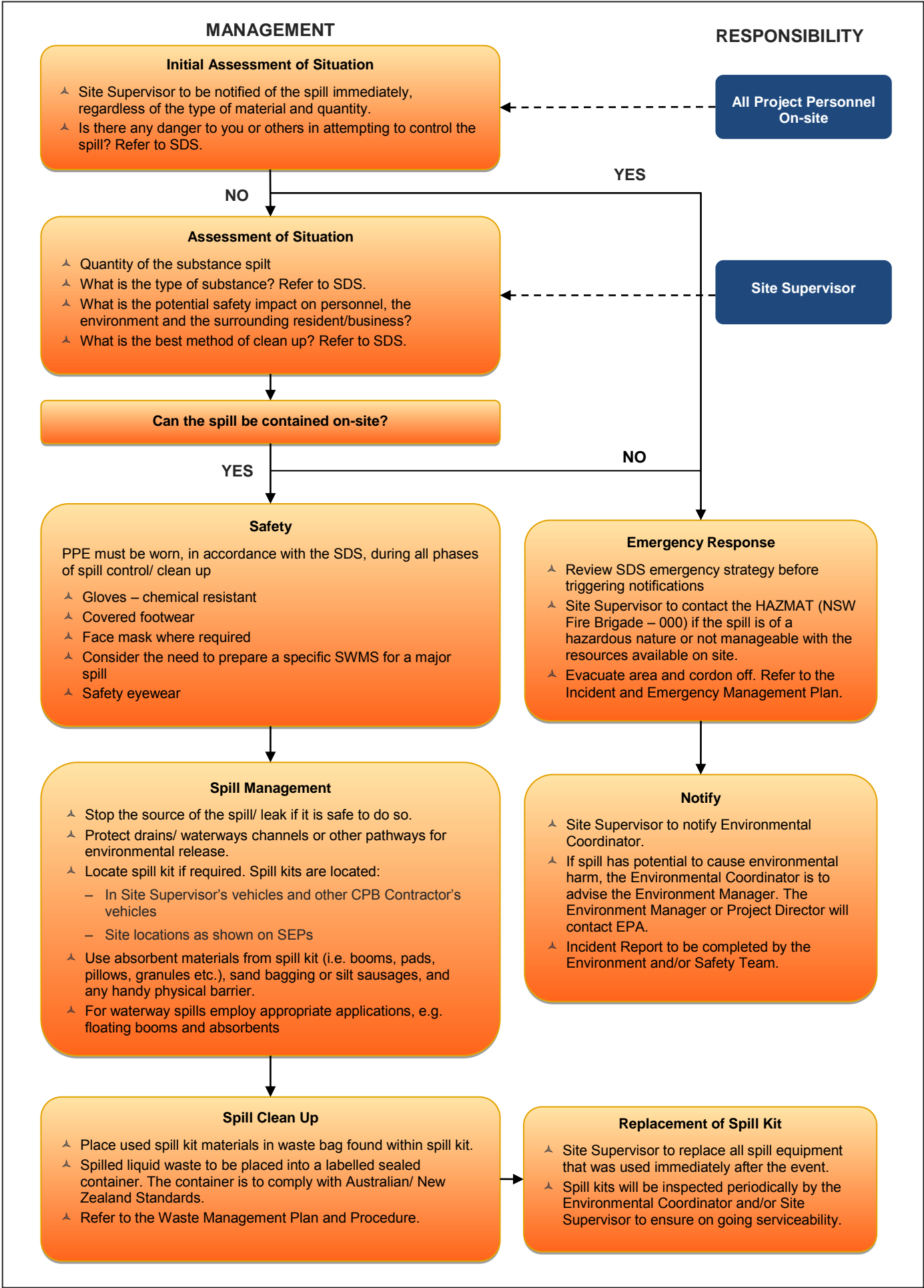
The following contingency measures are recommended:

- Monitoring during treatment indicates pH too low – additional lime should be added and continue to monitor
- Monitoring during treatment indicates pH is too high – mix additional ASS or gypsum into batch and continue to monitor
- Volume of ASS exceeds capacity of treatment area – adjust excavation or dewatering schedule where practicable
- Water quality in detention basins indicates pH too low – additional lime should be added and continue to monitor
- Water quality in detention basins indicates pH too high – gypsum should be added at the rate of 5kg/m<sup>2</sup>
- Treatment area leachate water quality indicates low pH and high electrical conductivity (greater than 1500 µS/cm) - additional lime should be added and continue to monitor
- Heavy rainfall and flooding during construction – cease operations, report incident to EPA (131 555), undertake investigation to identify impacted areas and remediate under the direction of an appropriately qualified person.



**Attachments**

**Attachment F: Spill Management Procedure**



## 1. Spill Management Procedure

### 1.1 Purpose

To detail the requirements for managing, containing and cleaning up any spills i.e. chemical, fuel or oil spills or leaks that may occur on the Project site.

### 1.2 Training

- All personnel are to undertake Project inductions identifying their environmental and compliance obligations.
- Obligations and responsibilities relevant to spill management will also be included in daily pre-start or activity-specific pre-start briefings, toolbox talks or targeted environmental training as appropriate.
- Specific training on the appropriate use of the various spill kit materials will be undertaken periodically.

### 1.3 Provision of Spill Kits

Appropriate spill kits will be located at any site where there is a significant risk / consequence of a spill (different types of spill kits are available for different pollutants). Typical spill kit materials and their application are provided in the following table.

Material	Application
Booms	Deploy booms first to contain spill. Floating booms to be used for spills in waterways to prevent spreading. Reduce the size of the spill by gently pushing the booms towards the centre of the spill.
Granules / Particulate	If the booms alone cannot absorb the spill/ leak, then use absorbent granules to soak up spilled liquid.
Pillows	Cushion shaped products containing absorbent fibres, used directly under a leak or drip. Best for thickly spread liquids.
Pads	Reduce the size of the spill/ leak by gently pushing the pads towards the centre of the spill. Best for thinly spread liquids.
Skimmers	Skimmers are used to mechanically remove the spill from waterways without creating major biological or chemical changes to the water.
Sorbents	Used in water way spills where spill material will float on the water. Sorbents are materials that soak up the spill. Once the absorbent material has been applied to the spill material, the mixture is recovered with the aid of nets, rakes, forks or pike poles. Additional options include hydrophobic spill kits
Manual Recovery	Manual recovery is another common method especially for areas with a high concentration of oil. Buckets and shovels are used to remove the oil.

### 1.4 Disposal of Spilled Material and Used Spill Containment Material and Devices

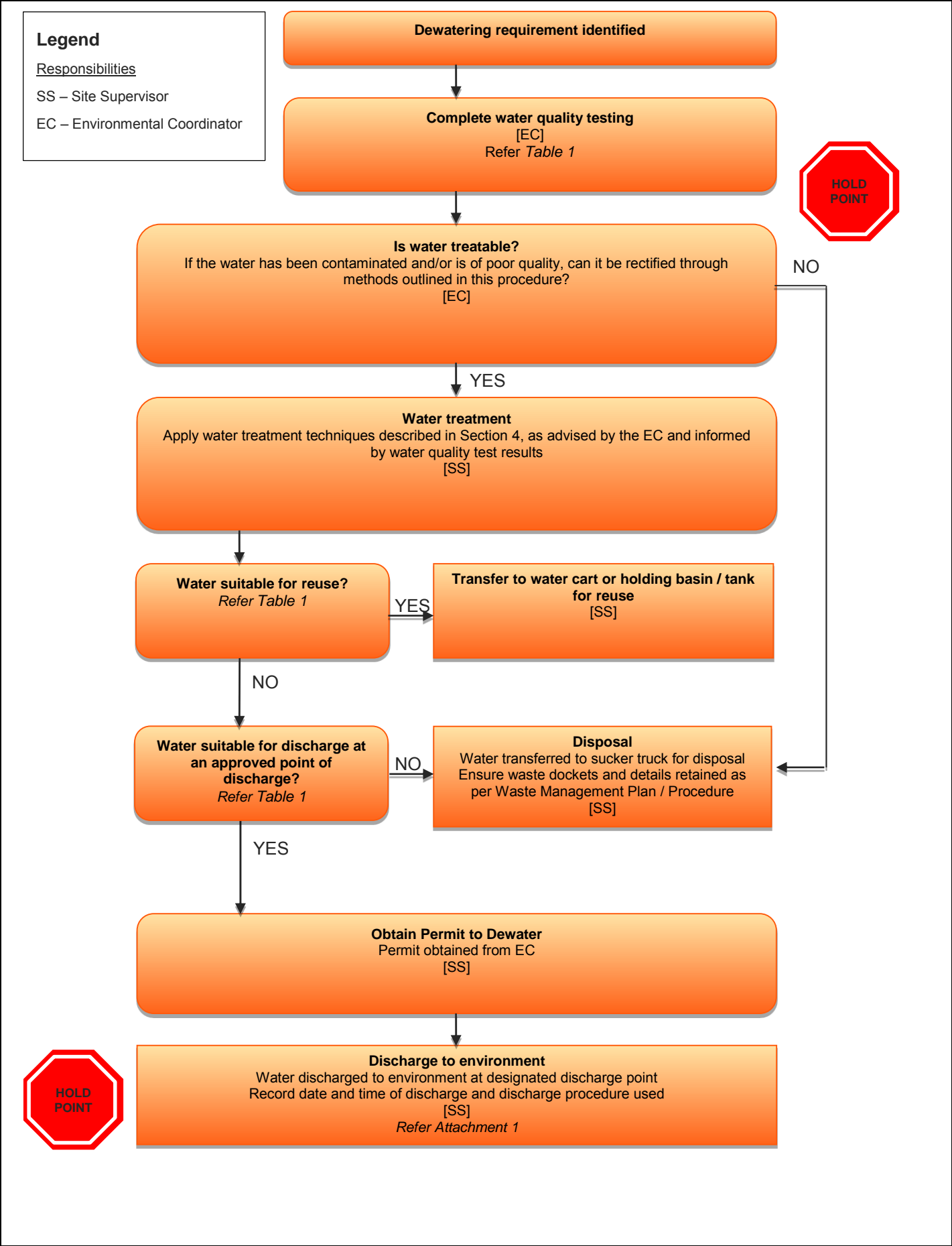
- PPE is to be worn by persons undertaking collection and disposal material used and spilled waste in accordance with the SDS.
- Booms, pads, pillows, gloves and absorbent granules to be placed in waste bag supplied in spill kit. These are then to be disposed of to the contaminated waste bin.
- Spilled liquid waste to be placed into a labelled sealed container. The container is to comply with Australian/ New Zealand Standards.

### 1.5 Incident Management

- Incidents are managed in accordance with the CEMP and Incident and Emergency Management Plan. The investigation will include a review the events leading up to the incident and implement improved practices as required, with findings reported to SIMTA and EPA as required.
- Corrective actions may include monitoring groundwater and/ or nearby surface waters for possible contamination.
- In accordance with the Protection of the Environment Operations Act 1997, should the incident be deemed to have resulted in significant environmental harm, or the associated clean up costs exceed \$10,000, the Environment Manager or Project Director will notify EPA of the incident via the Pollution Line (131 555).

**Attachments**

**Attachment G: Dewatering and Discharge Procedure**



## 1. Introduction

### 1.1 Objectives

To correctly test and treat site water to ensure potential impacts from dewatering are minimised during construction and comply with the environment protection licence (EPL) that applies to the Moorebank Precinct East Stage 1 RALP No. 1 project.

### 1.2 Training

- All personnel are to undertake project inductions identifying their environmental and compliance obligations under the Minister's Conditions of Approval for the project.
- Obligations and responsibilities relevant to dewatering procedures will be included in project induction, daily pre-start or activity-specific pre-start briefings, toolbox talks or targeted environmental training as appropriate.
- Specific training will be provided for staff undertaking water quality testing and discharge.

## 2. Dewatering and Discharge Procedure

### 2.1 Discharge Locations

Locations for the discharge of construction water, as nominated in the project EPL.

### 2.2 Water Quality Criteria

Water quality criteria that must be met prior to any offsite discharge to the environment or onsite reuse are provided in Table 1 below. Where field sampling is required, appropriately calibrated monitoring equipment as nominated below shall be used.

Table 1 Water quality criteria for discharge to environment or onsite reuse [\[this table to be updated on issue of the project EPL\]](#)

Parameter	Project Limits	Method of Assessment	Quality Control
Offsite discharge			
pH	6.5 – 8.5	pH meter	1 in 20 lab tested
Total suspended solids	50 mg/L	Laboratory analysis	N/A
Turbidity*	50 NTU	Water quality meter	1 in 20 lab tested
Oil and grease	None visible	Visual inspection	N/A
Colour	No visible discoloration	Visual inspection	N/A
Onsite reuse			
Oil and grease	None visible	Visual inspection	N/A
pH	6.5-8.5	pH meter	1 in 20 lab tested

\* If a statistical correlation is developed between turbidity and Total Suspended Solids through the construction phase for discharge water, turbidity measurements may be used to allow discharge from sediment basins before laboratory data is available, if approved under the EPL.

### 3. Reuse Options

All onsite reuse options are to be explored before any offsite discharges are permitted. Reuse of onsite water may be required for the following construction activities (but not limited to):

- Dust control
- Compaction
- Wash down
- Vegetation establishment / rehabilitation

### 4. Water Treatment

Where water can be made suitable for discharge, water treatment should occur within 24 hours following each storm event and the basin should be drained once suspended solids levels are less than 50 milligrams per litre and pH is between 6.5 to 8.5.

Where the water cannot be made suitable (e.g. due to contamination) refer to Waste Management Plan / Procedure for disposal guidelines.

#### 4.1 Neutralising Water by Adjusting pH Levels

- If the water is above pH 8.5, hydrochloric acid (32% muriatic) or suitable alternative is used to lower the pH.
- If the water is below pH 6.5 a base such as Calcium Hydroxide (lime) or suitable alternative is used to raise the pH.
- Determine quantity of lime or acid required by taking a 10 litre test sample of basin water and adding a known amount of lime or acid (initially 0.004%) and re-test. Vary the amount of lime/acid until within adopted limits. Once the required percentage is determined, calculate required volume of acid/lime for the basin by multiplying volume of water in basin by the determined percentage. Ensure thorough mixing after addition of acid/lime.

#### 4.2 Turbid Water

- If the TSS is greater than 50mg/L then the sediment must be settled out if water is to be released via a licensed discharge point.
- Treating the water with flocculent (e.g. gypsum or Alum) will make the sediment settle. Contact the environment team for advice. Application rates should be based on industry guidelines and / or manufactures specifications; typical dosing rates of 30kg of gypsum per 100m³ of water.
- NOTE: an even application over the captured water is essential for effective flocculation (e.g. use a spray or similar device to circulate the water and wait for the sediment to settle out).
- Typical timeframe for treatment to take effect is 8-12 hours.
- Environmental Coordinator to test water to ensure water quality criteria cited in Table 1 has been met prior to pumping.

#### 4.3 Oil and Grease

- Examine the surface of the water for visual evidence (e.g. sheen or discolouration).
- If oil or grease contamination is present, spread absorbent material over the surface (or similar surfactant).

### 5. Erosion and Sedimentation Control

Erosion and sedimentation controls must be maintained at all sites at all times as per the Site Environmental Plans (SEP).

Sedimentation basins must be maintained and sediment should be regularly removed to ensure inlets to dewatering systems are above sediment levels.

## Attachment H: Permit to Dewater Form

Permit to Dewater				
Permit No:	Project:		Location / Chainage:	
Expiry Date:	Project No:		Approximate Volume to be released	
Date inspected:	Water release point no:		Location to be discharged to: (e.g.) watercourse, grassed area, sediment basin, sucker truck)	
CONTROL MEASURE		YES	NO	COMMENTS
Pipe intake sited to avoid discharge of silty water				
Pipe outlet sited to avoid scouring or environmental damage at discharge point				
Float or similar device installed to prevent inlet from sinking into mud				
Spill Kit in place				
Pumping equipment checked and operational				
Water Testing Equipment Calibrated				
Water Quality Criteria (relevant to site location)		ENTER THE FIELD TEST INFORMATION HERE		
pH:	Other:	DATE:	pH:	
Total Suspended Solids:		TIME:	Turbidity:	
Turbidity		METER:	Visible Oil:	
Oil/Grease:		SAMPLE COLLECTED BY	DATE OF DISCHARGE:	
		(BASIN) DISCHARGED BY:	TIME OF DISCHARGE:	
What type and how much flocculent was applied? Type: Dose: Kg/L		SUPERVISORS NOTES		
DISCHARGE APPROVED BY (Environment Manager or Delegate) NAME: SIGNED:		Sed basin levels checked and known? (Y/N)..... Check Every .....mins. Pump Is Running OK (Y/N)..... Suction Hose is Clear of Silt (Y/N)..... Discharge is going to where it should (Y/N)..... Discharge is not causing any discolouration/oily film (Y/N)..... Other		



## Attachments

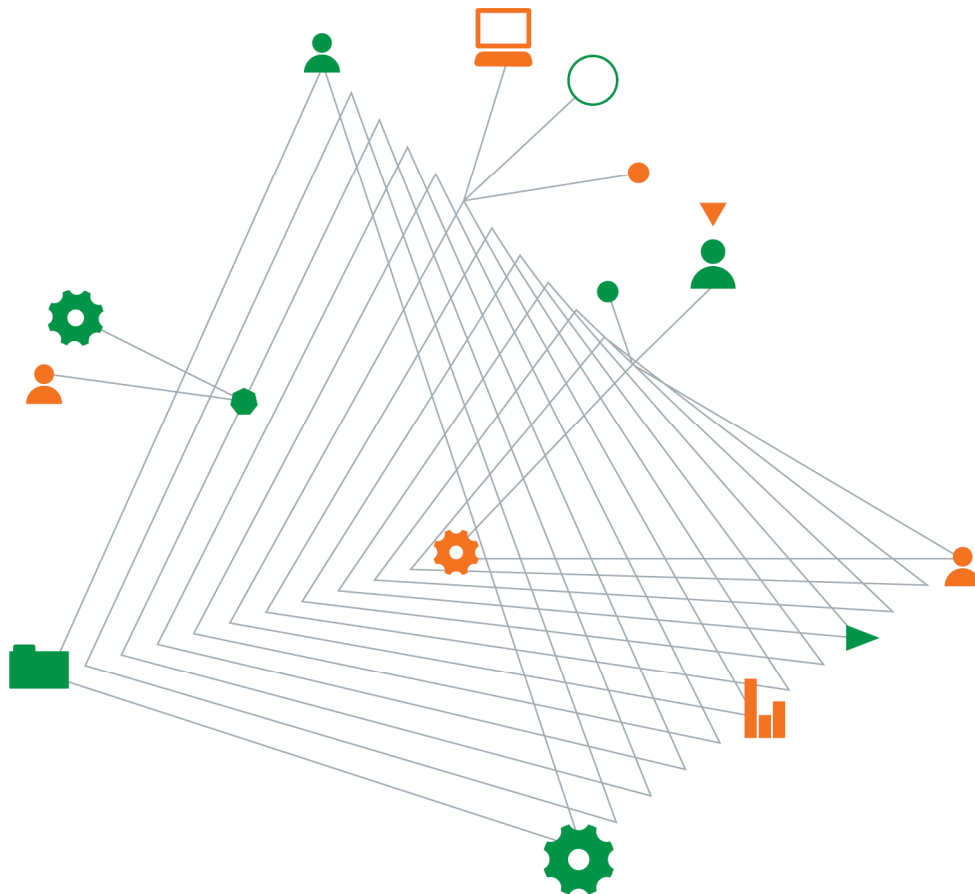
### **Attachment I: Contamination Management Plan and Asbestos Management Plan**

*It is noted that the Contamination Management Plan and Asbestos Management Plan are live documents and may be subject to change if construction works identify additional risks that need to be managed.*

**CPB Contractors Pty Ltd**

**Moorebank Precinct East Stage 1 RALP No. 1  
– Contamination Management Plan**

25 May 2018



Experience  
comes to life  
when it is  
powered by  
expertise

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# Moorebank Precinct East Stage 1 RALP No. 1 – Contamination Management Plan

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25 May 2018

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## Quality information

### Revision history

Revision	Description	Date	Author	Reviewer
Draft V1	First Draft	07/03/2016	CH/FW	SG
Draft Rev B	Second Draft incorporating SIMTA and CPB comments	29/04/2016	FW	SG
Draft Rev C	Third Draft incorporating SIMTA and CPB comments	31/05/2016	FW	SG
Draft Rev D	For SIMTA's second review	22/08/2016	FW	SG
Rev E	Updated to address final CoAs and for submission	09/02/2017	FW	SG
Rev F	Updated in response to comments from Site Auditor	06/10/2017	CPB	SG
Rev G	Updated following GWS re-design and additional investigations	10/05/2018	AR	ML
Rev H	Update following CPB comments	25/05/2018	AR	ML

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- Figure 1 – Indicative Project Map (within text)
- Figure 2 – Environmental Documents Map (within text)
- Figure 3 – Site Locality Plan (attached)
- Figure 4 – Site Identification and Land Zone (attached)
- Figures 5 to 10 – Known Contamination Locations (attached)

## **Annexures**

- Annexure A – Compliance Matrix
- Annexure B – Glossary of Terms
- Annexure C – Material Tracking Record
- Annexure D – Unexpected Finds Register

# 1. Overview

## 1.1. Purpose

This Contamination Management Plan addresses contamination management on Sydney Intermodal Terminal Alliance's (SIMTA) Moorebank Precinct East (MPE) Stage 1 (SSD#6766) – Rail Access Land Package (RALP) No. 1 (the Project, the Rail Link) and the management of impacts to the environment and community.

This Contamination Management Plan addresses the following key requirements:

- Services Agreement – Schedule 5 Principal's Project Requirements
- Conditions of Approval under SSD-6766 SIMTA Intermodal Terminal Facility – Stage 1 (NSW)
- Stage 1 EIS (including Framework CEMP and Preliminary Erosion and Sediment Control Plans)
- Stage 1 Response to Submissions Report (including Final Compilation of Mitigation Measures)
- Conditions of Approval under MP10\_0193 SIMTA Moorebank Intermodal Terminal Facility – Concept Plan (NSW)
- NSW Concept Plan EIS
- NSW Concept Plan Submissions Report (including Revised Statement of Commitments)
- Conditions of Approval under EPBC 2011/6229 SIMTA Intermodal Terminal (Commonwealth)
- Commonwealth Concept Plan EIS (including Framework CEMP and Framework SWMP)
- Other applicable legislative obligations.

JBS&G previously prepared a draft contamination management plan<sup>1</sup>, for the SIMTA facility on the east of Moorebank Avenue and the Rail Link, which is superseded by this Plan. This Plan only applies to the scope of the Stage 1 – RALP No. 1 works package which consists of the construction of a 2.8 kilometre rail line, along with its required support infrastructure including site compounds, to connect the Import-Export Terminal and Interstate Terminals to the Southern Sydney Freight Line (SSFL).

This Contamination Management Plan has been prepared based on the results of the environmental investigations previously conducted at the site, outlined in Section 1.6, and the environmental investigation completed by Coffey since 2016. The Contamination Management Plan only deals with contamination issues identified at the site during construction phase of the project. This Contamination Management Plan is a sub plan to the Construction Environmental Management Plan (CEMP) which has been prepared for the Project, and will be updated as necessary.

Construction impacts and mitigation measures associated with the activities to be undertaken at the Glenfield Waste Services (GWS) Facility will be addressed in the GWS Construction Impact Assessment Report.

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<sup>1</sup> JBS&G (2015c) 'Draft Contamination Management Plan Moorebank Avenue, Moorebank, NSW', Ref: 50342/100501 (Rev A), 11 May 2015.

## 1.2. Project Scope

SIMTA's MPE Stage 1 Development involves the construction and operation of the necessary infrastructure to support a container freight road volume of 250,000 twenty-foot equivalent units (TEU).

CPB Contractors' scope of work specifically applies to MPE Stage 1 RALP No. 1 which consists of a 2.8 kilometre rail line, along with its required infrastructure, to connect the Import-Export Terminal and Interstate Terminals to the Southern Sydney Freight Line (SSFL), and capable of accommodating trains up to 1,800m in length.

The SIMTA site is located in the Liverpool local government area. It is 27 kilometres south-west of the Sydney Central Business District (CBD), 26 kilometres west of Port Botany, 16 kilometres south of the Parramatta CBD, 0.6 kilometres from the M5 South-West Motorway, five kilometres east of the M5 South-West Motorway / Westlink M7 Motorway Interchange and connecting to the main north-south rail line via the Southern Sydney Freight Line.

The RALP No. 1 is the first package of Stage 1 of the overall MPE project and its construction will include:

- A northbound connection and a southbound connection to the SSFL
- Civil and earthworks, including remediation works and benching
- Embankments and reinforced earth walls to support the rail section that passes through the Glenfield Waste Services landfill site
- A bridge over the Georges River
- A culvert crossing over Anzac Creek
- Installation of new Moorebank Avenue overbridge
- Service relocation and protection
- Track work
- Signalling systems
- Security fencing

An indicative map of the Project is provided in Figure 1.

