

Appendix B5

SGWPW-JHSW-NWW-PM-PLN-000520

Contaminated Aquatic Sediments in
Alexandra Canal Management Sub Plan
SSI 9737

Sydney Gateway Road Project

July 2021

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Document control

Approval and authorisation

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Copy number	Issued to	Version
1	Transport for New South Wales	
2	Independent Verifier	
3	Environmental Representative	
4	Project Director	
5	Environment and Sustainability Manager	
6	Quality Manager	

Glossary/ Abbreviations

Abbreviations	Expanded text
ASS	Acid Sulfate Soils
CEMP	Construction Environmental Management Plan
CoA	Conditions of Approval
CASACMP	Contaminated Aquatic Sediments in Alexandra Canal Management Sub Plan
CSSI	Critical State Significant Infrastructure
DBG	Densely Graded Base
DGVs	Default Guideline Values
DPIE	NSW Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
ENM	Excavated Natural Material
EPL	Environmental Protection License
EPA	NSW Environment Protection Authority
EWMS	Environmental Work Method Statements
JHSWJV	John Holland Seymour Whyte Joint Venture
MDP	Major Development Plan
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PFAS	Per- and Polyfluoroalkyl Substances
SWTC	Scope of Works and Technical Criteria
SWMP	Soil and Water Management Sub Plan
TfNSW	Transport for NSW (formerly Roads and Maritime Services)
TSS	Total Suspended Solids
UMMs	Updated Mitigation Measures
VENM	Virgin Excavated Natural Material

1 Introduction

1.1 Context

This Contaminated Aquatic Sediments in Alexandra Canal Management Sub Plan (CASACMP or Plan) forms part of the Construction Environmental Management Plan (CEMP) for Design and Construction of Sydney Gateway Project (the Project).

This Plan has been prepared to address the requirements of the Minister's Conditions of Approval (CoA), the environmental management measures listed in the Project's combined Environmental Impact Statement (EIS) / Major Development Plan (MDP), Updated Mitigation Measures (UMMs) from the Response to Submissions Report and all applicable legislation and Transport for New South Wales (TfNSW) requirements.

Prior to carrying out any works or activities that would disturb the bed sediments of Alexandra Canal, NSW EPA requires a written plan to be prepared and submitted for EPA's approval, outlining how disturbance of bed sediments and migration of contaminated sediments will be minimised. This plan meets the purposes of the written plan required under Remediation Order (23004; Refer Appendix A) and will be submitted to NSW EPA on behalf of Sydney Water, for NSW EPA's approval.

Note – this Plan has been developed specifically for works and impacts occurring within NSW State land under approval SSI 9737, which is administered by the NSW Department of Planning, Industry and Environment (DPIE).

1.2 Environmental management systems overview

The environmental management system overview is described in Section 1.5 of the CEMP. The environmental management system also incorporates the project specific CEMP and sub-plans, strategies, procedures and environmental work method statements (EWMS). The environmental management system clearly identifies required environmental management actions for implementation by John Holland Seymour Whyte Joint Venture (JHSWJV) personnel and contractors.

1.3 Background

1.3.1 Background

Transport for NSW (TfNSW) have gained approval to deliver a high capacity road connection linking the Sydney motorway network at St Peters interchange with Sydney Airport's domestic and international terminals and the Port Botany Precinct. The Project is located on both State and Commonwealth land.

For areas on State land, the Project was declared to be critical State significant infrastructure (CSSI) under the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) and was approved by the NSW Minister for Planning and Public Spaces on 27 August 2020.

Commonwealth approval under the *Airports Act 1996* (the *Airports Act*) was granted by the Australian Minister for Infrastructure, Transport and Regional Development on 23 September 2020.

John Holland Seymour White Joint Venture (JHSWJV) have been contracted by Transport for New South Wales (TfNSW) for the Design and Construction of the Project.

1.3.2 Project Objectives

The primary objective of the Project is to support sustainable growth in the economy and cater for projected increases in passengers and freight demand. This will be achieved by improving

connectivity between the regional growth and freight distribution centres in western Sydney and the Sydney Airport and Port Botany area. The objectives of the Project are to:

- Improve connectivity to Sydney Airport terminals by providing high capacity direct road connections that cater for forecast growth in passenger and air freight volumes.
- Support the efficient distribution of freight to and from Sydney Airport and Port Botany to logistic centres in Western Sydney.
- Improve the liveability of Mascot town centre by reducing congestion and heavy vehicle movements on the local road network.

1.3.3 Detailed Description

The Project is located about eight kilometres south of the Sydney Central Business District, in the suburbs of Tempe, St Peters and Mascot. It sits within the boundaries of the Inner West, City of Sydney and Bayside local government areas.

The key features of the Project are illustrated in Figure 1-1, which include:

- Road links to provide access between the Sydney motorway network and Sydney Airport's terminals, consisting of the following components:
 - St Peters interchange connection – a new elevated section of road extending from St Peters interchange to the Botany Rail Line, including an overpass over Canal Road.
 - Terminal 1 connection – a new section of road connecting Terminal 1 with the St Peters interchange connection, including a bridge over Alexandra Canal and an overpass over the Botany Rail Line.
 - Qantas Drive upgrade and extension – widening and upgrading Qantas Drive to connect Terminals 2/3 with the St Peters interchange connection, including a high-level bridge over Alexandra Canal.
- Terminal links – two new sections of road connecting Terminal 1 and Terminals 2/3, including a bridge over Alexandra Canal.
- Terminals 2/3 access – a new elevated viaduct and overpass connecting Terminals 2/3 with the upgraded Qantas Drive.
- Road links to provide access to Sydney Airport land:
 - A new section of road and an overpass connecting Sydney Airport's northern lands on either side of the Botany Rail line (the northern lands access)
 - A new section of road, including a signalised intersection with the Terminal 1 connection and a bridge, connecting Sydney Airport's existing and proposed freight facilities on either side of Alexandra Canal (the freight terminal access)
- An active transport link, about 3 kilometres long and located along the western side of Alexandra Canal and section along Qantas Drive, to maintain connections between Sydney Airport, Mascot and the Sydney central business district.
- Intersection upgrades and/or modifications.
- Construction of operational ancillary infrastructure including maintenance bays, new and upgraded drainage infrastructure, signage and lighting, retaining walls, noise barriers, flood mitigation basin, emplacement mounds, utility works and landscaping.

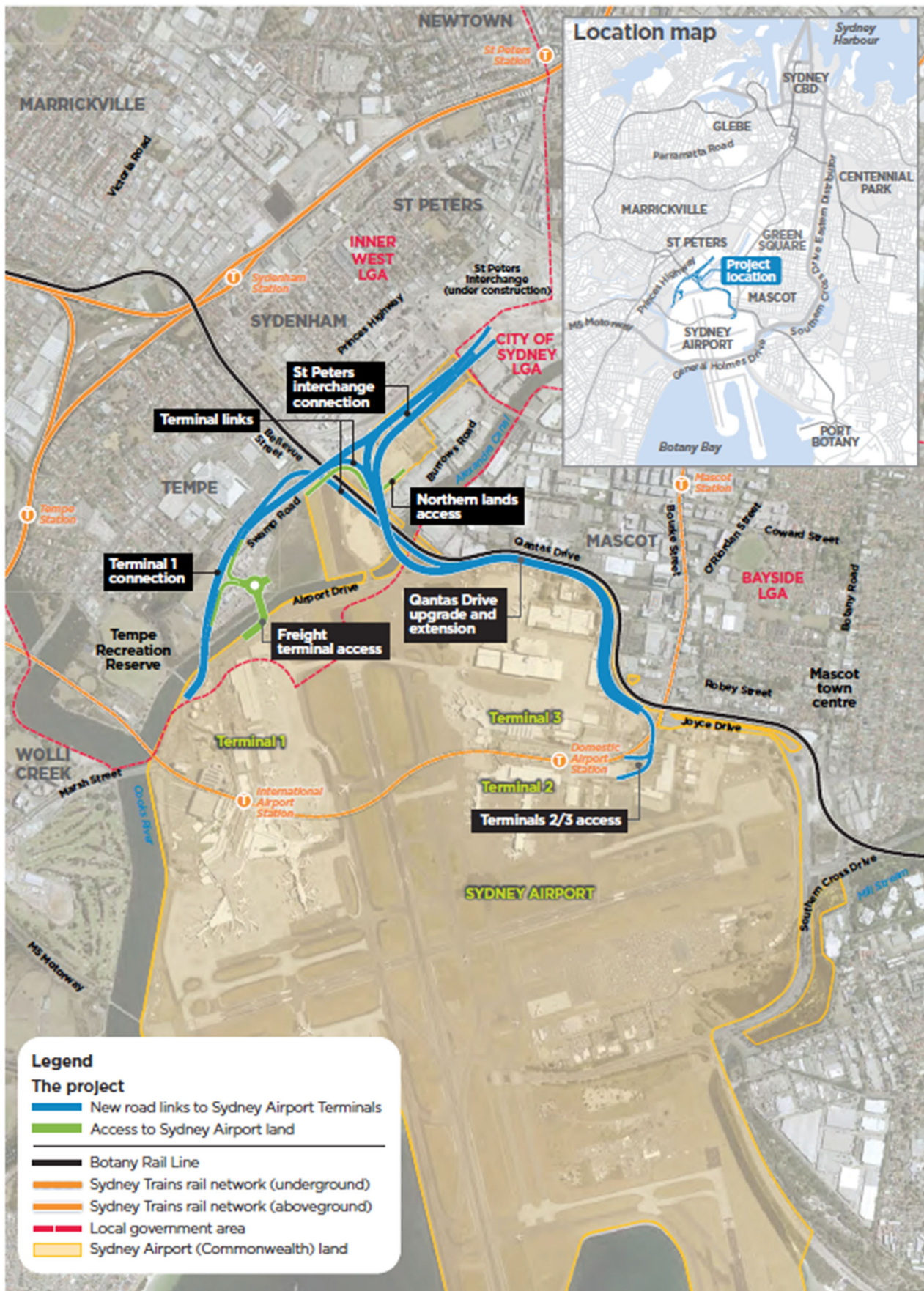


Figure 1-1 Project overview

2 Purpose and objectives

2.1 Purpose

The purpose of this Plan is to describe how JHSW JV proposes to manage work in the Alexandra Canal and to ensure, in accordance with remediation order (Ref 23004), disturbance to the bed sediments is minimised.

2.2 Scope

The Project has been designed to minimise disturbance of the Alexandra Canal bed sediments, wherever possible. New stormwater drainage and construction of the bridge abutments associated with the Project will connect into Alexandra Canal. This Plan provides the mitigation measures and management techniques to be implemented in order to maintain compliance.

Any waste removal associated with the works in and adjacent to the Canal (including removal of sediment) will be managed in accordance with the Waste & Resource Management Sub Plan.

If Acid Sulphate Soils (ASS) are encountered these will be managed in accordance with the ASS Management Plan included in the SWMP.

2.3 Objectives

The key objective of this Plan is ensure all requirements relevant to works within Alexandra Canal are captured, scheduled and assigned responsibility as outlined in:

- The combined EIS / MDP prepared for the Sydney Gateway Project.
- Conditions of Approval for SSI 9737 issued by the Minister for Planning and Public Spaces (NSW) on 27 August 2020.
- UMMs detailed in the Response to Submissions Report.
- Roads and Maritime specifications G36, G38 and G40.
- The Project's Environmental Protection Licence (EPL).
- Relevant legislation and other requirements described in **Section 3.1** of this Plan.
- The objectives and actions required by the remediation order (Ref. 23004) that applies to the Alexandra Canal (**Appendix A**).

2.4 Targets and performance outcomes

The following targets have been established for the management of works within Alexandra Canal during the delivery of the Project. To achieve this outcome, JHSWJV will meet the targets as outlined below:

- Compliance with the relevant legislative requirements, CoA and UMM.
- Meet EPL requirements.
- Provide training in the form of inductions to relevant Project personnel relating to works in Alexandra Canal, before they begin work on site.
- Ensure compliance with remediation order (Ref. 23004) that applies to the Alexandra Canal.

- Minimise the potential for generation of ASS and therefore minimise the potential creation of sulfuric acid as a product of ASS.

The performance outcomes relevant to contaminated aquatic sediments in Alexandra Canal (as identified in Chapter 27.4 Compilation of performance outcomes of the EIS/MDP) are detailed in Table 2-1.

Table 2-1 – Environmental performance targets and outcomes

No.	Performance Outcomes	Where addressed
1	Existing contamination is managed in accordance with relevant regulatory requirements.	This Plan has been developed to comply with the requirements in the remediation order for the Alexandra Canal to ensure disturbance to the contaminated bed sediments from construction is minimised.

3 Environmental requirements

3.1 Relevant legislation and guidelines

3.1.1 Legislation

All legislation relevant to this Plan is included in Table 3-1 below. It should also be noted that the remediation order was issued under the *Contaminated Land Management Act 1997*.

Table 3-1 Legislation relevant to this Plan

Act	Requirement	Reference
<i>Protection of the Environment Operations Act 1997</i>	Do not cause or permit land pollution other than under authority of a licence or regulation. (However it is not a land pollution offence to place virgin excavated natural material or lawful pesticides and fertilisers on land, or by placing matter on land that has been notified to the EPA as an unlicensed landfill and which is operated in accordance with the regulations.)	S142A – S142E
<i>Protection of the Environment Operations Act 1997</i>	A person who pollutes any waters is guilty of an offence	S120
<i>Contaminated Land Management Act 1997</i>	Notify the EPA if: <ul style="list-style-type: none"> Contaminants exceed thresholds contained in guidelines or the regulations where contamination has entered or will foreseeably enter neighbouring land, the atmosphere, groundwater or surface water Contaminants in soil are equal to or exceed guideline levels with respect to the current or approved use of the land. Contamination meets other criteria that may be prescribed by the regulations. 	S60
<i>Contaminated Land Management Act 1997</i>	A remediation order (number 23004) was issued by the NSW EPA to Sydney Water on 10 May 2004.	Refer to Section 4.2.1 below for details

3.1.2 Guidelines and standards

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

- Acid Sulfate Soil Manual (ASSMAC 1998).
- Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (2004).
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018).
- Guidelines for Consultants reporting on contaminated Land: Contaminated land guidelines (NSW EPA 2020)

- Guidelines for Controlled Activities on Waterfront Land – Riparian corridors (Department of Industry, 2012).
- Guidelines for Instream Works on Waterfront Land (Department of Primary Industries, Office of Water, 2012).
- Guidelines for Watercourse Crossings on Waterfront Land (Department of Primary Industries, Office of Water, 2012).
- Guidelines for Outlet Structures on Waterfront Land (Department of Primary Industries, Office of Water, 2012)
- Guidelines for Laying Pipes and Cables in Watercourses on Waterfront Land (Department of Primary Industries, Office of Water, 2012).
- Managing Urban Stormwater: Soils and Construction. Landcom, (4th Edition) March 2004 (reprinted 2006) (the “Blue Book”). Volume 1 and Volume 2.
- National Acid Sulfate Soils Guidance (DAWE 2018)
- National Environment Protection (Assessment of Site Contamination) Measure 1999 (amended 2013).
- PFAS National Environmental Management Plan (HEPA 2020).
- Roads and Maritime QA Specification G36 – Environmental Protection (Management System).
- Roads and Maritime QA Specification G38 – Soil and Water Management (Soil and Water Management Plan).

3.2 Water Quality trigger values for Alexandra Canal

The ANZG (2018) guidelines adopt a risk-based approach that uses trigger values that can be modified to be applicable to regional, local or site-specific guidelines. The trigger values are the criteria used for concentrations that, if exceeded, would indicate a potential environmental problem, and so ‘trigger’ a management response. **Table 3-2** below provides indicative site-specific water quality trigger values for Alexandra Canal for short term monitoring. These values will be used for monitoring as detailed in Section 7.3 of this Plan and are based upon the baseline water quality monitoring completed for the EIS/MDP and Submissions Report.

Table 3-2 Water quality trigger values for Alexandra Canal

Pollutants	Unit	Trigger Value
Aluminium (Filtered)	µg/L	27.4
Arsenic (Filtered) #	µg/L	30
Barium++	mg/L	2
Boron+	µg/L	5,100
Cadmium (Filtered)*	µg/L	36
Chromium (CrVI) (Filtered)*	µg/L	85
Copper (Filtered)*	µg/L	8
Cobalt (Filtered)	µg/L	150
Iron (Filtered)	µg/L	48.8
Lead (Filtered)*	µg/L	4.4
Manganese (Filtered)	µg/L	20.26
Mercury (Filtered)**	µg/L	0.40

Pollutants	Unit	Trigger Value
Nickel (Filtered)*	µg/L	560
Zinc (Filtered)*	µg/L	55.6
pH (Lab)*	pH units	7.0-8.5
Total Suspended Solids (TSS)	mg/L	15.2
Turbidity	NTU	11.48
Bicarbonate Alkalinity as CaCO ₃	mg/L	124
Ammonia (as total ammonia NH ₃ -N)	mg/L	1.7
Nitrate (as N) #	mg/L	10
Nitrite (as N) #	mg/L	0.10
Total Nitrogen (as N)	mg/L	0.90
Total Phosphorus (as P)	mg/L	0.07
PFOA^	µg/L	220
PFOS^	µg/L	0.13
TPH – C6-C9 fractions+++	µg/L	150
TPH – Mineral Oil (>C9 fractions)+++	µg/L	600
F2- Naphthalene	mg/L	120
Ethylbenzene	µg/L	250
Total Xylenes +	µg/L	625
p- Xylene +	µg/L	200
m- Xylene +	µg/L	75
o- Xylene +	µg/L	350
Naphthalene +	µg/L	70
Anthracene +	µg/L	0.4
Phenanthrene +	µg/L	2
Fluoranthene +	µg/L	1.4
Benzo (a) pyrene +	µg/L	0.2

Notes:

The above table, sourced from Appendix E of the Response to Submissions Report, contains pollutants that have not been detected in the surface or groundwater monitoring but which are potential contaminants of concern if detected in future monitoring data. Trigger values for all watercourses should be revised as future monitoring data is collected.

*80th percentile site monitoring value is lower than 80% protection level for aquatic ecosystems

**Bioaccumulative toxin 95% protection level was above the 80th percentile monitoring value

No separate aquatic ecosystems values available and ANZG (2018) default trigger values are higher than 80th percentile value so ANZG (2018) default trigger values is adopted

^No values recommended in ANZG (2018) as they are under development, values adopted from the PFAS National Environmental Management Plan 2.0 (2020) instead

+Low reliability trigger values from ANZG (2018) adopted

++Australian Drinking Water Guidelines (NHMRC, 2018) trigger value adopted in absence of value available from ANZG (2018)

+++Airports (Environment Protection) Regulations 1997 freshwater trigger values adopted in absence of values available from ANZG (2018) and monitoring data.

3.3 Conditions of Approval – SSI 9737

The Conditions of Approval (CoA) relevant to this Plan are listed in **Table 3-3** below. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table 3-3 Conditions of Approval relevant to the CASACMP

Source	Requirement	How addressed				
CoA C5(d)	The following CEMP sub-plans must be prepared in consultation with the relevant agencies identified for each CEMP sub-plan. Details of all information requested by an agency during consultation must be included in the relevant CEMP sub-plan, including copies of all correspondence from those agencies.	Details on consultation associated with this Plan are provided in Section 3.5				
	<table><tr><th>Required CEMP sub-plan</th><th>Relevant agencies to be consulted for each CEMP sub-plan</th></tr><tr><td>(d) Contaminated aquatic sediments in Alexandra Canal</td><td>Sydney Water</td></tr></table>		Required CEMP sub-plan	Relevant agencies to be consulted for each CEMP sub-plan	(d) Contaminated aquatic sediments in Alexandra Canal	Sydney Water
	Required CEMP sub-plan		Relevant agencies to be consulted for each CEMP sub-plan			
(d) Contaminated aquatic sediments in Alexandra Canal	Sydney Water					
CoA C6	The CEMP sub-plans must state how:					
	(a) the environmental performance outcomes identified in the documents listed in Condition A1 will be achieved;	The performance measures are detailed in Section 2.4 of this Plan.				
	(b) the mitigation measures identified in the documents listed in Condition A1 will be implemented;	Mitigation measures are detailed in Section 6 of this Plan.				
	(c) the relevant terms of this approval will be complied with; and	Section 3 outlines the relevant conditions for this Plan.				
	(d) issues requiring management during construction, as identified through ongoing environmental risk analysis, will be managed.	Potential construction works are identified in Section 5 of this Plan and mitigation measures are detailed in Section 6 of this Plan. Ongoing risk assessment will be				

Source	Requirement	How addressed
		undertaken as identified in Section 5 of this Plan.
CoA C8	The Contaminated Aquatic Sediments in Alexandra Canal CEMP sub-plan must: (a) detail how work in Alexandra Canal will be managed;	Preliminary design and construction information is contained within Appendix B of this Plan. Management measures associated with these works are included in Section 6.
	(b) be in accordance with the Remediation Order (Ref. 23004) that applies to the Canal; and	A copy of the Remediation Order is provide din Appendix A of this Plan and is discussed in Section 4.2.1. A compliance table as also been included in Section 4.2.1
	(c) include evidence than an accredited EPA Site Auditor has reviewed the sub-plan and has issued an interim audit advice or a Section B Site Audit Statement regarding the appropriateness of the sub-plan.	The Interim Audit Advice is contained within Appendix C of this Plan.
CoA C9	Any variations to the Landfill Leachate, Gas and Odour CEMP sub-plan and Contaminated Aquatic Sediments in Alexandra Canal CEMP sub-plan must be approved in writing by the EPA accredited Site Auditor and evidence of the approval submitted to the Planning Secretary for information with the amended sub-plan.	The process of updates and amendments to this Plan area detailed in Section 8.2
CoA E98	New or modified drainage outlets to Alexandra Canal must be designed, in consultation with Sydney Water, to minimise the potential for scour and mobilisation of bed sediments in accordance with the requirements of Remediation Order (Ref 23004),	Consultation with Sydney Water (including on the design) is detailed in Section 3.5 of this Plan. Preliminary design information is contained within Appendix B of this Plan for context only, and the Final Design / AFC will be as agreed with Sydney Water under their approval process.

3.4 Other requirements relevant to the development of this Plan

Other requirements detailed in the EIS/MDP, Updated Mitigation Measures (UMMs) from the Submissions Report and relevant TfNSW Specifications (G36, 38 and 40) are detailed in **Table 3-4** below. This includes reference to where the condition is addressed in this Plan or other Project management documents.

Table 3-4 Other environmental requirements relevant to this Plan

Source	Requirement	How addressed
UMM – SW3	Appropriate treatment measures, including water sensitive urban design, will be considered in the detailed design with the aim of improving water quality within Alexandra Canal and/or achieving the targets outlined in the Botany Bay and Catchment Water Quality Improvement Plan (Sydney Metropolitan Catchment Management Authority, 2011)	The bridge designs are considered as part of the Place, Design and Landscape Plan in accordance with CoA E76.
UMM – CS11	A plan of management will be developed in accordance with the remediation order and implemented to manage work within Alexandra Canal and minimise the disturbance and migration of contaminated sediments. The plan will identify specific methodologies to minimise disturbance and dispersion of potentially contaminated sediments.	This Plan has been developed to comply with this requirement Section 3.5 of this Plan details the consultation required for this Plan.
UMM SW2	Discharge outlets will be designed with appropriate energy dissipation and scour protection measures to minimise the potential for scour. Scour protection will be developed in consultation with relevant stakeholders, including Sydney Water.	The drainage design reports for the Project consider use of scour protection for permanent works. Designs for the modified drainage outlets to Alexandra Canal and for construction of the bridge abutments are currently being developed (preliminary information is provided in Appendix B for context only).
DPI, 2012	All works within or adjacent to waterways should be managed in accordance with the DPI's guidelines for Controlled Activities on Waterfront Land.	The relevance of this guideline is covered in Sections 3 & 6 of this Plan.

3.5 Consultation

This Plan has been provided to Sydney Water for review and comment in accordance with CoA C5(d) and will also be provided to the EPA Accredited Site Auditor for review with a request to subsequently issue an interim audit advice confirming the suitability of the proposed controls as well as the appropriateness of the plan in accordance with CoA C8. Once the interim audit advice is received, the Plan will be provided to the ER for endorsement and DPIE for approval in accordance with the requirements of CoA C3 of the Planning Approval.

Separately, the Remediation Order (Ref 23004), held by Sydney Water, requires EPA's approval of a written plan directed at minimising the disturbance and migration of contaminated sediments at the site. For the purposes of complying with this requirement, this Plan will be submitted to the EPA for approval under the Remediation Order.

Designs for the modified drainage outlets to Alexandra Canal and for construction of the bridge abutments are currently being developed (preliminary information is provided in **Appendix B** for context only). These will be submitted to Sydney Water for review and approval in accordance with the Building Over and Adjacent Submissions. The design incorporates design criteria and measures required to minimise the potential for scour and mobilisation of bed sediments in accordance with the requirements of remediation order (CoA E98).

The relevant design packages include the drainage designs; bridge and road works packages for works over Alexandra Canal, and temporary works packages for the drainage outlets and piling platforms.

4 Existing environment

4.1 Background

The Alexandra Canal was constructed through dredging and canalisation of Sheas Creek, which formed a natural tributary to the Cooks River. It is owned and operated by Sydney Water Corporation and is listed on the State Heritage Register.

The Alexandra Canal is approximately 4 kilometres long from Huntley Street to Cooks River, and approximately 40-60 metres wide and an average of 3 metres deep along its length. The canal discharges into the Cooks River near the north-western corner of Sydney Airport, which then discharges into Botany Bay to the west of Sydney Airport. The tides in Alexandra Canal and the Cooks River estuary are semi-diurnal, characterised by two low tide and two high tide conditions per day.

Alexandra Canal has been subject to discharge and runoff from the numerous industries and other land uses located along the canal since the late 1800s. This has led to the bed sediments of the canal being highly contaminated.

4.2 Contamination

4.2.1 Remediation Order

The Alexandra Canal was declared a remediation site (number 21008) on 25 August 2000 by the NSW EPA, due to bed sediments being contaminated with organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs) and metals. A remediation order (number 23004) was issued by the NSW EPA to Sydney Water on 10 May 2004. The following primary chemicals of concern within the bed sediments of Alexandra Canal have been identified:

- Asbestos
- Metals
- Nitrogen species
- Organotin compounds
- PAH
- PCBs
- Pesticides
- Petroleum hydrocarbons
- PFAS
- pH


The remediation order (number 23004) in **Appendix A**, states that *"any works or activities on the bed sediments of the site [Alexandra Canal] that would result in the disturbance, or further disturbance, of the bed sediments"* except as provided by the order.

The remediation order states that works disturbing the bed sediments require a plan to be submitted to the NSW EPA for approval prior to commencement of the works and plans for investigation or remediation must be prepared in accordance with the Guidelines for *Consultants reporting on contaminated Land: Contaminated land guidelines*, which revokes the 2011 edition of the Guidelines for Consultants Reporting on Contaminated Sites.

The order applies to the bed sediments of the Alexandra Canal between Huntley Street, Alexandria and the junction of the Cooks River at Mascot. Any works or activities subject of an approved plan must be performed in accordance with the approved plan. Table 4-1 outlines the key requirements of the remediation order and how these will be addressed for the Project.

Table 4-1 Remediation order requirements

No	Action required by the remediation order	How addressed for the Project
1	<p>Sydney Water must refrain from carrying out, or from causing, permitting or allowing its agents, contractors, licensees or lessees from carrying out, any works or activities on the bed sediments of the site that would result in the disturbance, or further disturbance, of the bed sediments except as provided by this Order.</p> <p>Examples of the types of works or activities that may come within the scope of this Order include construction and maintenance work relating to dredging activities or boating facilities (such as piers, wharves, slipways or marinas).</p>	<p>This Plan has been prepared for the Project to permit the drainage outlet works and bridge works to be undertaken in proximity to the Canal. No works that have the potential to disturb bed sediments will be undertaken until this Plan is approved (as noted below).</p>
2	<p>Prior to the conduct of works or activities coming within the terms of requirement 1, Sydney Water must prepare and submit for the EPA's approval a written plan directed at minimising the disturbance and migration of contaminated sediments at the site. The EPA may approve the plan or aspects of the plan as submitted or approve the plan subject to a requirement that additional mitigation measures must be implemented.</p> <p>This provision is waived for emergency works that are required to protect the safety or property of persons involved in the emergency (e.g. repairs to collapsed canal wall during flood). In this case the EPA must be notified of the situation and the actions being undertaken.</p>	<p>This Plan has been prepared to comply with this requirement. This Plan is being prepared in consultation with Sydney Water and the EPA, as well as the EPA accredited Site Auditor in accordance with the requirements of the Planning Approval Conditions C5, C6, C8 and C9.</p> <p>This Plan, once finalised following consultation, will be approved by the EPA Accredited Site Auditor prior to submission to the EPA for approval. This Plan was also be submitted for endorsement by the ER and approval from DPIE prior to works commencing, in accordance with the Planning Approval.</p>
3	<p>Any works or activities the subject of an approved plan must be performed in accordance with the plan.</p>	<p>Once the Plan is approved (refer to Point 2 above), this Plan will be implemented throughout the works.</p>
4	<p>The plan submitted to the EPA for its approval must be prepared in accordance with the EPA publication titled Guidelines for Consultants Reporting on Contaminated Sites, dated November 1997, as it relates to investigation and or remedial action plans.</p>	<p>This Plan has been prepared in accordance with this guideline as noted in Sections 1.1 and 3.1.2 of this Plan.</p>

No	Action required by the remediation order	How addressed for the Project
5	<p>Sydney Water must also, as far as reasonable, ensure that other persons who may carry out works or activities on the bed sediments of the site are made aware of this Order and are advised not to do anything inconsistent with the Order. Without limiting what Sydney Water is required to do to comply with this requirement, it must</p> <p>a) develop and implement an information campaign to alert people near the site to the requirements of this Order;</p> <p>b) erect signs along the length of the canal at 1 kilometre intervals to alert users of the canal about the requirements of this Order;</p> <p>c) liaise with and provide information to relevant councils about the requirements of this Order.</p>	<p>(a) JHSW Community & Stakeholder Team will ensure appropriate notifications are in place to the community and stakeholders in advance of the works commencing adjacent to the Canal.</p> <p>(b) Signage will be reviewed and, where required, signage similar to existing will be implemented prior to works commencing. The existing signage is shown below:</p>  <p>(c) The Project works are within the Inner West Council area and regular updates will be provided to Council throughout the works (including provision of community and stakeholder notifications).</p>
6	<p>A copy of the documentation recording the information campaign must be provided to the EPA by (date to be inserted).</p>	<p>A copy of all notifications relevant to the works adjacent to the Canal will be provided to EPA.</p>

4.2.2 Recent sediment investigation

An investigation into the bed sediments along Alexandra Canal was undertaken during the development of the EIS / MDP, which involved the collection of bed sediment and surface water samples from Alexandra Canal at 12 locations.

Samples were analysed for heavy metals (As, Cd, Cr, Cu, Pb, Ni, Hg and Zn), total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene, xylenes and naphthalene (BTEXN), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphorus pesticides (OPPs), polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs) dioxins, furans, PFAS and asbestos.

Elutriate testing was performed for ammonia, heavy metals, PAHs, Phenols, OCP and PCB to assess the concentrations of contaminants that could potentially be released from the sediments during dredging and disposal of the sediments.

A summary of the investigation is presented in Technical Working Paper 5 in the EIS / MDP.

Observations of potential contamination were recorded during the sediment sampling, with hydrocarbon odours recorded at 10 locations ranging in intensity from moderate to strong. A hydrocarbon sheen was also recorded at seven of the locations. Surface water was observed to be clear with no turbidity and no odour noted at all 12 locations.

Laboratory chemical testing undertaken as part of the sediment investigation found that:

- Asbestos was detected in 13 of the sediment samples collected.
- Concentrations of metals, TPH, PAH, PCBs and pesticides in sediment exceeded the ecological criteria.
- Concentrations of zinc exceeding the ecological marine criteria were reported in all surface water samples except SW11_2. One exceedance of copper was also reported at SW8_1.
- Elutriate results for ammonia, lead and zinc exceeded the ecological marine criteria.
- Organotin compounds including tributyltin, monobutyltin and dibutyltin were detected above the laboratory limit of reporting. Organotin waste materials are subject to a chemical control order (CCO) created under Part 3, Division 5 of the *Environmentally Hazardous Chemicals Act 1985*.
- PFAS compounds were detected above the laboratory limit of reporting, however concentrations were below the adopted guidelines values.
- PFAS concentrations reported during traditional analysis were below the laboratory limit of reporting. Total Oxidisable Precursor Assay (TOPA) analysis reported PFAS concentrations above the laboratory limit of reporting (0.01 µg/L) at six locations.
- The action criteria for acid sulfate soils was exceeded at eight locations.

4.2.3 Surface water investigation

Investigation into water quality within the Alexandra Canal was undertaken as part of the EIS. Surface water was sampled at a total of eight (8) locations (SW1-SW8), including six (6) locations (SW1-SW6) in the Alexandra Canal. These locations are shown in **Figure 4-1**.



Figure 4-1 WSP-GHD (2020b) Surface water monitoring locations

Detail on the observations from surface water sampling in the Alexandra Canal are presented in **Section 4.7.2.1** of the EIS. Overall, it was found that sampling points within the Cooks River and Alexandra Canal (SW1 to SW8) frequently exceeded ANZECC (2000) / ANZG (2018) guideline values for sulfate, total dissolved solids, total suspended solids, chloride, total nitrogen, aluminium, iron, manganese, zinc and ammonia.

The key statistics for turbidity and TSS recorded at SW1-SW6 in Alexandra Canal under baseline conditions are presented in **Table 4-2** (below). The results show that median turbidity and TSS were generally below the trigger criteria whilst 80th percentile and maximum values exceeded the trigger values at all locations.

Table 4-2 Key statistics SW1-SW6 turbidity and TSS Alexandra Canal

Parameter	SW1	SW2	SW3	SW4	SW5	SW6	Trigger
Turbidity – NTU							
Turbidity – Median	3.6	3.3	4.0	3.2	2.2	2.2	11.48
Turbidity – 80 th Percentile	14.74	11.04	13.84	15.78	15.8	13.72	
Turbidity – Maximum	21.2	20.5	22.4	22.2	27.9	44.2	
TSS – mg/L							
TSS – Median	12.0	10.0	13.0	13.0	10.0	8.0	15.2
TSS – 80 th Percentile	16.6	13.8	20.4	16.6	14.8	15.2	
TSS – Maximum	33.0	24.0	25.0	21.0	26.0	47.0	

The results from surface water sampling show that baseline conditions within the Alexandra Canal may generally not achieve the identified trigger values for TSS and turbidity. The baseline range and variability have been considered in developing this Plan for Alexandra Canal.

5 Construction activities and potential impacts

The Project activities with the potential to disturb the contaminated aquatic sediments in Alexandra Canal include discharge of water to the canal and construction works inside the canal, on the canal wall or adjacent to the canal, which are required for the installation of new stormwater drainage structures or construction of the bridges. These activities are outlined in this section of the Plan.

Where disturbance of sediments is unavoidable, management to prevent adverse water quality impacts to the surrounding environment is required. Notice to, and approval from, Sydney Water and the EPA is required. The mitigation measures to manage contaminated bed sediments during construction would need to address:

- Preventing the dispersion of turbid plumes potentially containing elevated levels of chemicals of potential concern into Alexandra Canal
- Preventing the generation of ASS and therefore minimising the potential creation of sulfuric acid as a product of ASS.

The measures to minimise and manage disturbance to sediments are detailed in Section 6 of this Plan. Works will also be carried out in accordance with the guidelines included in Section 3.1.2.

5.1 Construction activities

There are approximately 10 stormwater outlets to be upgraded or installed in Alexandra Canal as part of the Project stormwater drainage system (**Figure 5-1**). The new stormwater drainage outlets below the high-water mark will be constructed by first constructing coffer dams around the outlet locations. The indicative locations where coffer dams are proposed to be installed are presented in **Figures 5-1 to 5-3** (below). These figures also show the location of the drainage outlets and bridge locations. For drainage above the high-water mark, silt curtains will be installed around the outlet area.

The coffer dams will be constructed by installing interlinked sheet piling into the bed and banks to create a box around the outlet location. The water inside the coffer dam will then be pumped out to create a dry area in which to construct the stormwater outlets without further sediment disturbance, noting that dewatering is expected to be an ongoing activity (possibly daily depending on flows) Table 7-1 in Section 7.3 below details the monitoring requirements during coffer dam dewatering (noting that this is subject to discussion with EPA as part of the EPL). The strips of canal wall above and below water level would have to be removed to allow the sheet piling through the bank. Additional excavation of the bank material (below the canal walls) might be required if there is refusal of sheet piles. Key construction activities that may result in disturbance to the contaminated aquatic sediments include:

- Permanent structure installation:
 - Drainage outlets in Alexandra Canal wall: activities consist of demolition of existing outlets and replacement with new outlets, repair of canal walls adjacent to outlets, installation of rip rap, flow controls and other drainage features.
 - Bridges over Alexandra Canal: bridge structures (i.e. abutments, foundation, piers and supports) adjacent to the canal.
- Temporary structure installation (to be removed upon completion):
 - Sheet-pile coffer dams inside Alexandra Canal: coffer dams will be constructed around the permanent structures to allow construction activities to be undertaken without further disturbance to the canal sediments.
 - work platform for the bridge abutment construction. This will involve placement of rip rap rock contained within geotextile fabric. Densely Graded Base (DGB) may be used

to form the work surface (or other suitable material which is either Excavated Natural Material (ENM) or Virgin Excavated Natural Material (VENM). Imported material will be undertaken in accordance with the Material, Waste and Resource Process.

- Water treatment plant discharge into the Canal (subject to the EPL).

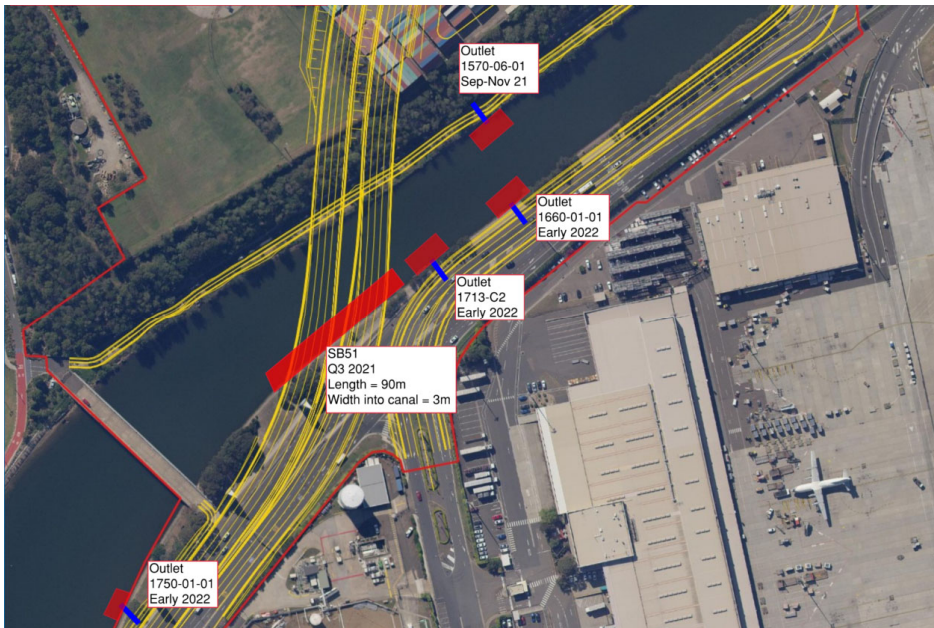


Figure 5-1 Indicative location of the coffer dams and construction works (1 of 3)

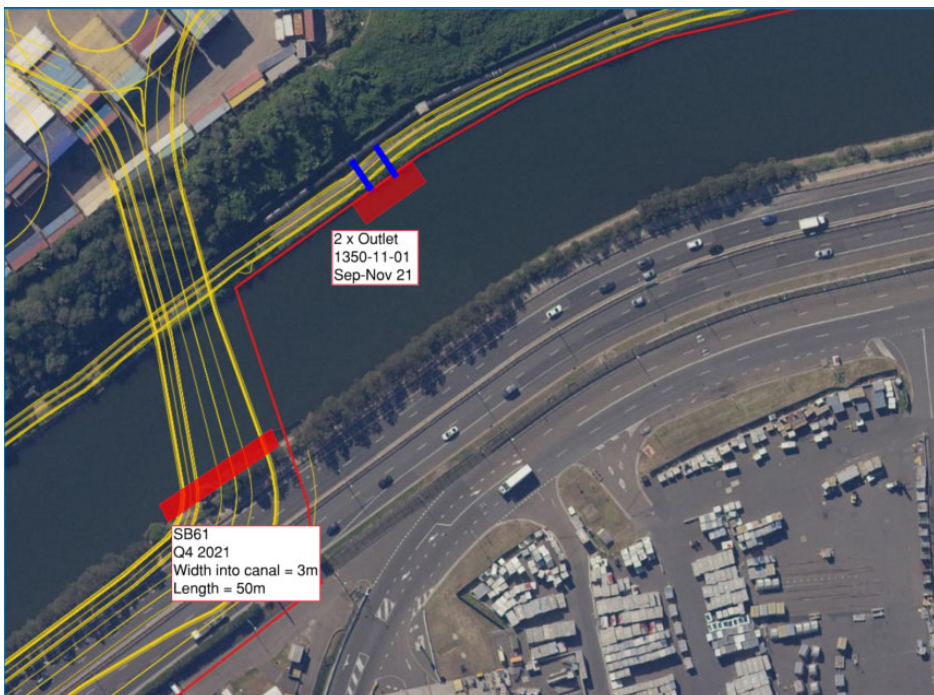


Figure 5-2 Indicative location of the coffer dams and construction works (2 of 3)

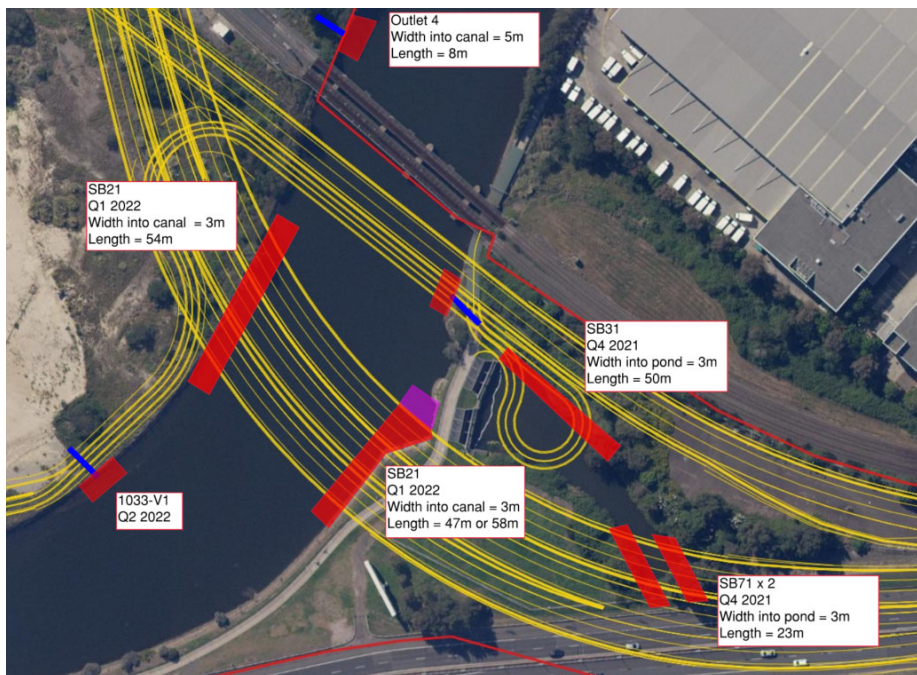


Figure 5-3 Indicative location of the coffer dams and construction works (3 of 3)

5.2 Potential impacts

The potential for contaminated aquatic sediments to impact water quality in the Alexandra Canal is dependent on multiple independent and associated factors including:

- area of disturbance
- physical properties of sediments that may be disturbed
- chemical properties of sediments that may be disturbed, and
- construction methodology (including duration) and environmental control measures

The potential impacts associated with construction activities, if left unmanaged, include:

- Disturbance of sediments during discharge of water to the canal.
- Disturbance of sediments during installation and removal of working platforms and coffer dams, resulting in the mobilisation of sediments into the water column, causing localised impacts to water quality.
- Dewatering and excavation within coffer dams exposing sediments to atmosphere resulting in the exposure of Acid Sulfate Soil (ASS) and generation of acidic leachate and contaminated water.
- Mobilisation of sediments at outlet locations during construction as a result of high energy stormwater discharges through outlets.
- Discharge of leachate during construction of the drainage outlets due to penetration of the bentonite wall.
- Disturbance of soil / sediments during riparian vegetation removal, if required, in areas outside of coffer dams.

These potential impacts may result in risks to human health and aquatic ecology if not properly managed, including:

- Increased harm caused to the aquatic ecosystems that is in contact with the sediments and/or contaminated water.

- Increased risks to human health as a result of consumption of contaminated fish.
- Increased mobilisation of contaminated sediments resulting in increased and dispersal of existing contamination.
- ASS generation

The risks above will be managed during construction as detailed in Section 6 and will be revised through ongoing environmental risk analysis and review.

6 Construction methodology and environmental control measures

6.1 Design considerations

The Project's permanent and temporary structures have been designed to minimise disturbance to the bed sediments. To ensure the best environmental outcomes this has included consideration of tidal influence and variation in flow velocities. The design of temporary and permanent outlets into the canal are being designed with appropriate energy dissipation and scour protection measures to minimise the potential for scour and disturbances to the canal sediments. **Appendix B** includes preliminary design drawings and documents to provide an overview of the planned works.

The construction methodology and staging has been designed to, as far as practical, avoid the disturbance to Alexandra Canal. For example, the structural supports and foundations associated with the bridge crossings have been positioned outside of the canal walls. However, disturbance to the canal is inevitable for constructing drainage outlets and also provision of construction areas to build the bridges.

6.2 Temporary Works- Cofferd Dams and Working Platforms

Cofferd dams are the proposed construction method which minimises disturbance to the Canal sediments where works are being undertaken below the high-water mark. They will isolate construction impacts to the area within the coffer dam and minimise further sediment disturbance or contamination mobilisation to the rest of the Canal. **Figure 6-1** provides a conceptual site model for how coffer dams will be the effective construction method, and **Figures 5-1, 5-2 and 5-3** shows their indicative location in this Project.