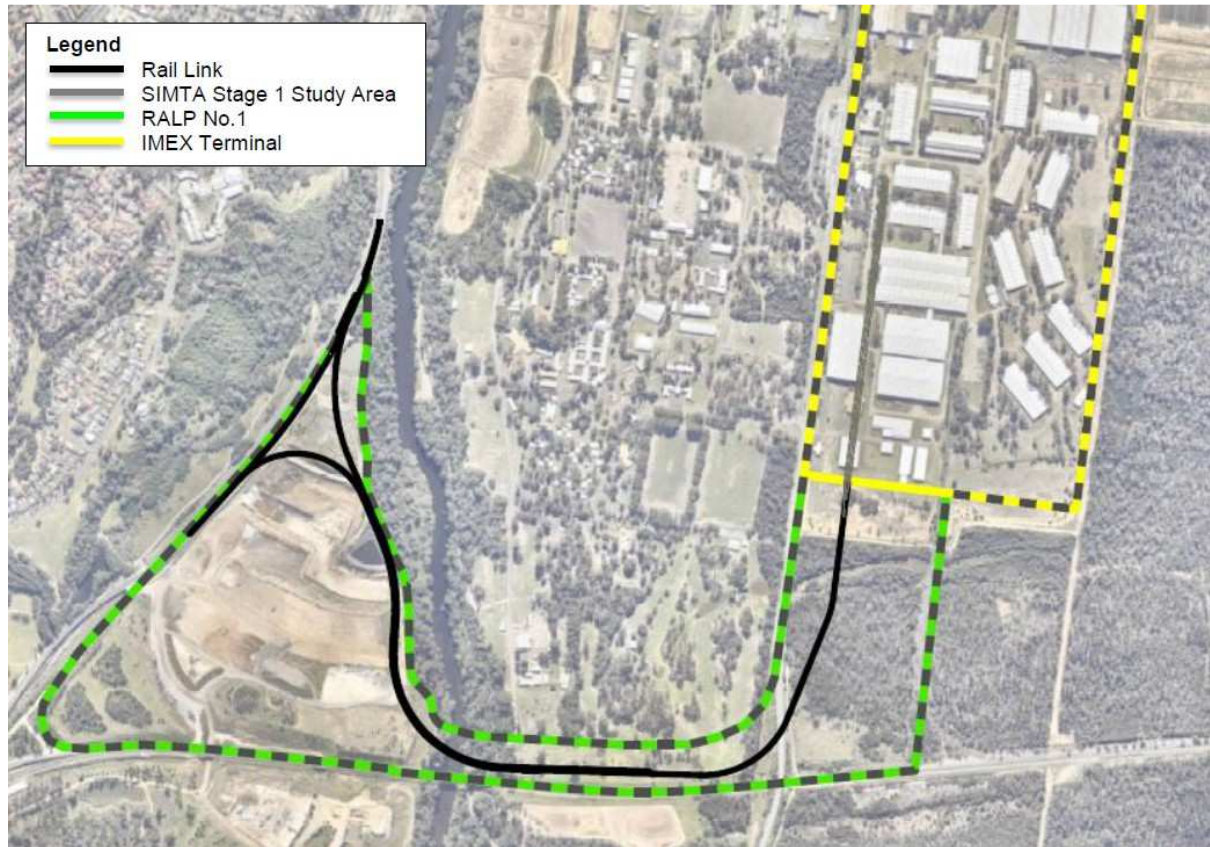


Figure 1: Indicative Project Map

### 1.3. Objective

The objective of this Contamination Management Plan is to provide measures required to manage identified and potential contamination which could be present during construction of the proposed Rail Link and within the 'work zone', in a manner which protects human health and the local environment.

This Contamination Management Plan was prepared in accordance with the DIPNR (2004) 'Guideline for the Preparation of Environmental Management Plans'.

### 1.4. Definitions

Definitions for terms used in this plan are contained in the Glossary in Attachment B.

### 1.5. Interactions with Other Management Plans

This Sub Plan is part of the Construction Environmental Management Plan (CEMP). Figure 2 below sets out interactions of this Sub Plan with the other environmental management documents implemented on the Project.

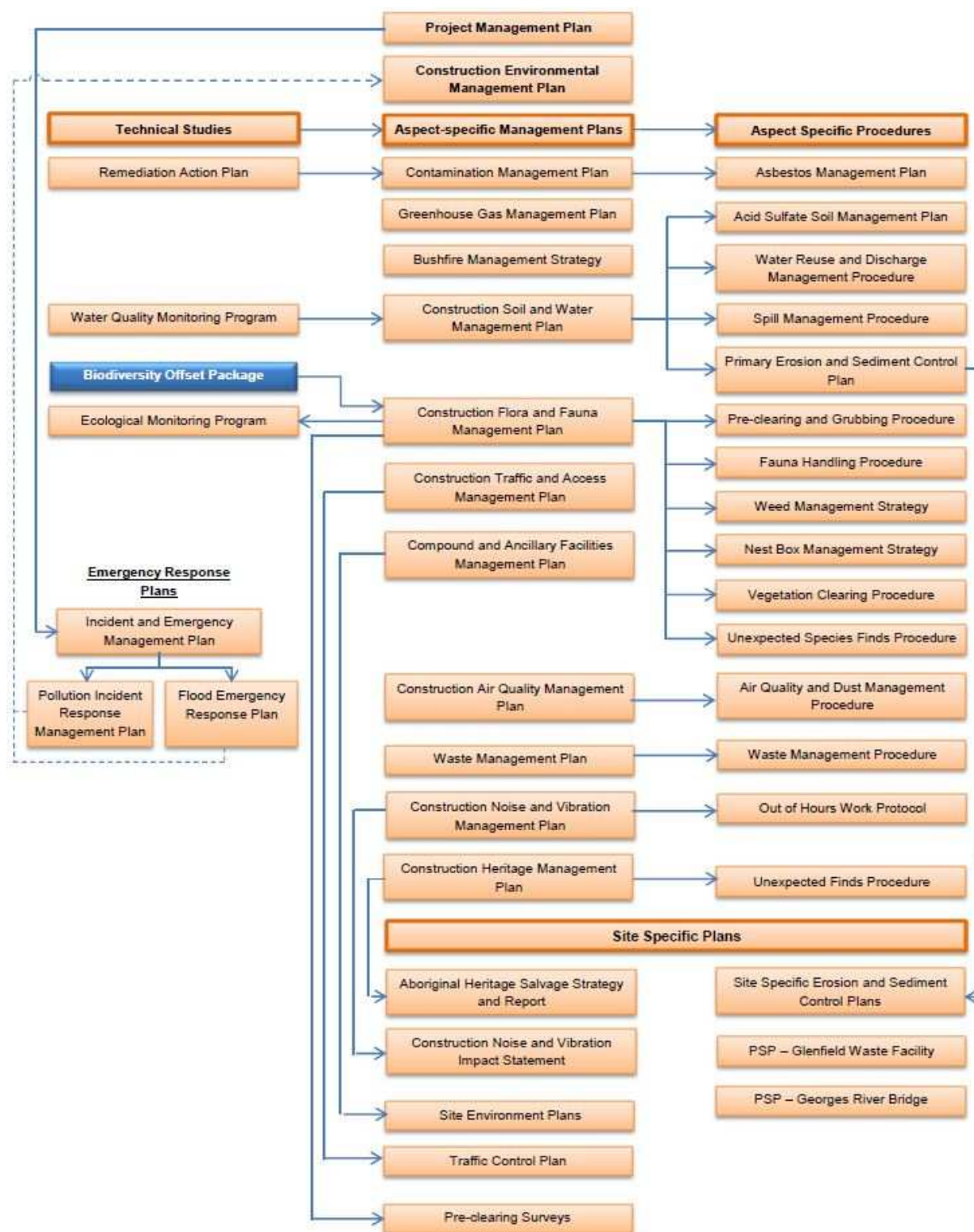


Figure 2: Environmental Documents Map



## 1.6. Reference to this Plan

This Contamination Management Plan will guide the construction methodology planning and also be referred to under the following specific circumstances:

- Pre-construction preparatory works by any contractors working within the Rail Link site
- During work where contamination is encountered
- In the event that an unexpected find is encountered

A separate document (Coffey, 2017e) 'Moorebank Precinct East Stage 1 RALP No. 1 – Asbestos Management Plan') has been prepared for managing asbestos contamination within the Rail Link site.

A Remediation Action Plan (RAP) (Coffey, 2018) has also been prepared, which provides strategy for remediation of contamination within the Rail Link site.

## 1.7. Previous Reports

The following reports have been prepared for the site and were used by JBS&G (2015c) to form their Contamination Management Plan<sup>2</sup>:

- JBS&G (2015a) 'Phase 2 Environmental Site Assessment SIMTA Intermodal Terminal Facility - Stage 1', Ref: 50342-60868, 23 March 2015.
- JBS&G (2015b) 'SIMTA Intermodal Terminal Facility - Stage 1 Remediation Action Plan', Ref: 50342-61155, 23 March 2015.

In addition, Coffey prepared the following documents specific to this work:

- Coffey (2018) 'Moorebank Intermodal Rail Link Land Contamination Status Report' Moorebank, NSW' ('the LCSR')<sup>3</sup>
- Coffey (2017e) 'Moorebank Precinct East Stage 1 RALP No. 1 – Asbestos Management Plan' ('the AMP')
- Coffey (2018) 'Moorebank Precinct East Stage 1 RALP No. 1 – Remediation Action Plan' ('the RAP').

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<sup>2</sup> Coffey was not provided with the majority of the reports, but used their referenced data from the JBS&G (2015c).

<sup>3</sup> This report includes the results of additional investigations undertaken within the Rail Link by Coffey for CPB Contractors.

## **2. Legal and Other Requirements**

### **2.1. Compliance Requirements**

Conditions of project environmental compliance requirements that specifically address the management of contamination are detailed in Attachment A.

### **2.2. Relevant Legislation and Guidelines**

All contamination related management, including remediation activities, will be undertaken in accordance with, but not limited to, all relevant sections of:

- National Environment Protection (Assessment of Site Contamination) Measure 1999, amended in 2013 (NEPM ASC, 2013).
- NSW EPA (2014) 'Waste Classification Guidelines, Part 1: Classifying Waste'.
- NSW EPA (2014) 'Waste Classification Guidelines, Part 4: Acid sulphate soils'.
- NSW EPA (2016) 'Addendum to the Waste Classification Guidelines (2014) – Part 1 Classifying Waste'.
- WA DoH (2009) 'Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia'.
- *Contaminated Land Management Act 1997* and associated guidelines
- Contaminated Land Management Regulations 2013
- HEPA (2018) 'PFAS National Environmental Management Plan'
- OEH Science (2017) 'PFAS Screening Criteria' (Draft).
- *Work Health and Safety Act 2011*.
- Work Health and Safety Regulations 2011.
- *Protection of the Environment Operations Act 1997*.
- Protection of the Environment Operations Regulations 2014
- Safe Work Australia (2016) 'Managing Risks Associated with Lead in the Workplace: Blood Lead Removal Levels and Workplace Exposure Standard'.
- State Environmental Planning Policy No 55 Remediation of Land (SEPP 55) and the associated planning guidelines (DUAP/ NSW EPA; 1998).

This Contamination Management Plan has been prepared having regard to the above regulations and guidance documentation.

### **2.3. Additional Permits and Approvals**

The project has obtained an Environment Protection Licence as required by the *Protection of the Environment Operations Act 1997*. The conditions of the Environment Protection Licence relevant to the management of contamination are detailed in Attachment A.

No other permits or approvals with respect to contamination are required.

### **3. Consultation and Stakeholders**

There are no formal requirements for consultation on this plan as part of the project approvals.

The report was provided to the Department of Environment and Planning (DP&E) in February 2017 as part of the review of the Construction Environmental Management Plan (CEMP) and other sub-plans. No comments were provided prior to the approval of the CEMP.

The report was provided to the Site Auditor upon request as part of the review of the Remediation Action Plan. Comments were provided and have been incorporated.

## 4. Roles and Responsibilities

### 4.1. Responsibilities

The key roles and responsibilities in relation to the issues relevant to this Contamination Management Plan are detailed in Table 1.

**Table 1: Roles and Responsibilities in Relation to this Plan**

Personnel	Responsibilities
Principal Contractor	<ul style="list-style-type: none"> <li>• Approve the Contamination Management Plan</li> <li>• Provision of safe working environment in relation to contamination</li> <li>• Ensure that all persons involved with this project have undertaken appropriate occupational health and safety training and have been inducted into the Coffey Contamination Management Plan</li> <li>• Ensure that all persons involved with contamination in the restricted area for asbestos has been inducted into this Contamination Management Plan</li> <li>• Ensure that all persons working in the project are adequately trained for the work they undertake</li> <li>• Keep the training and induction records relevant to this Contamination Management Plan for persons involved in this project</li> <li>• Ensure that a site specific site safety plan for works in areas of potential contamination may be encountered is prepared for the site</li> <li>• Ensure that any subcontractors provide adequate Safe Work Method Statement (SWMS) where contamination may be encountered</li> <li>• Monitor the compliance into the this Contamination Management Plan, and other relevant regulations, standards and codes</li> <li>• Control access into the restricted area for contamination</li> <li>• Be responsible for the project work at all times until work completed</li> <li>• Maintain the Unexpected Finds Register for this project</li> <li>• Auditing compliance with the Contamination Management Plan</li> <li>• Manage accident and emergency procedures related to contamination</li> <li>• Manage workplace injury management and rehabilitation</li> <li>• Inform a suitably qualified environmental consultant for unexpected finds</li> <li>• Maintain material tracking records relating to the excavation, stockpiling and disposal of waste material, as well as importation of materials to site</li> </ul>
Subcontractor(s) or their Supervisor(s)	<ul style="list-style-type: none"> <li>• Understand the requirements of this Contamination Management Plan</li> <li>• Prepare SWMS, as required by the Principal Contractor, for specific activities undertaken within the project where contamination may be encountered</li> <li>• Take reasonable care for their own safety and the safety of others</li> </ul>

Personnel	Responsibilities
	<ul style="list-style-type: none"> <li>Attend site induction contamination awareness training and identification of contamination, follow all site rules and work instructions</li> <li>Take immediate action to rectify contamination hazards that should arise during the course of the work</li> <li>Immediately report unexpected finds to site supervisor</li> <li>Comply with this Contamination Management Plan SWMS and other relevant OHS legislation and industry standards.</li> <li>Establish and maintain a positive safety climate on the project</li> <li>Compliance all other applicable statutory responsibilities related to management of contamination in the workplace</li> </ul>
Suitably Qualified Contamination Specialist	<ul style="list-style-type: none"> <li>Provision of safe working environment</li> <li>Issue this Contamination Management Plan and coordinate works to review/update the Contamination Management Plan, as necessary</li> <li>Provide onsite supervision of all potential contamination works</li> <li>Engage suitably qualified and competent staff and/or contractors to manage works in areas impacted with contamination,</li> <li>Provide advice on handling, management and treatment of potentially contaminated material</li> <li>Provide validation of excavation, waste classification and other advice in relation to contamination</li> <li>Other activities that may be required by the Principal Contractor from time to time</li> </ul>

For further staff personnel responsibilities, refer to the Construction Environmental Management Plan.

## 4.2. Training and Induction

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

- Legislative requirements (POEO Act, EPL etc.)
- Duty to notify of environmental harm (or the potential for it) including chain of reporting
- Storage and use of hazardous substances
- Water reuse and discharge procedure
- Contamination and unexpected Finds.

Detailed training will be provided to key personnel regarding contamination management. This training will include:

- Legislation as it applies to contamination
- Appropriate occupational health and safety training in relation to contamination and contamination awareness training
- Identification of contaminated material which may be encountered during their work.

- Records of the site induction and tool box talks relating to contamination will be kept.

Toolbox talks will also be used to further reinforce awareness of contamination issues.



## 5. Existing Environment

Information provided in this section is based on the information presented in the LCSR (Coffey; 2018).

### 5.1. Site Condition

The Rail Link passes across a number of parcels of land, as shown on Figures 3 and 4, and described below from east to west:

- **DNSDC South** – comprising open grassed area in the southern portion of the DNSDC site. The area is relatively level, with no obvious feature other than some sparse mature trees and wire mesh security fence along the western and southern boundaries.
- **Commonwealth Land South / Boot Toe Land** – comprising bushland, located south of the DNSDC South, which includes a cleared area with a narrow fire-trail and overhead power line corridor along the northern boundary. Anzac Creek runs east to west across the northern portion of this land. An unused rail siding runs north-south along the western edge leading from the East Hills railway line in the south into the former DNSDC site. Minor waste material (including a rusted drum) was observed during previous investigation. At the time of the Coffey investigation, a small stockpile area was noted within the work zone. It appears that some earthworks had been conducted along the fire trail. Asbestos fragments were noted in the stockpile (see Figure 3). The fragments were collected for laboratory analysis (see Section 9).
- **Sydney Trains Land** – comprising a triangular parcel of land alignment to Moorebank Avenue. An unsealed accessed road is located along the western site boundary and separately fenced from the Commonwealth Land South / Boot Toe Land and the RailCorp Land to the south of this area. The northern portion comprises patches of grassed areas, dense scrub and open bushland. At the time of the Coffey investigation, low mounds of waste burial were observed in the southwestern corner of the area, with buried waste (and containing asbestos fragments) also being observed in this area. A security fence separates the Sydney Trains Land and Moorebank Avenue.
- **Moorebank Avenue** – comprises a road, built on an embankment increasing in elevation towards the south where the road passes over the East Hills rail corridor, and the adjoining roadway corridor. The road corridor increases in width in the south, probably as a result of the realignment of the road to create the road bridge over the East Hills railway corridor when constructed (in the 1980s). Access roads are present along the eastern and western side of Moorebank Avenue. A plastic bag containing ACM was observed by Coffey on the Moorebank Avenue western access road adjacent BH15 during the 2016 investigation.
- **Royal Australian Engineers (RAE) Golf Course** – to the west of Moorebank Avenue, the RAE Golf Course is mostly open grassed former golf course including former fairways, greens and bunkers with scattered mature trees. A wide row of trees is present along the eastern boundary. To the south is the existing East Hills rail corridor and to the east, Moorebank Avenue. A security fence separates the golf course from the rail corridor to the south and Moorebank Avenue to the east of the site. Golder (2011a) noted that a former mock Viet Cong village is located in the southern portion of the RAE Golf Course and that it was noted to be outside of the investigation area at the time of the JBS&G (2015a) investigation, and outside of the Rail Link study area. CPB has confirmed with Department of Defence that the Viet Cong Village is located outside of the Project boundary and that no excavation is proposed to be carried out in the vicinity of the Viet Cong Village footprint. Further to the north of the Viet Cong Village, and approximately 250m to the north of the Rail Link is an identified defence Fire Fighting Training Area (FFTA).
- **Georges River and the surrounding land** - the proposed Rail Link alignment passes over the Georges River to the north of the existing rail bridge where it enters the Glenfield Waste Service facility. Both sides of the riverbank are heavily vegetated. Some excavation and/or filling were

observed adjacent to the existing rail bridge supports, presumably associated with construction of the bridge.

- **Glenfield Waste Services (GWS) Facility** – comprising an active landfill (waste repository) and a former quarry. The proposed Rail Corridor enters the GWS facility at the eastern boundary about 20m north of the existing rail corridor bridge crossing at Georges River. The existing East Hills rail corridor bisects the GWS Facility. The Rail Link will pass to the north of the East Hills rail corridor.

The Rail Link enters south-eastern corner of the GWS facility in a location which includes a rehabilitated area. JBS&G (2015) noted that a 'black liner material' is present on the sloping embankment leading to the river. The area also includes a fenced enclosure used to park excavation and other equipment. A gravel access road passes immediately west of the enclosure, leading to the lower excavated landfill areas towards the centre of the landfill. The Rail Link follows the eastern boundary of the GWS facility, which was observed to be at a considerably higher elevation relative to the excavated landfill base and dam. This high ground, which consists of two internal access roads utilised by GWS, was considered to be formed by natural in-situ material yet to be excavated, as well as reworked natural materials excavated at the time of quarrying.

At the time of the Coffey investigation, Coffey noted that a sign at the front of the facility that indicated that the site has previously accepted asbestos material, however this practice appears to be discontinued. Observations made during the site walkover also indicated that the current landfill cell batters appear to be lined by geomembrane. A geomembrane, which is most likely a component of the landfill liner, is visible on the top of the western slope leading to the landfill cell that is currently receiving waste. Anecdotal information provided by the GWS Facility Manager also indicated that the base of the current landfill cells is lined with geomembrane, though there is some conjecture on whether the primary component of the liner is a geosynthetic lay liner (GCL) or a geomembrane. As discussed above, there is evidence of a geomembrane anchored at the top (next to the lower access road) and extending down along the landfill cell wall is exposed around chainage (MB2S) CH40461.

Coffey noted that there are two water bodies located within the GWS Facility – a surface water dam at the northern end of the facility and a leachate pond in the central east. The surface water dam will be extended in a southerly direction to increase the capacity. The existing leachate pond will be decommissioned and pumped into the new leachate pond which will be built between the Northern and Southern Connections. The expansion of the surface water dam, decommissioning of the existing leachate pond and construction of the new leachate pond will be undertaken by the GWS Landowner (i.e. the works will not be undertaken as part of the RALP). This area of the site has been used to store overburden from the landfill operations to the site. Coffey understands that the overburden materials derived from land stripping activities undertaken prior to the quarrying and landfill cell construction activities. The overburden has been used as daily cover material in active landfill cells. Observations made during a recent walkover indicates this area has been used to store materials and plant associated with the Rail Link project. No indicators of potential contamination were noted.

The Rail Link divides into the **Northern Connection** and **Southern Connection** close to the northern end of the facility which is roughly the topographic highest point of the GWS land. The Southern Connection of the Rail Link swings towards the west and south to connect to the SSFL to the west of the current quarry, while the Northern Connection of the Rail Link maintains a northerly direction from the high ground to a lower area where the northern dam of the Glenfield site exists. Refer to Figure 3 for the Land Ownership and Figure 4 for the Land Zone.

## 5.2. Topography and Drainage

Land to the east of Georges River is generally flat with the topography sloping slightly towards the Georges River. Land immediately along the Georges River banks slopes down towards the river (JBS&G, 2015c).

The topography within the GWS Facility has been modified by quarrying and landfilling activities. The eastern boundary of the GWS Facility, along the alignment of the Rail Link, the land slopes gently to the north, with the highest ground north of the current quarry. From the northern side of the high ground there is a steep (formed) embankment down to a lower level occupied by the northern stormwater dam.

Surface water at the site will likely infiltrate unsealed ground surfaces and enter the groundwater features in the vicinity of the site, including Anzac Creek, Glenfield Creek and Georges River. Drainage within the GWF is either captured within the two dams onsite or flows into Georges River.

## 5.3. Geology

Fluvial deposits of clayey sand and clay are present beneath the Rail Link south of the SIMTA site and east of the Georges River, while the area west of the Georges River are underlain by Quaternary fluvial deposits of medium grained sand, clay and silt. The majority of the GWF area has been quarried and subsequently filled with waste materials including building demolition, shredded car tyres and asbestos disposed in the landfill within the quarry. Surface material and fluvial deposits are underlain at depth by shale and sandstone (Golder, 2011a).

## 5.4. Hydrogeology

Groundwater within the RAE site is understood to flow within shale and alluvial deposits in a north and westerly direction towards the Georges River (Golder, 2010). The two aquifers have been reported, comprising shallow and deep aquifers with groundwater at depths of approximately 6m below ground surface (bgs) to 11mbgs (DP, 2009b; URS, 2002a).

Groundwater flow in the GWF site is anticipated to be influenced by quarrying and land filling at the site, with general flow in the easterly direction towards the river (Golder, 2011a).

Deep groundwater is reported to exhibit high salinity and therefore provides little or no beneficial use. Shallow groundwater was reported to have lower salinity (URS, 2002b).

## 5.5. Acid Sulfate Soil

Construction activities associated with the construction of the Rail Link as it traverses the Georges River and the former Glenfield Waste Facility pass through 'Class 5' ASS according to Liverpool LEP 2008 Acid Sulfate Soils Map - Sheet ASS-013 (LEP Amendment 2014).

Class 5 relates to works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum (m AHD) by which the water table is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.

In this case, the mapped 'Class 1' ASS area is representative of the bed and lower bank of the Georges River (i.e. below 5 m AHD).

An Acid Sulfate Soils Management Plan has been prepared to manage any acid sulfate soils found during construction works.

## 5.6. Surrounding Land Uses

To the north of the site, east and west of Moorebank Avenue is the proposed SIMTA site (formerly DNSDC). Commonwealth (Defence) land occupies the land south of the East Hills Railway corridor (EHRC) to the Georges River. The Georges River forms the eastern boundary of the GWS Facility. To the east of Moorebank Avenue lies more Commonwealth land (i.e. Boot Land) formerly used by Defence, and is currently heavily vegetated and is being traversed by the Rail Link.

To the north of the area of the site between Moorebank Avenue and the Georges River is the former Australian Defence Force (ADF) training base and RAE Golf Course. At the time this report had been compiled, this area was undergoing significant development as part of the construction of the MITD, including demolition of old ADF buildings and excavation.

The GWF is bounded to the west by the existing South and Main Southern Rail corridor which also includes the South Sydney Freight Line (SSFL). Further west of the rail corridor is Leacock Regional Park and the residential areas of Casula east of the Hume Highway.