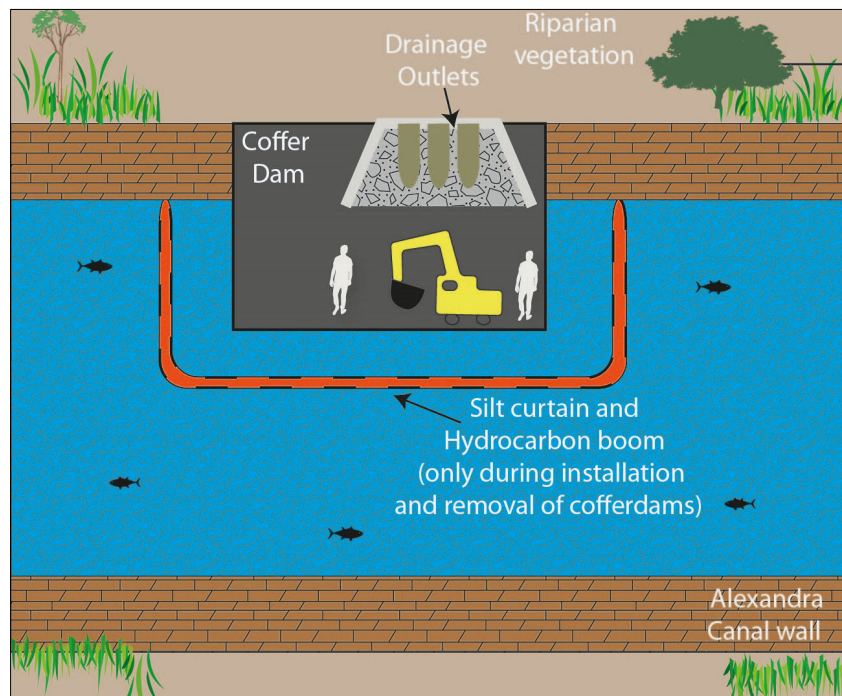


Figure 6-1 Conceptual site model

The coffer dams will be installed to provide a physical barrier between the construction site and the canal. Water inside the coffer dam will be removed for the preparation and commencement of construction activities. The water from within the coffer dam will be pumped out directly into the

canal (within the silt curtain). It is anticipated that installing and removing the coffer dams has the potential to disturb sediments within the canal bed, and therefore, EWMS will be prepared prior to installation and removal. A preliminary EWMS and Environmental Control Plan for these works is provided in Appendix D.

There are some areas where the working area adjacent to the Canal is limited and working platforms for piling for the bridge abutment construction will be required. In these areas coffer dams will be replaced with rip rap rock contained within geotextile fabric. The rocks will be carefully placed and wrapped in geotextile fabric to create a working platform within the edge of the canal.

These activities will potentially cause localised sediment plumes with subsequent mobilisation of contamination and further travel downstream of the canal. These potential effects would be significantly minimised by executing the following measures during work platform and coffer dam installation and removal:

- Plan for installation of and removal of all temporary works to be carried out in consideration of meteorological conditions including tides, weather and wind (for example- not during or immediately following high rainfall events where flows in the canal may be elevated). Works will be managed to minimise the duration of contamination dispersion in the canal, as far as reasonably practical.
- Install pollution control measures / facilities. A double silt curtain is proposed to be installed around the coffer dams and /or working platforms. This will be installed with consideration of tidal conditions to minimise the disturbance of sediments during installation. Silt curtains/barriers will disrupt the water flow and allow the suspended sediment to resettle. The purpose of the 'double' layer is to ensure that investigations can immediately be undertaken in the event of any sediment escape between the first and second curtains and still prevents mobilisation of sediments outside of the second curtain. The information provided in Appendix E shows an example of the double silt curtain and it's effectiveness. In the case of any incident, these barriers provide a noticeable visual contrast between the trapped turbid water and the rest of canal water outside which is easily noticeable for construction crews to undertake incident corrective action.
- Undertake regular inspection and monitoring program to ensure compliance (refer to Section 7.3 for details).
- Removal of sediment laden construction materials which have the potential to contain contaminated sediment will be managed in accordance with the Waste & Resources Management Plan and taken to a facility lawfully able to accept the waste.

6.3 Acid Sulphate Soil Management

Generation of ASS as a result of dewatering of the boxed area and exposure of the sediments to the atmosphere will need to be managed throughout the works. A site assessment and soil testing for potential ASS will be carried out in compliance with the SWMP and prior to any excavation or disturbance to the canal bed material. Should the material be found to be ASS generating, further treatment or remediation will be decided as per the SWMP.

Dewatering and exposure of sediments to atmosphere may result in Acid Sulfate Soil (ASS) and generation of acidic leachate. Dewatering and discharge of potential acidic leachates will be conducted in compliance with the SWMP following all the applicable control measures. An Acid Sulphate Soil Management Plan has been developed and is included in the Soil and Water Management Sub Plan.

6.4 Vegetation removal

Riparian habitats containing rooted vegetation are mostly outside the Alexandra Canal wetted perimeter. Clearing activities for vegetation will not further expose / disturb the canal bed sediments. It is envisaged that majority of vegetation removal will be at the top of the banks. It is expected that any vegetation removed in these locations will be removed as contaminated material (on the basis that the sediment on the base of the plants etc will be contaminated and also may be removed as part of potential bank removal works in some areas) unless the vegetation can be cut off at seabed level/roots remain in place (ie only if there is no contaminated sediments attached). Revegetation and stabilisation is detailed in the design (including examples provided in Appendix B of the Plan) including placement of low saltmarsh species and grasses.

6.5 Discharge into the Canal

There are several elements of the Project works which have the potential to discharge water into Alexandra Canal throughout construction as detailed below.

Discharges will occur:

- Through the existing drainage outlets into the surface water of the Canal for the purposes of clean water diversion only. Any surface water runoff around work areas will be managed through installation of erosion and sediment controls detailed in the Erosion and Sediment Control Plan(s).
- Through new outlets constructed as part of the Project, again for clean water diversion. In addition, adequate dissipation controls (such as scour protection or flow reduction) are integrated into the designs of the new outlet to minimise disturbance of contaminated sediments. It is noted that approval of the drainage design is subject to Sydney Water approvals process prior to commencement of construction.

In addition, temporary discharge, such as from the Water Treatment Plant, may also occur (subject to EPA approval under the EPL). These discharges will be in accordance with the trigger values in the EPL (to be finalised with EPA) and in accordance with CoA E93.

Additionally, the initial and ongoing dewatering in the coffer dam will discharge water to the canal; and adequate measures will be undertaken to minimise disturbance to sediments (e.g. reduce discharge flow rate or using floating pipes for discharge on the surface level). This dewatering will occur within the silt curtain and monitoring will be undertaken as detailed in Section 7.3 of this Plan.

There is also the potential for leachate to enter the canal during drainage outlet construction. There are several drainage outlets which penetrate the top of the bentonite wall and the staging and management of these works to avoid potential leachate into the canal is critical. The management of these works will include:

- Providing a casing around the drainage pipeline and the bentonite wall to seal the area as quickly as possible;
- Managing the excavation in stages so as to ensure sufficient and ongoing dewatering capacity. Detailed staging will be required for each drainage outlet and will be detailed in the Activity Method Statement (AMS) as well as a specific EWMS. The staging will consider the excavation closest to the bentonite wall occurring later in the construction phase so as to minimise the extent and duration of any leachate management.
- The groundwater and potential leachate will be removed via either pipework or tanker truck and appropriately disposed of to either the Leachate Treatment Plant or to an approved liquid waste facility. A dewatering permit will be in place for these works to ensure the movement of water within the excavation area is appropriately managed.

The measures and requirements to meet the objectives of this Plan and to address potential impacts from contaminated aquatic sediments in Alexandra Canal are outlined in **Table 6-1**.

Figure 6-2 also provides a process flow diagram for the required measures during construction to manage potential disturbances to the canal sediments.

Table 6-1 Management and mitigation measures applicable to contaminated aquatic sediments in Alexandra Canal

ID	Measures / Requirements	When to implement	Responsibility	Reference	Evidence
CAS1	Undertake construction in accordance with this approved Plan (once approved).	Pre-construction	JHSWJV Environment Manager (or delegate)	CS11	ER site inspection reports Weekly environment inspections Compliance tracking program
CAS2	Undertake construction in accordance with the approved design (i.e. as approved by Sydney Water). (Preliminary design information provided in Appendix B for context). This will also include the placement of coffer dams and rock platforms.	Construction	Construction Team	This Plan	AFC Design and Independent Verifier records Environmental inspection records
CAS3	Undertake surface water quality monitoring at the commencement and completion of construction that has the potential to disturb contaminated bed sediments within Alexandra Canal, and weekly during disturbance. The monitoring program included in Section 7.3 of this Plan must be implemented, with results of monitoring provided to the EPA if required by the EPL or approval of this Plan.	Construction	JHSWJV Environment Manager (or delegate)	UMM SW6	Section 7.3 of this Plan details monitoring required. Compliance tracking program Water quality monitoring program and records Environmental inspection records

ID	Measures / Requirements	When to implement	Responsibility	Reference	Evidence
CAS4	<p>Environmental Work Method Statements (EWMS) will be prepared prior to construction commencing within Alexandra Canal and will be implemented to minimise disturbance to contaminated bed sediments within Alexandra Canal.</p> <p>EWMS will be required for:</p> <ul style="list-style-type: none"> • drainage outlet works. Note that where different staging is required for various outlets, additional EWMS will be required to be specific for the staging. • coffer dam installation, dewatering and removal • rock work platform installation and removal. 	Construction	JHSWJV Environment Manager (or delegate)	G36, G38	EWMS
CAS5	<p>Training will be provided to relevant Project personnel, including relevant sub-contractors on control practices and the requirements from this Plan through inductions, toolboxes, or targeted training. This will specifically relate to working platform and coffer dam construction/removal, dewatering of coffer dams and placement of booms around the work areas.</p>	Construction	JHSWJV Environment Manager (or delegate)	CoA C4(j)	Training, inductions, toolboxes and targeted training
CAS6	<p>Soil testing for potential ASS will be carried out in compliance with the SWMP and prior to any excavation or disturbance to the canal bed material in accordance with the NSW EPA Waste Classification Guidelines.</p> <p>If PASS is identified, it will be managed in accordance with the Acid Sulfate Soil Manual (ASSMAC 1998).</p> <p>Management strategies will include:</p> <ul style="list-style-type: none"> • Avoid areas where PASS occurs (if possible); • Minimise disturbance in areas of PASS through detailed construction methodology; • Manage/dispose of PASS appropriately in accordance with the Acid Sulphate Soils Management Plan; 	Construction	JHSWJV Environment Manager (or delegate)	UMM CS10	The ASS Management Plan is contained within the Soil and Water Management Sub Plan.

ID	Measures / Requirements	When to implement	Responsibility	Reference	Evidence
CAS7	Prior to commencing the installation and removal of coffer dams or rock work platforms, consideration of meteorological conditions must be undertaken. This includes potential rainfall, wind and tides.	Construction	Construction Team	This report	Project construction schedule BOM reports/ Site records
CAS8	Installation of a double layer silt curtain will be completed prior to the installation of sheet pile coffer dams (before commencing construction of stormwater outlets and bridges) or working platforms (for bridge abutment works)	Construction	JHSWJV Project Manager (or delegate)	This report	Preliminary design information is provided in Appendix B. The approved design will be implemented throughout the works. Construction staging drawings /AMS/ EWMS ER Inspection Records/ JHSW inspection records Environmental compliance records
CAS9	Installation of hydrocarbon booms will be undertaken around the coffer dams during construction and decommissioning . In addition, appropriate land based and marine based spill response materials will be available on the site to ensure any spills can be appropriately managed throughout the works. Any incidents will be notified in accordance with the JHSW incident reporting procedure.	Construction	Site Foreman / Engineer/ Environment Manager	This report	EWMS(s) ER Inspection Records/ JHSW inspection records Environmental compliance records Incident reporting procedures and forms.
CAS11	The staging of drainage outlet works needs to consider the potential for leachate dewatering in excavations as a result of penetration of the bentonite wall. Detailed construction staging through the EWMS must be completed prior to the commencement of drainage works. In addition, any dewatering (or transfer of leachate/ground water to a water treatment plant) must be approved through the Dewatering Permit prior to dewatering commencing.	Construction	Construction Team	This report	EWMS AMS Dewatering Permit Environmental compliance records

ID	Measures / Requirements	When to implement	Responsibility	Reference	Evidence
CAS12	Riparian vegetation clearing: Any vegetation removal inside coffer dams will be conducted in accordance with the Flora & Fauna Management Sub Plan. Vegetation removal within areas not protected by coffer dams are unlikely; however, should it be required, vegetation will be cut as close to the base as possible, leaving the roots in place will eliminate disturbance of sediments.	Construction	JHSWJV Environment Manager (or delegate)	This report	Flora & Fauna Management Sub Plan Environmental compliance records/ Environmental inspection records Consultation records
CAS13	Implement the monitoring program as detailed in Section 7.3 of this Plan to ensure that the surface water quality within Alexandra Canal is monitored throughout the works that have the potential to disturb bed sediments in the Canal	Construction	JHSWJV Environment Manager (or delegate)	This Report	Monitoring Records
CAS14	All works within or adjacent to waterways will be managed in accordance with the DPI's guidelines for Controlled Activities on Waterfront Land, including: <ul style="list-style-type: none"> Minimize construction footprints and proposed extent of disturbance to soil and vegetation within the watercourse or waterfront land Accommodate natural watercourse functions Provide any necessary scour protection, such as rock riprap and vegetation. If cutting into banks, protect cuttings against scour. Discharge from an outlet should not cause bed or bank instability Point outlet structure and direct discharge downstream Bridge piers or foundations should not be located within the main channel of the watercourse. Monitor and maintain all in-stream works until suitably stabilised. 	Construction	Construction Team	DPI, 2012	Preliminary design information is included in Appendix B Construction staging and methods/AMS EWMS Environmental inspection records

ID	Measures / Requirements	When to implement	Responsibility	Reference	Evidence
	<ul style="list-style-type: none"> Stabilise and rehabilitate all disturbed areas to adequately restore the integrity of the riparian corridor 				

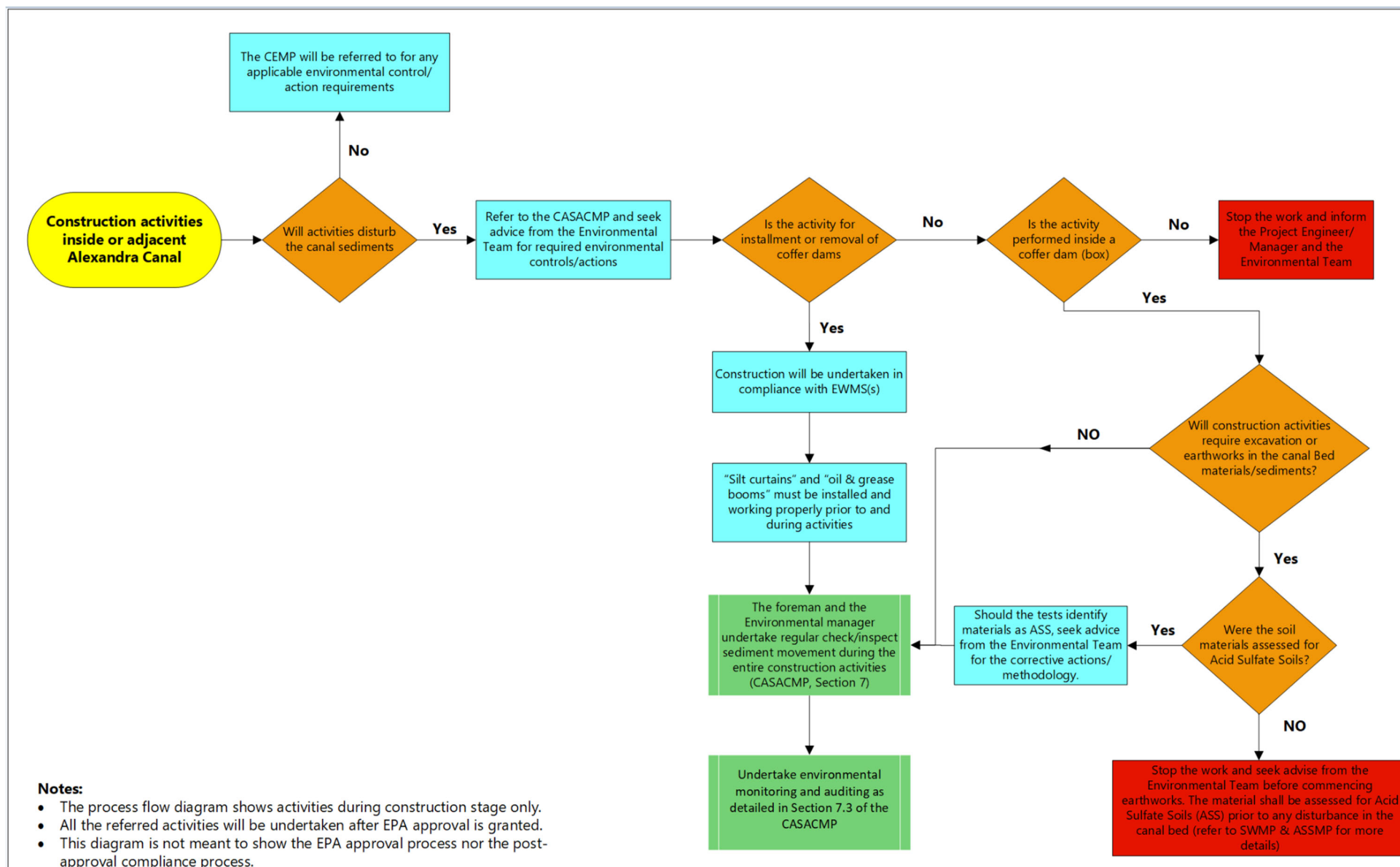


Figure 6-2 Construction management process flow diagram for disturbance to contaminated aquatic sedimentation in Alexandra Canal

7 Compliance management

7.1 Roles and responsibilities

The JHSWJV Project Team's organisational structure and overall roles and responsibilities are outlined in **Section 3.3** of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in **Section 6** of this Plan.

7.2 Training

All employees, contractors and utility staff working on site will undergo site induction training relating to overall environmental management. The induction training will address elements related to management of works within Alexandra Canal including:

- Requirements of this Plan.
- Applicable and relevant legislative requirements.
- Roles and responsibilities for contaminated aquatic sediments in Alexandra Canal.
- Typical construction activities that may impact contaminated aquatic sediments in Alexandra Canal and associated environmental mitigation and management measures.

Targeted training in the form of toolbox talks or specific training may also be provided to personnel with a key role in managing works within Alexandra Canal. Examples of training topics could include:

- Impacts to the environment and surrounding community.
- Mitigation measures to minimise impacts from working with contaminated aquatic sediments in Alexandra Canal.

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

7.3 Monitoring and inspection

In accordance with UMM SW6, a water quality monitoring program will be developed and implemented as part of the SWMP, which includes monitoring locations within Alexandra Canal. By extension of this water quality monitoring program in the SWMP, monitoring of water quality will be undertaken during any works within Alexandra Canal, as described in **Table 7-1**. The locations of the fixed monitoring points (ie SW2, SW6 and SW8) are shown in Figure 7-1 below.

Environmental monitoring is proposed to be undertaken during the ebb tide only so as to provide a consistent measure of water quality within the Alexandra Canal, and provide a means to assess the effects of construction activities through a comparison of water quality upstream of the sediment disturbance zone with water quality downstream of the sediment disturbance zone.

Water quality will also be compared against baseline conditions to assess whether disturbances result in water quality impacts significantly outside of the observed baseline variation. Significance of variation will be assessed using standard statistical methods for comparisons of non-parametric data (e.g. Kruskal-Wallis test / Mann-Whitney U test), nominally measured where the p value is less than 0.05.

Table 7-1 Monitoring program during construction in Alexandra Canal

Sampling ID	Sampling location	Monitoring parameters	Timing and Frequency
During construction of permanent structures within coffer dams (Ebb Tide)			
TBD (in proximity to the work site)	Alexandra Canal – downstream of construction site	Physio-chemical parameters ¹	<ul style="list-style-type: none">Once, at the start and completion of construction, andWeekly, during construction
SW2	Alexandra Canal – upstream of proposed road and rail bridge	Physio-chemical parameters ¹	
SW6	Alexandra Canal – before the confluence with Cooks River	Physio-chemical parameters ¹	
SW8	Cooks River – South of Marsh Street	Physio-chemical parameters ¹	
During coffer dams’ installation and removal (Ebb Tide)			
TBD (in proximity to the work site)	Alexandra Canal – downstream of construction site	<ul style="list-style-type: none">Physio-chemical parameters¹Sampling and laboratory analysis ²	Physio-Chemical Parameters: <ul style="list-style-type: none">Once, at the start and completion of installation / removal activitiesDaily during construction of the coffer damsDaily during dewatering of coffer dam areas or as otherwise required by the EPL Sampling and laboratory analysis: <ul style="list-style-type: none">Once, at the start and completion of installation/removal activitiesAs otherwise required by the EPL
SW2	Alexandra Canal – upstream of proposed road and rail bridge	Physio-chemical parameters ¹	
SW6	Alexandra Canal – before the confluence with Cooks River	Physio-chemical parameters ¹	
SW8	Cooks River – South of Marsh Street	<ul style="list-style-type: none">Physio-chemical parameters¹Sampling and laboratory analysis ²	
In the event of an incident occurrence (Ebb Tide)			
TBD (in proximity to the work site)	Alexandra Canal – downstream of construction site	<ul style="list-style-type: none">Physio-chemical parameters¹Sampling and laboratory analysis ²	Physio-Chemical Parameters: <ul style="list-style-type: none">Immediately (within 24hrs) following incidentDaily, until turbidity results show no exceedance³ Sampling and laboratory analysis: <ul style="list-style-type: none">Once, when incident happened, sampling to be undertaken as soon
SW2	Alexandra Canal – upstream of proposed road and rail bridge	Physio-chemical parameters ¹	
SW6	Alexandra Canal – before the confluence with Cooks River	Physio-chemical parameters ¹	

Sampling ID	Sampling location	Monitoring parameters	Timing and Frequency
SW8	Cooks River – South of Marsh Street	<ul style="list-style-type: none"> Physio-chemical parameters¹ Sampling and laboratory analysis² 	<ul style="list-style-type: none"> as practical after incident (preferably no later than 24 hrs from the incident occurrence) Daily, as long as turbidity monitoring shows exceedances³

Notes:

¹ Field physio-chemical parameters include pH, DO, ORP, temperature, total dissolved solids (TDS) and turbidity (NTU). Monitoring will be performed using a multi-probe water quality handheld meter.

² Water sampling and laboratory analysis will be undertaken for testing parameters including:

- pH, total dissolved solids (TDS), total suspended solids (TSS), turbidity, major anions and cations (calcium, magnesium, potassium, sodium, chloride, sulfate, carbonate and bicarbonate alkalinity, total alkalinity)
- Nutrients: nitrate, nitrite, total nitrogen, ammonia and total phosphorus
- Contaminants of concern: per- and poly-fluoroalkyl substances (PFAS), total recoverable hydrocarbons (TRH), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), total phenols, organochlorine pesticides (OCP), organophosphorus pesticides (OPP), total and dissolved heavy metals (lead, zinc, copper, cadmium, chromium, nickel, iron, manganese, mercury, arsenic and aluminium), tributyltin (TBT) and polychlorinated biphenyls (PCBs)

³ Sampling should continue daily during incident unless trigger exceedances are shown to be unrelated to disturbance resulting from the site activities.



Figure 7-1 Water quality monitoring locations

Field physio-chemical parameters will be measured at each sampling location using a multi-probe water quality handheld meter (calibrated at least 24 hours prior to the measurements being collected). Further details are available in the SWMP.

When samples for laboratory tests are required, grab samples will be collected manually from the upstream and downstream of sampling locations as identified below within Alexandra Canal using a telescopic dip device, or similar. Samples will be collected at multiple depths and mixed in one composite sample, and the sample will be sent to laboratory as soon as practical.

Laboratory analysis will include all parameters as assessed in the baseline water quality monitoring program as detailed in Section 3.2 of this Plan as well as those required by the EPA accredited Site Auditor (as identified in the notes below Table 7-1 and in Appendix C Interim Audit Advice).