The EHRC is located to the south of the RALP.

Refer to attached Figure 3 and Figure 4 for the Land Ownership and for the Land Zone.

## 6. Summary of Contamination Issues

Table 2 below lists the known contamination issues as summarised in the JBS&G (2015b) RAP and Coffey (2018) LCSR. Figures 5 to 10 attached shows the locations of known contamination.

**Table 2: Summary of Contamination Issues**

Contaminant of Potential Concern (COPC)	Issue Identified at the Rail Link Site
Bonded ACM	<p>Non friable (bonded) asbestos containing material (ACM) was encountered in the fill at 0.3-0.4mbgs at a test pit within the RAE Golf Course. This is considered to be associated with historical burials or filling activity.</p> <p>Non friable (bonded) ACM was also encountered in the near surface fill at two test pits (TPE11 and TPE12) located within the Sydney Trains land, with waste burials also noted in the vicinity. Waste stockpiles and waste burials were also observed along the eastern embankment of Moorebank Avenue. ACM fragments were observed within the RALP alignment immediately south of Anzac Creek. Additionally, a household garbage bag containing ACM fragments was also observed on the western Moorebank Avenue embankment at the time of the investigation (near BH15). This is considered to be associated with historic waste burials and/or illegal dumping.</p>
Friable ACM	Friable ACM was not observed during the recent Coffey 2016 investigation however based on site observations made during investigation activities, friable ACM may be present within the fill material at TPE11 and TPE12 within the Sydney Trains Land.
Heavy metals	Lead impact was identified by JBS&G (2015) from soil sample collected at TP49 at 2.8-3.0m (2,000mg/kg). Further lead impact soils were identified during investigations in January 2018 completed by Coffey in the vicinity of TP49. TPE7A was located adjacent and to the east of TP49 where lead impacts were identified at 0.5-0.6m (10,000mg/kg) and 2-2.1m (3,500mg/kg). Test pits TPL1 to TPL10 were positioned to further assess lead impacts along the Southern Connection. The investigation did not reveal the presence of lead above Health Investigation Criteria for commercial/industrial land use (HILD), with the exception of TPL1 at 2.0m (8,100 mg/kg) and 2.5m (3,300 mg/kg). TPL1 was positioned within the RALP footprint on the GWS access road.
Landfill material, leachate and landfill gas	<p>Landfill material was encountered in boreholes BHs 7, 8, 9A and 9 during the recent investigation, at depths ranging between 1m to 15m deep. Although no landfill material was encountered in other boreholes drilled with the GWF site, it should be noted that the other boreholes were drilled outside of the current active cell due to access restriction.</p> <p>Elevated ammonia concentrations were reported in groundwater sample collected from BH18S, and surface water samples from the existing leachate dam and surface water pond. The presence of ammonia indicates that leachate is present in these locations.</p> <p>Landfill gas was generally present at a concentration exceeding the investigation criteria of 1.25%v/v in the gas and groundwater monitoring wells located within the GWF site.</p>
PFAS contamination	Post planning approval, PFAS contamination of groundwater has been identified by EP Risk (May 2017) under the western section of the Rail Link within the former RAE Golf Course, associated with previous Fire Fighting training activities conducted within the ADF base to the north. Coffey were subsequently engaged by CPB to further assess PFAS impacts within the RAE Golf Course section of the RALP. This investigation identified two additional potential sources of PFAS, namely; the FE Training Area and the Viet Cong Village, parts of which lie within the RALP site boundary. The intrusive investigation revealed that PFAS was not detected above the investigation criteria within soil, however it was detected at levels above the LOR. PFAS was detected within groundwater beneath the RAE Golf Course section of the RALP above investigation criteria. A subsequent round

Contaminant of Potential Concern (COPC)	Issue Identified at the Rail Link Site
	<p>of groundwater sampling also identified PFAS at BH5, BH18 and CWM01, with only the concentrations in the sample collected from CWM01 exceeding the investigation criteria.</p> <p>Groundwater/seepage water that is encountered during excavations is required to be managed in accordance with Section 8.6 and 10.5 of this report.</p>

There is limited data available for the following sections of the Rail Link as these sections of the site were not accessible at the time of investigation, where potential unidentified contamination risks may present.

- Northern Connection – this section of the Rail Link has been used for rail transport purposes.
- Section of the Rail Link site between Anzac Creek and the DNSDC South land. This section was previously used for Defence purposes.

The contamination expected from these areas is readily able to be managed through standard industry approaches including off-site disposal and on-site reuse or management. Further assessments will be undertaken prior to commencement of construction works.



## 7. Remediation Action Plan

Based on the recent investigations conducted along the Rail Link, it was considered that remediation will be required in certain parts of the Rail Link in order to make it suitable for the proposed rail uses. The proposed remedial activities have been summarised in the Project's Remediation Action Plan (RAP) (Coffey, 2018), developed as per Condition of Approval C8 (SSD #6766).

The objective of the RAP is to identify appropriate measures by which the identified site contamination can be remediated and/or adequately managed (including appropriate validation) as such there is a low likelihood of contamination posing a risk to human health or the environment and the Rail Link is suitable for the proposed use as rail corridor, in accordance with guidelines endorsed by NSW EPA.

At the completion of remediation and validation works, a validation report will be prepared in general accordance with the relevant sections of Guidelines for Consultants Reporting on Contaminated Sites (NSW OEH, 2011) and other relevant guidance endorsed by the NSW EPA.

## **8. Health and Safety Management**

### **8.1. Safe Work Method Statements**

The Principal Contractor or subcontractors undertaking the work must prepare specific Safe Work Method Statements (SWMS) for works undertaken. SWMS' must include activities where contaminated material may be encountered and strategy to minimise exposure to asbestos in accordance to this Contamination Management Plan, including requirements of personal protective equipment (PPE).

SWMSs must:

- Describe how work is to be carried out
- Identify the safety risks
- Describe the control measures that must be applied to the work
- Describe the equipment used in the work
- Describe any standards or codes applicable to the work
- Training and qualifications required of persons undertaking the work.

SWMS prepared by subcontractors must be reviewed and approved by the Principal Contractor.

### **8.2. Site Access Control, Barrier and Signage**

It is anticipated if areas of contamination are identified during construction works localised restricted area (contamination) may be delineated within the overall site boundaries. Access to the restricted area (contamination) will be controlled and permitted by the Principal Contractor only after persons entering the site have been advised of the potential contamination hazards.

Restricted area (contamination) boundaries shall be determined by the Principal Contractor in consultation with the Contamination Consultant and will vary according to the location and size of the required daily activities. Any restricted area (contamination) boundaries will be designed to allow other site works not involving significant intrusive works to continue without being required to adhere to this Contamination Management Plan.

It may be found that the restricted area (contamination) boundaries require to be assigned to the site boundaries, in which case all site workers must adhere to the requirements of this Contamination Management Plan.

Workers entering the restricted area must be inducted to this Contamination Management Plan. Site access will not be allowed until the workers have been inducted, have signed in, and if entering the restricted area (contamination) must have equipped with the required PPE (Section 8.3).

Upon exiting the site, personnel must remove and dispose of/clean the PPE in the provided decontamination area.

### **8.3. Personal Protective Equipment Requirements**

Requirements of Personal Protective Equipment (PPE) will be determined by the Principal Contractor, depending on the type of work for each activity, and must be covered in relevant SWMS.

In areas where contaminated soil or groundwater have not been encountered, no additional PPE is required above the standard construction site PPE outlined by the Principal Contractor for the site.

The minimum level of additional PPE required for onsite personnel working in a restricted area (contamination) is listed below:

- **Body Protection.** For workers undertaking work in the restricted areas for contamination, it is recommended that disposable Tyvek suits must be worn. Disposable gloves should also be worn for workers contacting soils. Disposable Tyvek coveralls and gloves must be removed when leaving the restricted area (contamination) and are to be considered as potentially contaminated and will therefore need to be disposed as contaminated waste.
- **Respiratory Protection.** Respiratory protection is required to prevent inhalation of asbestos fibres, should they become airborne during works to manage asbestos impacted soils/waste. As a minimum, workers shall wear a half-face mask with P2 filter.
- **Eye Protection.** Safety glasses are to be worn by personnel working on-site.
- **Hand Protection.** Disposable gloves are to be worn by personnel working on-site.
- **Foot Protection.** Steel toed boots are to be worn by personnel working on-site.

Eating, drinking, chewing gum or tobacco, smoking or other practices that involves hand to mouth transfer increases the probability of ingestion of foreign matter into the body. Hands must be thoroughly washed before eating, drinking or smoking. Smoking, drinking or eating is not permitted on-site.

Plant operators must close cabin doors and windows when operating within the restricted area for contamination.

## 8.4. Landfill Gas

Should excavation work involving disturbance of landfill materials at the GWS facility it is recommended that a Gas Management Plan (GMP) is prepared to address site specific landfill gas issues. Generally the following should be undertaken when disturbing landfill materials at the GWS facility or the wastes buried within the Sydney Trains Land.

- Continuous field screening of the work area using a combustible gas detector to monitor gas concentrations against the lower explosive limit (LEL), methane (CH<sub>4</sub>), carbon dioxide (CO<sub>2</sub>) and hydrogen sulfide (H<sub>2</sub>S).
- Workers entering into deep excavation or trenches are to be equipped with personal detectors. The detector should be able to monitor methane and hydrogen sulfide at a minimum.

Where works do not disturb buried landfill cells, monitoring will be conducted on a risk based approach. Monitoring requirements during surface construction works will be detailed in the relevant safety documents.

## 8.5. Unexploded Ordnance

Should potential unexploded ordnance be identified during excavation work, the following procedures and controls should be in place:

- Cease all work immediately and workers to move away from the affected area. The evacuation distances are generally based on the amount of explosive in the UXO, i.e., the bigger the UXO, the greater evacuation distance will require.
- Do not touch, disturb or tamper with the suspected item.
- Notify the site supervisor and secure the affected area to prevent access to other site workers

- Contact Police or Department of Defence to arrange for UXO Specialist to attend and dispose of it.
- No unauthorised entry until the affected area is cleared by UXO Specialist.

## 8.6. PFAS Contaminated Soil and Groundwater

Based on the review of available records, it is understood that the PFAS impacted soil and groundwater derive from the historic firefighting activities conducted within the Defence Estate located to the north Rail Link footprint. PFAS has been encountered in soils along the RAE Golf Course. PFAS contaminated groundwater has been identified within monitoring wells beneath the RAE Golf Course and at CMW01 within the GWS facility, adjacent the Georges River. Soil and groundwater within areas east of Moorebank Avenue have not been assessed for PFAS impacts to date.

Should excavation or piling works encounter groundwater, then the following procedures and controls will be followed:

- Avoid excavations beneath the water table, or dewatering where possible
- Advise the Project Environment Manager that groundwater has been encountered
- If workers are required to enter the excavation, the appropriate SWMS will be followed and the following additional PPE will be required in order to prevent exposure from the key mechanisms (i.e. accidental ingestion of soil/water and hand to mouth transfer).
- Management of pumped groundwater shall be done in accordance with Section 10.5.
- Management of excavated soils which are saturated with groundwater shall be done in accordance with Section 10.5.

The soils tested within the Defence Estate reveal the presence of PFAS above the LOR, however not above investigation criteria. Notwithstanding this, given the presence of PFAS within soils within the Defence Estate, these materials require appropriate management to prevent sediment entering waterways via runoff/erosion, or cross contamination of cleaner materials. Excavated soils should be placed in appropriately designated stockpiling areas, which are located away from waterways, and contain appropriate sediment control. Soil which is excavated from the Defence Estate as part of the construction works should be assessed prior to reusing such materials within the site. The assessment should also consider other relevant COPCs.

## 9. General Site Management

### 9.1. Sediment Control

An Erosion and Sediment Control Plan (ESCP) will be developed as part of the Construction Soil and Water Management Plan (CSWMP) by the Principal Contractor and will be included in the CEMP.

During excavation work the following procedures and controls should be in place:

- Ensure erosion and sediment controls are in place prior to works commencing particularly on highly erodible soils and the soils within the Defence Estate<sup>4</sup> as mentioned in Section 8.6.
- Erosion and sediment control may include (where necessary):
  - Diversion banks/drains upslope of the work to divert water around the disturbed area. Drains must discharge onto stable, preferably vegetated surfaces or through sediment controls such as silt fences.
  - Level spreaders or silt fences at the end of diversion banks of any overland flow paths leading from the disturbed area, to dissipate flows and trap sediments.
  - Geotextile filter fabric fences down slope of the work areas.
  - Silt fences or filter fabric socks at the entrance to any drains, gutters or watercourses.
- Permanent water-retaining structures or other erosion and water management controls will be routinely maintained.
- Water generated from a potentially or actually contaminated area is not allowed to be discharged into either watercourse, on-site sediment basins or stormwater basins. The water is to be contained on site in designated areas, tested and pumped out for off-site disposal to appropriately licenced facility.
- On completion of excavation works:
  - Exposed areas are to be stabilised (that is, compacted, sealed or vegetated) as soon as practicable following completion of works.
  - Erosion and sediment controls devices are to be removed once work areas have been rehabilitated.

For further information on Erosion and Sediment Controls for the project, refer to the Construction Soil and Water Management Plan. Site specific erosion and sediment controls will be detailed in Site Environmental Plans and are subject to change as construction progresses.

### 9.2. Stockpile Management

Spoil management procedures will be developed by the Principal Contractor and will be included in the CEMP and CSWMP as relevant. Further details on material management are provided in Section 10.

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<sup>4</sup> As mentioned in Section 6, PFAS was detected above the LOR within soils tested within the RAE Golf Course (Defence Estate land).

- Stockpiles containing potentially contaminated materials (and soils within the Defence Estate<sup>4</sup> as mentioned in Section 8.6.) shall be placed to minimise environmental impacts and shall consider the following items:
- Potentially contaminated material will need to be placed on plastic sheet to minimise impact to the stockpile footprint.
- Minimisation of water infiltration into stockpile by covering with plastic sheeting (particularly for potentially contaminated material).
- Stockpiles containing asbestos and/or volatile contamination shall be covered by plastic sheet to prevent exposure of contamination, if unused for over 1 day. Air monitoring may be required in the vicinity of stockpiles containing asbestos and/or volatile contamination, particularly on windy days. Air monitoring will be undertaken by a suitably qualified environmental consultant.
- Sediment control upslope to minimise surface water into stockpile.
- Sediment control downslope to minimise migration of material, particularly potentially contaminated material.

Stockpiles containing clean material shall be placed in areas without contamination wherever possible. If temporary clean stockpiles are required to be established in areas potentially contaminated, additional controls will be installed to prevent cross contamination. These include:

- Stockpile material will need to be placed on plastic sheet to minimise cross contamination.
- Sediment control upslope to minimise surface water into stockpile.
- Sediment control downslope to minimise migration of material, particularly potentially contaminated material.

Erosion and sediment controls for stockpiles will be set up as per the principals in the CSWMP and site specific erosion and sediment controls will be detailed in Site Environmental Plans and are subject to change as construction progresses.

### 9.3. Dust and Odour Management

Activities undertaken during construction of the Rail Link are likely to release both dusts and odours, which has the potential to cause nuisance and/or pose health risks to workers and community surrounding the site. Dust and odour emissions are likely to be most significant during excavation of soils.

Air quality and dust management procedures have been developed by the Principal Contractor and included in the CEMP.

In summary, the management procedures will provide details on the following aspects:

- Identification of sensitive receptors surrounding the site.
- Legislative and regulatory requirements.
- Sources of dust and odour emissions during the works.
- Establish response 'trigger levels' and implement an appropriate programme to monitor dust and odour during the works.
- Controls to minimise dust and odour emissions from the site. These control measures may include:
  - i. Staging excavation works to minimise the disturbance of contaminated soil surfaces as well as minimising the size of the excavation face open at any one time.
  - ii. Minimising stockpile heights, erecting temporary wind breaks, stockpile wetting and/or stockpile covers to minimise dust emissions.



- iii. Where strong odours are noted during the monitoring program which exceed the adopted trigger levels, works shall cease to identify the odour source and enable the deployment of odour suppressant controls. Odour controls include:
  - Modification of working methods.
  - Odour neutralising or suppressant sprays may be deployed on exposed surfaces and surrounding the site boundary.
  - Odour suppressant foams will be applied to odorous stockpiles and work faces as required.
  - In the event that persistently strong odours are detected, the provision of additional odour controls may be required.
- Identification and evaluation of contingency measures.
- Reporting and management of complaints.

## **9.4. Work Near Waterways**

Excavation work will be undertaken near the Georges River and Anzac Creek for the construction of bridge or rail track in this area. The amount of surface water and groundwater entering excavation should be minimised. All groundwater or surface water which enter excavations and require dewatering shall be managed in accordance with Section 10.5. Assessment of suitability for disposal or reuse of contained water shall be undertaken by a suitably qualified environmental consultant.

General management for potential contamination and the site in these areas shall be undertaken as per Section 10.

# **10. Management Measures for Potentially Contaminated Material**

## **10.1. Contamination Management during Site Work**

This section outlines general requirements for works that could disturb potentially contaminated material (such as excavation of soil or intersection with contaminated groundwater):

- Intrusive work onsite shall be carried out by suitably qualified and experienced contractors, who have been inducted to this Contamination Management Plan.
- Prior to intrusive work, relevant persons undertaking work in the area with potential contamination will undertake a toolbox session to ensure that they understand how to recognise contamination in soil and potential risk associated with contamination in soil. The toolbox talk will incorporate the activities required to manage contamination issues as detailed in this Contamination Management Plan.
- Site access shall be restricted as per Section 8.2.
- All relevant persons must wear the appropriate PPE at all times.
- Fill removed and stockpiled during excavation shall be kept secured in accordance with the procedure outlined in Section 9.2. Further testing as appropriate
- Groundwater is not to be mixed, diluted, or reused on the project, without further assessment. It will be contained in a manner to minimise the potential for cross contamination. Any potentially

contaminated groundwater encountered during construction activities (e.g. piling of bridge piers) is to be tested prior to discharge offsite.

- Unexpected finds must be reported to the Principal Contractor, and managed as per Section 11.
- Excavation work for potentially asbestos containing material must be managed as per the Coffey (2017) AMP.
- All relevant persons must wear disposable nitrile gloves when in contact with material identified as potentially contaminated.
- Transportation of potentially contaminated material shall be undertaken in accordance with Section 10.9.
- Vehicles or equipment in contact with potentially contaminated material shall be decontaminated as per Section 10.10.

## 10.2. Working within GWS Facility

Some subsurface work may be required to be undertaken at the GWS facility for the construction of the rail track in this area.

The amount of landfill material to be excavated should be minimised. Capping material should be separated from landfill material. Excavated landfill material should be separately stockpiled in a bund area lined with plastic liner. Stockpiles should be covered at the end of each working day and/or at the completion of excavation.

The landfill material generated as construction spoil may be reburied in another part of the landfill, subject to agreement of operator of GWS Facility.

Contaminated water seeping out of landfill material or any leachate generated from dewatering could be pumped into the leachate pond, if agreed with the GWS Facility.

Odour suppressing agent will need to be applied at regular intervals and as needed. Work should be scheduled to be undertaken during calm conditions, where possible.

No eating, drinking and smoking whilst working within GWS facility. Workers should be equipped with appropriate PPE. General management for potential contamination and the site in this area shall be undertaken as per Sections 10.1.

## 10.3. Working within Buried Waste Disposal Areas

Given that the illegal dumping and waste burial activities were previously recorded in the area along the Rail Link site, other unknown waste burial grounds may be encountered during excavation work.

Any waste materials encountered should be removed prior to commencement of construction activities. In the case where unknown waste burial is encountered, assessment of the extent of the burial shall be undertaken by a suitably qualified environmental consultant before resuming work. Should waste material be encountered during construction, the material should be separated for removal to an appropriately licensed landfill

General management for potential contamination and the site in this area will be undertaken as per Section 10.1. Waste material generated from these areas should be classified for off-site disposal as outlined in Section 10.6.1.

## 10.4. Working within Defence Land

Excavation work will be undertaken within current and former Defence properties where UXO, waste burial and other contaminated material may be encountered. General management for potential contamination and the site in these areas shall be undertaken as per Section 8 and 10.1. Waste material generated from these areas should be classified for off-site disposal as outlined in Section 10.1.

## 10.5. Management of Contaminated Groundwater

### 10.5.1. Rail Link to the East of Georges River

With the exception of PFAS, concentrations of COPC have generally not been detected above the investigation criteria. As discussed in Section 6, PFAS has been detected in groundwater above investigation criteria beneath this portion of the Rail Link. The presence of PFAS within groundwater to the east of Moorebank Avenue shall be assessed prior to the construction activities commencing in that area.

In the event that any dewatering or collection of groundwater from excavations is required in this portion of the Rail Link, the following procedures should be followed:

- Any water pumped from the excavations or runoff collected is to be stored in retention basins or fully contained tanks on-site as potentially contaminated liquid.
- Water samples are to be collected that are representative of the stored water. Samples should be analysed for PFAS contaminants to confirm the presence and nature of the contamination.
- Collected PFAS contaminated groundwater is not to be mixed, diluted or reused on the project.
- If PFAS is confirmed as present, water will be disposed of to an appropriately licensed facility.
- If visual and/or olfactory sign of other contamination is present in the water, representative samples of the water should be collected and analysed for other COPC determined by an experienced environmental consultant which may include TRH, BTEX, PAHs, metals, PCBs, chlorinated hydrocarbons and/or pesticides, and ammonia.
- If required, liquid waste will be disposed of in accordance with relevant NSW EPA guidelines.

It is noted that remediation of the PFAS contaminated groundwater under the Rail Link is not proposed given the source of the contamination is external to the project footprint. PFAS contaminated groundwater encountered during excavation or piling works will be managed based on the steps above.

### 10.5.2. Rail Link to the West of Georges River

As a portion of the site is located within a landfill (GWS Facility), the following procedures must be followed in the event that dewatering or collection of groundwater and surface water from excavations is required to construct the Rail Link:

- Water pumped from excavations within exposed landfill shall be treated as leachate and will either be, subject to approval by GWS, pumped or channelled towards the existing (or proposed) leachate pond and will be managed as per the requirements of GWS's existing EPL.
- Water that is contained within excavations within GWS, except for within exposed landfill, is to be stored in retention basins or fully contained tanks on-site as potentially contaminated liquid. Water samples are to be collected that are representative of the stored water. Samples should be analysed for contaminants, including PFAS, to confirm the presence and nature of the contamination.

- Controls shall be established to restricted runoff entering the landfill and mixing with leachate, or discharging direct into the river. Stormwater runoff shall be channelled or pumped into the existing stormwater basin in the north of the GWS facility. Stormwater shall be managed as per the requirements of GWS's existing EPL.

## 10.6. Waste Disposal and Reuse

### 10.6.1. Waste Classification

Waste classification will be undertaken for material (e.g. excavated soil or fill) requiring offsite disposal in accordance with project's waste management strategy.

The assessment must be conducted in accordance with the NSW EPA (2014) 'Waste Classification Guidelines Part 1: Classifying Waste', NSW EPA (2014) NSW EPA (2016) 'Addendum to the Waste Classification Guidelines (2014) – Part 1 Classifying Waste', NSW EPA (2014) 'Waste Classification Guidelines Part 4: Acid Sulfate Soils and the Coffey (2018) RAP by a suitably qualified environmental consultant. Some materials may have pre-classification or exemptions. Appropriate advice should be sought for these materials, in accordance with appropriate NSW EPA guidelines.

Detailed information in relation to waste classification is provided in the Coffey (2018) RAP.

### 10.6.2. Material Reuse

Upon identification of materials that require characterisation, the contractor will notify the client (or their nominated representative) and the qualified environmental consultant of the details of the material requiring characterisation and the purpose of the characterisation (e.g. materials requiring to be disposed offsite, materials requiring to be imported to the site, or characterisation of potentially contaminated soils, etc.). The Contamination Specialist will be responsible for undertaking the sampling required for characterisation based on EPA approved guidelines. Upon receipt of the analytical results the Contamination Specialist is responsible for providing appropriate documentation (e.g. material characterisation report, waste classification etc.) to the contractor.

It is expected that any landfill material generated as construction spoil will be reburial at another part of the GWF, subject to agreement with GWF operator.

Detailed information in relation to material reuse is provided in the Coffey (2018) RAP.

## 10.7. Material Importation

Where material is required to be imported onto the site, the imported fill material must comprise virgin excavated natural material (VENM) defined in accordance with Schedule 1 of the *Protection of the Environment Act 1997* (POEO Act), excavated natural material (ENM) classified in accordance with the specific exemption (NSW EPA, 2014b); or material granted a specific exemption by NSW EPA.

Prior to importation of material onto the site, the contractor/supplier shall provide, at a minimum, the following information to the site for prior evaluation in order to obtain an approval on the potential acceptability of the material for use at the site:

- Details of the source site history, source site address, and characteristics of the material (such as colour, soil type, odours)
- Details of any sampling performed for purposes of certification.

Prior to and during the importation of VENM or ENM, visual inspection must be undertaken by a suitably qualified practitioner who is competent to assess whether the appearance of the imported

material is consistent with the source material description. All materials entering into the site are required to meet current and appropriate guidelines.