During works that have the potential to impact bed sediments, daily visual surveillance will be undertaken for potential disturbance causing sediment plume and oil / grease visual sheens by the Foreman. Environmental inspections, focussing on protection of water quality and minimising disturbance to bed sediments, will be undertaken on at least a weekly basis, and more often during the following activities / events:

- During the coffer dams installation and removal, the foreman will undertake visual surveillance twice a day (morning and afternoon). The environmental inspector will perform inspection once a day during the first week from the date construction starts, and twice a week afterwards.
- At incident events, the foreman will inspect the incident location twice a day (morning and afternoon), and the environmental inspector conducts daily inspections until the investigation is complete and corrective actions undertaken or monitoring results show exceedances ceased (whichever happens earlier).

Exceedances will be determined through comparison of upstream turbidity values against downstream turbidity values, and against baseline conditions to assess whether disturbance exceeds natural baseline variation (refer to baseline and trigger values in **Table 3-2** and **Table 4-2**). Significance of variation will be assessed using standard statistical methods for comparisons of non-parametric data (e.g. Kruskal-Wallis test / Mann-Whitney U test). Interpolation of baseline values will be used where insufficient information is available for a statistical baseline comparison.

A review of other influences (such as other activities within the Canal, weather events etc) will be undertaken to determine if the exceedance is potentially attributable to the works. Where exceedances are determined to be attributable to the works, works will be reviewed and an investigation will be completed by the Environment Manager and Project Manager (or their delegates). Works should cease temporarily until any additional measures, that may be required, are confirmed and implemented (per the agreed corrective actions in the incident report). In the event that an incident is confirmed to have occurred, appropriate notification will be undertaken to TfNSW, ER, and EPA.

7.4 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub plan, CoA and other relevant approvals, licenses and guidelines. Audit requirements are detailed in **Section 3.9** of the CEMP.

7.5 Reporting

Project reporting requirements specifically relevant to the management of works that potentially impact contaminated sediments within Alexandra Canal are detailed in the table below. Other general reporting requirements are further detailed in **Section 3.9** of the CEMP.

Table 7-2 General environmental reporting requirements

Item	Frequency	Standards	External Reporting	Responsibility
Incidents	As required	As required by the CoA, EPL, TfNSW Environmental Incident Classification and Reporting procedure. Incidents will also be entered in the John Holland Event Tracker system.	Appropriate authority dependant on the nature of the incident however may include DPIE, EPA, Sydney Water, and TfNSW (refer to Section 3.8 in the CEMP).	Environment Manager / Foreman or delegate
Exceedances	As required	As per the CEMP.	Authorities as per compliance and reporting obligations. This may include EPA if required under the EPL, and includes Sydney Water for reporting under the Remediation Order.	Environment Manager / Foreman or delegate

8 Review and improvement

8.1 Continuous improvement

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

The continuous improvement process will:

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

8.2 Plan update and amendment

The processes described in **Section 3.9** to **Section 3.13** of the CEMP may result in the need to update or revise this Plan. In accordance with CoA C9, any variations to this Plan will be approved by the EPA accredited Site Auditor.

A copy of the updated Plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure – refer to **Section 3.11** of the CEMP. Further to this and in accordance with CoA C9, if the Plan is updated, evidence of the approval by the EPA accredited Site Auditor will be submitted to DPIE for information, along with the amended Plan.

Appendix A

Copy of remediation order (23004)

Note: On 21 March 2012 Sydney Water provided an [update on actions required under this Order](#).

Environment Protection Authority

Remediation order

Section 23 of the Contaminated Land Management Act 1997

HO1833
23004/ Area #3151

Service: By Registered Mail to Registered Office and Principal Place of Business

Sydney Water Corporation (ABN)
115-123 Bathurst Street
SYDNEY NSW 2000

Attention: Managing Director

Background

- A. On 25 August 2000 the Environment Protection Authority ("EPA") declared the bed sediments of the Alexandra Canal between Huntley Street, Alexandria and the junction of Alexandra Canal with the Cooks River at Mascot, being Lot 1 DP 532493, Lot 1 DP749404 and Lot 3 DP878489 ("the site") within the local government areas of Botany Bay, Marrickville and South Sydney as a remediation site.
- B. The bed sediments at the site have been found to be contaminated with chlorinated hydrocarbons including organochlorine pesticides (chlordane, total DDT and dieldrin), polychlorinated biphenyls (PCBs) and metals ("the contaminants") in such a way as to present a significant risk of harm to human health and the environment.
- C. The EPA has considered the matters in s.9 of the Contaminated Land Management Act ("the Act") and found that the contamination at the site presents a significant risk of harm because
- Harm is being caused to the benthic biota that is in contact with the contaminants in the sediments;
 - Harm may be caused to humans from the increased risk associated with the consumption of contaminated fish; and
 - Disturbance of the sediments would mobilise the contaminants and hence increase the risk of harm.
- D. The EPA has considered all submissions made as to whether an order should be made.
- E. There are no other persons who are required to be served with a copy of this order for the purposes of s.24(3) of the Act.

Action required by this order

By this order, the EPA orders Sydney Water Corporation ("Sydney Water"), being the owner of the site, to do the following:

1. Sydney Water must refrain from carrying out, or from causing, permitting or allowing its agents, contractors, licensees or lessees from carrying out, any works or activities on the bed sediments of the site that would result in the disturbance, or further disturbance, of the bed sediments except as provided by this Order.

Examples of the types of works or activities that may come within the scope of this Order include construction and maintenance work relating to dredging activities or boating facilities (such as piers, wharves, slipways or marinas).

2. Prior to the conduct of works or activities coming within the terms of requirement 1, Sydney Water must prepare and submit for the EPA's approval a written plan directed at minimising the disturbance and migration of contaminated sediments at the site. The EPA may approve the plan or aspects of

the plan as submitted or approve the plan subject to a requirement that additional mitigation measures must be implemented.

This provision is waived for emergency works that are required to protect the safety or property of persons involved in the emergency (eg repairs to collapsed canal wall during flood). In this case the EPA must be notified of the situation and the actions being undertaken.

3. Any works or activities the subject of an approved plan must be performed in accordance with the plan.
4. The plan submitted to the EPA for its approval must be prepared in accordance with the EPA publication titled *Guidelines for Consultants Reporting on Contaminated Sites*, dated November 1997, as it relates to investigation and or remedial action plans.
5. Sydney Water must also, as far as reasonable, ensure that other persons who may carry out works or activities on the bed sediments of the site are made aware of this Order and are advised not to do anything inconsistent with the Order. Without limiting what Sydney Water is required to do to comply with this requirement, it must
 - a) develop and implement an information campaign to alert people near the site to the requirements of this Order;
 - b) erect signs along the length of the canal at 1 kilometre intervals to alert users of the canal about the requirements of this Order;
 - c) liaise with and provide information to relevant councils about the requirements of this Order.
6. A copy of the documentation recording the information campaign must be provided to the EPA by (date to be inserted).

[SIGNED]

CAROLYN STRANGE
Director Contaminated Sites
Department of Environment and Conservation
(by Delegation)

Date: 10 May 2004

NOTE:

Relationship to other regulatory instruments

This Order does not affect the requirement to comply with the provisions of any applicable environmental planning instruments, pollution reduction programs or the provisions of any other environmental protection legislation administered by the EPA.

Failure to comply with this Order

It is an offence to fail to comply with a remediation order. Heavy penalties may be imposed if you are convicted of this offence by the Land and Environment Court.

Information recorded by the EPA

Section 58 of the Contaminated Land Management Act 1997 requires the EPA to maintain a public record. A copy of this remediation order will be included in the public record.

Information recorded by councils

Section 59 of the Act requires the EPA to notify the relevant local council as soon as practicable after an order is made. The council is then required to note on its planning certificate issued pursuant to s.149(2) of the Environmental Planning and Assessment Act that the land is currently subject to a remediation order. The EPA is required to notify council as soon as practicable when the order is no longer in force and the notation on the s.149(2) certificate can be removed.

Guidelines made by the EPA

- *Contaminated Sites*: [Guidelines for Assessing Service Station Sites](#), December 1994
- *Contaminated Sites*: [Guidelines for the vertical mixing of soil on former broad-acre agricultural land](#), January 1995 (vertmix.pdf, 149kb, requires [acrobat reader](#))
- *Contaminated Sites*: *Sampling Design Guidelines*, September 1995

- *Contaminated Sites: [Guidelines for Assessing Banana Plantation Sites](#)*, October 1997
- *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*, November 1997
- *Contaminated Sites: Guidelines for the NSW site auditor scheme*, June 1998
- *Contaminated Sites: [Guidelines on Significant Risk of Harm from Contaminated Land and the Duty to Report](#)*, April 1999 (sroh.pdf, 164kb, requires [acrobat reader](#))

Note: All references in the EPA's contaminated sites guidelines to the *Australian Water Quality Guidelines for Fresh and Marine Waters* (ANZECC, November 1992) are replaced as of 6 September 2001 by references to the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC and ARMCANZ, October 2000), subject to the same terms.

Guidelines approved by the EPA ANZECC publications

- *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*, published by Australian and New Zealand Environment and Conservation Council (ANZECC) and the National Health and Medical Research Council (NHMRC), January 1992
- *Australian Water Quality Guidelines for Fresh and Marine Waters*, Australian and New Zealand Environment and Conservation Council (ANZECC), November 1992, which are only approved for the purposes of contaminated site assessment, investigation, remediation and site auditing under the Contaminated Land Management Act (or other relevant legislation) commenced before September 2001
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Paper No 4, October 2000

EnHealth publications (formerly National Environmental Health Forum monographs)

- *Composite Sampling*, by Lock, W. H., National Environmental Health Forum Monographs, Soil Series No.3, 1996, SA Health Commission, Adelaide
- *Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards*, Department of Health and Ageing and EnHealth Council, Commonwealth of Australia, June 2002

National Environment Protection Council publications

- *National Environment Protection (Assessment of Site Contamination) Measure 1999*

The Measure consists of a policy framework for the assessment of site contamination, Schedule A (*Recommended General Process for the Assessment of Site Contamination*) and Schedule B (*Guidelines*). Schedule B guidelines include:

B(1) *Guideline on Investigation Levels for Soil and Groundwater*

B(2) *Guideline on Data Collection, Sample Design and Reporting*

B(3) *Guideline on Laboratory Analysis of Potentially Contaminated Soils*

B(4) *Guideline on Health Risk Assessment Methodology*

B(5) *Guideline on Ecological Risk Assessment*

B(6) *Guideline on Risk Based Assessment of Groundwater Contamination*

B(7a) *Guideline on Health-Based Investigation Levels*

B(7b) *Guideline on Exposure Scenarios and Exposure Settings*

B(8) *Guideline on Community Consultation and Risk Communication*

B(9) *Guideline on Protection of Health and the Environment During the Assessment of Site Contamination*

B(10) *Guideline on Competencies & Acceptance of Environmental Auditors and Related Professionals*

Other documents

- *Guidelines for the Assessment and Clean Up of Cattle Tick Dip Sites for Residential Purposes*, NSW Agriculture and CMPS&F Environmental, February 1996
- *Australian Drinking Water Guidelines*, NHMRC & Agriculture and Resource Management Council of Australia and New Zealand, 1996

Appendix B Construction staging information (preliminary only)

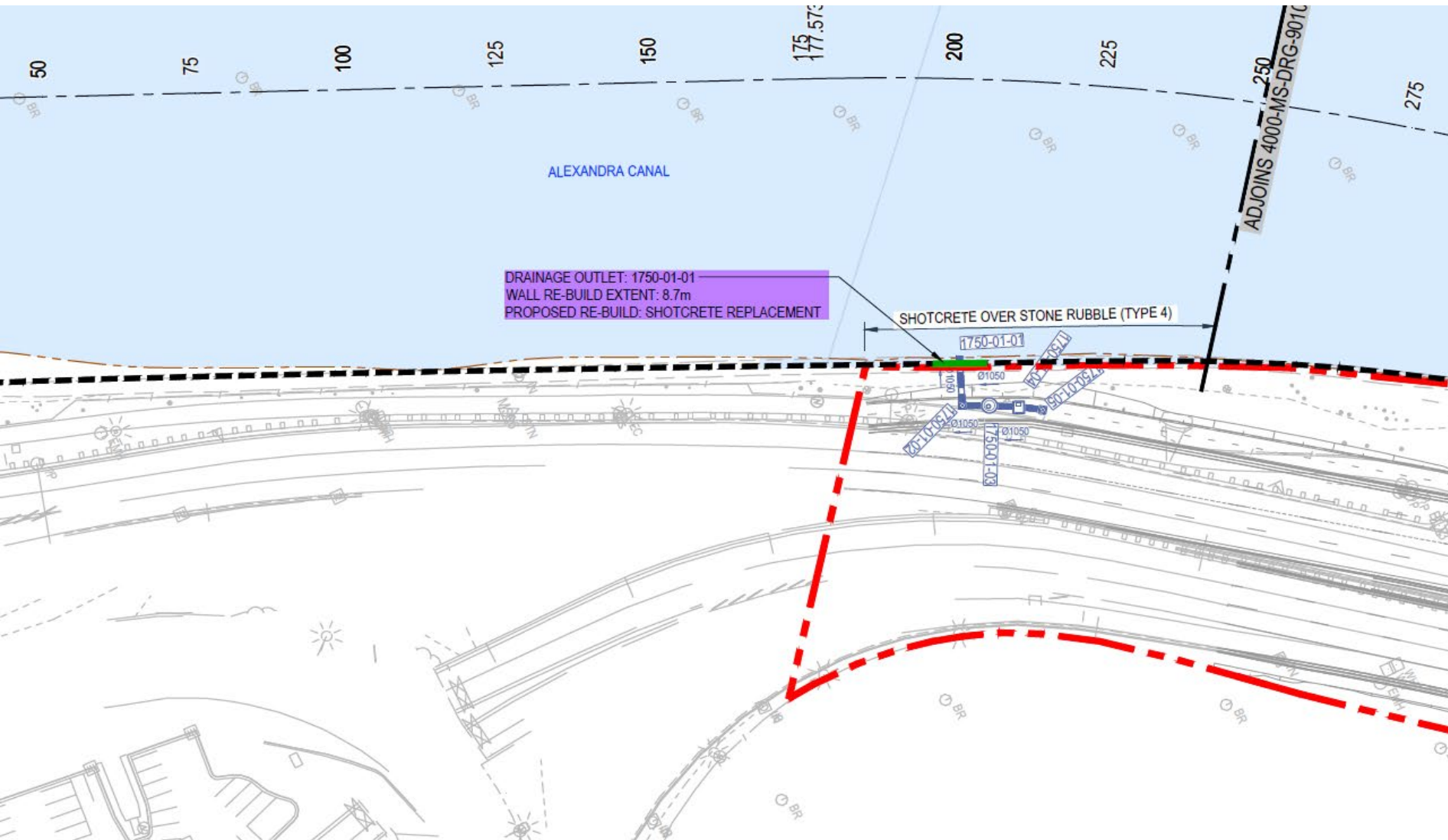
This Appendix provides an overview of the drainage outlets and the bridge works in proximity to the Alexandra Canal

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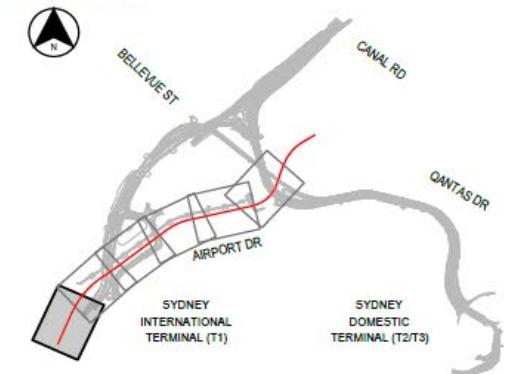
Design and Construction along the Canal

Canal Wall Rebuild – Drainage Outlet (Case 178754)

- **Being Constructed:** 1050mm diameter piped outlet
- **Wall Treatment:** Shotcrete replacement (shotcrete over stone rubble – type 4)



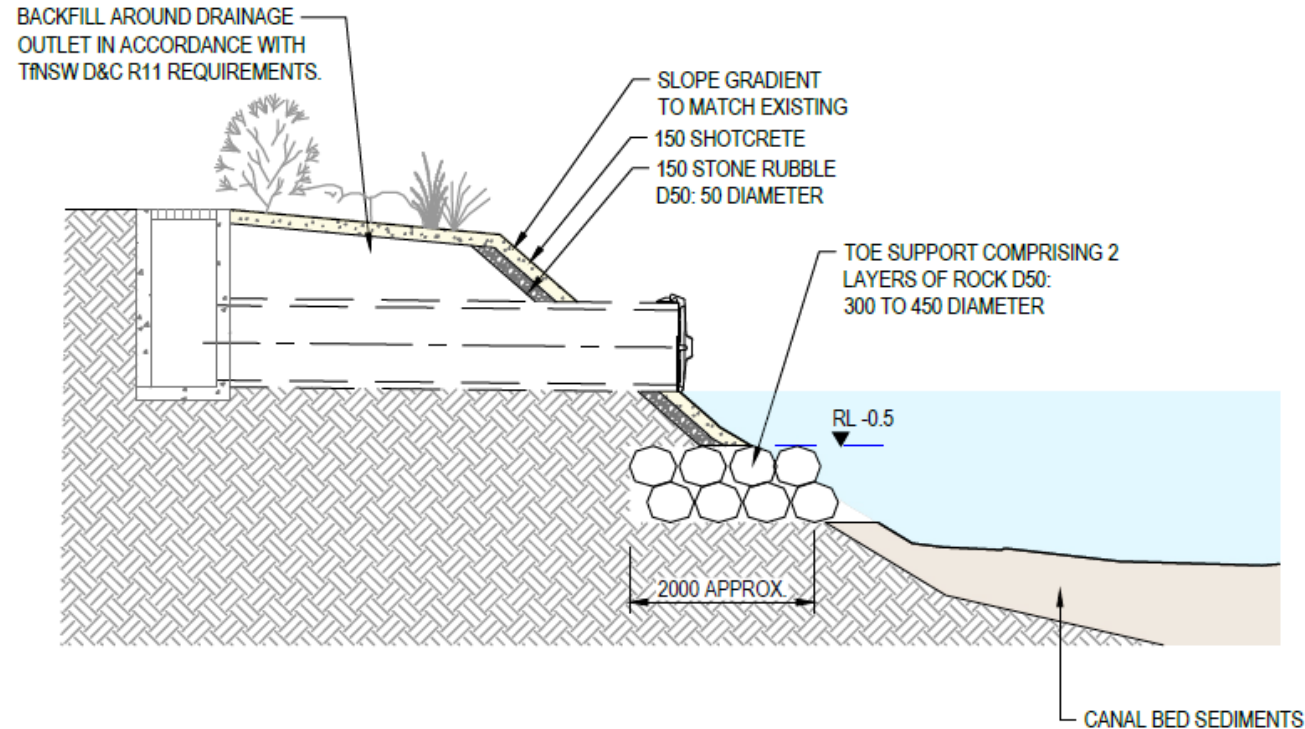
KEY PLAN



NOT FOR CONSTRUCTION

Canal Wall Rebuild – Drainage Outlet (Case 178754)

- 1050mm diameter piped outlet
- 8.7m wall rebuild
- Environmental boom (up to 2) will be placed to prevent contaminated material being disturbed into the Canal
- Cofferdam would be placed to allow drainage to construct toe
- Rocks gently placed to form structural support for shotcrete wall



SECTION A
SCALE 1 : 100
901003 & 901006

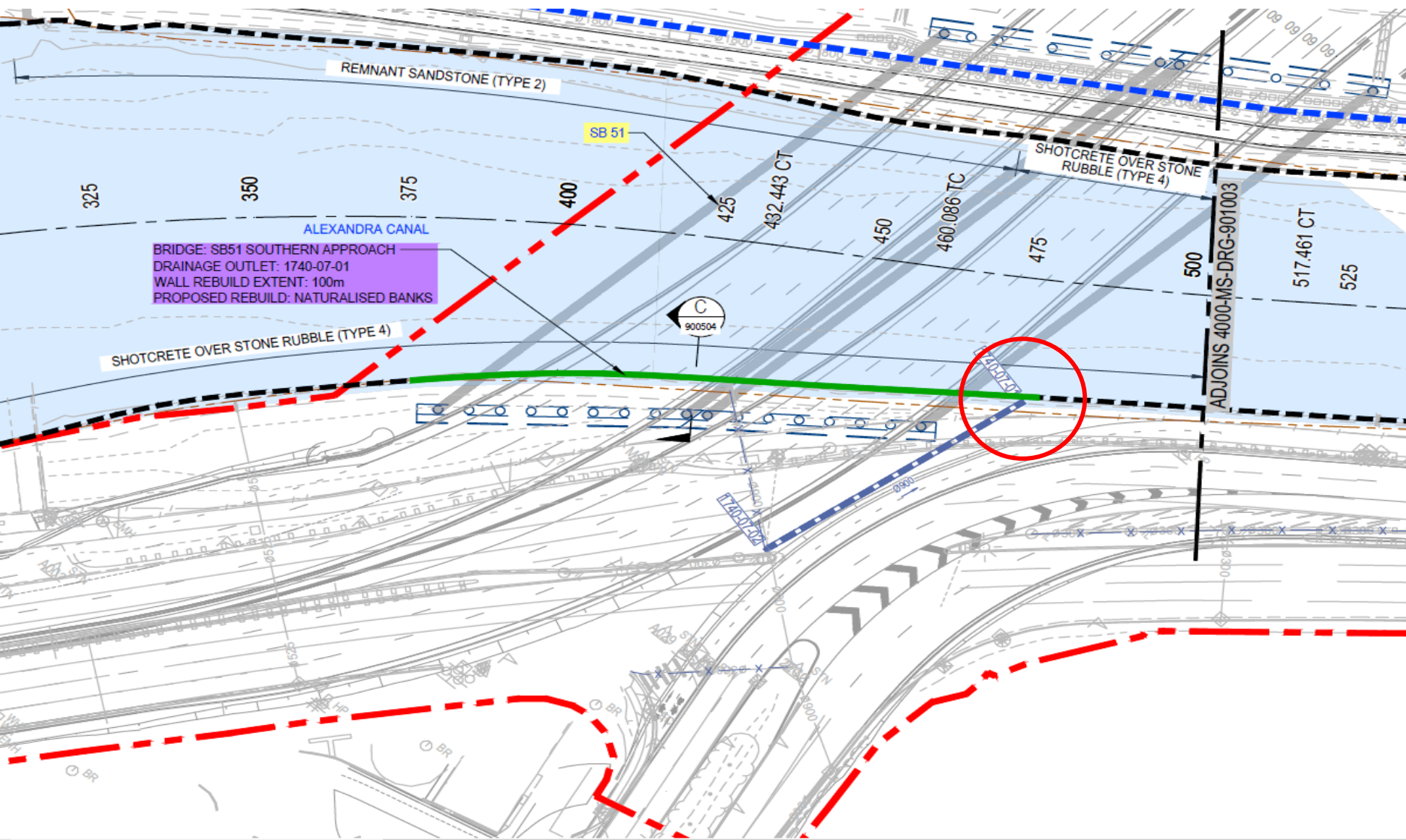
PROPOSED RE-BUILD: SHOTCRETE REPLACEMENT
FOR BANK TYPE 4: SHOTCRETE OVER STONE RUBBLE AND BANK TYPE 7: GROUT FILLED FABRIC MATTRESS
(OPTION 2 IN ALEXANDRA CANAL ASSET MASTERPLAN FOR BANK TYPES 4 AND 7)

INDICATIVE STAGING:

1. REMOVE EXISTING WEEDS, MANGROVES & CASUARINAS ALONG TOP OF BANK.
2. REMOVE EXISTING SHOTCRETE & STONE RUBBLE. CONSTRUCT TOE SUPPORT. CONSTRUCT DRAINAGE OUTLET AND BACKFILL IN ACCORDANCE WITH TNSW D&C R11 REQUIREMENTS.
3. PLACE STONE RUBBLE AND SHOTCRETE ON CANAL WALL FACE. SHOTCRETE COLOUR SHALL MATCH THE COLOUR OF THE EXISTING CANAL WALL.
4. PLANT NEW GRASSES ALONG TOP OF BANK.