Mulch should be inspected for the presence of asbestos containing materials. Detailed information in relation to material importation is provided in the Coffey (2018) RAP.

Imported material tracking will be undertaken and should include source site location, date and time of importation, vehicle registration detail, volume, testing undertaken and final placement location. Tracking records will need to be well maintained and provided for reporting within the Validation Report.

## 10.8. Material Tracking

Stockpile tracking will be undertaken and should include stockpile identification, location of placement, dimensions, volume, source location, contamination status, testing undertaken, any treatment undertaken, validation of stockpile footprint (if required) and final destination of stockpile (onsite or offsite).

Material requiring offsite disposal shall be tracked and the following information shall be recorded for inclusion within the Validation Report:

- Truck and/or bin registration number
- Origin of material
- Material type
- Approximate volume
- Waste disposal docket
- Relevant waste classification document
- Waste classification of material

Copies of waste disposal dockets shall be kept by the Principal Contractor and be provided to the Environmental Consultant to be included in the Validation Report. Detailed information in relation to material importation is provided in the RAP (Coffey, 2018). Disposal of asbestos containing material is required to follow NSW EPA's *Waste Locate* procedure which is described in the Asbestos Management Plan (Coffey, 2018).

## 10.9. Transport of Contaminated Material

Potentially contaminated material will be transported in covered trucks to minimise spills or otherwise release of contamination to the surrounding environment, and must take into consideration the specific requirements of the contamination being transported as outlined within the Protection of the Environment Operations (Waste) Regulation 2014 .

## 10.10. Vehicle or Equipment Decontamination

Vehicles or equipment that have come in contact with contaminated material shall be decontaminated at the end of work day or if exiting the contaminated area.

Example of equipment decontamination may include:

- Rinsing in a large container with fresh water to remove accumulated soil.
- Washing in a second container containing 5% Decon 90 solution, using scrubbing brush.

- Rinsing with fresh water.
- If used, the decontamination rinse water should be emptied regularly and appropriately assessed of in accordance with the appropriate guidelines. Assessment should be undertaken by a suitably qualified environmental consultant.

Vehicle decontamination can be undertaken by wheel wash or vehicle wash, or other means considered to be effective. Wastewater shall be collected by a licenced waste removalist.

## **10.11. Assessment Criteria**

If potentially contaminated soil or groundwater is proposed to be tested prior to management, treatment and/or disposal, testing will be undertaken against the most appropriate assessment criteria, as outlined in the Remediation Action Plan (Coffey, 2018), and is dependent on the nature of the contamination and the proposed management measure.



## 11. Unexpected Finds Protocol

Contamination that may not have been detected during previous investigation works may be discovered during the course of the project. Such contamination may be discovered due to observations such as:

- Odour
- Discolouration or staining of soil or rock
- Seepage of unusual liquids from soil or rock
- Unusual odours or sheens on groundwater and/or surface water
- Unusual metal objects
- Presence of underground storage tanks
- Presence of oil
- Presence of waste or rubbish above or below ground
- Potential asbestos containing material
- Unusual colour in soil
- Unusual colour in groundwater and/or surface water

Where field observations encounter ground conditions that are not consistent with records from previous investigations, this shall trigger the unexpected finds protocol. In the event that unexpected contamination is identified or suspected, works will stop in the affected part of the project area. This area will be isolated to minimise potential for disturbance to the affected soils.

The qualified environmental professional monitoring construction works will assess the unexpected find and provide advice regarding:

- a) Preliminary assessment of potential or actual contamination and need for immediate management controls;
- b) What further assessment and/or remediation works are required and how such works are to be undertaken in accordance with contaminated site regulations and guidelines. For example, this may comprise further investigation to delineate the extent of contamination.
- c) Preparation of an addendum to the remediation action plan (if necessary) or provide clean up advice;
- d) Remediation works required (where applicable);
- e) Validation works required following remediation works (if applicable). Validation works should be guided by the qualified environmental professional, and the validation outcomes documented for presentation within the Validation Report

The Site Auditor should be informed of the unexpected find once a preliminary assessment is made.

Works should not recommence in the affected area until approval has been received from the project Environment Manager, who has reviewed the advice from the qualified environmental professional. The relevant Health and Safety Plan for the project should also be reviewed following the uncovering of the unidentified find and advice received from the environmental professional.

Any unexpected finds shall be documented in the unexpected finds register for the project, copy of the register is provided in Annexure D, and documented in the validation report for the RAP (Coffey, 2018).

## 12. Contingencies

A list of contingency items and control measures with respect to this Contamination Management Plan is as follows.

**Table 3: Contingency and Control Measures**

Contingency Item	Control Measures
Person undertaking work has not been inducted into this Contamination Management Plan.	Principal Contractor or a person appointed by the Principal contractor will prepare a non-conformance report and assess reason of the non-conformance.  Person undertaking work shall be inducted into this Contamination Management Plan.
Significant unexpected find is encountered in the work area	Report to Principal contractor, who should engage a suitably qualified environmental consultant to provide advice on handling, treatment and management of the material.
Unexpected find is found on a stockpile or material that has been excavated	Stop work and report to Principal Contractor. Location of the original material should be revealed from material tracking data. Environmental consultant should provide advice on management of the material in the original location as well as the location where it has been placed.
Spills or leakage from vehicles or other equipment	Work shall cease in the area and the spill shall be contained and cleaned up using a spill kit, as much as practicable. For large leaks, which cannot be contained using the spill kit, or leaks that leave the site, emergency services (000) shall be contacted for assistance. The area should be isolated. Principal Contractor shall engage a suitably qualified environmental consultant, who will provide management measures.  All leaks and spills shall be reported as environmental incidents.
Significant dust generation	Stop work, undertake more dust suppression.  Do not commence work again until dust suppression is adequately undertaken.
Contaminated material disposed of inappropriately (e.g. to landfill which is not licenced to receive the waste)	Principal Contractor or a person appointed by the Principal Contractor shall immediately contact landfill.  Principal Contractor or a person appointed by the Principal Contractor shall prepare a non-conformance report and assess reason of the non-conformance. Rectification of the procedure shall be undertaken, if considered appropriate.  Incident may need reporting to NSW EPA in accordance with the project's EPL obligations.

Relevant emergency contacts are as follows.

**Table 4: Emergency Contacts**

Company	Contact Person and Number
Principal Contractor	CPB Contractors Pty Ltd
Site Supervisor	1800 986 465
Environment Manager	1800 986 465
Contamination Specialist	Coffey – contact through project Environment Manager
WorkCover NSW	131 050
NSW EPA	131 555

## **13. Review and Improvement**

### **13.1. Non-Compliances and Corrective / Preventative Action**

Environmental inspections and monitoring results are interpreted to identify actual and potential non-compliances and events that may result in nuisance, environmental harm and unacceptable loss of amenity or community complaints.

Following the identification of a non-compliance, corrective and/or preventative actions will be identified and assigned to the appropriate person with set timeframes. Timeframes will be set to ensure any damage incurred is rectified and any chance of recurrence is eliminated as soon as practicable.

Refer to the CEMP (Part B, Element 3) for detailed NCR and corrective action management.

### **13.2. Revisions of this Plan**

Continual improvement is achieved through constant measurement and evaluation, audit and review of the effectiveness of this Plan.

This plan will be updated as required, such as

- To take into account changes to the environment or generally accepted environmental management practices, new risks to the environment, or changes in law
- Where requested or required by the NSW Department of Planning and Environment or any other Authority
- Repeated non-conformances
- In response to internal or external audits

Refer to Part 3 – Element 12 of the CEMP for further details of the reviews of the CEMP and sub-plans, including the CMP.

The updated plan must be endorsed by the Environmental Representative and approved internally by the Project Director. Minor changes may be approved by the Environmental Representative. Minor changes would typically include those that:

- Are editorial in nature (e.g. staff and agency/authority name changes)
- Do not increase the magnitude of impacts on the environment when considered individually or cumulatively
- Do not compromise the ability of the project to meet approval or legislative requirements

Where the Environmental Representative deems it necessary, the Plan will be provided to the Secretary of DP&E for their information or approval.

## 14. Incident Response

The immediate incident response will be managed as per the Incident and Emergency Management Plan (IEMP). The following generally summaries the incident response strategies will be implemented:

- In the event of encountering unexpected contamination, remedial measures as per the Unexpected Finds Procedure will be implemented as required
- Incidents where material harm to the environment is caused or threatened will be managed in accordance with a Pollution Incident Response Management Plan (PIRMP) per the EPL requirements.

The CEMP (Part B, Element 9) covers the broader incident management, including incident notifications, classification, corrective actions and reporting.

### 14.1. Incident Response Measures

In the event that an adverse surface water quality is identified as a result of construction activities, the incident will be managed according to the IEMP. The following general response would be implemented:

- Stop works in accordance with incidence response procedures
- Review and amend construction methodology with particular note to management strategies / mitigation measures intended to prevent contamination
- Implement amended construction methodology
- Increase the frequency of monitoring until the amended construction methodology has been validated as effective (i.e. compliance with monitoring criteria) where required:
- The Project Director or Environment Manager report any pollutant release to the surrounding environment to the EPA
- Remediation of impacted areas in consultation with the EPA, NSW Office of Water and Liverpool City Council
- Recommence construction once corrective actions have been implemented and preventative actions are determined and agreed

## 15. References

- Coffey (2017e) 'Moorebank Precinct East Stage 1 RALP No. 1 – Asbestos Management Plan' ('the AMP').
- Coffey (2018) 'Groundwater Investigation – Glenfield Waste Services Landfill, Glenfield NSW, ref: GEOTLCOV24072AG-L03, dated 22 February 2018.
- Coffey (2018) 'Lead Hotspot Investigation – Glenfield Waste Services (GWS) Tip, ref: GEOTLCOV24072AG-L01v2, dated 21 March 2018
- Coffey (2018) 'Moorebank Intermodal Rail Link Land Contamination Status Report' Moorebank, NSW', ref: GEOTLCOV24072AH-R01, dated 17 April 2018.
- Coffey (2018) 'Moorebank Precinct East Stage 1 RALP No. 1 – Remediation Action Plan' ('the RAP'), ref: GEOTLCOV24072AH-R02, dated 18 April 2018.
- Coffey (2018) 'PFAS Assessment Report – Royal Australian Engineers (RAE) Golf Course', ref: GEOTLCOV24072AF-CD-Rev2, dated 12 December 2017.
- DIPNR 2004, 'Guideline for the Preparation of Environmental Management Plans', Department of Infrastructure, Planning and Natural Resources.
- DUAP/NSW EPA 1998, 'Managing Land Contamination: State Environmental Planning Policy No 55 Remediation of Land (SEPP 55)'.
- Golder. (2010). Phase 1 Environmental Site Assessment, Stage 1A of Moorebank Intermodal Freight Terminal Development. Golder Associates.
- Golder. (2011a). Phase 1 Environmental Site Assessment, SIMTA Rail Corridor Land. Golder Associates.
- Golder. (2011b). Preliminary Environmental Site Assessment - SIMTA Site and Associated Rail Corridor. Golder Associates.
- JBS&G 2015a, 'Phase 2 Environmental Site Assessment SIMTA Intermodal Terminal Facility - Stage 1', Ref: 50342-60868, 23 March 2015.
- JBS&G 2015b, 'SIMTA Intermodal Terminal Facility - Stage 1 Remediation Action Plan', Ref: 50342-61155, 23 March 2015.
- JBS&G 2015c, 'Draft Contamination Management Plan (CMP) Moorebank Avenue, Moorebank, NSW', Ref: 50342/100501 (Rev A), 11 May 2015.
- NEPC 2013, 'National Environment Protection (Assessment of Site Contamination) Measure'.
- NSW EPA 2014, 'Waste Classification Guidelines Part 1: Classifying Waste'.
- EP Risk (2017). Literature Review, Criteria for Assessment of PFAS and Risk Assessment
- EP Risk (2017). Per- & Polyfluoroalkyl Substances (PFAS) Data Gap Investigation



**Important Information about Your Coffey  
Environmental Report**

# Important information about your Coffey Environmental Report

## **Introduction**

This report has been prepared by Coffey for you, as Coffey's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice,

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Coffey has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

## **Your report has been written for a specific purpose**

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination pose in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

## **Limitations of the Report**

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey.

The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Coffey should be kept apprised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statutes and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

## **Interpretation of factual data**

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but

steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of a suitably qualified and experienced environmental consultant through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Coffey would be pleased to assist with any investigation or advice in such circumstances.

### **Recommendations in this report**

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

### **Report for benefit of client**

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

### **Interpretation by other professionals**

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Coffey prepared the report and has familiarity with the site, Coffey is well placed to provide such

assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and Coffey disowns any responsibility for such misinterpretation.

### **Data should not be separated from the report**

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

### **Responsibility**

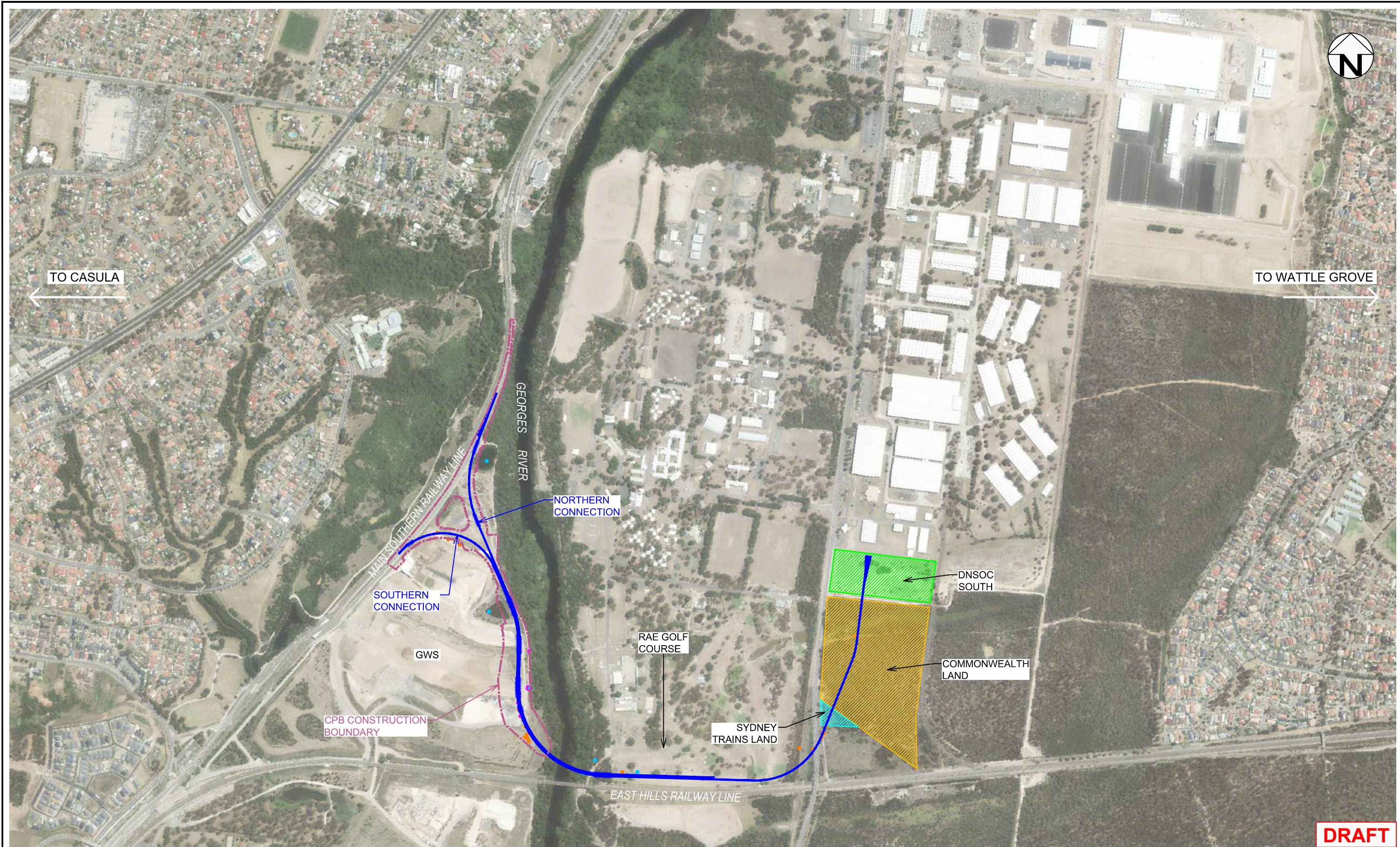
Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.

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## Figures





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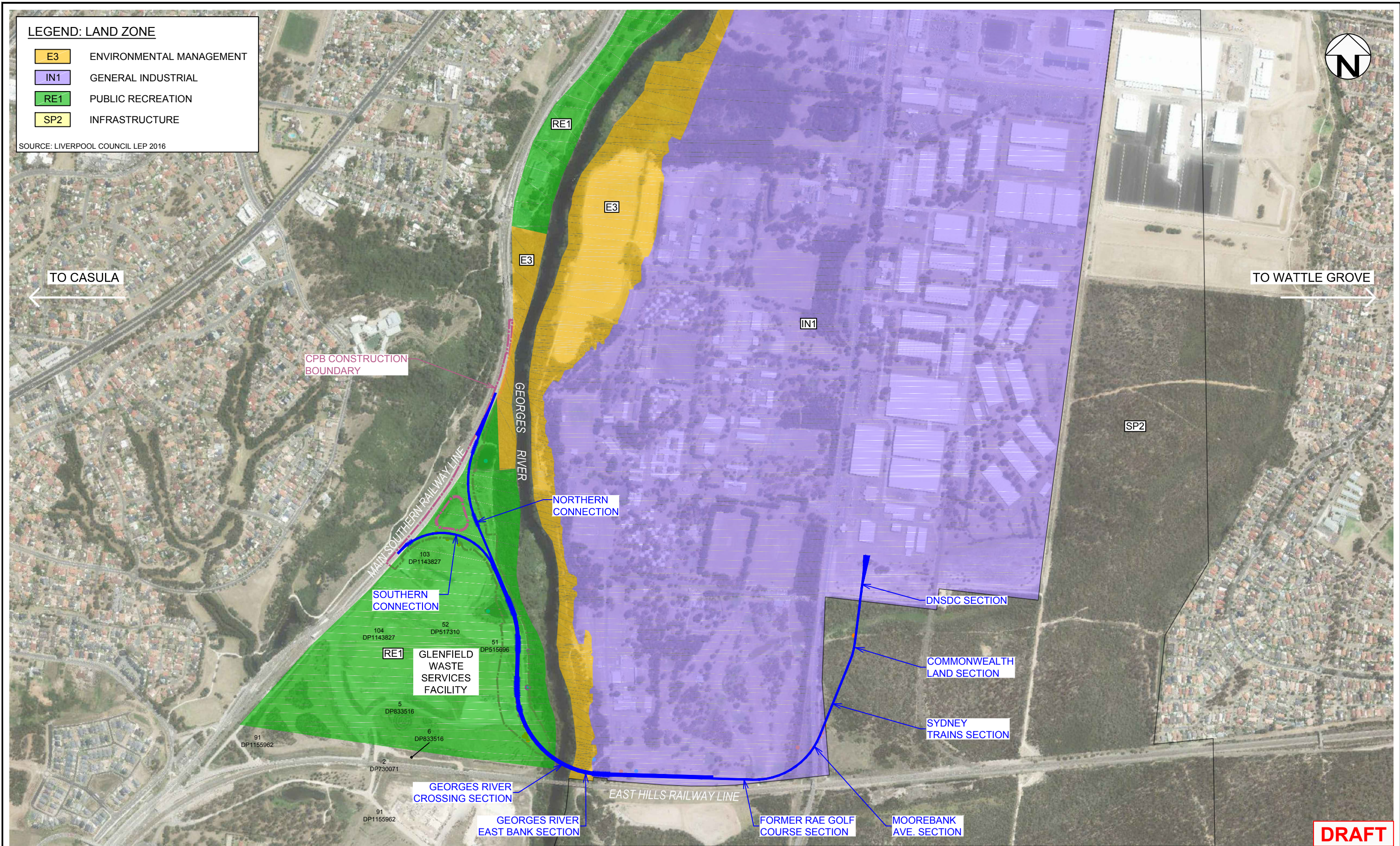
coffey

A TETRA TECH COMPANY

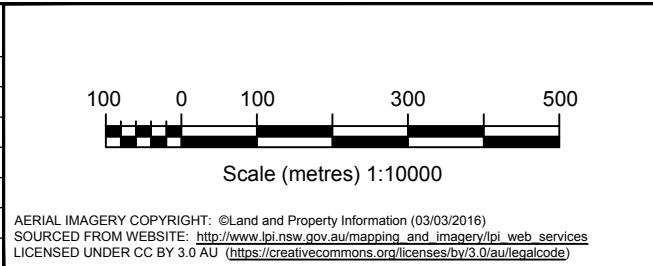
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title:	SITE LOCALITY PLAN		
project no:	754-GEOTLCOV24072AH-R03	figure no:	FIGURE 3
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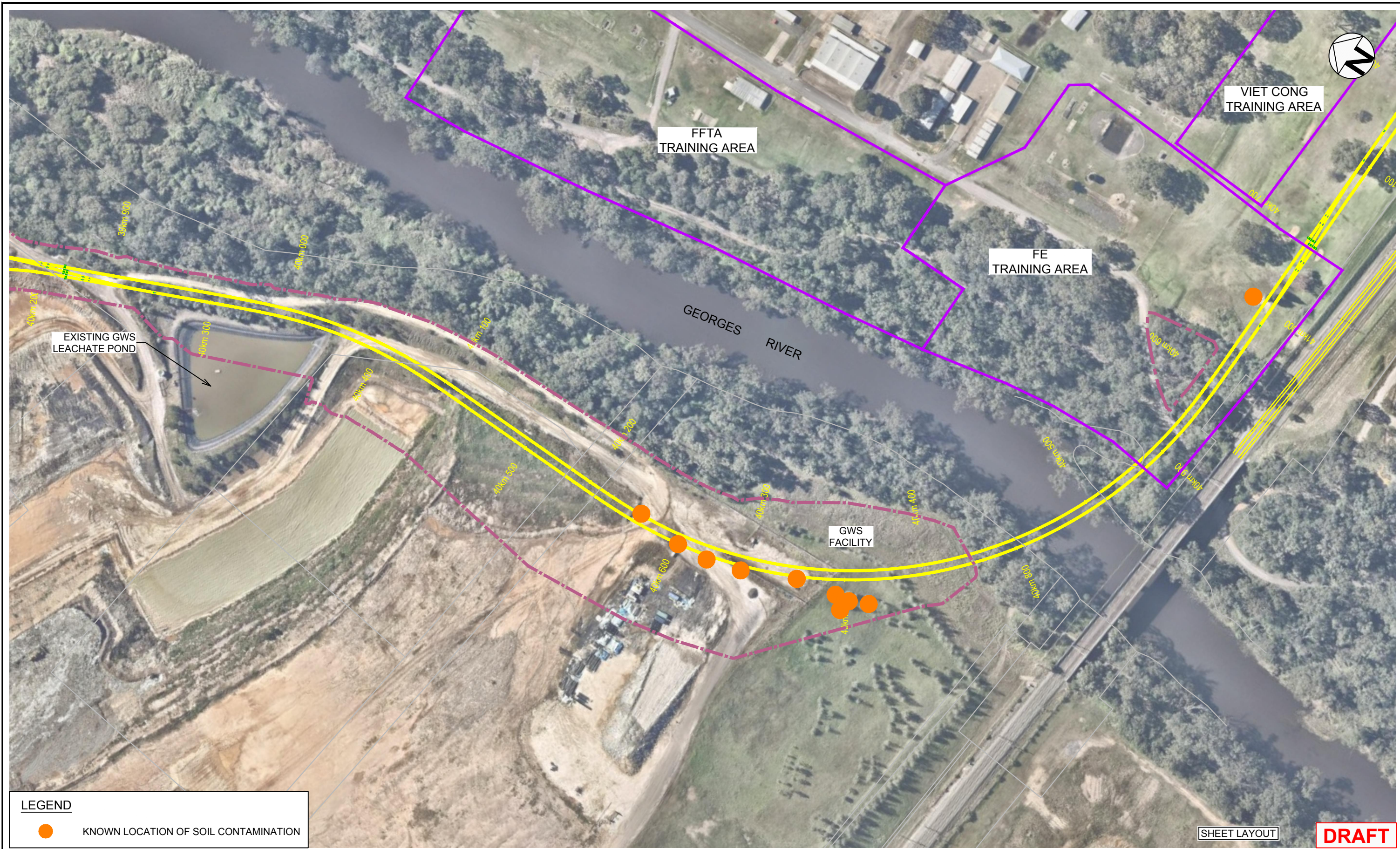


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project no:	754-GEOTLCOV24072AH-R03	figure no:	FIGURE 4
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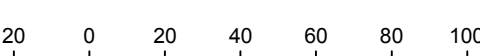

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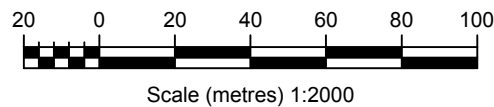
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**LEGEND**