Canal Wall Rebuild SB51 – (Case 178763 + BOA)

- Being constructed: Bridge Piers
- Wall Treatment: Shotcrete replacement (Shotcrete over Stone Rubble (Type 4))



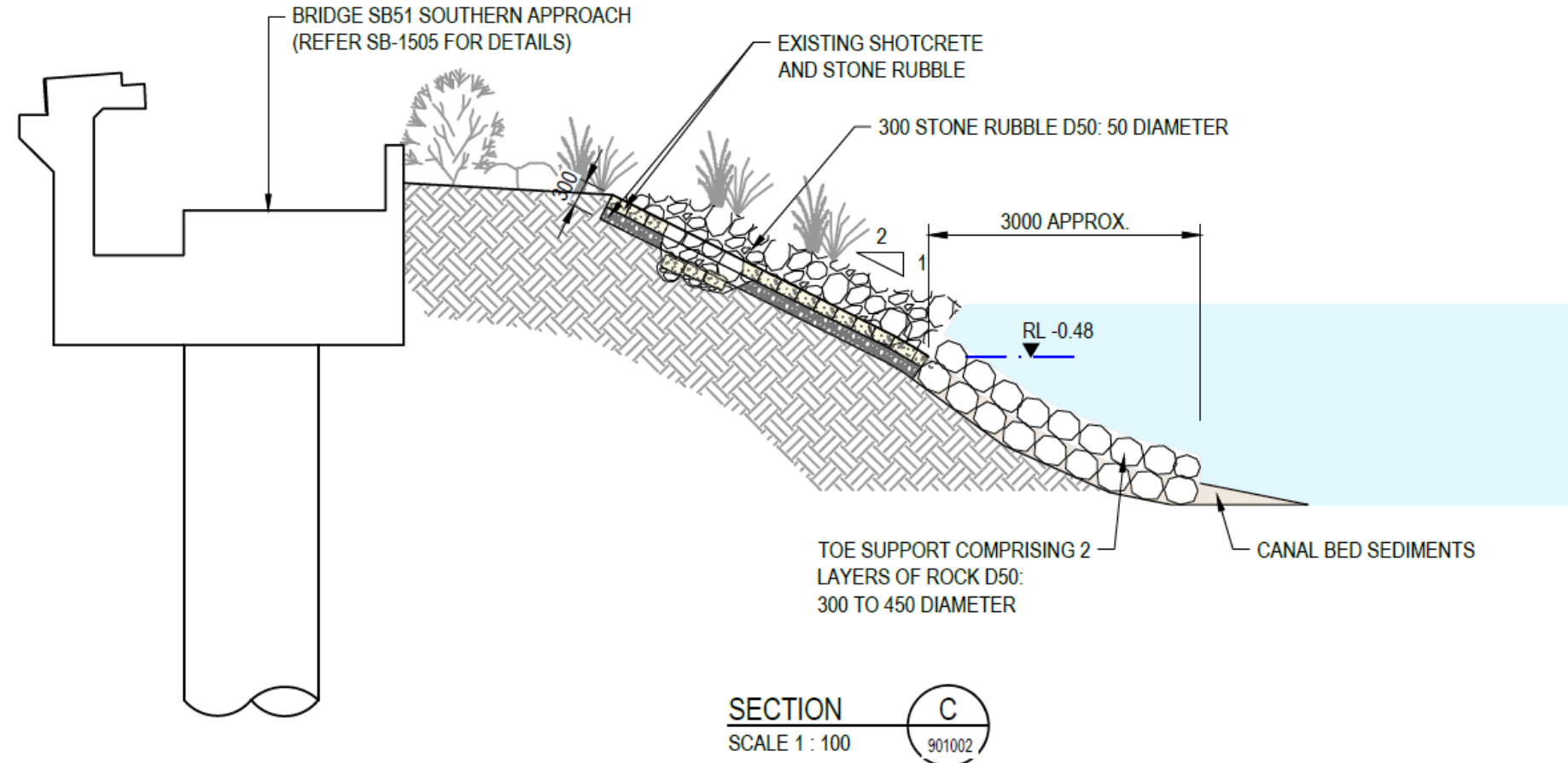
- THE DESIGNER DURING DETAILED DESIGN PENDING FURTHER INVESTIGATION AND DESIGN DEVELOPMENT.
1. DRAINAGE STRUCTURES ARE SHOWN INDICATIVELY IN THIS PACKAGE. REFER TO DRAINAGE PACKAGES (DR-1450) AND (DR-1451) FOR DETAILS.
 2. BRIDGE STRUCTURES ARE SHOWN INDICATIVELY IN THIS PACKAGE. REFER TO BRIDGE DESIGN PACKAGES SB-1515 (SB21), SB-1516 (SB31), SB-1505 (SB51), SB-1535 (SB61), SB-1560 (SB81) AND SB-1561 (SB91) FOR DETAILS.

KEY PLAN



Canal Wall Rebuild SB51 – (Case 178763 + BOA)

- 100m wall rebuild
- Rocks to be placed gently from truck (not dumped). Nominally 300-450mm diameter
- Smaller stone rubble to be placed above toe, with shotcrete over
- In line with Alexandra Canal Asset Management Plan
- Double environmental booms to be placed around SB51 to prevent discharge of sediments or contaminants
- **No rebuild on Northern bank**



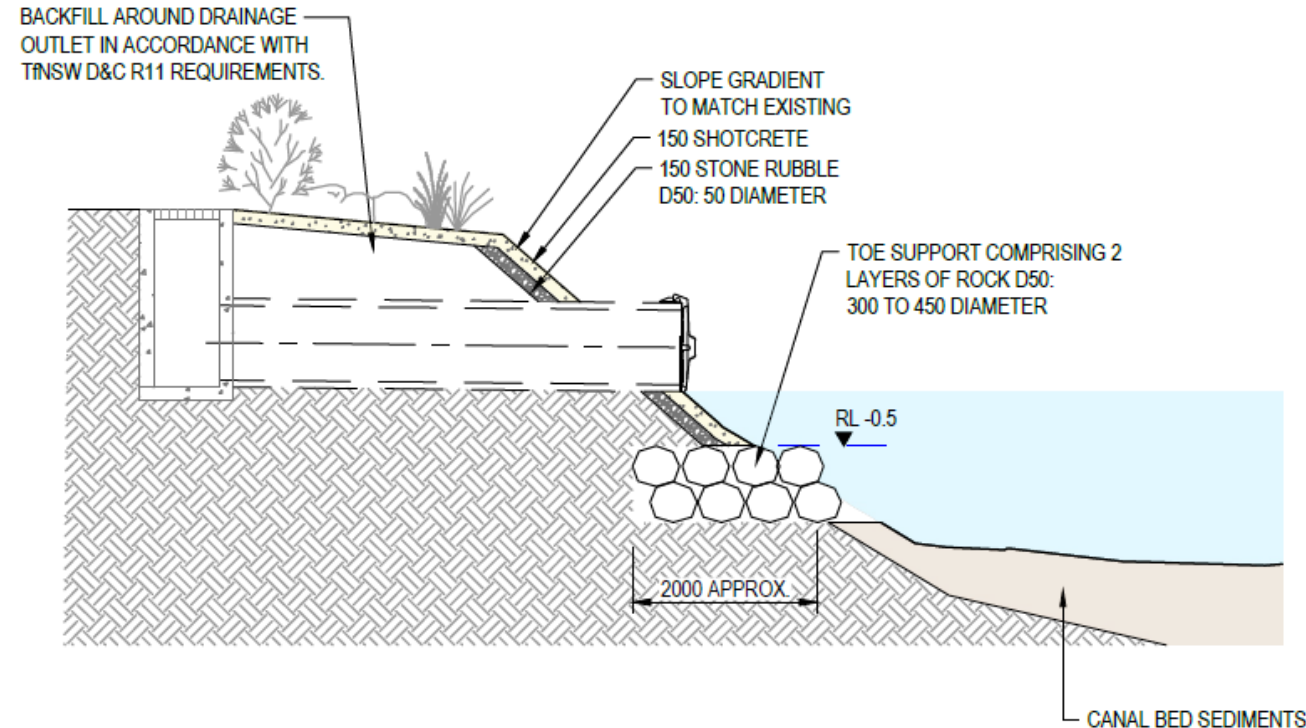
PROPOSED RE-BUILD: NATURALISED BANKS
FOR BANK TYPE 4: SHOTCRETE OVER STONE RUBBLE
(OPTION 3 IN ALEXANDRA CANAL ASSET MASTERPLAN FOR BANK TYPE 4)

INDICATIVE STAGING:

1. REMOVE EXISTING WEEDS, MANGROVES & CASUARINAS WITHIN ALONG TOP OF BANK.
2. BREAK-UP EXISTING SHOTCRETE & STONE RUBBLE TO 300mm FROM CANAL WALL SURFACE.
3. INSTALL ROCK BOULDERS OVER EXISTING SHOTCRETE AND LARGE TOE ROCKS.
4. PLANT LOW SALTMARSH SPECIES IN BANK AND NEW GRASSES ALONG TOP OF BANK.

Canal Wall Rebuild Drainage Outlet – (Case 178756)

- **Being Constructed:** 900mm diameter drainage pipe
- **Wall Treatment:** Shotcrete replacement (shotcrete over stone rubble – type 4)
- Environmental boom (up to 2) will be placed to prevent contaminated material being disturbed into the Canal
- Cofferdam would be placed to allow drainage to construct toe
- Rocks gently placed to form structural support for shotcrete wall



SECTION A
SCALE 1 : 100 901003 & 901006

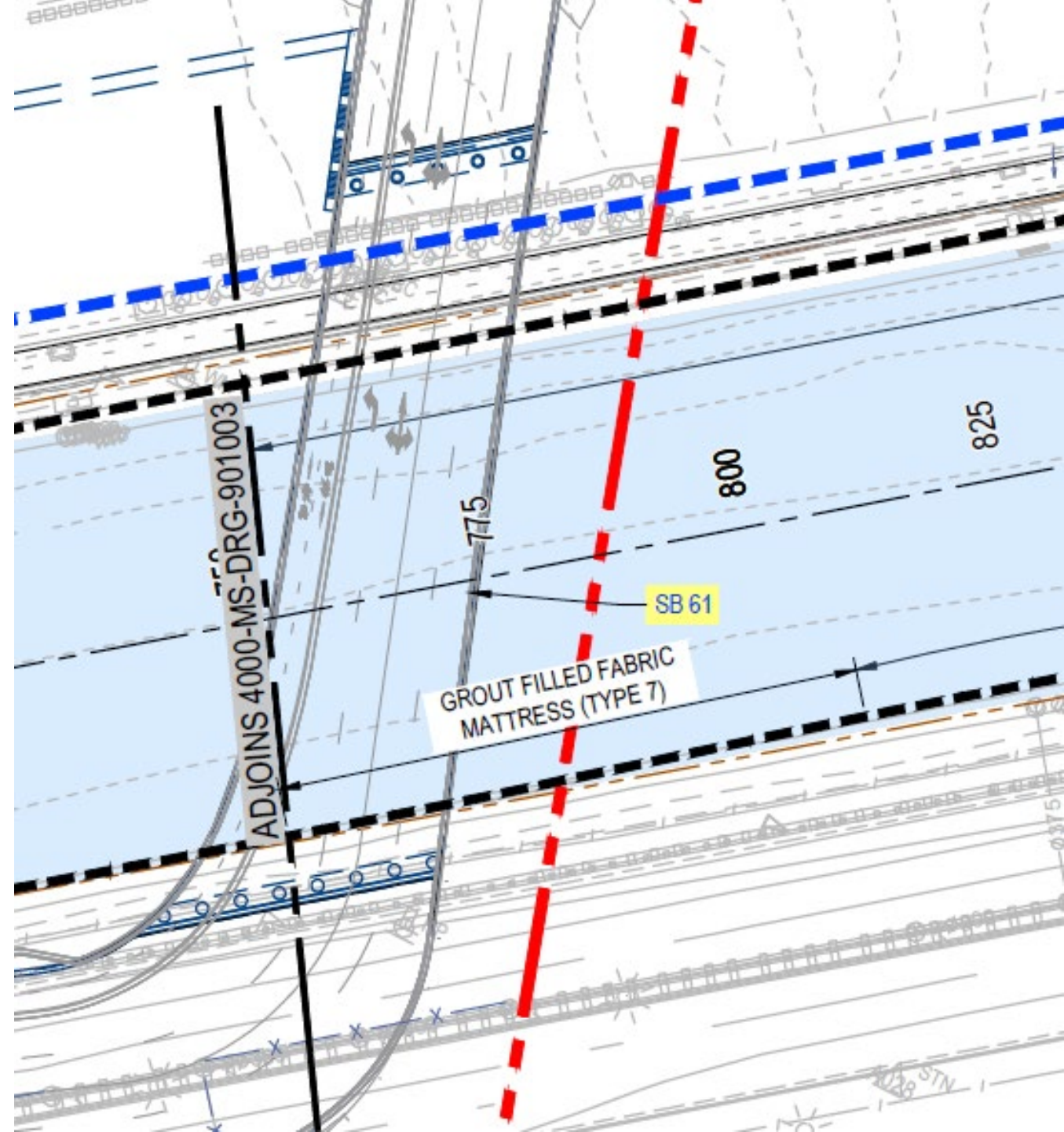
PROPOSED RE-BUILD: SHOTCRETE REPLACEMENT
FOR BANK TYPE 4: SHOTCRETE OVER STONE RUBBLE AND BANK TYPE 7: GROUT FILLED FABRIC MATTRESS
(OPTION 2 IN ALEXANDRA CANAL ASSET MASTERPLAN FOR BANK TYPES 4 AND 7)

INDICATIVE STAGING:

1. REMOVE EXISTING WEEDS, MANGROVES & CASUARINAS ALONG TOP OF BANK.
2. REMOVE EXISTING SHOTCRETE & STONE RUBBLE. CONSTRUCT TOE SUPPORT. CONSTRUCT DRAINAGE OUTLET AND BACKFILL IN ACCORDANCE WITH TNSW D&C R11 REQUIREMENTS.
3. PLACE STONE RUBBLE AND SHOTCRETE ON CANAL WALL FACE. SHOTCRETE COLOUR SHALL MATCH THE COLOUR OF THE EXISTING CANAL WALL.
4. PLANT NEW GRASSES ALONG TOP OF BANK.

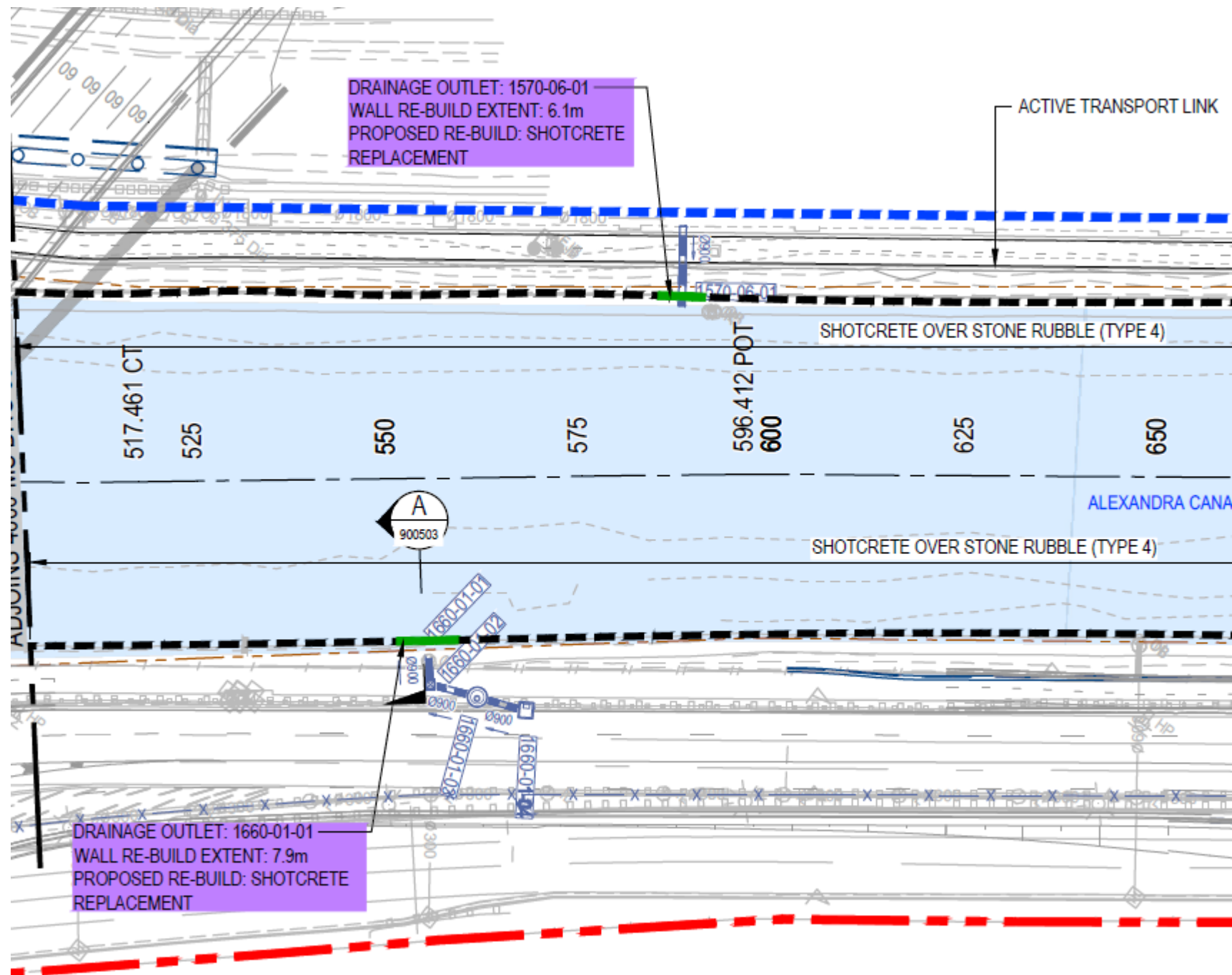
SB61 – (Case 178761 + BOA)

- **Being Constructed:** 2 x 900mm diameter drainage outlets (1 on North, 1 on South bank of Canal)
- **Wall Treatment:** N/A
- BOA and Case submission will include SEA documenting results of design and construction methodologies



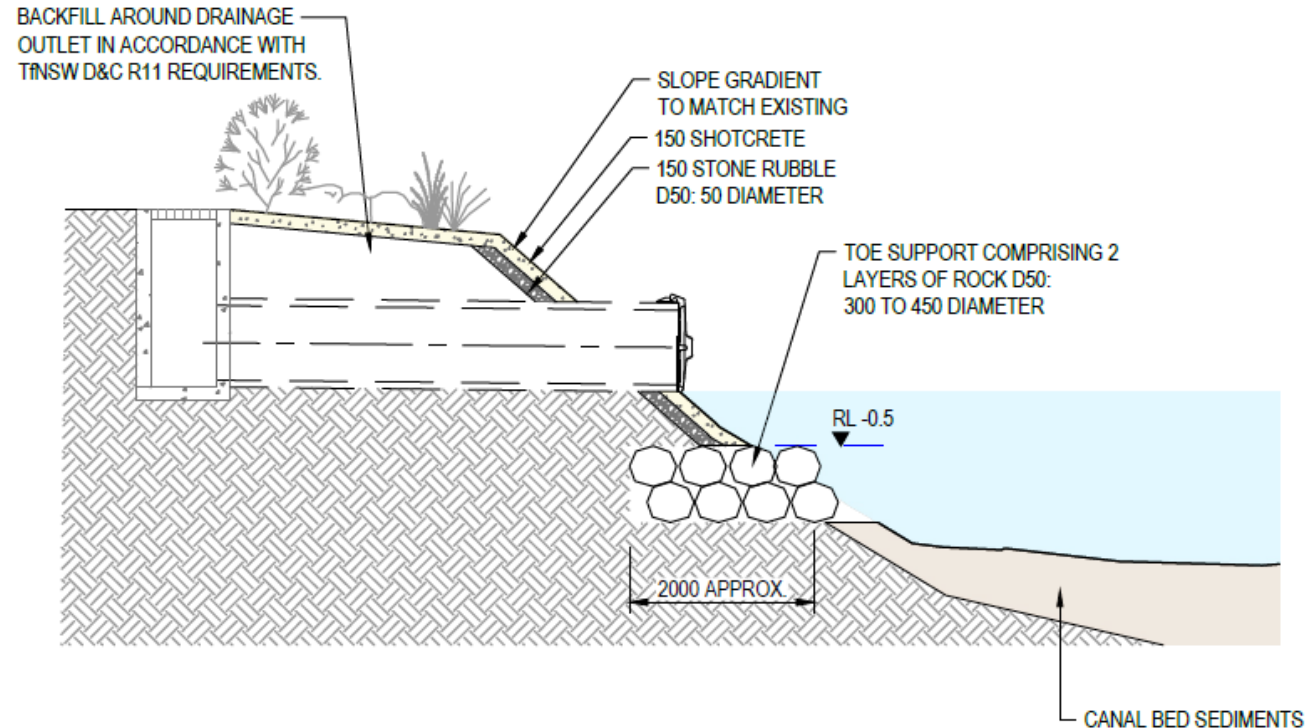
Canal Wall Rebuild – Drainage Outlet (Case 178754)

- **Being Constructed:** 2 x 900mm diameter drainage outlets (1 on North, 1 on South bank of Canal)
- **Wall Treatment:** Shotcrete over Stone Rubble (Type 4)
- East of SB51
- 6.1m wall rebuild (northern bank)
- 7.9m wall rebuild (southern bank)



Canal Wall Rebuild – Drainage Outlet (Case 178754)

- 900mm diameter piped outlet
- Environmental boom (up to 2) will be placed to prevent contaminated material being disturbed into the Canal
- Cofferdam would be placed to allow drainage to construct toe
- Rocks gently placed to form structural support for shotcrete wall



SECTION A
SCALE 1 : 100
901003 & 901006

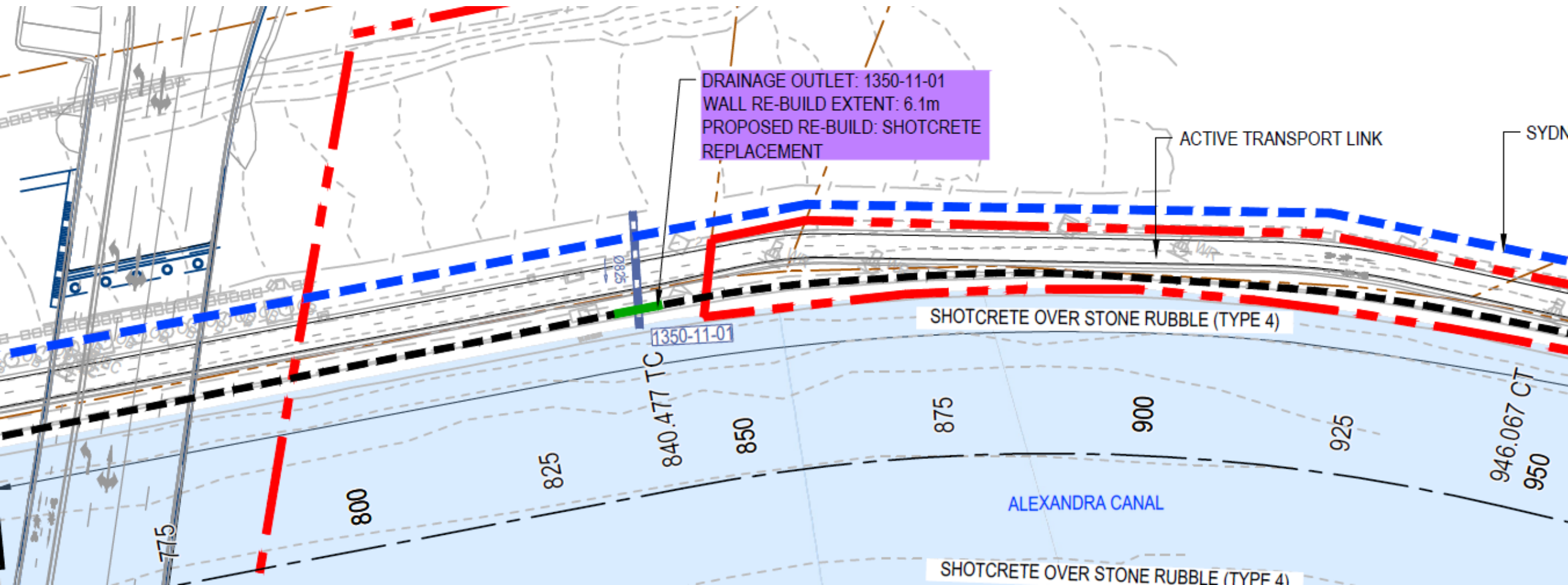
PROPOSED RE-BUILD: SHOTCRETE REPLACEMENT
FOR BANK TYPE 4: SHOTCRETE OVER STONE RUBBLE AND BANK TYPE 7: GROUT FILLED FABRIC MATTRESS
(OPTION 2 IN ALEXANDRA CANAL ASSET MASTERPLAN FOR BANK TYPES 4 AND 7)

INDICATIVE STAGING:

1. REMOVE EXISTING WEEDS, MANGROVES & CASUARINAS ALONG TOP OF BANK.
2. REMOVE EXISTING SHOTCRETE & STONE RUBBLE. CONSTRUCT TOE SUPPORT. CONSTRUCT DRAINAGE OUTLET AND BACKFILL IN ACCORDANCE WITH TNSW D&C R11 REQUIREMENTS.
3. PLACE STONE RUBBLE AND SHOTCRETE ON CANAL WALL FACE. SHOTCRETE COLOUR SHALL MATCH THE COLOUR OF THE EXISTING CANAL WALL.
4. PLANT NEW GRASSES ALONG TOP OF BANK.

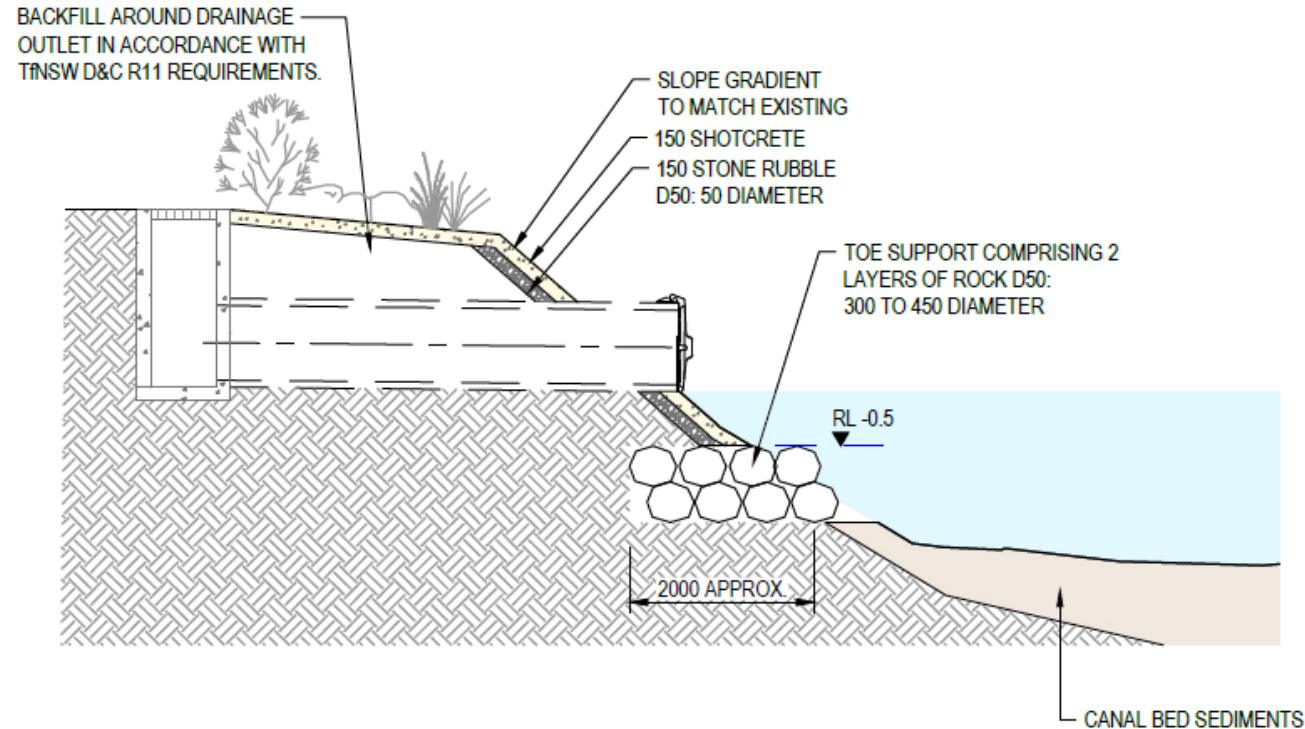
Canal Wall Rebuild – Drainage Outlet (Case 178754)

- **Being Constructed:** 1 x 825mm diameter drainage outlets (1 on North bank of Canal)
- **Wall Treatment:** Shotcrete over Stone Rubble (Type 4)
- West of Sb61
- 6.1m wall rebuild



Canal Wall Rebuild – Drainage Outlet (Case 178754)

- 825mm diameter piped outlet
- Environmental boom (up to 2) will be placed to prevent contaminated material being disturbed into the Canal
- Cofferdam would be placed to allow drainage to construct toe
- Rocks gently placed to form structural support for shotcrete wall



SECTION A
SCALE 1 : 100
901003 & 901006

PROPOSED RE-BUILD: SHOTCRETE REPLACEMENT
FOR BANK TYPE 4: SHOTCRETE OVER STONE RUBBLE AND BANK TYPE 7: GROUT FILLED FABRIC MATTRESS
(OPTION 2 IN ALEXANDRA CANAL ASSET MASTERPLAN FOR BANK TYPES 4 AND 7)

INDICATIVE STAGING:

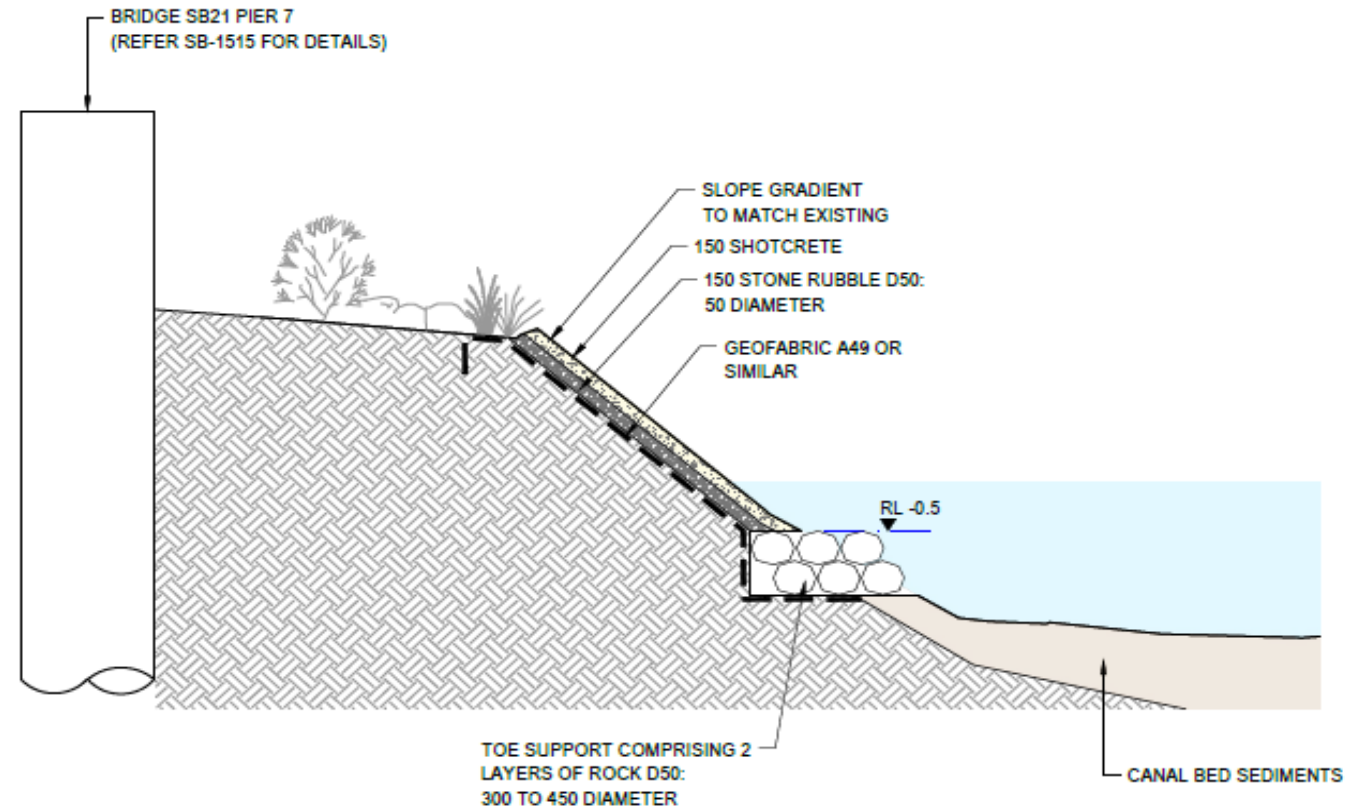
1. REMOVE EXISTING WEEDS, MANGROVES & CASUARINAS ALONG TOP OF BANK.
2. REMOVE EXISTING SHOTCRETE & STONE RUBBLE. CONSTRUCT TOE SUPPORT. CONSTRUCT DRAINAGE OUTLET AND BACKFILL IN ACCORDANCE WITH TNSW D&C R11 REQUIREMENTS.
3. PLACE STONE RUBBLE AND SHOTCRETE ON CANAL WALL FACE. SHOTCRETE COLOUR SHALL MATCH THE COLOUR OF THE EXISTING CANAL WALL.
4. PLANT NEW GRASSES ALONG TOP OF BANK.

JOHN HOLLAND | **SEYMOUR WHYTE**
 together @ VINECI

-
- This technical drawing illustrates the proposed re-build of Bridge SB91 Northern Approach. The plan view shows the bridge structure crossing a waterway, with various drainage outlets and wall sections identified by callouts.
- Callout 1:** DRAINAGE OUTLETS: 1030-01-01
WALL RE-BUILD EXTENT: 5.9m
PROPOSED RE-BUILD: SHOTCRETE REPLACEMENT
 - Callout 2:** BRIDGE: SB91 NORTHERN APPROACH
WALL RE-BUILD EXTENT: 26m
PROPOSED RE-BUILD: SHOTCRETE REPLACEMENT
 - Callout 3:** BRIDGE: SB31 NORTHERN APPROACH (PIER 7)
DRAINAGE OUTLETS: 0714-01-01 & 0837-01-01
WALL RE-BUILD EXTENT: 38m
PROPOSED RE-BUILD: COLOURED CONCRETE WITH SHOTCRETE OVERLAY
 - Callout 4:** DRAINAGE OUTLET: 0805-01-01
WALL RE-BUILD EXTENT: 14.7m
PROPOSED RE-BUILD: COLOURED CONCRETE WITH SHOTCRETE OVERLAY
- The drawing also includes labels for "ACTIVE TRANSPORT LINK", "SHOTCRETE OVER STONE RUBBLE (TYPE 4)", and "REMNANT SANDSTONE (TYPE 2)". Elevation points such as 1275, 1278.477 TC, 1300, 1350, 1500, 1571, 1632, 173 TC, and 190503 are indicated along the bridge and surrounding area.

Canal Wall Rebuild SB81 – Case 178764 + BOA

- Environmental boom (up to 2) will be placed to prevent contaminated material being disturbed into the Canal
- Rocks gently placed to form structural support for shotcrete wall
- Geofabric to be placed with shotcrete atop geofabric
- Image for SB21, but SB81 similar



SECTION D
SCALE 1 : 100
901006

PROPOSED RE-BUILD: SHOTCRETE REPLACEMENT
FOR BANK TYPE 4: SHOTCRETE OVER STONE RUBBLE AND BANK TYPE 7: GROUT FILLED FABRIC MATTRESS
(OPTION 2 IN ALEXANDRA CANAL ASSET MASTERPLAN FOR BANK TYPES 4 AND 7)

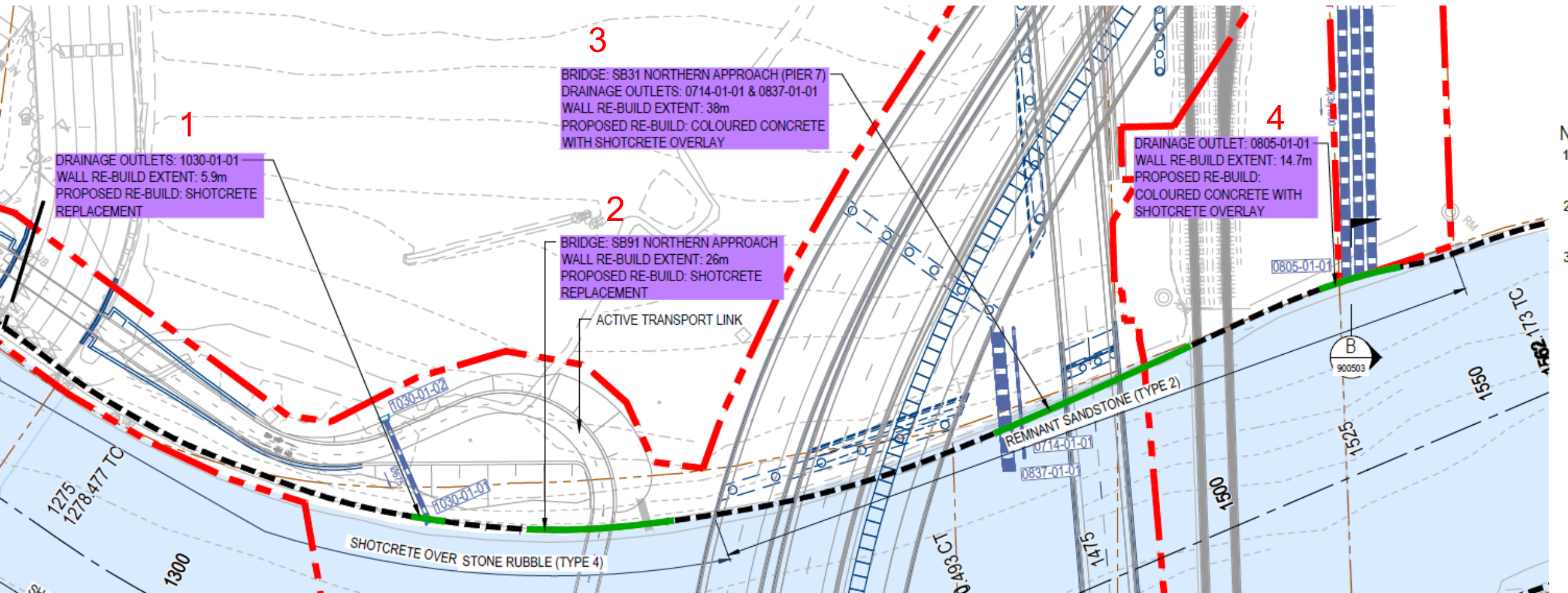
INDICATIVE STAGING:

1. REMOVE EXISTING WEEDS, MANGROVES & CASUARINAS ALONG TOP OF BANK.
2. REMOVE EXISTING SHOTCRETE & STONE RUBBLE. CONSTRUCT TOE SUPPORT WITH GEOFABRIC A49 (OR SIMILAR)
3. PLACE STONE RUBBLE ON TOP OF GEOFABRIC A49 (OR SIMILAR) AND SHOTCRETE ON CANAL WALL FACE. SHOTCRETE COLOUR SHALL MATCH THE COLOUR OF THE EXISTING CANAL WALL.
4. PLANT NEW GRASSES ALONG TOP OF BANK.

Canal Wall Rebuild

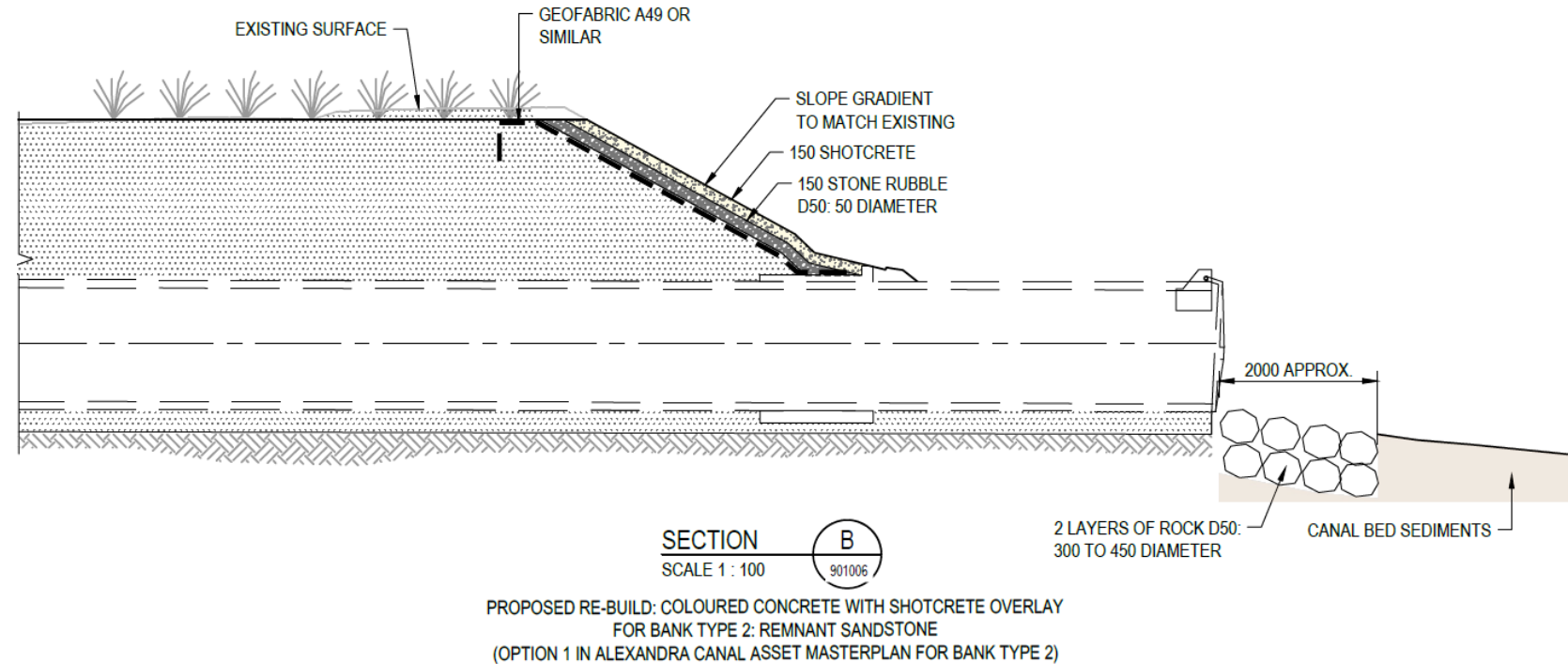
- ITEM 3 (Image below) – CASE 178761 + BOA
- Being Constructed: Bridge Abutments – SB31
- Wall Treatment: Coloured Concrete with shotcrete overlay
- 38m wall rebuild

- ITEM 4 (Image below) – CASE 178756
- Being Constructed: 3 x 1800mm diameter pipe outlets
- Wall Treatment: Coloured concrete with shotcrete overlay
- 14.7m wall rebuild



Canal Wall Rebuild – Case 178756 Drainage Outlets

- Environmental boom (up to 2) will be placed to prevent contaminated material being disturbed into the Canal
- Cofferdam to be constructed and pit dewatered
- Rocks gently placed for scour protection at drainage pipe outlets
- Excavation for drainage pipes with backfill
- Placement of coloured concrete with shotcrete overlay

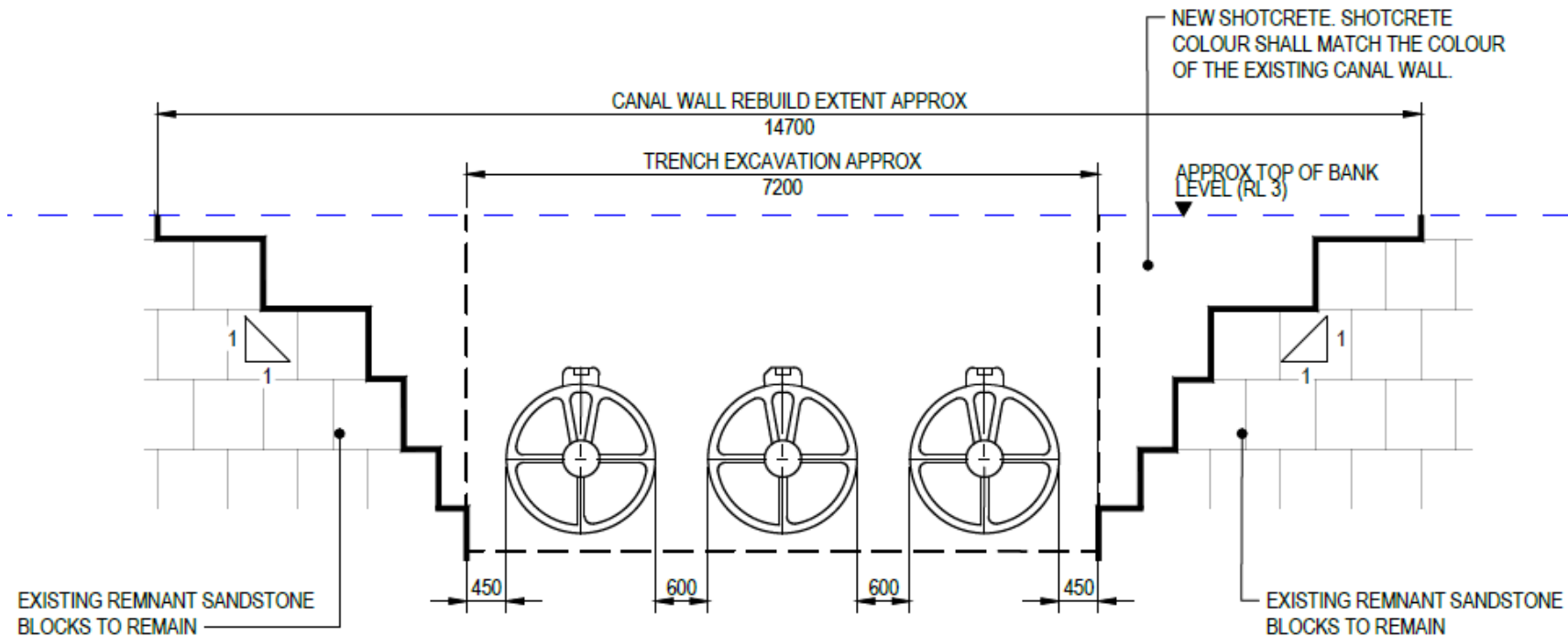


INDICATIVE STAGING:

1. REMOVE EXISTING WEEDS, MANGROVES & CASUARINAS ALONG TOP OF BANK.
2. REMOVE EXISTING SANDSTONE BLOCKS. THESE BLOCKS MAY BE RE-USED ON THE CANAL WALL FACE FOR NATURALISED BANKS AT SB51 SOUTHERN APPROACH.
3. CONSTRUCT DRAINAGE OUTLET AND BACKFILL IN ACCORDANCE WITH TNSW D&C R11 REQUIREMENTS.
4. PLACE STONE RUBBLE AND SHOTCRETE ON CANAL WALL FACE. SHOTCRETE COLOUR SHALL MATCH THE COLOUR OF THE EXISTING CANAL WALL.
5. PLANT NEW GRASSES ALONG TOP OF BANK.