● KNOWN LOCATION OF SOIL CONTAMINATION

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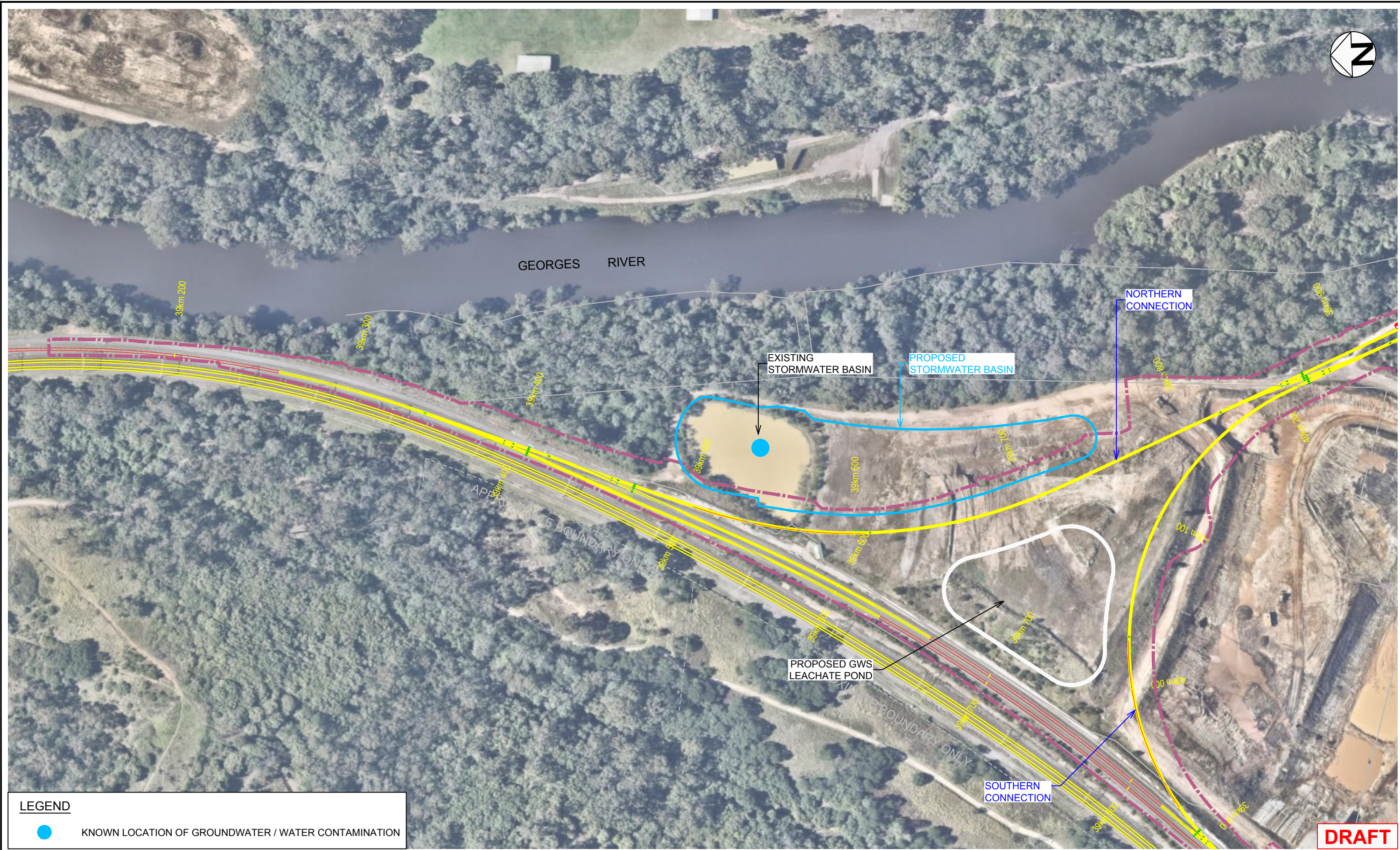


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project: MOOREBANK INTERMODAL RAIL LINK CONTAMINATION MANAGEMENT PLAN MOOREBANK, NSW	
title: KNOWN LOCATION OF SOIL CONTAMINATION SHEET 4 OF 4	
project no: 754-GEOTLCOV24072AH-R03	figure no: FIGURE 8
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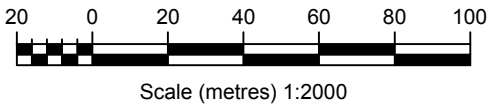


LEGEND

KNOWN LOCATION OF GROUNDWATER / WATER CONTAMINATION

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client:	CPB CONTRACTORS PTY LTD		
project:	MOOREBANK INTERMODAL RAIL LINK CONTAMINATION MANAGEMENT PLAN MOOREBANK, NSW		
title:	KNOWN LOCATIONS OF GROUNDWATER / WATER AND GROUND GAS ISSUES - SHEET 1 OF 2		
project no:	754-GEOTLCOV24072AH-R03	figure no:	FIGURE 9
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## **Annexure A – Compliance Matrix**

## Compliance Requirements

Specific project compliance requirements in relation to contamination management are set out below.

## Contract Clauses

Specific contract clauses and references which set limits and/or govern impacts to contamination management on the project include:

Table 5: Principal's Project Requirements

Contract Document Reference	Requirement	Where Addressed
1.1.2	<b>Site Investigations and Surveys</b>	
	The Contractor must undertake during the Services Phase, all site investigations and surveys required to complete the Works and to prepare a Final Offer, including but not limited to:	Land Contamination Status Report
	b) Contamination sampling, testing and reporting	Land Contamination Status Report
1.2.1	<b>Land Preparation Works (RALP No. 1)</b>	
d)	Any and all site remediation within MIDIT Land required to comply with all relevant legislation, planning approvals, environmental site assessment, remediation action plan, contamination management plans and the Site Auditor Statements/Reports. Remediation works may include, but are not limited to, the following activities: (i) Bioremediation or offsite disposal of hydrocarbon impacted soils; (ii) Offsite disposal or in-ground pits and separation tanks, and bioremediation or offsite disposal of associated impacted soils; (iii) Offsite disposal of Hexachlorobenzene (HCB) contaminated soil; (iv) Offsite disposal of heavy metal impacted soil; and (v) Offsite disposal of friable or bonded Asbestos Containing Material (ACM).	Remediation Action Plan, except activities (i) to (iii) do not apply to the Stage 1 scope of works

## Conditions of Project Planning Approvals

Conditions of project environmental approvals that specifically address the management of contamination include:

### Stage 1 Conditions of Approvals

Table 6: Stage 1 Conditions of Approval

Stage 1 CoA Ref	Requirement	Where Addressed
C5.	Prior to the commencement of construction of the rail link within the Glenfield Waste Facility licenced premises, the Applicant shall prepare an assessment report of the proposed impacts of construction on the Glenfield Waste Facility licenced premises. The assessment must address:	GWF Construction Impacts Assessment Report
a)	Targeted intrusive investigations to determine contamination pathways and to develop mitigation, management and/or remediation options based on those investigations;	GWF Construction Impacts Assessment Report
b)	details of the quantity of landfilled waste to be removed, the location from where it will be removed, the methodology to be utilised and the estimated timeframe for the removal and reburial;	GWF Construction Impacts Assessment Report
c)	proposed measures to mitigate odour impacts on sensitive receivers, including an undertaking to apply daily cover to any exposed waste in accordance with benchmark technique 33 of the document <i>Environmental Guidelines: Solid Waste Landfills</i> , NSW EPA 1996;	GWF Construction Impacts Assessment Report
d)	details of impacts on pollution control and monitoring systems including existing groundwater and landfill gas bores and their subsequent repair/ replacement;	GWF Construction Impacts Assessment Report
e)	the methodology proposed to ensure that the landfill barrier system disturbed in the removal process is replaced/ repaired to ensure its ongoing performance. The Applicant shall detail matters such as sub grade preparation and specifications, liner installation/ reinstallation procedures and construction quality assurance (CQA) procedures;	GWF Construction Impacts Assessment Report
f)	a commitment to providing the EPA with a construction quality assurance report within 60 days of the completion of the works referred to in (d) above; and	GWF Construction Impacts Assessment Report
g)	an overview of any access and/or materials/ equipment storage arrangements with Glenfield Waste Facility in relation to the construction of the project, and operation and maintenance of the rail link.	GWF Construction Impacts Assessment Report
h)	details of any other expected or potential impacts to the licensed area and options for management and mitigation of those impacts (i.e. leachate management and surface water runoff, potential impacts on the Georges River during works, dust etc); and	GWF Construction Impacts Assessment Report
i)	details of and proposed mitigation measures for the long term management of the rail link (eg. subsidence or gas issues).	GWF Construction Impacts Assessment Report
	The Applicant must provide the assessment report to the EPA for review and approval at least 6 weeks prior to the commencement of construction. A copy must also be submitted to the Secretary for information. No works are permitted to commence within the Glenfield Waste Facility licenced premises without the EPA's written approval, unless otherwise agreed by the Secretary.	GWF Construction Impacts Assessment Report

## Stage 1 Final Compilation of Mitigation Measures

Table 7: Stage 1 Final Compilation of Mitigation Measures

Stage 1 FCMM Ref	Requirement	Where Addressed
7C	A Contamination Management Plan (CMP) will be developed for the Proposal, and included in the CEMP, that will contain detailed procedures on:	This Plan
a)	Handling, stockpiling and assessing potentially contaminated materials encountered during the development works.	Section 10.1
b)	A management tracking system for excavated contaminated materials to ensure the proper management of the material movements at the site, particularly during excavation and bioremediation works.	Not applicable
c)	Assessment, classification and disposal of waste in accordance with relevant legislation.	Section 10.6
d)	Specific contingency measures in the unlikely event that construction of the Rail link in the Glenfield Waste Facility results in the disturbance of existing landfill cells. Including:	This Plan
	<ul style="list-style-type: none"> <li>• Management of construction works in areas potentially impacted by asbestos via an Asbestos Management Plan</li> </ul>	Asbestos Management Plan
	<ul style="list-style-type: none"> <li>• Management of excavation work to minimise the potential for surface or groundwater infiltration into the excavations, thereby potentially increasing the volume of leachate in the impacted cells. This will include the routine monitoring of leachate levels and groundwater surrounding the impacted areas using existing monitoring infrastructure.</li> </ul>	Section 9 and Section 10
	<ul style="list-style-type: none"> <li>• Management of impacted soils using the Material Management Procedures</li> </ul>	Section 10
	<ul style="list-style-type: none"> <li>• Replacement or relocation of existing monitoring wells that may be impacted by the construction work. The impact to existing monitoring wells and the alternate locations of any replacement wells will be subject to negotiations with the proponents of the Glenfield Waste Facility and the NSW EPA to ensure that existing environmental protection licence requirements are satisfied.</li> </ul>	GWF Construction Impacts Assessment Report
	<ul style="list-style-type: none"> <li>• Should future design iterations identify that landfill containment may be compromised, a specific work plan will be developed to address potential environmental and/or health and safety issues that may arise.</li> </ul>	If required, GWF Construction Impacts Assessment Report and PSP Glenfield Waste Facility
	<ul style="list-style-type: none"> <li>• A contingency plan for unexpected contaminated materials, such as materials that are odorous, stained or containing anthropogenic materials, that may be encountered during construction.</li> </ul>	Section 11 and Section 12



## NSW Concept Plan Conditions of Approval

Table 8: NSW Concept Plan Conditions of Approval

NSW Concept Plan CoA Ref	Requirement	Where Addressed
2.7	Any future Development Application for stage 1 shall include an assessment of soil and water impacts for the entire site including rail link. The assessment shall:	Stage 1 EIS
d)	Include a contamination assessment in accordance with the guidelines made under the Contaminated Land Management Act 1997 and in consultation with the EPA for the subject site including the Glenfield Waste Facility. The assessment shall include: <ul style="list-style-type: none"> <li>i. the potential environmental and human health risks of site contamination on the project site;</li> <li>ii. a Remediation Action Plan;</li> <li>iii. consideration of implications of proposed remediation actions on the project design and timing; and</li> <li>iv. a Phase 2 environmental site assessment of the project site including rail corridor.</li> </ul>	Stage 1 EIS

## NSW Concept Plan Revised Statement of Commitments

Table 9: NSW Concept Plan Revised Statement of Commitments

NSW Concept Plan Revised SoC Ref	Requirement	Where Addressed
1.71	The following tasks will be undertaken in association with the detailed planning applications for the staged redevelopment of the SIMTA site:	Stage 1 EIS
a)	Confirming what, if any, actions were taken in regards to the Milsearch (2002) recommendations and the associated low risk ordnance issues.	Stage 1 EIS
b)	Undertaking further investigations in the areas of environmental concern likely to be impacted upon by the proposed development. These investigations will be based on the detailed design of the proposed development to identify the extent of contamination, and what, if any, remediation activities are needed. The remediation of areas of the site (if any) would be best matched to the development of the site and considered as part of the future design.	Land Contamination Status Report
c)	Developing a Contamination Management Plan with detailed procedures on: <ul style="list-style-type: none"> <li>• Handling, stockpiling and assessing potentially contaminated materials encountered during the development works;</li> <li>• Landfill gas management during the excavation, handling, and stockpiling of waste materials, if excavation is required during the development, in the area of the Glenfield Quarry and Landfill;</li> <li>• Assessment, classification and disposal of waste in accordance with relevant legislation; and</li> <li>• A contingency plan for unexpected contaminated materials, such as materials that is odorous, stained or containing anthropogenic materials, that may be encountered during site works.</li> </ul>	This Plan
1.72	The Proponent will undertake the following tasks in association with the detailed planning applications for the rail link:	Stage 1 EIS
a)	Undertaking a Phase 2 intrusive environmental site assessment of the proposed rail corridor lands, with an objective to assess the risk	Land Contamination Status Report

NSW Concept Plan Revised SoC Ref	Requirement	Where Addressed
	posed to the detailed design and construction of the rail corridor by the areas of environmental concern identified within this report. The Phase 2 intrusive investigation would include a program of soil and groundwater sampling completed in accordance with the guidelines made or approved by the EPA under s105 of the <i>Contaminated Land Management Act 1997</i> ;	
b)	Developing and implementing a contamination management plan as part of the project construction environmental management plan for managing contaminated materials either expected or unexpectedly encountered during the construction of the rail corridor. The contamination management plan would include detailed procedures on: <ul style="list-style-type: none"> <li>• Handling, stockpiling and assessing potentially contaminated materials encountered during the developments works;</li> <li>• Assessment, classification and disposal of waste in accordance with relevant legislation; and</li> </ul>	Section 10
c)	A contingencies plan for unexpected contaminated materials, such as materials that is odorous, stained or containing anthropogenic materials that may be encountered during site works.	Section 11 and Section 12

## Commonwealth Concept Plan Conditions of Approval

Table 10: Commonwealth Concept Plan Conditions of Approval

Commonwealth CoA Ref	Requirement	Where Addressed
7-	For the better protection of Commonwealth land, the person taking the action must engage a suitably qualified expert(s) to prepare a Construction Environment Management Plan (CEMP), for the approval of the Minister. The CEMP must include in relation to construction of the proposed facility:	Document Authors, Reviewers and Qualifications
b)	identification and quantification of all potential impacts associated with noise, vibration, air quality, traffic, light spill, hydrological changes, contamination, and indigenous heritage (including cumulative impacts associated with the DoFs proposed intermodal) upon Commonwealth land. Consideration must be given to people and communities at SME, DNSDC, Defence housing, and the environment more generally in neighbouring bushland areas. Of note, the air quality assessment must quantify emissions arising from air pollutant sources for which there are established national air quality standards;	Section 6 and Section 10
c)	the results of further investigations with regard to land contamination and indigenous heritage impacts (specifically, PADs two and three). If adverse impacts are identified, details on how such matters will be managed I mitigated must also be provided. Evidence of ongoing consultation with RAPs regarding further investigations for indigenous heritage objects/places must be provided;	Land Contamination Status Report  Heritage Management Plan
g)	details of a comprehensive monitoring program (including locations, frequency and duration) for: <ul style="list-style-type: none"> <li>i. validating the anticipated impacts associated with condition 7(b); and</li> <li>ii. determining the effectiveness of proposed mitigation/management measures;</li> </ul>	Section 9 and Section 13

## Commonwealth Concept Plan Mitigation Measures

Table 11: Commonwealth Concept Plan Mitigation Measures

C'th Concept Plan MM Ref	Requirement	Where Addressed
7.4.11.2	<u>Contamination</u> Additional investigations will be undertaken to identify and delineate the potential for contamination within the rail corridor and the SIMTA site. The additional investigation results will also facilitate the development of a Contamination Management Plan for the development of the SIMTA proposal. The Contamination Management Plan will include detailed procedures on:	Land Contamination Status Report
a)	Handling, stockpiling and assessing potentially contaminated materials encountered during the development works.	Section 10 of this Plan
b)	Landfill gas management during the excavation, handling, and stockpiling of waste materials, if excavation is required during the development, in the area of the Glenfield Waste Facility.	Section 8.4 of this Plan
c)	Excavation and disposal of USTs in accordance with Planning and Development Process for Sites with Underground Petroleum Storage Systems (UPSS) (DECCW 2009), UPSS Technical Note: Decommissioning, abandonment and removal of UPSS (DECCW 2010) and UPSS Technical Note: Site Validation Reporting (DECCW 2010).	Not applicable
d)	Assessment, classification and disposal of waste in accordance with relevant legislation.	Section 10.6 of this Plan
e)	A contingency plan for unexpected contaminated materials, such as materials that are odorous, stained or containing anthropogenic materials, that may be encountered during construction.	Section 11 of this Plan
7.4.11.3	<u>Asbestos Management</u>	
a)	Demolition of the structures listed in Table 24, will be undertaken in accordance with How to manage and control asbestos in the workplace (Safe Work Australia, 2011a) and How to safely remove asbestos (Safe Work Australia 2011b). Excavation or disturbance of those areas of the SIMTA site and rail corridor where the potential for asbestos to be present within the soil has been identified will also be managed in accordance with the code of practice.	Asbestos Management Plan
b)	Prior to commencement of construction, a risk assessment will be undertaken by a competent person prior to removal of any asbestos material from the SIMTA site. In accordance with How to manage and control asbestos in the workplace (Safe Work Australia, 2011a), the assessment must comprise review and summation of all available information for the SIMTA site, including the: <ul style="list-style-type: none"> <li>• Asbestos risk assessment/risk register.</li> <li>• Asbestos management plan.</li> <li>• Implementation of the asbestos management plan to date.</li> <li>• A confirmation of controls to be implemented where construction works will impact on asbestos materials.</li> </ul>	Asbestos Management Plan
c)	All works for the removal of asbestos from site will be undertaken by appropriately qualified personnel in accordance with Code of Practice: How to Safely Remove Asbestos (WorkCover NSW, 2011b).	Asbestos Management Plan

## Environment Protection Licence

Environment Protection Licence clauses that specifically address the management of contamination are included in the table below.

Table 12: Environment Protection Licence

EPL Ref	Requirement	Where Addressed
L1.1	<b>Pollution of waters</b>  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.	CSWMP
O1.1	<b>Activities must be carried out in competent manner</b>  Licensed activities must be carried out in a competent manner. This includes:  a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and  b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.	CEMP  CSWMP  WMP
O4.1	<b>Waste Management</b>  The licensee must assess, classify and manage any waste generated at the premises in accordance with the Waste Classification Guidelines Part 1 : Classifying Waste, April 2008 (Waste Guidelines) prior to dispatching the waste offsite.	CEMP  WMP
O4.2	<b>Waste Management</b>  The licensee must not cause, permit or allow any waste generated:  (a) outside the premises to be received at the premises, except for materials that meet the EPA's Resource Recovery Exemptions for engineered fill purposes.  (b) at the premises to be disposed of at the premises, except as permitted in Condition O4.3.	CEMP  WMP
O4.3	<b>Waste Management</b>  Excavated material suitable for re-use within the premises may be transported from one part of the premises to another part by road in accordance with Condition O4.4.	CEMP  CTAMP  WMP
O4.4	<b>Waste Management</b>  The licensee must ensure that:  (a) the body of any vehicle or trailer, used to transport waste or excavation spoil from the premises, is covered before leaving the	CTAMP  CAQMP  CSWMP  WMP

O5.1	<p>premises to minimise any spill or escape of any dust, waste, or spoil from the vehicle or trailer; and</p> <p>(b) mud, splatter, dust and other material likely to fall from or be cast off the wheels, underside or body of any vehicle, trailer or motorised plant leaving the premises, is removed to the greatest extent practicable before the vehicle, trailer or motorised plant leaves the premises; and</p> <p>(c) road surfaces subject to the tracking of material by vehicles leaving the premises are effectively cleaned at the end of each work day.</p>	
	<p><b>Erosion and Sediment Control</b></p> <p>The licensee must, 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.</p>	CSWMP

Note: Current EPL does not include the GWS facility. The EPL will be updated when full access to the GWS facility is provided and the EPL subsequently updated.



## **Annexure B – Glossary of Terms**

## Abbreviations

<b>ACM</b>	Asbestos Containing Material
<b>AEC</b>	Area of Environmental Concern
<b>AMP</b>	Asbestos Management Plan
<b>ASS</b>	Acid Sulfate Soil
<b>BTEX</b>	Benzene, Toluene, Ethylbenzene and Xylenes
<b>CEMP</b>	Construction Environmental Management Plan
<b>COPC</b>	Chemical of potential concern
<b>GWS</b>	Glenfield Waste Services
<b>OCP</b>	Organochlorine Pesticide
<b>OPP</b>	Organophosphorous Pesticide
<b>PAH</b>	Polycyclic Aromatic Hydrocarbon
<b>PCB</b>	Polychlorinated Biphenyl
<b>PPE</b>	Personal Protection Equipment
<b>SMWS</b>	Safe Work Method Statement
<b>UXO</b>	Unexploded Ordnance
<b>VOC</b>	Volatile Organic Compound

## **Annexure C – Material Tracking Record**

## Material Tracking Record

This material tracking record will be updated on a daily basis.

[illegible]

## **Annexure D – Unexpected Finds Register**



# Unexpected Finds Register

Unexpected finds are to be reported immediately using the form attached. The unexpected finds register is to be updated after an unexpected find is encountered associated with works undertaken at the site.

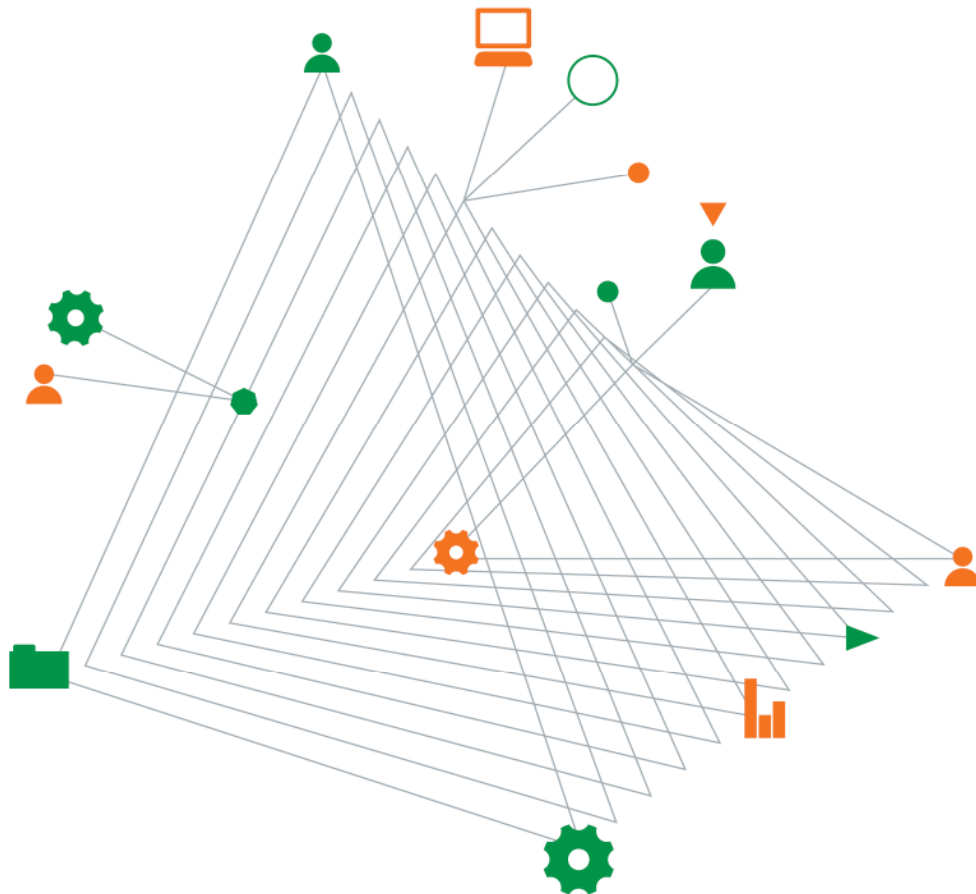
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**CPB Contractors Pty Ltd**

**Moorebank Precinct East Stage 1 RALP No. 1  
– Asbestos Management Plan**

GEOTLCOV24072AH-R06-Rev1

17 August 2018



Experience  
comes to life  
when it is  
powered by  
expertise

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# Moorebank Precinct East Stage 1 RALP No. 1 – Asbestos Management Plan

Prepared for  
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# 1. Overview

## 1.1. Purpose

This Asbestos Management Plan (AMP) addresses contamination management on Sydney Intermodal Terminal Alliance's (SIMTA) Moorebank Precinct East (MPE) Stage 1 – Rail Access Land Package (RALP) No. 1 (the Project, the Rail Link) and the management of impacts to the environment and community.

This AMP addresses the following key requirements:

- Services Agreement – Schedule 5 Principal's Project Requirements
- Conditions of Approval under SSD-6766 SIMTA Intermodal Terminal Facility – Stage 1 (NSW)
- Stage 1 EIS (including Framework CEMP and Preliminary Erosion and Sediment Control Plans)
- Stage 1 Response to Submissions Report (including Final Compilation of Mitigation Measures)
- Conditions of Approval under MP10\_0193 SIMTA Moorebank Intermodal Terminal Facility – Concept Plan (NSW)
- NSW Concept Plan EIS
- NSW Concept Plan Submissions Report (including Revised Statement of Commitments)
- Conditions of Approval under EPBC 2011/6229 SIMTA Intermodal Terminal (Commonwealth)
- Commonwealth Concept Plan EIS (including Framework CEMP and Framework SWMP)
- Other applicable legislative obligations.

JBS&G previously prepared a draft contamination management plan<sup>1</sup>, for the SIMTA facility on the east of Moorebank Avenue and the Rail Link, which included an AMP. Coffey have additionally prepared a contamination management plan (Coffey, 2018) for the RALP No. 1 works package which consists of the construction of a 2.8 kilometre rail line, along with its required support infrastructure including site compounds, to connect the Import-Export Terminal and Interstate Terminals to the Southern Sydney Freight Line (SSFL). The 'RALP No. 1 Work' will be referred to as 'work zone' or 'the site' in this document.

This AMP presents the approach for the handling, treatment and management of asbestos within the work zone. There are no existing buildings within the work zone but investigations have identified the presence or potential presence of asbestos within soils that may be disturbed within the work zone. Thus, primarily the AMP will address asbestos impacted soils at the site and has been prepared in general accordance with the following publications:

- Safe Work Australia (2016), Code of Practice: How to Manage and Control Asbestos in the Workplace.
- Safe Work Australia (2016), Code of Practice: How to Safely Remove Asbestos.
- WorkCover NSW (2014) 'Managing Asbestos in or on Soil', March 2014.

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<sup>1</sup> JBS&G (2015c) 'Draft Contamination Management Plan Moorebank Avenue, Moorebank, NSW', Ref: 50342/100501 (Rev A), 11 May 2015.



## 1.2. Project Scope

SIMTA's MPE Stage 1 Development involves the construction and operation of the necessary infrastructure to support a container freight road volume of 250,000 twenty-foot equivalent units (TEU).

CPB Contractors' scope of work specifically applies to MPE Stage 1 RALP No. 1 which consists of a 2.8 kilometre rail line, along with its required infrastructure, to connect the Import-Export Terminal and Interstate Terminals to the Southern Sydney Freight Line (SSFL), and capable of accommodating trains up to 1,800m in length.

The SIMTA site is located in the Liverpool local government area. It is 27 kilometres south-west of the Sydney Central Business District (CBD), 26 kilometres west of Port Botany, 16 kilometres south of the Parramatta CBD, 0.6 kilometres from the M5 South-West Motorway, five kilometres east of the M5 South-West Motorway / Westlink M7 Motorway Interchange and connecting to the main north-south rail line via the Southern Sydney Freight Line.

The RALP No. 1 is the first package of Stage 1 of the overall MPE project and its construction will include:

- A northbound connection and a southbound connection to the SSFL
- Civil and earthworks, including remediation works and benching
- A bridge over the Georges River
- A culvert crossing over Anzac Creek
- Installation of new Moorebank Avenue underpass
- Service relocation and protection
- Track work
- Signalling systems
- Security fencing

An indicative map of the Project is provided in Figure 1.

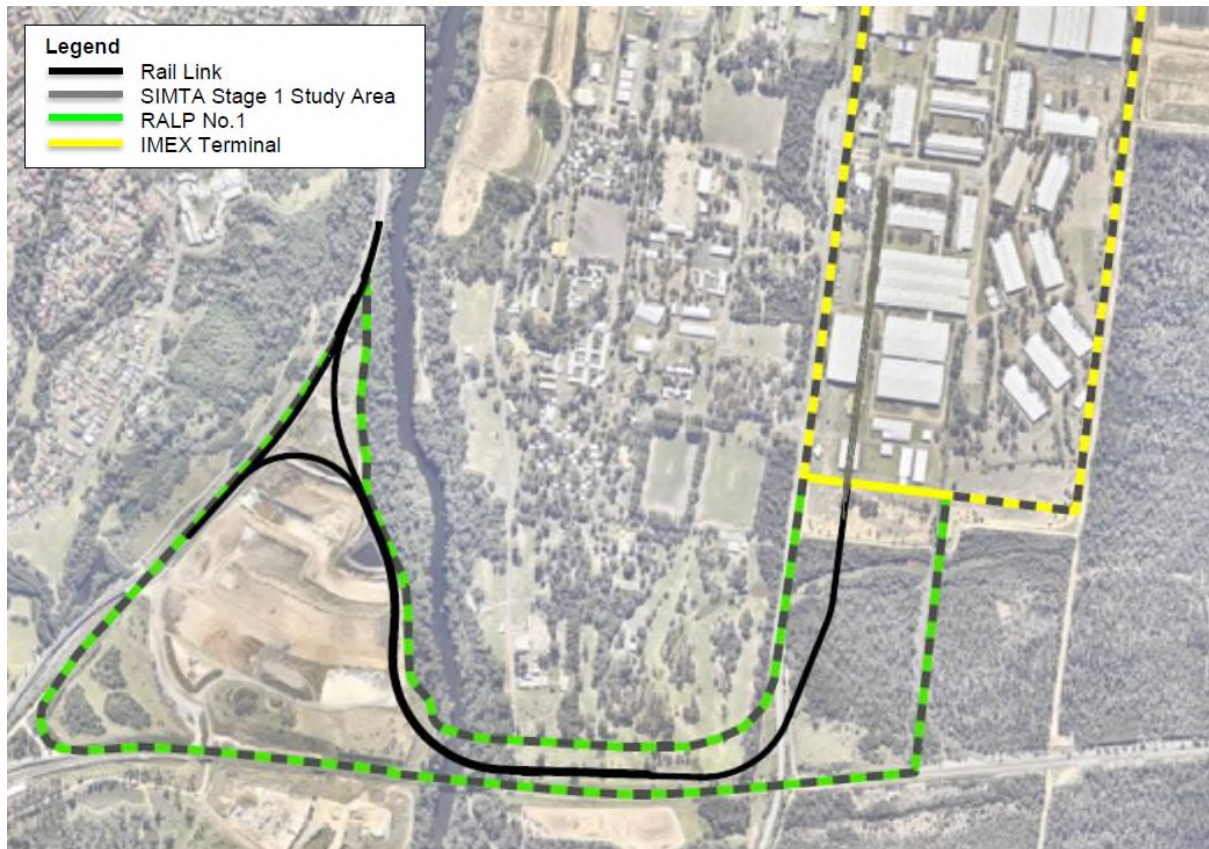


Figure 1: Indicative Project Map

### 1.3. Objective

The objective of the AMP is to provide strategies for handling, treatment and management of asbestos including the appropriate removal, transport and disposal of asbestos impacted soils from the site in order to protect the health of workers undertaking work at the site, visitors and offsite receptors, and prevent the spread of contamination to offsite areas.

The AMP aims to:

- Outline safe working conditions for workers.
- Outline procedures to manage works where asbestos may be encountered during the construction works for the Rail Link including asbestos impacted soil/fill.
- Outline measures for the safe onsite storage and, if required, offsite disposal of ACM in accordance with relevant legal and statutory requirements.
- Outline ongoing management requirements to ensure risk posed by potential asbestos contamination is adequately managed.

### 1.4. Definitions

Definitions for terms used in this plan are contained in the Glossary in Attachment B.

## 1.5. Interactions with Other Management Plans

This Sub Plan is part of the Construction Environmental Management Plan (CEMP). Figure 2 sets out interactions of this Sub Plan with the other environmental management documents implemented on the Project.

## 1.6. Reference to this Plan

This AMP is applicable for the intrusive and non-intrusive construction works within the site, where potential ACM could be present within the work zone.

A separate document Coffey (2018) 'Moorebank Precinct East Stage 1 RALP No. 1 – Contamination Management Plan') has been prepared for the handling, treatment and management of other contamination within the Rail Link site.

A Remediation Action Plan (RAP) (Coffey, 2018) has also been prepared, which provides strategy for remediation of contamination within the Rail Link site.

## 1.7. Previous Reports

The following reports have been prepared for the site and were used by JBS&G (2015c) in the development of their Construction Management Plan<sup>2</sup>:

- JBS&G (2015a) 'Phase 2 Environmental Site Assessment SIMTA Intermodal Terminal Facility - Stage 1', Ref: 50342-60868, 23 March 2015.
- JBS&G (2015b) 'SIMTA Intermodal Terminal Facility - Stage 1 Remediation Action Plan', Ref: 50342-61155, 23 March 2015.

In addition, Coffey prepared the following documents specific to this work:

- Coffey (2018) 'Moorebank Intermodal Rail Link Land Contamination Status Report' Moorebank, NSW' ('the LCSR')<sup>3</sup>
- Coffey (2018) Moorebank Precinct East Stage 1 RALP No. 1 – Remediation Action Plan, Moorebank, NSW' ('the RAP')

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<sup>2</sup> Coffey was not provided with the majority of the reports, but used their referenced data from the JBS&G (2015c).

<sup>3</sup> This report includes the results of additional investigations undertaken within the Rail Link by Coffey for CPB Contractors.

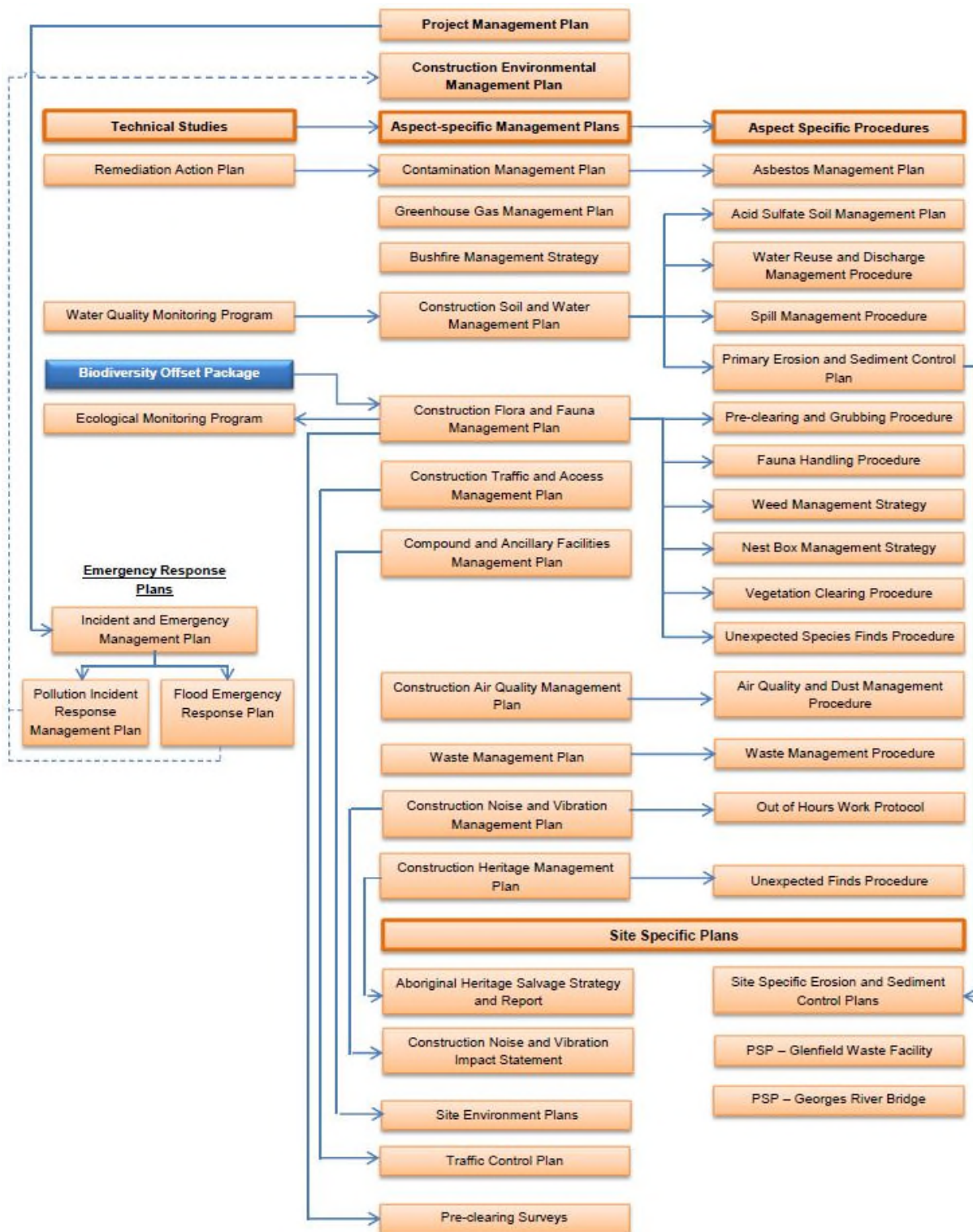


Figure 2: Environmental Documents Map

## **2. Legal and Other Requirements**

### **2.1. Compliance Requirements**

Conditions of project environmental compliance requirements that specifically address the management of contamination are detailed in Attachment A.

### **2.2. Relevant Legislation and Guidelines**

All asbestos related works, including asbestos remedial works, will be undertaken in accordance with, but not limited to, all relevant sections of:

- *Work Health and Safety Act 2011*.
- *Work Health and Safety Regulations 2011*.
- *Protection of the Environment Operations Act 1997* and associated Regulations.
- WorkCover NSW (2014) 'Managing Asbestos in or on Soil', March 2014.
- NSW EPA (2014) 'Waste Classification Guidelines, Part 1: Classifying Waste'.
- National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended in 2013 (NEPM ASC, 2013).
- WA DoH (2009) 'Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia'.

This AMP has been prepared having regard to the above regulations and guidance documentation.

### **2.3. Additional Permits and Approvals**

The project has obtained an Environment Protection Licence as required by the *Protection of the Environment Operations Act 1997*. The conditions of the Environment Protection Licence relevant to the management of asbestos are detailed in Attachment A.

All parties involved in the site works will ensure that they currently (and for the duration of the project) hold all relevant licences, approvals and permits for working with asbestos including excavation activities and transport and disposal of asbestos wastes. This may include, but is not be limited to:

- OHS Construction Industry Induction White Card.
- Notification<sup>4</sup> to SafeWork NSW (required five days before licensed asbestos removal work is commenced).
- Permit from SafeWork NSW for any removal work involving bonded asbestos of 10m<sup>2</sup> or more and friable asbestos (if relevant or required)

Asbestos removal will be undertaken by appropriately qualified persons including licensed asbestos removalists as described in Section 4.1.3.

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<sup>4</sup> Notification for friable asbestos removal work, if required, should be accompanied by an Application for Permit for friable asbestos removal works.



### **3. Consultation and Stakeholders**

There are no formal requirements for consultation on this plan as part of the project approvals.

## **4. Roles and Responsibilities**

### **4.1. Roles**

A description of the key roles is provided below.

#### **4.1.1. Principal Contractor**

The provisions of the Work Health and Safety Regulation 2011 prepared under the *Work Health and Safety Act 2011*, the Principal Contractor must be appointed as the “person conducting a business or undertaking” (PCBU).

The Principal Contractor has the responsibilities set out in the Work Health and Safety Act and Regulations and the Safe Work Australia Codes of Practice.

The Principal Contractor will also be responsible for co-ordinating health and safety activities related to asbestos for the project.

#### **4.1.2. Competent Person or Asbestos Assessor**

A Competent Person or an Asbestos Assessor shall be engaged to assess any suspected asbestos containing materials encountered during the Rail Link construction works and provide advice on appropriate procedures for its handling, treatment or management.

A Competent Person is defined in SafeWork Australia (2016) as “a person who has acquired, through training, qualification or experience, the knowledge and skills to carry out the task” – in this case the task is asbestos identification.

An Asbestos Assessor is a person who holds an asbestos assessor licensed by SafeWork NSW.

The asbestos consultant or competent person shall also complete airborne asbestos monitoring and dust monitoring during any asbestos works. Laboratory analysis for air monitoring is discussed in Section 9.2.6.

#### **4.1.3. Licensed Asbestos Removalist**

A NSW SafeWork licensed asbestos removalist will be required to undertake asbestos removal as follows:

- Class A (friable) licensed asbestos removal contractor shall be engaged if friable asbestos is identified.
- Class B (non-friable) licensed asbestos if more than 10 m<sup>2</sup> of non-friable asbestos is identified for removal or if there is doubt about the total quantity.

For smaller quantities of non-friable asbestos, a suitably trained and experience contractor is required to conduct the removal work.

The asbestos removal contractor will remove ACM or asbestos impacted soils from the area and remediate or dispose of them to a suitably licensed waste facility or transfer the material to an onsite containment area (if available). The licensed asbestos removal contractor will be the primary person responsible and in charge for works on site involving ACM or asbestos impacted soils.

The following procedure must be followed when transporting asbestos waste for off-site disposal:

- Each waste load is required to obtain a unique NSW EPA consignment ID, which is generated using NSW EPA *WasteLocate*.
- Checking between the details in WasteLocate against the load to confirm the details are accurately reflected the load before leaving the site.
- Consignment note is required to be scanned to confirm delivery of the load.

Waste tracking records must be kept by the Principal Contractor.

## 4.2. Responsibilities

The key responsibilities for personnel in relation to the issues covered in this AMP are detailed in Table 1.

Table 1: Roles and Responsibilities in Relation to this AMP

Personnel	Responsibilities
Principal Contractor and their Site Supervisor(s) CPB Contractors	<ul style="list-style-type: none"> <li>• Prepare and implement the AMP</li> <li>• Provision of safe working environment in relation to asbestos</li> <li>• Ensure that all persons involved with this project have undertaken appropriate occupational health and safety training and have been inducted into the Coffey Contamination Management Plan</li> <li>• Ensure that all persons involved with asbestos in the restricted area for asbestos have been inducted into this AMP</li> <li>• Ensure that all persons working on the project have been provided appropriate occupational health and safety training in relation to asbestos, asbestos awareness training and training in the identification of asbestos containing materials (ACM)</li> <li>• Ensure that all persons working in the project are adequately trained for the work they undertake</li> <li>• Keep the training and induction records relevant to this AMP for persons involved in this project</li> <li>• Ensure that a site specific site safety plan for works in areas of potential asbestos may be encountered is prepared for the site</li> <li>• Ensure that any subcontractors provide adequate SWMS for the activities where asbestos may be encountered</li> <li>• Monitor the compliance with this AMP and relevant regulations, codes and guidelines</li> <li>• Control access into the restricted area for asbestos</li> <li>• Be responsible for the project work at all times until work completed</li> <li>• Maintain the Asbestos Register for this project</li> <li>• Auditing compliance with the AMP</li> <li>• Manage accident and emergency procedures related to asbestos</li> <li>• Inform the Competent Person / Asbestos Assessor of new asbestos finds</li> </ul>

Personnel	Responsibilities
	<ul style="list-style-type: none"> <li>Engage a suitably experienced licensed asbestos removalist and ensure they maintains appropriate licences and permits</li> <li>Maintain material tracking records relating to the excavation, stockpiling and disposal of asbestos containing materials</li> <li>Keep air monitoring records</li> <li>Compliance with all other applicable statutory responsibilities related to management of asbestos in the workplace</li> </ul>
Subcontractor(s) and their Supervisor(s)	<ul style="list-style-type: none"> <li>Understand project specific requirements with respect to asbestos</li> <li>Prepare SWMS, as required by the Principal Contractor, for specific activities undertaken within the project where asbestos may be encountered</li> <li>Take reasonable care for their own safety and the safety of others</li> <li>Attend site induction, asbestos awareness training and identification of ACM training, and, follow all site rules and work instructions related to asbestos</li> <li>Take immediate action to rectify asbestos hazards that should arise during the course of the work</li> <li>Immediately report unexpected finds (including asbestos) to site supervisor</li> <li>Comply with project specific requirements, and other relevant OHS legislation and industry standards, with respect to asbestos.</li> <li>Establish and maintain a positive safety climate on the project</li> <li>Compliance of all other applicable statutory responsibilities related to management of asbestos in the workplace</li> </ul>
Licensed asbestos removalist	<ul style="list-style-type: none"> <li>Notify SafeWork in writing at least five days before removal work commences in accordance with Safe Work Australia (2016)</li> <li>Obtain Permit from SafeWork for any bonded asbestos work of 10m<sup>2</sup> or more and friable asbestos removal works</li> <li>Undertake asbestos removal work in accordance with Safe Work Australia (2016).</li> <li>Compliance all other applicable statutory responsibilities related to management of asbestos in the workplace</li> </ul>
Suitably Qualified Asbestos Specialist	<ul style="list-style-type: none"> <li>Provision of safe working environment</li> <li>Issue this AMP and coordinate works to review/update the AMP, as necessary</li> <li>Provide onsite supervision of all potential asbestos works</li> <li>Provide air monitoring services, when required by the Safe Work Australia Codes and/or the Principal Contractor and arrange for display of daily results for information of workers</li> </ul>

Personnel	Responsibilities
	<ul style="list-style-type: none"> <li>Engage suitably qualified and competent staff and/or contractors to manage works in areas impacted with asbestos</li> <li>Provide advice on handling, management and treatment of potentially asbestos impacted material</li> <li>Be available, if required, for consultation with regards to conditions and requirements of this AMP</li> <li>Provide validation of excavation, waste classification and other advice in relation to asbestos</li> <li>Other activities that may be required by the Principal Contractor from time to time</li> </ul>

### 4.3. Training and Induction

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

- Legislative requirements (POEO Act, EPL etc.)
- Duty to notify of environmental harm (or the potential for it) including chain of reporting
- Storage and use of hazardous substances
- Water reuse and discharge procedure
- Contamination and unexpected Finds.

Detailed training will be provided to key personnel regarding contamination management. This training will include:

- Workers undertaking work within the site be given a project induction which will include a requirements with respect to asbestos.
- Workers undertaking work onsite must be trained have been given appropriate occupational health and safety training in relation to asbestos, asbestos awareness training and training in the identification of asbestos containing materials (ACM) which may be encountered during their work
- Persons undertaking site induction will acknowledge that they have understood the requirements of the site safety and environmental obligations related to asbestos
- Records of the site induction and toolbox talks relating to asbestos will be kept, in accordance with the relevant legislation.

Toolbox talks will also be used to further reinforce awareness of asbestos issues.



## 5. Existing Environment

Information provided in this section is based on the information presented in the JBS&G (2015c) Coffey (2018) Contamination Management Plan.

### 5.1. Site Condition

The Rail Link comprises a 20m wide work zone which passes across a number of parcels of land, as shown on Figure 1, and described below:

- **DNSDC South** – comprising open grassed area in the southern portion of the DNSDC site. The area is relatively level, with no obvious feature other than some sparse mature trees and wire mesh security fence along the western and southern boundaries.
- **Commonwealth Land South / Boot Toe Land** – comprising bushland, located south of the DNSDC South, which includes a cleared area with a narrow fire-trail and overhead power line corridor along the northern boundary. Anzac Creek runs east to west across the northern portion of this land. An unused rail siding runs north-south along the western edge leading from the East Hills railway line in the south into the former DNSDC site. Minor waste material (including a rusted drum) was observed during previous investigation. At the time of the Coffey investigation, a small stockpile area was noted within the work zone. It appears that some earthworks had been conducted along the fire trail. Asbestos fragments were noted in the stockpile (see Figure 3). The fragments were collected for laboratory analysis (see Section 9).
- **Sydney Trains Land** – comprising a triangular parcel of land alignment to Moorebank Avenue. An unsealed accessed road is located along the western site boundary and separately fenced from the Commonwealth Land South / Boot Toe Land and the RailCorp Land to the south of this area. The northern portion comprises patches of grassed areas, dense scrub and open bushland. At the time of the Coffey investigation, low mounds of waste burial were observed in the southwestern corner of the area, with buried waste (and containing asbestos fragments) also being observed in this area. A security fence separates the Sydney Trains Land and Moorebank Avenue.
- **Moorebank Avenue** – comprises a dual carriageway road, built on an embankment increasing in elevation towards the south where the road passes over the East Hills rail corridor, and the adjoining roadway corridor. The road corridor increases in width in the south, probably as a result of the realignment of the road to create the road bridge over the East Hills railway corridor when constructed (in the 1980s). Waste stockpiles and low mounds of waste burial were observed along the eastern embankment of Moorebank Avenue, but not along the western embankment. An unsealed access road is also present along the western embankment where a plastic bag containing ACM was observed near BH15 at the time of the Coffey 2016 investigation.
- **Royal Australian Engineers (RAE) Golf Course** – to the west of Moorebank Avenue, the RNE Golf Course is mostly open grassed former golf course including former fairways, greens and bunkers with scattered mature trees. A wide row of trees is present along the eastern boundary. To the south is the existing East Hills rail corridor and to the east, Moorebank Avenue. A security fence separates the East Hills rail corridor from the golf course north of the site and west of Moorebank Avenue. Golder (2011a) noted that a former mock Viet Cong village is located in the southern portion of the RAE Golf Course and that it was noted to be outside of the investigation area at the time of the JBS&G (2015a) investigation.