Canal Wall Rebuild – Case 178756 Drainage Outlets

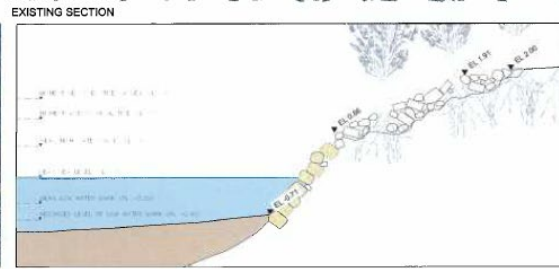
- Elevation below, showing flood gates
- Shotcrete colour to match colour of the existing canal wall
- Rebuild to be stepped to match into existing sandstone blocks



ELEVATION OF CANAL WALL REBUILD EXTENT AT DRAINAGE OUTLET 0805-01-01

SCALE 1:100

Canal Wall Rebuild – Case 178756 Drainage Outlets

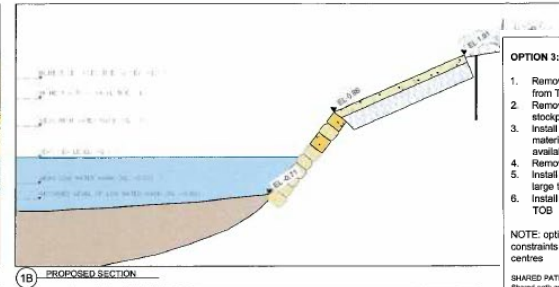
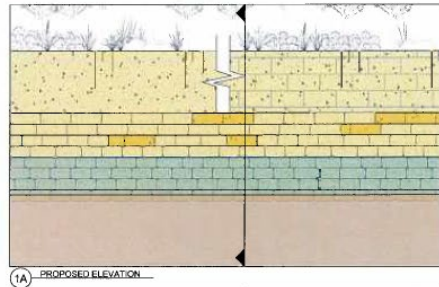


OPTION 1: COLOURED CONCRETE WITH SHOTCRETE OVERLAY

1. Remove existing weeds, Mangroves & Casuarinas within 2m from TOB (staged removal as required)
2. Remove displaced stones or highly eroded stone blocks & stockpile for reuse elsewhere in canal
3. Repair cavity with high strength coloured concrete
4. Remove existing stone rubble above remnant sandstone
5. Install no fines concrete or compacted gravel sub-base material, & new sandstone-coloured shotcrete
6. Install new grasses along TOB

NOTE: option stencilling/colouring to face of shotcrete

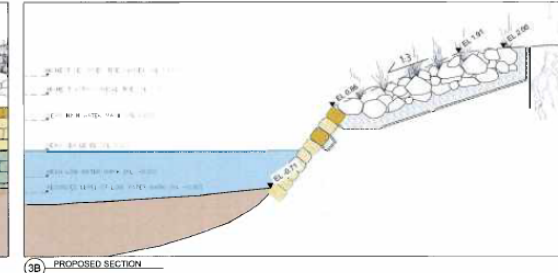
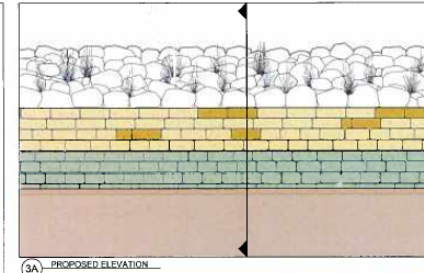
SHARED PATH NOTES:
Shared path assumed to be min. 3500mm wide x 200mm deep, with 1300mm high bicycle barrier. Design, documentation, engineering & construction by others



- OPTION 3: SANDSTONE REPAIR WITH NATURALISED BANKS**
1. Remove existing weeds, Mangroves & Casuarinas within 2m from TOB (staged removal as required)
 2. Remove displaced stones or highly eroded stone blocks & stockpile for reuse elsewhere in canal
 3. Install no fines concrete or compacted gravel sub-base material, & new blocks or salvaged sandstone blocks if available
 4. Remove existing stone rubble above remnant sandstone
 5. Install sandstone boulders above remnant sandstone, with large low rocks, intercalates for topsoil & planting
 6. Install low saltmarsh species in bank & new grasses along TOB

NOTE: optional tree planting along TOB subject to space constraints for shared path with root barrier at nom. 10-20m centres

SHARED PATH NOTES:
Shared path assumed to be min. 3500mm wide x 200mm deep, with 1300mm high bicycle barrier. Design, documentation, engineering & construction by others

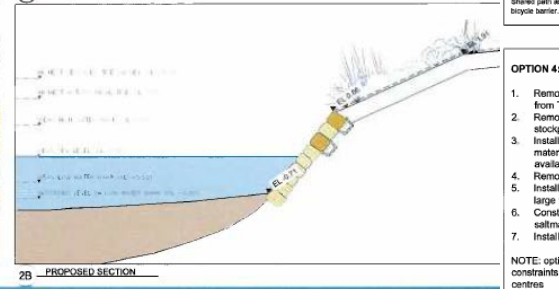
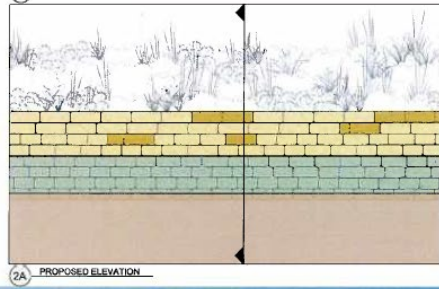


OPTION 2: SANDSTONE REPAIR WITH PLANTING (PREFERRED)

1. Remove existing weeds, Mangroves & Casuarinas within 2m from TOB (staged removal as required)
2. Remove displaced stones or highly eroded stone blocks & stockpile for reuse elsewhere in canal
3. Install no fines concrete or compacted gravel sub-base material, & new blocks or salvaged sandstone blocks if available
4. Remove existing stone rubble above remnant sandstone
5. Install new grasses along TOB

NOTE: optional tree planting along TOB subject to space constraints for shared path with root barrier at nom. 10-20m centres

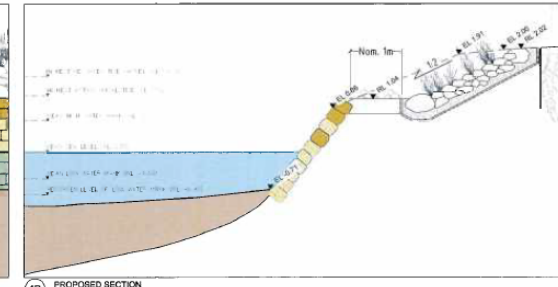
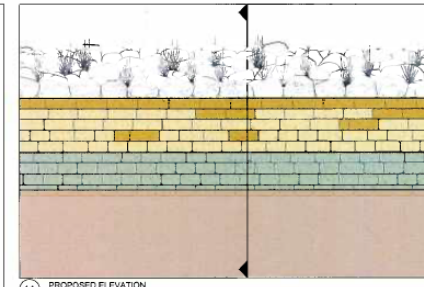
SHARED PATH NOTES:
Shared path assumed to be min. 3500mm wide x 200mm deep, with 1300mm high bicycle barrier. Design, documentation, engineering & construction by others



- OPTION 4: SANDSTONE REPAIR WITH SALTmarsh BENCH**
1. Remove existing weeds, Mangroves & Casuarinas within 2m from TOB (staged removal as required)
 2. Remove displaced stones or highly eroded stone blocks & stockpile for reuse elsewhere in canal
 3. Install no fines concrete or compacted gravel sub-base material, & new blocks or salvaged sandstone blocks if available
 4. Remove existing stone rubble above remnant sandstone
 5. Install sandstone boulders above remnant sandstone, with large low rocks & intercalates for topsoil & planting
 6. Construct nom. 1m wide saltmarsh bench & install low saltmarsh species in bank
 7. Install new grasses along TOB

NOTE: optional tree planting along TOB subject to space constraints for shared path with root barrier at nom. 10-20m centres

SHARED PATH NOTES:
Shared path assumed to be min. 3500mm wide x 200mm deep, with 1300mm high bicycle barrier. Design, documentation, engineering & construction by others



BANK TYPE 2: REMNANT SANDSTONE ALEXANDRA CANAL ASSET MASTERPLAN

DATE: 09/2019
SCALE: 1:60 @ A3



JACOBS



JACOBS

BANK TYPE 2: REMNANT SANDSTONE ALEXANDRA CANAL ASSET MASTERPLAN

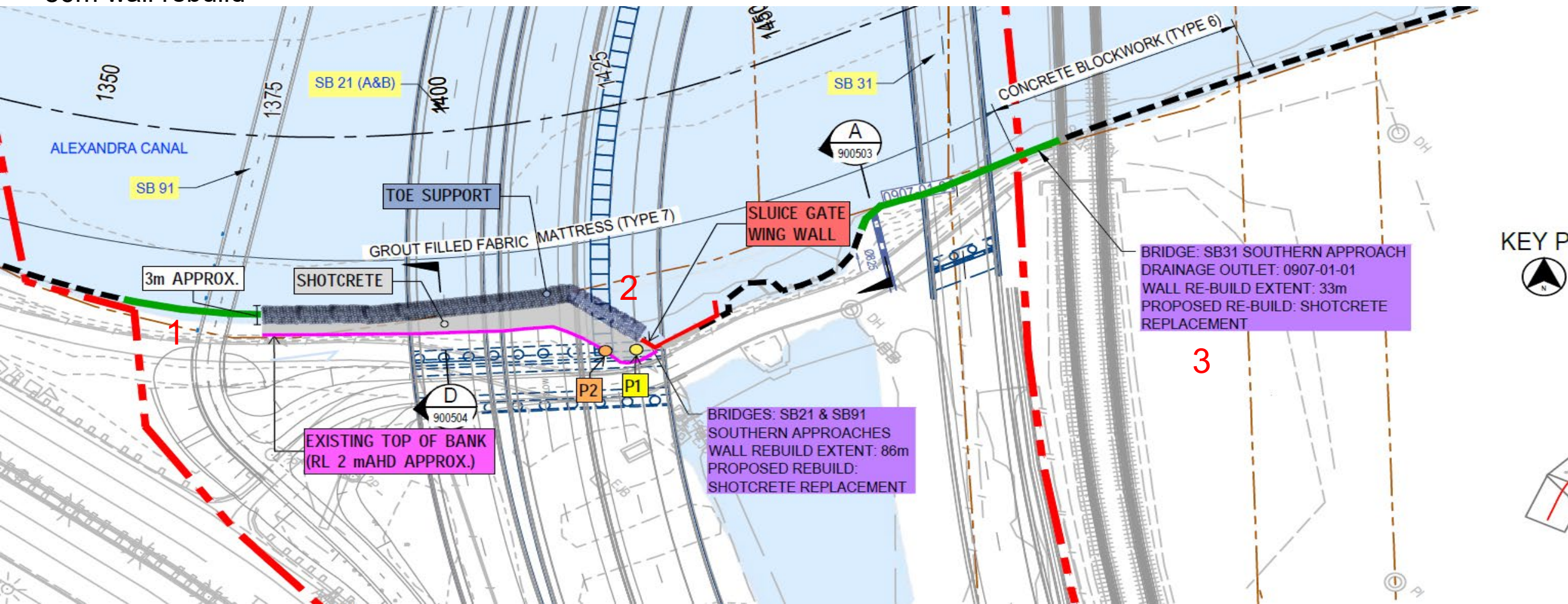
DATE: 09/2019
SCALE: 1:60 @ A3



Canal Wall Rebuild

- ITEM 1 (Image below) – CASE 178764 + BOA
- Being Constructed: Bridge Abutments – SB91
- Wall Treatment: Shotcrete Replacement
- 86m wall rebuild

- ITEM 2 & 3 (Image below) – CASE 178761 + BOA
- Being Constructed: Bridge Abutments – SB21 and SB31
- Wall Treatment: Shotcrete Replacement
- 86m rebuild (SB21); 33m rebuild (SB31)



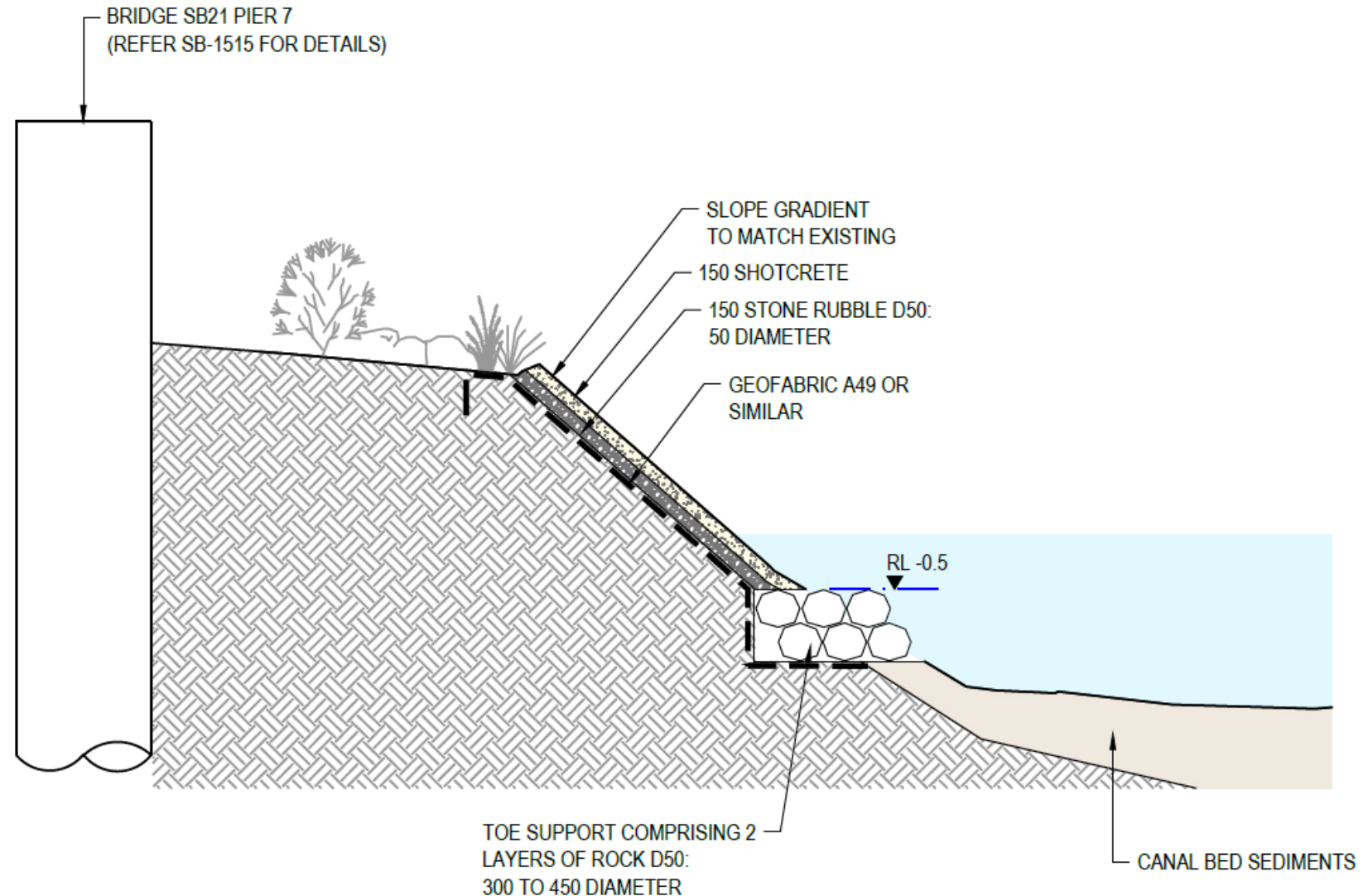
Canal Wall Rebuild – Case 178761 + BOA –SB21

- Piles located in close proximity to existing canal wall
- Environmental boom (up to 2) will be placed to prevent contaminated material being disturbed into the Canal
- Rock platform to be built, per plan on previous slide (rocks to be gently placed)
- Piles to be constructed
- Shotcrete to be placed above rock platform and around piles
- Excess rocks to be removed



Canal Wall Rebuild – Case 178761 + BOA –SB21

- Piles located in close proximity to existing canal wall
- Environmental boom (up to 2) will be placed to prevent contaminated material being disturbed into the Canal
- Rock platform to be built, per plan on previous slide (rocks to be gently placed)
- Piles to be constructed
- Shotcrete to be placed above rock platform and around piles
- Excess rocks to be removed



Summary of Construction Methods

- Wall rebuilds will follow proposed and preferred treatments in Alexandra Canal Asset Management Plan wherever possible
 - Preferred treatments cannot always be followed due to the steepness of the banks and need to provide scour protection
 - E.g. naturalised banks often preferred, where required, shotcrete replacement used (for Bank Type 4 and 7, as examples)
- Rocks to be placed by boom/HIAB into canal, to sink into sediments
 - Form the toe of any shotcrete rebuilds
- All drainage outlets will have a localised Cofferdam at the outlet
- Where needed, rock platforms will be placed in the Canal to prevent cofferdam construction (i.e. SB21 southern abutment)

Appendix C

Site Auditor Interim Audit Advice



ZOIC Environmental Pty Ltd
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Phone: +61 2 9251 8070
www.zoic.com.au

20051 IA14 6Jul21 CASACMP Approve

6 July 2021

Mark Turner
John Holland Seymour Whyte Joint Venture
Level 3, 65 Pirrama Road
Pyrmont, NSW 2009

Via email: Mark.Turner@jhq.com.au
cc: Robert.Muir@jhsw.com.au

Dear Mark,

Re: Interim Advice 14 – Endorsement of Contaminated Aquatic Sediments in Alexandra Canal Management Plan, Sydney Gateway Project, NSW

1 Introduction

John Holland Seymour Whyte Joint Venture (JHSW JV) has appointed Kylie Lloyd of Zoic Environmental Pty Ltd (Zoic), a NSW EPA Auditor accredited (No. 0302) under the Contaminated Land Management (CLM) Act 1997, to conduct an Audit at the Sydney Gateway Project, NSW ("the site").

The aim of the engagement is to enable a site audit statement (SAS) and associated site audit report (SAR) to be prepared that confirms the suitability of the site for proposed redevelopment as a road network, a new waste mound (cell) and leachate treatment plant, in accordance with the NSW EPA (2017) Contaminated Land Management Guidelines for the NSW Site Auditor Scheme (3rd edition).

2 Scope of Audit and Nature of Interim Advice

NSW EPA (2017) describes the site assessment and audit process as:

1. *Consultant is commissioned to assess contamination.* The contaminated site consultant designs and undertakes the site assessment and, where required, all remediation and validation activities to achieve the objectives specified by the owner or developer; and
2. *Site auditor reviews the consultant's work.* The site owner or developer commissions the Auditor to review the consultant's work. The Auditor then prepares a SAR and SAS at the conclusion of the review, which are given to the owner or developer.

Therefore, the contaminated land consultant and other relevant parties should be satisfied that the work to be conducted conforms to all appropriate regulations, standards and guidelines and is suitable based on the site history and the proposed land use.

This Audit is statutory in nature and makes reference to requirements contained within Conditions C7, C8, C9, E46, E47 and E90 of the State Significant Infrastructure (SSI) 9737 dated 27 August 2020, which state:

- C8 The Contaminated Aquatic Sediments in Alexandra Canal CEMP Sub-plan must:
- (a) detail how work in Alexandra Canal will be managed;
 - (b) be in accordance with the Remediation Order (Ref. 23004) that applies to the Canal; and
 - (c) include evidence that an accredited EPA Site Auditor has reviewed the Sub-plan and has issued an interim audit advice or a Section B Site Audit Statement regarding the appropriateness of the Sub-plan.
- C9 Any variations to the Landfill Leachate, Gas and Odour CEMP Sub-plan and Contaminated Aquatic Sediments in Alexandra Canal CEMP Sub-plan must be approved in writing by the EPA accredited Site Auditor and evidence of the approval submitted to the Planning Secretary for information with the amended Sub-plan.

3 Current Interim Advice

In preparing this interim audit advice, the Auditor has reviewed the following reports related to land contamination assessment:

- JHSWJV (8 June 2021) Contaminated Aquatic Sediments in Alexandra Canal Management Plan SSI 9737 (Ref: SGWPW-JHSW-NWW-PM-PLN-000520) ('the CASACMP').

Additionally, the following documents were referred to confirm references made in the CASACMP above were included:

- JHSWJV (19 February 2021) Construction Waste and Resource Management Plan – State (Ref: SGWPW-JHSW-NWW-PM-PLN-000510).
- JHSWJV (May 2021) Flora and Fauna Management Sub-Plan (State) – SSI 9737 (SGWPW-JHSW-NWW-PM-PLN-000514).
- JHSWJV (29 June 2021) Soil and Water Management Sub Plan (Ref: SGWPW-JHSW-NWW-PM-PLN-000515).
- JHSWJV (June 2021) Material Waste and Resource Importation Process.

The purpose of the current IA is to document Auditor findings following the review of existing information related to site conditions and contamination status and to assess if the above document meet the requirement of Conditions C8 and C9 provided in Section 2 above. This advice also outlines any data gaps identified in the existing information which should be addressed by the appointed consultant as either part of any further investigation works, or as part of any remedial or validation works that may be required at the site.

4 Summary of JHSWJV (8 June 2021) Contaminated Aquatic Sediments in Alexandra Canal Management Plan (CASACMP)

The purpose of the report is to describe how the JHSWJV proposes to manage work in Alexandra Canal, and how compliance with the existing Remediation Order (Ref. 23004) that applies to the bed sediments in the canal will be maintained through the Project.

The key objective of the report is to address all requirements relevant to works within Alexandra Canal are captured, scheduled and assigned responsibility as outlined in:

- The combined environmental impact statement (EIS) / major development plan (MDP) prepared for the Sydney Gateway Project.
- Conditions of Approval (CoA) for SSI 9737 issued by the Minister for Planning and Public Spaces (NSW) on 27 August 2020.
- Updated mitigation measures (UMMs) detailed in the Response to Submissions Report.

- Roads and Maritime specifications G36, G38 and G40.
- The Project's Environmental Protection Licence (EPL).
- Relevant legislation and other requirements described in Section 3.1 of this Plan.
- The objectives and actions required by the NSW EPA's remediation order (Ref. 23004) that apply to the Alexandra Canal (Appendix A).

The plan does not include measures to manage surface water quality impacts associated with works adjacent to the Canal and acid sulfate soil management plan (those are managed through the Soil and Water Management Plan (SWMP) or any waste removal associated with works (which is managed through the Waste & Resources Management Plan).