CPB has confirmed with Department of Defence that the Viet Cong Village is located outside of the Project boundary and that no excavation is proposed to be carried out in the vicinity of the Viet Cong Village footprint.

- **Georges River and the surrounding land** - the proposed Rail Link alignment passes over the Georges River to the north of the existing rail bridge where it enters the Glenfield Waste Service

facility. Both sides of the riverbank are heavily vegetated. Some excavation and/or filling were observed adjacent to the existing rail bridge supports, presumably associated with construction of the bridge.

- **GWS Facility**– comprising an active landfill (waste repository) and a former quarry. The proposed Rail Corridor enters the GWS facility at the eastern boundary about 20m north of the existing rail corridor bridge crossing at Georges River. The existing East Hills rail corridor bisects the GWS Facility. The Rail Link will pass to the north of the East Hills rail corridor.

The Rail Link enters south-eastern corner of the GWS facility in a location which includes a rehabilitated area. JBS&G (2015) noted that a 'black liner material' is present on the sloping embankment leading to the river. The area also includes a fenced enclosure used to park excavation and other equipment. A gravel access road passes immediately west of the enclosure, leading to the lower excavated landfill areas towards the centre of the landfill. The Rail Link follows the eastern boundary of the GWS facility, which was observed to be at a considerably higher elevation relative to the excavated landfill base and dam. This high ground, which consists of two internal access roads utilised by GWS, was considered to be formed by natural in-situ material yet to be excavated, as well as reworked natural materials excavated at the time of quarrying.

At the time of the Coffey investigation, Coffey noted that a sign at the front of the facility that indicated that the site has previously accepted asbestos material, however this practice appears to be discontinued. Observations made during the site walkover also indicated that the current landfill cell batters appear to be lined by geomembrane. A geomembrane, which is most likely a component of the landfill liner, is visible on the top of the western slope leading to the landfill cell that is currently receiving waste. Anecdotal information provided by the GWS Facility Manager also indicated that the base of the current landfill cells is lined with geomembrane, though there is some conjecture on whether the primary component of the liner is a geosynthetic lay liner (GCL) or a geomembrane. As discussed above, there is evidence of a geomembrane anchored at the top (next to the lower access road) and extending down along the landfill cell wall is exposed around chainage (MB2S) CH40461.

Coffey noted that there are two water bodies located within the GWSF site – a surface water dam at the northern end of the facility and a leachate pond in the central east. The surface water dam will be extended in a southerly direction to increase the capacity. The existing leachate pond will be decommissioned and pumped into the new leachate pond which will be built between the Northern and Southern Connections. This area of the site has been used to store overburden from the landfill operations to the site. Coffey understands that the overburden materials derived from land stripping activities undertaken prior to the quarrying and landfill cell construction activities. The overburden has been used as daily cover material in active landfill cells. Observations made during a recent walkover indicates this area has been used to store materials and plant associated with the Rail Link project. No indicators of potential contamination were noted.

The Rail Link divides into the **Northern Connection** and **Southern Connection** close to the northern end of the facility which is roughly the topographic highest point of the GWSF land. The Southern Connection of the Rail Link swings towards the west and south to connect to the SSFL to the west of the current quarry, while the Northern Connection of the Rail Link maintains a northerly direction from the high ground to a lower area where the northern dam of the Glenfield site exists.

## 5.2. Topography and drainage

The topography within the GWS facility land has been modified by quarrying and landfilling activities. The eastern boundary of the GWS, along the alignment of the Rail Link, the land slopes gently to the north, with the highest ground occurring in the north of the GWS facility. Land immediately along the Georges River banks slopes towards the river.

In the northern part of the GWS facility, surface runoff would be captured in the stormwater pond, which overflows into Georges River. Surface runoff would by-and-large infiltrate into unsealed ground surfaces in other parts of the GWS facility. Leachate collected from the landfill is channelled towards the leachate pond situated within the eastern part of the GWS Facility.

Land to the east of Georges River is generally flat with the topography sloping slightly to the south and west mostly towards Georges River.

Given the moderate to low relief over the remainder of the proposed rail corridor and the ground surface conditions, most of the precipitation will likely infiltrate unsealed ground surfaces, recharge the shallow groundwater environment and eventually flow into ephemeral and perennial surface water features in the vicinity of the site, including Anzac Creek, Glenfield Creek and Georges River.

### **5.3. Geology**

Fluvial deposits of clayey sand and clay are present beneath the Rail Link south of the SIMTA site and east of the Georges River, while the area west of the Georges River are underlain by Quaternary fluvial deposits of medium grained sand, clay and silt. The southern portion of the GWS facility has been quarried and subsequently filled with waste materials including building demolition, shredded car tyres and asbestos disposed in the landfill within the quarry. Surface material and fluvial deposits are underlain at depth by shale and sandstone (Golder 2011a).

### **5.4. Hydrogeology**

Regional groundwater is understood to flow within shale and alluvial deposits in a north to westerly direction towards the Georges River (Golder 2010). The two aquifers have been reported, comprising shallow and deep aquifers with groundwater at depths of approximately 6m below ground surface (bgs) to 11mbgs (DP 2009b; URS 2002a).

Groundwater flow in the GWS facility is anticipated to be influenced by quarrying and land filling activities, with general flow in an easterly direction towards the river (Golder 2011a).

Deep groundwater is reported to exhibit high salinity and therefore provides limited beneficial use. Shallow groundwater was reported to have lower salinity (URS 2002b).

### **5.5. Surrounding Land Uses**

To the north of the site is the proposed SIMTA site (formerly DNSDC). Moorebank Avenue is present west of the Rail Corridor, with Commonwealth (Defence) land occupying the land west of Moorebank Avenue to the Georges River. The Georges River forms the eastern boundary of the Glenfield Waste Facility. To the east lies more Commonwealth land (i.e. Boot Land) formerly used by Defence, and is currently heavily vegetated.

The GWF is bounded to the west by the existing South and Main Southern Rail corridor which also includes the South Sydney Freight Line (SSFL). Further west of the rail corridor is Leacock Regional Park and the residential areas of Casula east of the Hume Highway.

The East Hills rail corridor is bounded to the south by Commonwealth land associated with the Holsworthy Defence facility on the eastern side of Georges River, and part of the Glenfield Waste Facility to the west of Georges River.

## 6. Asbestos Register

The JBS&G (2015b) RAP provided a summary of contamination issues at the site. With respect to asbestos, the JBS&G (2015b) RAP and JBS&G (2015c) indicated that non-friable (bonded) ACM was identified in fill at 0.3-0.4mbgs in a test pit on the north of the East Hills rail corridor (within the RNE Golf Course) potentially associated with historical burial or filling. This report also stated that there may be unconfirmed disposal of waste areas, where asbestos could be a contaminant of concern.

Asbestos was also observed during Coffey's recent investigations in the following locations:

- ACM was observed in test pits TPE11 and TPE12 which are located within the Sydney Trains land. Waste burial was also noted within the proximity
- Flytipping of waste, including asbestos contaminated materials, along the eastern embankment of Moorebank Avenue
- Spoil material located adjacent to test pit TP8, just to the north of Anzac Creek.

An asbestos register is provided in Annexure C, which indicates the locations of previous asbestos finds, as well as potential waste burials onsite, which may contain asbestos.

The locations where asbestos has been identified and where there is potential for the presence of asbestos in fill are shown on Figures A to E.

There is no data available for the section of the Rail Link site between Anzac Creek and the DNSDC South land. This section was previously used for Defence purposes. Potential unidentified asbestos risks may present in this section of the Rail Link.

The contamination expected from these areas is readily able to be managed through standard industry approaches including off-site disposal and on-site reuse or management.

## 7. Remediation Action Plan

Based on the recent investigations conducted along the Rail Link, it was considered that remediation will be required in certain parts of the Rail Link in order to make suitable for the proposed rail uses. The proposed remedial activities have been summarised in the Project's Remediation Action Plan (RAP) (Coffey, 2018).

The objective of the RAP is to identify appropriate measures by which the identified site contamination can be remediated and/or adequately managed (including appropriate validation) as such there is a low likelihood of contamination posing a risk to human health or the environment and the Rail Link is suitable for the proposed use as rail corridor, in accordance with guidelines endorsed by NSW EPA.

At the completion of remediation and validation works, a validation report will be prepared in general accordance with the relevant sections of Guidelines for Consultants Reporting on Contaminated Sites (NSW OEH, 2011) and other relevant guidance endorsed by the NSW EPA.



## **8. Health and Safety Management**

### **8.1. Safe Work Method Statements**

The Principal Contractor or subcontractors undertaking the work must prepare specific Safe Work Method Statements (SWMS) for the work undertaken. The SWMS must include activities where asbestos may be encountered and strategy to minimise exposure to asbestos in accordance to this AMP, including requirements of personal protective equipment (PPE).

SWMSs must:

- Describe how work is to be carried out.
- Identify the safety risks.
- Describe the control measures that must be applied to the work.
- Describe the equipment used in the work.
- Describe any standards or codes applicable to the work.
- Training and qualifications required of persons undertaking the work.

SWMS prepared by the contractors must be reviewed and approved by the Principal Contractor.

### **8.2. Site Access Control, Barrier and Signage**

The overall construction area will be secured by fencing, which limits access to public. The Principal Contractor shall also maintain site access control in areas where ACM has been identified or may potentially be present ('restricted area (asbestos)'). Site access to the restricted area will be determined by the Site Supervisor. Only authorised and appropriately inducted and trained persons are to be permitted in the restricted area.

Appropriate warning signs and/or barriers are to be placed around the restricted area maintaining at least 3m buffer from the impacted area, in accordance with the following regulations and guidelines:

- Standards Australia (1994) 'AS 1319-1994: Safety Signs for the Occupational Environment'.
- Safe Work Australia (2016) 'Code of Practice: How to Safely Remove Asbestos'.

It is anticipated if areas of ACM are identified during construction works localised restricted area (asbestos) may be delineated within the overall site boundaries. Access to the restricted area (asbestos) will be controlled and permitted by the Principal Contractor only after persons entering the site have been advised of the potential contamination hazards. This shall at least include notification of the potential presence of asbestos containing materials and asbestos impacted soils.

If ACM is identified then any authorised person accessing the restricted area (asbestos) should do so in accordance with health and safety requirements as indicated in this AMP. The implementation of the health, safety and environmental requirements should be administered by the Principal Contractor. Site access will not be allowed until the workers have been inducted, have signed in, and if entering the restricted area (asbestos) must have donned the required PPE (Section 8.3). Upon exiting the site, personnel must remove and dispose of/clean the PPE in the provided decontamination area.

Restricted area (asbestos) boundaries shall be determined by the Principal Contractor in consultation with the Competent Person / Asbestos Assessor and will vary according to the location and size of the required daily activities. Any restricted area (asbestos) boundaries will be designed to allow other site

works not involving significant intrusive works to continue without being required to adhere to this AMP, where possible.

It may be found that the restricted area (asbestos) boundaries require to be assigned to the site boundaries, in which case all site workers must adhere to the requirements of this AMP.

Workers entering the restricted area must be inducted to this AMP.

### 8.3. Personal Protective Equipment Requirements

Requirements for Personal Protective Equipment (PPE) will be determined by the Principal Contractor, depending on the type of work for each activity, and must be covered in the specific SWMS.

In areas where asbestos containing materials or asbestos impacted soils have not been encountered, no additional PPE is required above the standard construction site PPE outlined by the Principal Contractor for the site.

Should suspected ACM be identified, then the Competent Person / Asbestos Assessor should be contacted. If the presence of asbestos is confirmed the additional items of PPE are required in addition to the standard construction site PPE outlined by the Principal Contractor for the site, and applies for any ground workers within the restricted area (asbestos).

The minimum level of additional PPE required for onsite personnel working in a restricted area (asbestos) is listed below:

- **Body Protection.** Fluorescent or white disposable coveralls (Tyvek suits) are to be worn during excavation activities. For workers undertaking work in the restricted area for asbestos, disposable Tyvek suits must be worn. Disposable gloves must also be worn for workers contacting soils. Disposable Tyvek coveralls and gloves must be removed when leaving the restricted area (asbestos) and are to be considered as potentially contaminated with asbestos and will therefore need to be disposed as asbestos contaminated waste.
- **Respiratory Protection.** Respiratory protection is required to prevent inhalation of airborne dusts. A minimum of a P2 rated disposable mask or respirator fitted with a P2 rated cartridge will be used in the restricted area (asbestos).
- **Foot Protection.** Steel toed boots are to be worn by personnel working on-site.

Eating, drinking, chewing gum or tobacco, smoking or other practices that involves hand to mouth transfer increases the probability of ingestion of foreign matter into the body. Hands must be thoroughly washed before eating, drinking or smoking. Smoking, drinking or eating is not permitted within the restricted area (asbestos).

Plant operators must close cabin doors and windows when operating within the restricted area for asbestos.

## 9. Management Measures for Asbestos Impacted Soil

### 9.1. Asbestos Types, Risk and Exposure Pathways

At the time of preparation of this AMP, only non-friable ACM has been identified onsite, however site information and/or data for the presence of friable material was not available. Non-friable ACM is defined by Safe Work Australia (2016) as "... material containing asbestos that is not friable asbestos, including material containing asbestos fibres, reinforced with a bonding compound." This includes bonded asbestos fragments found in soil.

Friable asbestos is defined by Safe Work Australia (2016) as "... material that is in a powder form or that can be crumbled, pulverised or reduced to a powder by hand pressure when dry, and contain asbestos." This includes soil impacted with asbestos fibres or fibre bundles, or asbestos fragments which can easily produce asbestos fibre or fibre bundles.

Mechanical disturbance of non-friable asbestos may result in the production of friable asbestos.

Asbestos poses a human health risk through the inhalation of its fibres (WA DoH, 2009). If deposited in the lungs, the fibres can initiate diseases which may produce major health effects, such as asbestosis, lung cancer and/or mesothelioma.

Potential exposure pathways for asbestos relevant to this AMP are considered to be:

- Inhalation of asbestos fibres by workers/visitors during excavation of asbestos containing soil
- Inhalation of asbestos fibres by workers/visitors from stockpiled material containing asbestos
- Inhalation of asbestos fibres by workers or others onsite or offsite during transport of asbestos containing material.

Detailed remediation of asbestos from the site is covered in the Coffey (2018) RAP.

### 9.2. Asbestos Management during Construction Works

#### 9.2.1. Works in Areas where Asbestos has not been Identified

Management of general intrusive works during the construction of the Rail Link in areas where asbestos has not been identified is as follows:

- Intrusive work onsite in areas where asbestos has not been identified shall only be carried out by suitably qualified and experienced contractors, who have received asbestos awareness training and have been trained in the recognition of asbestos
- Intrusive works can be undertaken in a manner similar to that normally undertaken on similar construction projects, although the ground conditions should be carefully observed by the operator and/or others noting the presence of any evidence of ACM
- If no visual evidence of ACM is observed works can continue as normal
- If visual evidence of ACM is observed and/or ACM is encountered (i.e. new asbestos finds), works should cease and the Supervisor informed and should be managed as described in Section 9.2.4 below.

### **9.2.2. Works in Areas Identified as Potentially Asbestos Contaminated**

Management of general intrusive works during the construction of the Rail Link in areas where asbestos has been identified as potential asbestos contamination (see Section 6) is as follows:

- Intrusive work onsite in areas where asbestos has been identified shall only be carried out by suitably qualified and experienced contractors, who have received asbestos awareness training and have been trained in the recognition of asbestos
- A spotter who has received asbestos awareness training and have been trained in the recognition of asbestos should be present to observe the soils being disturbed in the intrusive excavation
- Intrusive works can be undertaken in a manner similar to that normally undertaken on similar construction projects, although the ground conditions shall be carefully observed by the operator and the spotter noting the presence of any evidence of ACM
- If no visual evidence of ACM is observed works can continue as normal. If there are no observations over a representative area the requirement for the presence of a spotter can be reassessed by consultation with the Competent Person / Asbestos Assessor.
- If visual evidence of ACM is observed and/or ACM is encountered (i.e. new asbestos finds), works should cease and the Supervisor informed and should be managed as described in Section 9.2.4 below.

### **9.2.3. Works in Areas Classified as Restricted (Asbestos)**

Areas where asbestos has been identified in previous contamination investigations are described in Section 6 and shown on Figures A to E are for the purpose of this AMP defined as restricted area (asbestos). Areas where asbestos is encountered during intrusive works as described in Section 9.2.1 and Section 9.2.2 will also be classified as restricted area (asbestos).

Management of intrusive work in areas classified as restricted area (asbestos) will be as follows:

- Intrusive work onsite within restricted area (asbestos) shall only be carried out by suitably qualified and experienced contractors, who have received asbestos awareness training and have been trained in the recognition of asbestos, which may be encountered during their work.
- Access to the restricted area (asbestos) must be controlled as per Section 8.2.
- New asbestos finds must be reported to the Principal Contractor, and managed as per Section 9.2.4.
- Excavation work within the restricted area (asbestos) must be observed by a Competent Person / Asbestos Assessor.
- Stockpile management of asbestos impacted material shall be undertaken in accordance with Section 9.2.7.
- Transport and disposal of asbestos impacted material shall be undertaken in accordance with Section 9.2.8.
- An asbestos decontamination area must be present within the restricted area (asbestos). Decontamination of asbestos shall be undertaken in accordance with Section 9.2.9.

Specific management controls during intrusive work within the restricted area for asbestos are as follows:

### ***Prior to excavation***

- Safe Work NSW should be notified for all asbestos removal work comprising: any friable asbestos removal; and non-friable asbestos removal >10m<sup>2</sup> or if there is doubt about the total area. Notifications must be submitted at least 5 days prior to any asbestos being disposed of offsite.
- A Safe Work NSW Permit is required for all friable asbestos removal works. The SafeWork Permit shall be sought by the licenced asbestos removal contractor. Friable asbestos removal permits must be submitted at least 7 days prior to any friable asbestos being disposed of offsite.
- An observation of the surface soil in the area of the excavation should be undertaken. If small number of ACM fragments are observed, they shall be picked up by a licenced asbestos removalist (if practicable) and placed into a labelled asbestos waste bag and stored in a designated waste storage area for offsite disposal by a licenced asbestos removalist. If significant number of ACM fragments is observed, they shall be dealt with during the excavation as described by the following section. Records of the ACM finds should be maintained in the Asbestos Register for the site by the Principal Contractor (attached in Annexure C).

### ***During excavation***

- Personnel undertaking work within the restricted area (asbestos) must wear minimum PPE as listed in Section 8.3. Air monitoring must be undertaken within the restricted area (asbestos) in accordance with Section 9.2.6.
- The excavation shall be kept damp by water spraying during excavation works to reduce the potential of dust generation in accordance with Section 9.2.10.
- Management of potentially asbestos impacted soil shall be decided by a Competent Person / Asbestos Assessor in accordance with guidance provided in the Coffey (2016c) RAP, ASC NEPM (as amended 2013), SafeWork NSW (2014) and other appropriate guidelines.

### ***Post excavation***

- Requirement for validation and excavation reinstatement shall be decided by Competent Person / Asbestos Assessor in accordance with guidance provided in the Coffey (2016c) RAP, ASC NEPM (as amended 2013), SafeWork NSW (2014) and other appropriate guidelines.
- The Competent Person / Asbestos Assessor shall also determine if the area can be taken off from the restricted area for asbestos.

## **9.2.4. New Asbestos Finds**

The strategy for new asbestos finds encountered during the construction of the Rail Link is as follows:

- If ACM is encountered in the area outside the restricted area (asbestos), work must cease within 10m radius of the area. The ACM must be left onsite and appropriately isolated (e.g. by covering) until the area is inspected by the Competent Person / Asbestos Assessor. The handling, treatment and/or management of ACM and potentially ACM impacted soil will be decided by a suitably Competent Person / Asbestos Assessor, which should be undertaken in accordance with the Coffey (2016c) RAP. The area of at least within 10m radius of the find must be included in the restricted area (asbestos) and managed as per this AMP.
- Records of the ACM finds should be maintained in the Asbestos Register for the site by the Principal Contractor (attached in Annexure C).



### **9.2.5. Remediation of Restricted Area (Asbestos)**

Decisions on the remediation, including handling, treatment and management of restricted area (asbestos) will be made by the Competent Person / Asbestos Assessor in consultation with the Principal Contractor.

When making a decision on remediation consideration will be given to a range of factors including, but not limited to:

- Guidance provided in the Coffey (2018) RAP, ASC NEPM (as amended 2013), SafeWork NSW (2014) and other appropriate guidelines.
- Depth of asbestos contamination and ongoing management requirements if managed in-situ.
- Potential for future disturbance if managed in-situ.
- Other considerations agreed with the Principal Contractor and the Project Owner.

Where remediation is undertaken appropriate validation should also be undertaken and documented in accordance with guidance in the Coffey (2018) RAP.

### **9.2.6. Air Monitoring**

Asbestos air monitoring is to be carried out by an Asbestos Assessor or a Competent Person during any works within a restricted area (asbestos) which results in disturbance of the ground surface. The purpose of the air monitoring is to verify that the control measures in place to minimise the generation of asbestos fibres into the air are working satisfactorily and that there is no exposure of asbestos fibres to adjacent areas. The air monitoring devices will be placed at the boundaries of the restricted area for asbestos determined as appropriate by the Asbestos Assessor or a Competent Person. If considered necessary or appropriate the Asbestos Assessor or a Competent Person may also consider to include monitoring on individuals or monitoring on machinery – this would only be carried out following consultation with the Principal Contractor.

Sample collection and analysis will be conducted in accordance with the National Occupational Health and Safety Commission (NOHSC) 'Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition, 3003 – 2005'.

The analysis will be performed by a NATA registered laboratory and reported on endorsed certificates. The results of air monitoring shall be available on a 24-hour turnaround time basis. Daily air monitoring reports shall be kept by the Principal Contractor or site supervisor who should be able to produce upon request or display the results in prominent locations to keep workers informed of the results.

Air monitoring test results should be below 0.01 fibres/mL throughout the duration of any ground disturbance works in the restricted area (asbestos), to demonstrate the adequacy of the control measures implemented. The following table shows the actions that will come into force should fibre levels exceed this action level of 0.01 fibres/mL.

Table 2: Action Level for Air Monitoring (Safe Work Australia, 2011a)

Action Level (fibres/mL)	Control / Action
< 0.01	Continue with control measures
≥ 0.01 and ≤ 0.02	Review control measures, investigate cause and implement controls to minimise further release
≥ 0.02	Stop removal work, and where applicable notify SafeWork NSW. Investigate cause including enclosure & equipment where present and clean immediate area. Do not recommence work until air test results return readings of < 0.01 fibres/ml

### 9.2.7. Management of Asbestos Impacted Stockpile

Stockpiles of potentially asbestos impacted material must be kept damp when in use and/or covered if remaining for more than 24 hours. Covers will need to extend beyond the perimeter of the stockpiles and be secured to prevent being blown away by wind.

Appropriate management of asbestos impacted stockpiles will be critical in instances where friable asbestos has been identified. The Competent Person / Asbestos Assessor should be consulted on the requirements for management and monitoring of friable asbestos stockpiles.

### 9.2.8. Transport and Disposal of Asbestos Impacted Soil

Each truck transporting potentially asbestos impacted material for transportation onsite or offsite requires transportation in accordance with the Protection of the Environment Operations (waste) Regulation 2014.

Waste requiring offsite disposal must be disposed of in accordance with appropriate guidelines, including (but not limited to) the NSW EPA (2014) 'Waste Classification Guidelines Part 1: Classifying Waste'.

NSW EPA has recently introduced new monitoring requirements for movement of asbestos waste. Under these new requirements, asbestos transporters and facilities receiving asbestos waste must report the movement of this waste to the EPA. To help industry meet their legal obligations the EPA has developed an easy to use online tool, *WasteLocate* designed for use on internet-connected tablets or smartphones. *WasteLocate* generates a unique EPA consignment ID that allows each load to be monitored from the place of generation to the site of disposal.

All asbestos impacted soils moving offsite will be required to be tracked with *WasteLocate* and transporters will be required to provide all *WasteLocate* records to confirm appropriate disposal.

### 9.2.9. Decontamination of Personnel and Equipment

Machinery used for the handling (e.g. excavation) and treatment of asbestos impacted soil may become contaminated with asbestos and will need to be decontaminated by washing down prior to leaving the restricted area (asbestos). All wash down liquids will need to be collected and managed appropriately.

Decontamination will involve hosing / removal of soil from the tracks and bucket as far as reasonably practicable by the Site Supervisor. Tools used shall be hosed down / wiped clean with a damp cloth.

Upon completion of works boots and clothing will be wiped down with a damp cloth and disposable PPE and Respiratory Protective Equipment (RPE) disposed of as asbestos waste. Non-disposable RPE should be wet-wiped and placed in a sealed container for future use.

### **9.2.10. Dust Management**

The following dust management measures shall be undertaken, as appropriate:

- Keeping excavation areas, stockpiles and haulage pathways damp.
- Keeping haulage vehicles covered and providing designated site access for haulage vehicles.
- Appropriate decontamination of haulage vehicles.
- Maintaining access roads to ensure no significant dust at the site boundary.
- Providing dust suppressors to equipment, where appropriate.

If significant dust is visible at the site boundary, then additional dust control measures shall be employed, which may include:

- Reducing the area of soil exposed (by covering or minimising size of excavations etc.)
- Temporarily suspending activities until wind speed reduce
- Additional use of water spray

### **9.2.11. Site Clearance**

#### **Site Inspections**

Following the completion of any asbestos removal works, a final site walkover will be completed by the Competent Person / Asbestos Assessor to inspect the site ground surface for the presence of ACM. Any ACM observed will be removed and placed in asbestos waste bags in accordance with Safe Work Australia (2016). Once a successful inspection has been completed and both the licensed asbestos removal contractor and the Competent Person / Asbestos Assessor are satisfied there are no visible residual asbestos impacts on the ground surface, the area shall be deemed suitable for re-occupation and a clearance report issued by the Competent Person / Asbestos Assessor.

Should clearance for the removal of friable asbestos be required, the final inspection and clearance report should be completed by a licensed asbestos assessor.

#### **Clearance Monitoring**

In the event that friable asbestos is encountered during the excavation works, clearance airborne asbestos monitoring shall be required following the friable asbestos removal. Following the completion of all earthworks, backfill of the excavated area and installation of the proposed carpark, clearance air monitoring will take place in the vicinity of the work area to ensure that there is no residual contamination remaining at the site.

Ambient air conditions clearance will be gained by recording airborne asbestos concentration levels in all sampling locations below 0.01 fibres / mL.

## 10. Contingencies

A list of contingency items and control measures with respect to asbestos and this AMP is as follows.

Table 3: Contingency and Control Measures

Contingency Item	Control Measures
Person undertaking work in the restricted area for asbestos has not undertaken induction into the AMP.	Principal Contractor or a person appointed by the Principal contractor shall prepare a non-conformance report and assess reason of the non-conformance.  Person undertaking work shall be inducted into this AMP.
Significant asbestos find is encountered in the work area	Stop work and report to Principal Contractor, who should contact the Competent Person / Asbestos Assessor to provide advice on handling, treatment and management of the material.
ACM is found on a stockpile or material that has been excavated	Location of the original material should be revealed from material tracking data. Principal Contractor should be informed. Competent Person / Asbestos Assessor should provide advice on management of the material in the original location as well as the location where it has been placed.
ACM is found on haulage pathway	Haulage path shall be closed and be inspected for the presence of other ACM by a NSW licensed asbestos assessor or a Competent Person.  Principal Contractor or a person appointed by the Principal Contractor shall prepare a non-conformance report and assess reason of the non-conformance.  Review of procedure of transport of asbestos contaminated material shall be undertaken by the Principal Contractor. Rectification of the procedure shall be undertaken, if considered appropriate.  ACM shall be collected and disposed of appropriately in accordance with Safe Work Australia (2016)
Significant dust generation	Stop work, undertake more dust suppression.  Do not commence work again until dust suppression is adequately undertaken.
Asbestos impacted stockpile disposed of inappropriately (e.g. to landfill which is not licenced to receive asbestos)	Principal Contractor or a person appointed by the Principal Contractor shall immediately contact landfill.  Principal Contractor or a person appointed by the Principal Contractor shall prepare a non-conformance report and assess reason of the non-conformance. Rectification of the procedure shall be undertaken, if considered appropriate.  Competent Person / Asbestos Assessor shall be engaged to assess appropriate management strategy.  Incident may need reporting to NSW EPA.

Relevant emergency contacts are as follows.

Table 4: Emergency Contacts

Company	Contact Person and Number
Principal Contractor	CPB Contractors Pty Ltd
Site Supervisor	To be advised
Asbestos Specialist	To be advised
SafeWork NSW	131 050
NSW EPA	131 555



## **11. Review and Improvement**

### **11.1. Non-Compliances and Corrective / Preventative Action**

Environmental inspection and monitoring results are interpreted to identify actual and potential non-compliances and events that may result in nuisance, environmental harm and unacceptable loss of amenity or community complaints. The Environmental Representative or a public authority may also raise a non-compliance or improvement notice.

Following the identification of a non-compliance, corrective and/or preventative actions will be identified and assigned to the appropriate person with set timeframes. Timeframes will be set to ensure any damage incurred is rectified and any chance of recurrence is eliminated as soon as practicable.

Refer to the CEMP (Part B, Section 3) for detailed NCR and corrective action management.

### **11.2. Revisions of this Plan**

Continual improvement is achieved through constant measurement and evaluation, audit and review of the effectiveness of this Plan.

This plan will be updated as required, such as

- To take into account changes to the environment or generally accepted environmental management practices, new risks to the environment, or changes in law
- Where requested or required by the NSW Department of Planning and Environment or any other Authority
- Repeated non-conformances
- In response to internal or external audits

The updated plan must be endorsed by the Environmental Representative and approved internally by the Project Director. Minor changes may be approved by the Environmental Representative. Minor changes would typically include those that:

- Are editorial in nature (e.g. staff and agency/authority name changes)
- Do not increase the magnitude of impacts on the environment when considered individually or cumulatively
- Do not compromise the ability of the project to meet approval or legislative requirements

Where the Environmental Representative deems it necessary, the Plan will be provided to the Secretary of DP&E for approval.

## 12. Incident Response

The immediate incident response will be managed as per the Incident and Emergency Management Plan (IEMP). The following generally summaries the incident response strategies will be implemented:

- In the event of encountering unexpected contamination, remedial measures as per the Unexpected Finds Procedure will be implemented as required
- Incidents where material harm to the environment is caused or threatened will be managed in accordance with a Pollution Incident Response Management Plan (PIRMP) per the EPL requirements.

The CEMP (Part B, Element 9) covers the broader incident management, including incident notifications, classification, corrective actions and reporting.

### 12.1. Incident Response Measures

In the event that an adverse surface water quality is identified as a result of construction activities, the incident will be managed according to the IEMP. The following general response would be implemented:

- Stop works in accordance with incidence response procedures
- Review and amend construction methodology with particular note to management strategies / mitigation measures intended to prevent contamination
- Implement amended construction methodology
- Increase the frequency of monitoring until the amended construction methodology has been validated as effective (i.e. compliance with monitoring criteria) where required:
- The Project Director or Environment Manager report any pollutant release to the surrounding environment to the EPA
- Remediation of impacted areas in consultation with the EPA, NSW Office of Water and Liverpool City Council
- Recommence construction once corrective actions have been implemented and preventative actions are determined and agreed

## 13. References

- Coffey 2018, 'Moorebank Intermodal Rail Link Contamination Management Plan, Moorebank, NSW'.
- Coffey 2018, 'Land Contamination Status Report, Moorebank Intermodal Rail Link, Moorebank, NSW'.
- Coffey 2018, 'Remediation Action Plan, Moorebank Intermodal Rail Link, Moorebank, NSW'.
- JBS&G 2015a, 'Phase 2 Environmental Site Assessment SIMTA Intermodal Terminal Facility - Stage 1', Ref: 50342-60868, 23 March 2015.
- JBS&G 2015b, 'SIMTA Intermodal Terminal Facility - Stage 1 Remediation Action Plan', Ref: 50342-61155, 23 March 2015.
- JBS&G 2015c, 'Draft Contamination Management Plan (CMP) Moorebank Avenue, Moorebank, NSW', Ref: 50342/100501 (Rev A), 11 May 2015.
- NOHSC 2005, 'Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition, 3003 - 2005', National Occupational Health and Safety Commission.
- NOHSC 2005, 'Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition, 3003 - 2005', National Occupational Health and Safety Commission.
- Safe Work Australia 2016, 'Code of Practice: How to Manage and Control Asbestos in the Workplace'.
- Safe Work Australia 2016, 'Code of Practice: How to Safely Remove Asbestos', December 2011.
- Standards Australia 1994, 'AS 1319-1994: Safety Signs for the Occupational Environment'.
- WA DoH 2009, 'Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia'.
- WorkCover NSW 2014, 'Managing Asbestos in or on Soil'.



## Figures









revision	no.	description	drawn	approved	date	 <div>Scale (metres) 1:2000</div>	drawn	FW / AW		client: CPB CONTRACTORS		
	A	DRAFT ISSUE	FW	SG	27/04/16		approved	SG		project: MOOREBANK INTERMODAL RAIL LINK ASBESTOS MANAGEMENT PLAN MOOREBANK, NSW		
							date	27 / 04 / 16		title: KNOWN ASBESTOS LOCATIONS SHEET 1 OF 4		
							scale	AS SHOWN		project no: GEOTLCOV24072AF-AH		
							original size	A3		figure no: FIGURE 2		rev: A







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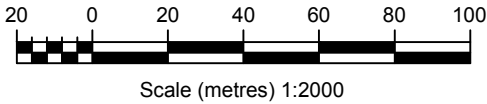


**LEGEND**

✕ KNOWN LOCATIONS OF ASBESTOS

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client: CPB CONTRACTORS	
project: MOOREBANK INTERMODAL RAIL LINK ASBESTOS MANAGEMENT PLAN MOOREBANK, NSW	
title: KNOWN ASBESTOS LOCATIONS SHEET 3 OF 4	
project no: GEOTLCOV24072AF-AH	figure no: FIGURE 4
rev: A	



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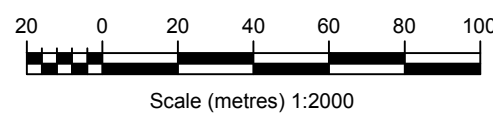
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KNOWN LOCATIONS OF ASBESTOS

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approved	SG
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scale	AS SHOWN
original size	A3



client: CPB CONTRACTORS	
project: MOOREBANK INTERMODAL RAIL LINK ASBESTOS MANAGEMENT PLAN MOOREBANK, NSW	
title: KNOWN ASBESTOS LOCATIONS SHEET 4 OF 4	
project no: GEOTLCOV24072AF-AH	figure no: FIGURE 5
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## **Annexure A – Compliance Matrix**

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# Compliance Requirements

Specific contract clauses and references which set limits and/or govern impacts to asbestos management on the project include:

## Contract Clauses

Table 5: Principal's Project Requirements

Contract Document Reference	Requirement	Where Addressed
1.21 d)	Any and all site remediation within MIDIT Land required to comply with all relevant legislation, planning approvals, environmental site assessment, remediation action plan, contamination management plans and the Site Auditor Statements/Reports. Remediation works may include, but are not limited to, the following activities: (i) Bioremediation or offsite disposal of hydrocarbon impacted soils; (ii) Offsite disposal or in-ground pits and separation tanks, and bioremediation or offsite disposal of associated impacted soils; (iii) Offsite disposal of Hexachlorobenzene (HCB) contaminated soil; (iv) Offsite disposal of heavy metal impacted soil; and (v) Offsite disposal of friable or bonded Asbestos Containing Material (ACM).	This Plan (for RALP No 1 – Stage 1 scope of works only)

## Conditions of Project Planning Approvals

Conditions of project environmental approvals that specifically address the management of asbestos include:

### Stage 1 Conditions of Approvals

Table 6: Stage 1 Conditions of Approval

Stage 1 CoA Ref	Requirement	Where Addressed
E33 e)	details of how environmental performance would be managed and monitored to meet acceptable outcomes, including what actions will be taken to address identified potential adverse environmental impacts. In particular, the following environmental performance issues shall be addressed in the CEMP:	CEMP
E33 e)	i) measures to monitor and manage dust emissions including dust from stockpiles, traffic on unsealed internal roads and materials tracking from construction sites onto public roads;	CEMP
E33 e)	ii) measures for the handling, treatment and management of hazardous and contaminated materials (including asbestos);	Contamination Management Plan

Stage 1 CoA Ref	Requirement	Where Addressed
E33 e)		This Plan
	iii) measures to monitor and manage waste generated during construction including but not necessarily limited to: general procedures for waste classification, handling, reuse, and disposal; use of secondary waste material in construction wherever feasible and reasonable; procedures or dealing with green waste including timber and mulch from clearing activities; and measures for reducing demand on water resources (including potential for reuse of treated water from sediment control basins);	Contamination Management Plan

## Stage 1 Final Compilation of Mitigation Measures

Table 7: Stage 1 Final Compilation of Mitigation Measures

Stage 1 FCMM Ref	Requirement	Where Addressed
7C	A Contamination Management Plan will be developed for the Proposal, and included in the CEMP, that will contain detailed procedures on:	Contamination Management Plan
7C d)	<p>d) Specific contingency measures in the unlikely event that construction of the Rail link in the Glenfield Waste Facility results in the disturbance of existing landfill cells. Including:</p> <p>Management of construction works in areas potentially impacted by asbestos via an Asbestos Management Plan</p> <p>Management of excavation work to minimise the potential for surface or groundwater infiltration into the excavations, thereby potentially increasing the volume of leachate in the impacted cells. This will include the routine monitoring of leachate levels and groundwater surrounding the impacted areas using existing monitoring infrastructure.</p> <p>Management of impacted soils using the Material Management Procedures</p> <p>Replacement or relocation of existing monitoring wells that may be impacted by the construction work. The impact to existing monitoring wells and the alternate locations of any replacement wells will be subject to negotiations with the proponents of the Glenfield Waste Facility and the NSW EPA to ensure that existing environmental protection licence requirements are satisfied.</p> <p>Should future design iterations identify that landfill containment may be compromised, a specific work plan will be developed to address potential environmental and/or health and safety issues that may arise.</p>	<p>Contamination Management Plan</p> <p>Glenfield Waste Construction Impact Assessment Report</p> <p>Section 9 of this Plan</p>

Stage 1 FCMM Ref	Requirement	Where Addressed
12B	A contingency plan for unexpected contaminated materials, such as materials that are odorous, stained or containing anthropogenic materials, that may be encountered during construction.	
	With respect to asbestos management, the obligations, roles and responsibilities for personnel involved in the Stage 1 Proposal will be identified, documented and communicated. These responsibilities are identified in the Work Health and Safety Act 2011. Prior to commencement of construction an Asbestos Management Plan is to be developed in accordance with Code of Practice How to Manage and Control of Asbestos in the Workplace (Safe Work Australia, 2016) for the Proposal. The Asbestos Management Plan will reference the asbestos register and risk assessment, which will also be prepared prior to construction being undertaken. The Asbestos Management Plan will address the following aspects, at a minimum:	Section 4 of this Plan
	a) Demolition of the three structures (Buildings 1, 2 and 20), will be undertaken in accordance with Code of Practice How to Safely Remove Asbestos (Safe Workr NSW, 2016)	Not applicable
	b) Asbestos removal work will be carried out by an asbestos removalist who is appropriately licensed to carry out the work.	Section 4 of this Plan

## NSW Concept Plan Revised Statement of Commitments

Table 8: NSW Concept Plan Revised Statement of Commitments

NSW Concept Plan Revised SoC Ref	Requirement	Where Addressed
1.61	<u>Asbestos</u>	
a)	The Proponent will develop an asbestos management plan for the SIMTA proposal containing a risk assessment undertaken in accordance with Code of Practice for the Management and Control of Asbestos in the Workplace (NOHSC,2005).	Stage 1 EIS
b)	Where the management plan recommends the removal of asbestos from site all works will be undertaken in accordance with the Code of Practice for the Safe Removal of Asbestos (NOHSC, 2005), including the development of an asbestos removal control plan and an emergency plan.	Section 4 of this Plan



## Commonwealth Concept Plan Mitigation Measures

Table 9: Commonwealth Concept Plan Mitigation Measures

C'th Concept Plan MM Ref	Requirement	Where Addressed
7.4.11.3	<u>Asbestos Management</u>	
a)	Demolition of the structures listed in Table 24, will be undertaken in accordance with How to manage and control asbestos in the workplace (Safe Work Australia, 2016) and How to safely remove asbestos (Safe Work Australia 2016). Excavation or disturbance of those areas of the SIMTA site and rail corridor where the potential for asbestos to be present within the soil has been identified will also be managed in accordance with the code of practice.	Not applicable to RALP No. 1
b)	Prior to commencement of construction, a risk assessment will be undertaken by a competent person prior to removal of any asbestos material from the SIMTA site. In accordance with How to manage and control asbestos in the workplace (Safe Work Australia, 2016), the assessment must comprise review and summation of all available information for the SIMTA site, including the: <ul style="list-style-type: none"> <li>• Asbestos risk assessment/risk register.</li> <li>• Asbestos management plan.</li> <li>• Implementation of the asbestos management plan to date.</li> <li>• A confirmation of controls to be implemented where construction works will impact on asbestos materials.</li> </ul>	Not applicable to RALP No. 1
c)	All works for the removal of asbestos from site will be undertaken by appropriately qualified personnel in accordance with Code of Practice: How to Safely Remove Asbestos (SafeWork NSW, 2016).	Section 4 of this Plan

## Environment Protection Licence

Environment Protection Licence clauses that specifically address the management of asbestos are included in the table below.

Table 10: Environment Protection Licence

EPL Ref	Requirement	Where Addressed
O1.1	<b>Activities must be carried out in competent manner</b>  Licensed activities must be carried out in a competent manner. This includes:  a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and  b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.	CEMP  CSWMP  WMP  AMP
O4.1	<b>Waste Management</b>	CEMP

O4.2	The licensee must assess, classify and manage any waste generated at the premises in accordance with the NSW EPA Waste Classification Guidelines Part 1 : Classifying Waste, 2016 (Waste Guidelines) prior to dispatching the waste offsite.	WMP AMP
	<b>Waste Management</b>  The licensee must not cause, permit or allow any waste generated:  (a) outside the premises to be received at the premises, except for materials that meet the EPA's Resource Recovery Exemptions for engineered fill purposes.  (b) at the premises to be disposed of at the premises, except as permitted in Condition O4.3.	CEMP  WMP AMP
O4.3	<b>Waste Management</b>  Excavated material suitable for re-use within the premises may be transported from one part of the premises to another part by road in accordance with Condition O4.4.	CEMP  CTAMP WMP
O4.4	<b>Waste Management</b>  The licensee must ensure that:  (a) the body of any vehicle or trailer, used to transport waste or excavation spoil from the premises, is covered before leaving the premises to minimise any spill or escape of any dust, waste, or spoil from the vehicle or trailer; and  (b) mud, splatter, dust and other material likely to fall from or be cast off the wheels, underside or body of any vehicle, trailer or motorised plant leaving the premises, is removed to the greatest extent practicable before the vehicle, trailer or motorised plant leaves the premises; and  (c) road surfaces subject to the tracking of material by vehicles leaving the premises are effectively cleaned at the end of each work day.	CTAMP  CAQMP CSWMP WMP
O5.1	<b>Erosion and Sediment Control</b>  The licensee must, 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.	CSWMP

Note: Current EPL does not include the GWS site. The EPL will be updated when full access to the GWS site is provided and the EPL subsequently updated.

## **Annexure B – Glossary of Terms**

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# Abbreviations

<b>ACM</b>	Asbestos Containing Material
<b>AMP</b>	Asbestos Management Plan
<b>CEMP</b>	Construction Environmental Management Plan
<b>NEPM</b>	National Environment Protection (Assessment of Site Contamination) Measure
<b>PCBU</b>	Person Conducting a Business or Undertaking
<b>PPE</b>	Personal Protective Equipment
<b>RAP</b>	Remediation Action Plan
<b>RPE</b>	Respiratory Protective Equipment
<b>SIMTA</b>	Sydney Intermodal Terminal Alliance
<b>SWMS</b>	Safe Work Method Statement



## **Annexure C – Asbestos Register**

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## Asbestos Register

### Moorebank Precinct East Stage 1 RALP No. 1

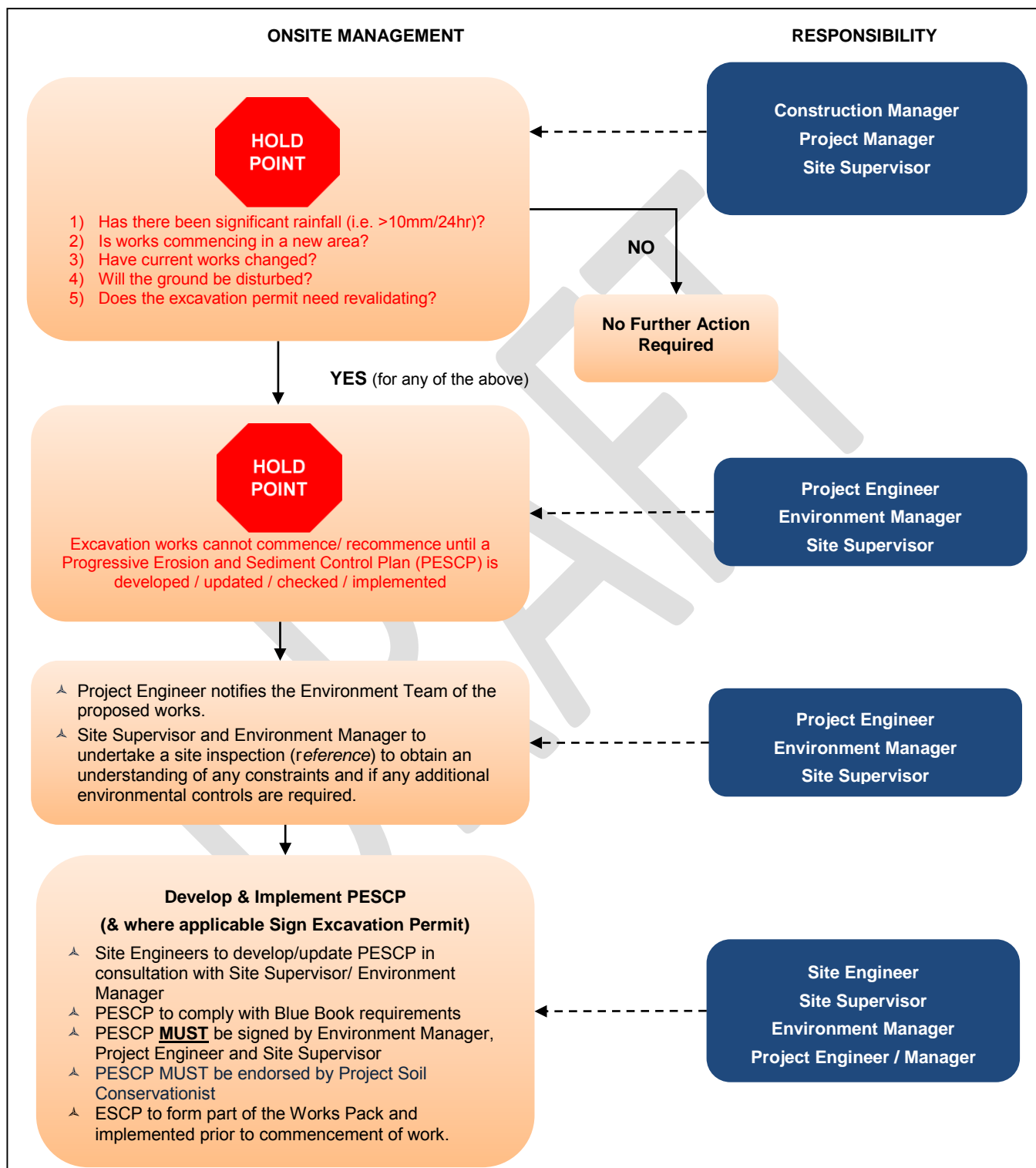
ID	Date of Identification	Location	Item Description, Including Condition of ACM (Friable/Non-Friable)	Approximate Size and Weight	Laboratory Testing	Fate of ACM
AHMS01 SIMTA	Historical investigation	Fill in the southern portion of the RNE Golf Course site at 0.3-0.4 mbgs	Bonded ACM	Unknown	Yes, indicating presence of asbestos	Removed during laboratory testing
TPE11 and TPE12	Coffey (2016b) investigation	Sydney Trains land – see accompanying figure	Bonded ACM	Unknown	Yes, indicating presence of asbestos	Remain on-site.
NIL	Coffey (2016b) investigation	Waste burial and mounds noted during investigation - see accompanying figure	Bonded ACM, though presence of friable asbestos cannot be precluded based on site observation	Unknown	No	Remain on-site
Near BH15	Coffey (2016b)	Western embankment of Moorebank Avenue - Flytipping and stockpile – see accompanying figure	Bonded ACM	Unknown	No	Remain on-site
Near BH16	Coffey (2016b)	Evidence of flytipping and stockpile containing ACM	Bonded ACM, though presence of friable asbestos cannot be precluded based on site observation	Unknown	No	Remain on-site
ASB-FC (near TP8)	Coffey (2016b)	Building rubble / spoil just north of Anzac Creek	Bonded ACM	Unknown	Yes, indicating presence of asbestos	Remain on-site

Please see Figures A to E for locations of the Asbestos Containing Materials.

## **Attachments**

### **Attachment J: Other Procedures**

*These are subject to change as construction progresses*





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