The established targets include:

- Compliance with the relevant legislative requirements, CoA and UMM.
- Meet EPL requirements.
- Provide training in the form of inductions to relevant Project personnel relating to works in Alexandra Canal, before they begin work on site.
- Ensure compliance with the NSW EPA's remediation order (Ref. 23004) that applies to the Alexandra Canal.
- Minimise the disturbance and migration of contaminated sediments at Alexandra Canal.
- Prevent the generation of ASS and therefore minimise the potential creation of sulfuric acid as a product of ASS.

The CASACMP provides the following requirements:

- Summary of environmental requirements
- Existing environment conditions
- Construction activities and potential impacts
- Construction methodology and environmental control measures
- Compliance management
- Review and improvement

The adopted water quality trigger values (provided in WSP GHD (22 October 2019) Sydney Gateway Road Project Technical Working Paper 8 – Surface Water (Ref: SG04-G2S-EN-RPT-WQ-0006-05) and Appendix E of the WSP GHD (May 2020) Sydney Gateway Road Project Response to Submissions Report) were based on the following:

- For physical and chemical stressors, use the least stringent of the 80th percentile values from the monitoring data (from SW6) and the default trigger values for aquatic ecosystems in marine waters.
- For non-bioaccumulative toxicants, use the least stringent of the 80th percentile values from the monitoring data (from SW6) and the 80% species protection level for marine waters
- For bioaccumulative toxicants, use the least stringent of the 80th percentile values from the monitoring data (from SW6) and the 95% species protection level for marine waters.
- To obtain 80% species protection level, WSP GHD (22 October 2019) appeared to consider the minimum between ANZG (2018) trigger level for the protection of 80% ecosystem for marine water, ANZECC (2000) primary and secondary contact recreation trigger level, ANZECC (2000) water quality guidelines for aquaculture and human consumers of aquatic foods and Airports (Environment Protection) Regulation 1997.

The adopted sediment trigger values were based on ANZG (2018).

The mitigation measures adopted were based on the following principles:

- Preventing the dispersion of turbid plumes potentially containing elevated levels of chemicals of potential concern into Alexandra Canal.
- Preventing the generation of ASS and therefore minimising the potential creation of sulfuric acid as a product of ASS.

The main adopted mitigation strategy to achieve the above is installation of coffer dams around the proposed construction activities. The proposed construction activities include installation of 10 outlets as part of the Project stormwater drainage system, as well as development of a bridge.

5 Regulatory requirements

A Remediation Order (Ref. 23004) for Alexandra Canal has been issued by NSW EPA to manage the bed sediments in Alexandra Canal that are contaminated with chlorinated hydrocarbons (including chlordane, total DDT and dieldrin), PCBs and metals.

The summary of the order is that Sydney water is required to:

- Refrain from allowing any works on the bed sediments that allows further disturbance (other than allowed by the order).
- A written plan is to be submitted to NSW EPA for any disturbance of the sediments which must be prepared in accordance with EPA guidelines for Consultants Reporting (as appropriate), with the provision being waived for emergency works.
- All works must follow the plan and Sydney Water must make people aware of the requirements

These requirements are to be followed by any agents, contractors, licensees or lessees for works within the designated area.

6 Auditor Comments

The Auditor has reviewed the JHSWJV (8 June 2021) CASACMP against relevant guidelines made or approved by NSW EPA and considers that the document is appropriate, subject to the following conditions:

1. Approval by NSW EPA on CASACMP is obtained prior to work commencement to satisfy Remediation Order requirements.
2. The trigger values provided in Section 3.2 of the CASACMP be utilised for comparison with baseline monitoring data purposes and trigger of action for works. It is noted any water discharge (whether from the WTP or otherwise) is required meet the environmental protection licence (EPL) issued by NSW EPA.
3. A detailed Environmental Work Method Statement (EWMS) is prepared for work associated with the CASACMP. This document should include (but not limited to):
 - Detailed methodology for installation, dewatering, implementation and removal of the temporary and permanent structures (drainage outlet works, coffer dam, rock work platform, etc.) to be placed on Alexandra Canal. The Auditor anticipates that the details in the EWMS will include mitigation measures for each of the hazards anticipated during the work.



- Mitigation measures for management of sediment and water.
 - Requirement for assessment of reuse material (e.g. the sandstone blocks proposed to be reused elsewhere in canal).
 - Consideration of tidal variability.
 - Justification that the proposed use of panolin oil during coffer dam removal will not result in contamination given the hydrocarbon nature of this oil.
4. Surface water monitoring will be conducted: For the following additional COPCs:
- Major cations and anions
 - Volatile organic compounds (VOCs)
 - Phenols
 - Organochlorine pesticides (OCPs)
 - Organophosphate pesticides (OPPs)
 - Tributyltin
 - Polychlorinated biphenyls (PCBs)

7 Closure

This interim advice does not constitute a SAS or a SAR, but rather is provided to assist the Client in the assessment and management of contamination issues at the site. The information provided herein should not be considered pre-emptive of the final Audit conclusions. It represents the Auditor's opinion based on the review of currently available information.

Should you have any queries or wish to discuss any points, please do not hesitate to contact Cheryl Halim or the undersigned.

Yours sincerely,

Kylie Lloyd
Site Auditor
Zoic Environmental Pty Ltd

Attachments: Attachment A – Review Comments (spreadsheet provided separately)



Attachment A – Review Comments

DOCUME	Stage 1	COMPLIANCE STATUS
		O Open
DOCUME	Contaminated Aquatic Sediments in Alexandra Canal Management Plan (State)	C Closed
		CS Closed subject to additional action / information
		(Status L,H are applicable to Design Documentation only)
		L Certification Limitation
PACKAG	21-Apr-21	H Drawings or part thereof on HOLD

Comment No.	Description	Document Owner Response	Response Date	Outstanding Comment	Outstanding Comment addressed by JHSW	Compliance Status	Auditor comment
1	1. Section 2.2: Typographic error – please review first sentence of the objectives.	Typo fixed	08/06/2021	The Auditor cannot see what has been updated - considered minor.		C	-
2	2. Section 2.3: Please provide a copy of the EPL if available.	the EPL is not yet finalised but we can provide a copy (public document) once issued	08/06/2021	To be provided	As noted, the EPL is not yet finalised. We request that the conditions of the IAA are amended to reflect that Construction of the scheduled activity works which are subject to an EPL have not yet commenced and the EPL will be in place prior to those works commencing. Once finalised a copy of the EPL will be provided to the Site Auditor (noting it is publicly available).	C	Noted, Addressed
3	3. Section 3.1.2: Guidelines and Standards	See below	08/06/2021	-		-	-
4	a. The PFAS National Environmental Management Plan has been revised in January 2020 (Version 2.0). Please update.	This has been amended.	08/06/2021	Addressed		C	-
5	b. Please add (amended in 2013) to "National Environment Protection (Assessment of Site Contamination) Measure 1999."	Included	08/06/2021	Addressed		C	-
6	4. Table 3-1: The Auditor has reviewed the trigger values against the trigger values for Alexandra Canal provided in Table 4.8 of the WSP GHD (30 March 2020) Sydney Gateway Road Project – Updates to Surface Water Quality Management Criteria Published in the Exhibited EIS, which is attached to the Sydney Gateway Road Project Response to Submissions Report (RTS). Some comments provided below:	<p>This response covers the points (a) to (e) below. The trigger levels for the Alexandra Canal are based on the baseline water quality monitoring completed as part of the EIS. In this regard, and on the basis that we are not 'discharging' as part of this Plan (ie this plan is about impact to the quality of the water in the Canal and disturbance from JHSW works), then the baseline water quality criteria included in App E of the Submissions Report are the relevant criteria for THIS PLAN (as opposed to 'discharge water quality' requirements which are required to comply with the EPL for the Groundwater MP and the Soil & Water MP).</p> <p>The Table in Section 3.2 (now Table 3-2) has been updated to be consistent with Appendix E of the Submissions Report. There was an error which meant several lines of triggers and criteria had been missed however this is now updated.</p>	08/06/2021	<p>Approval from NSW EPA is required on the appropriateness of the proposed water quality trigger values.</p> <p>It is noted in EPA's response to the EIS 80% species protection was not agreed.</p>	<p>The baseline water quality monitoring in Alexandra Canal is presented in Appendix E of the RtS report - these are the water quality trigger values which JHSW must monitor surface water quality within the Canal. These are detailed in Section 3.2 of the Plan. We note that not all analytes were considered COC in the EIS (eg PCBs) and therefore we do not have background data on analytes which are not included in Section 3.2 of the Plan. We have provided further responses to specific queries below in these responses.</p> <p>It is recognised that the EPA, under the Project EPL, may request water discharge criteria which is more stringent than the baseline data provided in the RtS but this would relate to <u>discharge from water treatment plants and the quality of water that JHSW must treat prior to discharge.</u></p> <p>JHSW considers that the baseline surface water quality monitoring / triggers in Alexandra Canal are <u>different</u> to the discharge criteria that the EPA may apply and we have tried to make this clear in the Plan (ie refer to baseline monitoring program being the source of Section 3.2).</p> <p>On the basis of the above information, JHSW requests that this is removed as a condition of the IAA based on the fact that we are already</p>	CS	It is acknowledged that the trigger values provided in Section 3.2 of the CASACMP be utilised for comparison with baseline monitoring data purposes and trigger of action for works. It is noted any water discharge (whether from the WTP or otherwise) is required meet the environmental protection licence (EPL) issued by NSW EPA.
7	a. Please include a column that nominated the source for the trigger value (e.g., ANZG (2018) trigger level for the protection of 80% ecosystem, ANZECC (2000) aquatic foods, primary contact recreation, secondary contact recreation, etc.)	This column has not been added on the basis that it comes from App E of the Submissions Report. This is referenced at the end of the table for clarification.	08/06/2021	This has not been addressed. The Auditor has reviewed the numbers and made comments accordingly.		C	-
8	b. As per NEPM (2013) and NSW EPA (2020) requirements, the rationale for adoption of the criteria should be provided including justification of choice between 80 th percentile of data measured during baseline studies and ANZG criteria (80% protection level or other nominated sources). The Auditor needs clarification of whether EPA has approved this approach noting the differing risk profiles and requirement for consideration of bioaccumulation.	The criteria from the EIS have been used. In terms of risk profile and consideration of bioaccumulation, JHSW have tried to plan the works to ensure controls are where the immediate work zones are located so as to minimise bed sediment disturbance. Whilst the Plan, and the Planning Approval and Remediation Order, acknowledge works are to be carried out, the controls in place must minimise the disturbance and we believe this Plan achieves this outcome.	08/06/2021	<p>Approval from NSW EPA is required on the appropriateness of the proposed water quality trigger values.</p> <p>It is noted in EPA's response to the EIS 80% species protection was not agreed.</p>	Please refer to the Response to Comment 6 above. This response also applies here.	CS	Addressed

Comment No.	Description	Document Owner Response	Response Date	Outstanding Comment	Outstanding Comment addressed by JHSW	Compliance Status	Auditor comment
9	c. The following criteria do not appear to be consistent with the general approach or data is unavailable:		08/06/2021			-	
10	i. Lead as a non-bioaccumulative chemical has trigger level which is consistent with 95% protection for marine ecosystem, instead of 80%.	This criteria is consistent with Appendix E of the Submissions Report	08/06/2021	Approval from NSW EPA is required on the appropriateness of the proposed water quality trigger values.	Please refer to the Response to Comment 6 above. This response also applies here.	CS	Addressed
11	ii. Zinc trigger level (higher than 80% protection level) noting the legend for zinc states "90 th percentile site monitoring value is lower than 80% protection level for aquatic ecosystems"	This criteria is consistent with Appendix E of the Submissions Report	08/06/2021	Approval from NSW EPA is required on the appropriateness of the proposed water quality trigger values.	Please refer to the Response to Comment 6 above. This response also applies here.	CS	Addressed
12	iii. pH trigger value	This criteria is consistent with Appendix E of the Submissions Report	08/06/2021	Approval from NSW EPA is required on the appropriateness of the proposed water quality trigger values.	Please refer to the Response to Comment 6 above. This response also applies here.	CS	Addressed
13	iv. bicarbonate alkalinity trigger value – the Auditor cannot find monitoring data.	This criteria is consistent with Appendix E of the Submissions Report	08/06/2021	Approval from NSW EPA is required on the appropriateness of the proposed water quality trigger values.	Please refer to the Response to Comment 6 above. This response also applies here.		Addressed
14	v. There is inconsistency between the RTS (PDF page 619) and Table 3-1 for turbidity. Please update accordingly.	Minor edit	08/06/2021	Addressed		C	-
15	d. Table 3-1 does not include all the analytes included in the Appendix E of the EIS or the RTS. Please justify omission or update.	This has now been amended (error in transfer of information)	08/06/2021	Other analytes have been added, but we have the following comments: - Xylenes should be assessed by individual isomers (o-, p-, m-xylenes) rather than total xylenes. It is inappropriate to derive the trigger level for total xylenes by totalling the trigger level for each of the isomers. - What is the basis of trigger values for ethylbenzene and F2-Naphthalene (not provided in Appendix E of the RTS).	Individual isomers (o-, p-, m-xylenes) and total xylenes are included in the Table in Section 3.2 already. This was in the version F provided to the Auditor. The basis of trigger values for ethylbenzene and F2-Naphthalene is provided in Appendix E of the RTS- please refer to page 620 of 777 (it is the top of the 2nd line in the table). Please refer to the link in the email for ease of reference. On the basis of the above information, JHSW requests that this is removed as a condition of the IAA based on the fact that we are already	CS	Addressed
16	e. Typographic error There are two entries in the legend specified as "++". Please review and update table.	Noted- the smaller ++ has been amended to # (applies for Arsenic and nitrate, nitrite)	08/06/2021	Noted		C	-
17	5. Please ensure any updates in this document are translated to SWMP and other relevant documents.	Noted and updated where relevant into SWMP	08/06/2021	No comment		C	-
21	6. Section 3.4: Please update as follows:		08/06/2021	-		-	-
22	a. Include a definition of SWTC.	Definition included- Scope of Works and Technical Criteria (SWTC)	08/06/2021	Included in Glossary, not within the text.		C	-
23	b. TfNSW G36 – Section 4.2.4 – A remediation action plan(s), is still to be provided to the Auditor.	This has since been removed as is covered by a separate plan. No RAP proposed for this scope.	08/06/2021	Although now removed from the CASACMP, a RAP is required to meet TfNSW G36 (Section 4.2.4).	TfNSW G36 does not require a RAP to be developed- it does allow for a RAP to be developed if required. It is not considered that a RAP is required for this Plan or scope of works nor is it a requirement of the CoA. Works will be undertaken in accordance with the existing Remediation Order. JHSW requests that this is removed as a condition of the IAA.	C	Noted
24	c. SWTC Vol 4A, D.1 s.9(b): - Please ensure agreement from Sydney Water and EPA is provided to the Auditor following submission.	Please refer to Section 3.5 regarding this approval and note that EPA approval under the Remediation Order will run separately to the Sub Plan approval under the Planning Approval. This has been agreed with Sydney Water who are happy for JHSW to coordinate the approval with EPA under the Remediation Order. A copy of the summary of consultation will also be provided to the Auditor as part of this response. We will also provide the Site Auditor with a copy of the Approval from EPA once received but note that this will be in due course.	08/06/2021	Noting Approval from Sydney Water has been obtained, Approval by NSW EPA to be provided prior to work commencement.	JHSW requests that this condition is amended for clarification to reflect that this EPA approval relates to the requirements of the Remediation Order (given the various references to EPA approval required by the conditions of the IAA)	CS	Addressed - Interim Advice letter updated to reflect this request
25	d. SWTC Vol. 4A, D.1, s.9(f): How are the items required by this condition considered during the design and confirmed?	These elements are primarily addressed as part of the design approval process with Sydney Water (BOA applications/submissions and approvals). This process is ongoing and the details provided in Appendix B are preliminary.	08/06/2021	Noted		C	-

Comment No.	Description	Document Owner Response	Response Date	Outstanding Comment	Outstanding Comment addressed by JHSW	Compliance Status	Auditor comment
26	e. SWTC Vol. 4A, D.1, s.9(g): Section 6 requires preparation of EWMS, which has not been provided as part of this Plan – please provide for review. It is noted that sediment management during cofferdam installation and removal and water removal will require specific measures.	Updated Plan includes example EWMS and happy to provide final EWMS ahead of the works commencing (but developed outside of this Plan). More details and specific measures are now included in the plan.	08/06/2021	EWMS to be provided and reviewed. Please see below on comments on Preliminary EWMS	JHSW notes that the EWMS can be provided to the Auditor for information. It is not considered that review of the EWMS falls within the scope of the Auditor for this Plan as the EWMS are a 'process' to be implied as the on site management tool which details the controls included in the Plan (notwithstanding JHSW has no concerns providing this to the Auditor for information). We understand the role of the Auditor is to confirm the appropriateness of the Plan. JHSW requests this condition is amended to refer to the EWMS being provided for information.	CS	Addressed - Interim Advice letter updated to remove this requirement
27	f. SWTC Vol. 4A, D.1, S.9(i): Please confirm where within the Sediment Plan the measures are documented for the removal of temporary material placed into Alexandra Canal (including the cofferdam). If not present please include	Removal of temporary works is detailed in Section 6.2 and also includes reference to removal of sediment alden materials at the completion of the works to a lawful facility.	08/06/2021	Only very brief statement is provided in Section 6.2. Methodology for removal should be provided in EWMS, which is to be provided. Waste & Resources Management Plan referred to in Section 6.2 is to be provided.	Refer to comment above re EWMS. Copy of Waste & Resources Management Plan provided 29/06/2021- JHSW requests this is removed as a condition of the IAA.	C	Addressed - Interim Advice letter updated to remove this requirement
28	g. UMM – SW3: Please provide the Drainage Design Reports and the SWMP for review.	The Soil and Water MP can be provided for information to the Site Auditor (we will provide a one drive link due to file size). It is confirmed that a session on the design was provided to the Auditor on Monday 7 June. Please advise if design reports are still required or if the briefing provided sufficient information.	08/06/2021	Please provide Soil and Water Management Plan and Design Reports.	Soil and Water Management Plan provided 29/06/2021- JHSW requests this is removed as a condition of the IAA. Design briefing provided to the Auditor 07 June 2021. Design reports to be issued via one drive link but JHSW requests that this is removed as a condition of the IAA noting that this is agreed to be provided to the Auditor (and again we would understand these are for information only).	C	Addressed - Interim Advice letter updated to remove this requirement
29	h. UMM – CS10: The Auditor has not been provided with SWMP or the ASSMP (see further comment for Section 6).	The Soil and Water MP can be provided for information to the Site Auditor (we will provide a one drive link due to file size). The ASSMP is an appendix to that Plan.	08/06/2021	Please provide Soil and Water Management Plan.	Soil and Water Management Plan provided 29/06/2021- JHSW requests this is removed as a condition of the IAA.	C	High level review has been conducted on ASSMP. While recognising that this plan is not part of the plan requiring endorsement, it is recommended that the following is added: - A requirement that verification after liming for onsite reuse is also conducted 1 month after liming (as well immediately after liming) as more acid can be released after few days of liming. The Auditor notes that the SWMP refers to two other plans regarding dewatering and discharge of potential acidic leachates: - Groundwater Management Sub Plan - Landfill Leachate, Odour and Gas Management Sub Plan The Auditor has not been provided nor reviewed these two sub-plans.
30	7. Section 4.3.1: Should the list also include TPH and ammonia?	This is the list consistent with the details from available information on the remediation order. TPHs and Ammonia were included in further sampling for the EIS as detailed in Sect 4.2.2 and are listed parameters in Section 3.2 as well.	08/06/2021	Noted		C	-
31	8. Section 4.3.2: Please include a copy of the results or refer to the report that is used. Will these results serve as the 'base line'?	This information is detailed in the EIS, technical working paper 5.	08/06/2021	Noted, reference to Technical Working Paper 5 has been provided. It is not clear if these results will serve as a baseline.		C	-
32	9. Section 5: Shouldn't the mitigation measures also address potential sediment resulting from erosion and runoff from the construction activities?	This is covered by the SWMP	08/06/2021	SWMP to be provided.	Soil and Water Management Plan provided 29/06/2021- JHSW requests this is removed as a condition of the IAA.	CS	Provided in Appendix A of SWMP. High level review conducted, noting SWMP does not require approval.
33	10. Section 5.1: Construction Activities:		08/06/2021	-		C	-
34	a. Please include reference to the DPI (2012) Guidelines for outlet structures on waterfront land" for installation of drainage outlets and DPI (2012) Guidelines for controlled activities on waterfront land – riparian corridors.	Included in Section 3.1.2	08/06/2021	Not addressed, noting that the Auditor's comment was to ensure that Section 5.1 meets the requirement of DPI (2012). 5.Construction activities should meet DPI (2012) Guidelines for outlet structures on waterfront land" for installation of drainage outlets and DPI (2012) Guidelines for controlled activities on waterfront land – riparian corridors.	JHSW notes the Auditor's comment here however these guidelines are referenced in Section 3.1.2 of the Plan. A statement has been included in Section 5 of the Plan which states: Works will also be carried out in accordance with the guidelines included in Section 3.1.2. JHSW requests that this is removed as a condition of the IAA on the basis that we have included this additional information in the Plan (Rev G).	C	Addressed

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35	b. Please include mention of requirement for management of water.	JHSW considers this is covered by Section 5.2 however please advise if there is something more specific you would like to see here.	08/06/2021	Section 5.2 only provides potential impacts but not mitigation measures to manage water impacts. EWMS to cover this requirement	Section 5.2 is only intended to provide potential impacts as mitigation measures are detailed in Section 6. This is the structure of the Plan. As noted above, JHSW notes that the EWMS can be provided to the Auditor for information. It is not considered that review of the EWMS falls within the scope of the Auditor for this Plan as the EWMS are a 'process' to be implied as the on site management tool which details the controls included in the Plan (not withstanding JHSW has no concerns providing this to the Auditor for information). We understand the role of the Auditor is to confirm the appropriateness of the Plan. JHSW requests this condition is amended to refer to the EWMS being provided for information	C	Noted, presence of EWMS included as a condition in the endorsement.
36	c. The Auditor notes that preferred imported DGB or other material shall comprise VENM or ENM. If other EPA approved material is imported, appropriate assessment must be conducted under the relevant EPA Order or Exemption. It is preferred that recycled aggregate is not used.	Noted. Reference to suitable materials to be used that are ENM/VENM in nature	08/06/2021	The wording in page 25 indicates that other material besides VENM/ENM can be imported if it forms DGB. The Auditor will provide a comment as a condition of the endorsement.	Reference to importation as per the approved Procedure has been included in Section 5.1 of the Plan.	CS	Addressed
37	11. Section 5.2: Potential Impact:		08/06/2021	-	-	-	-
38	a. Please confirm fate of pumped out water. If this water is returned to Alexandra canal, there will be additional impacts.	It is envisaged that the water pumped from within the coffer dam will be pumped out to the outside of the coffer dam but within the double silt curtain. This is detailed in Section 6.5. In addition, monitoring will be undertaken during this dewatering activity and in line with any EPA requirements.	08/06/2021	Details to be provided in EWMS	JHSW notes that the EWMS can be provided to the Auditor for information. It is not considered that review of the EWMS falls within the scope of the Auditor for this Plan as the EWMS are a 'process' to be implied as the on site management tool which details the controls included in the Plan (not withstanding JHSW has no concerns providing this to the Auditor for information). We understand the role of the Auditor is to confirm the appropriateness of the Plan. JHSW requests this condition is amended to refer to the EWMS being provided for information	CS	Noted, condition amended.
39	b. Can potential impacts to the sediment also result from runoff from the remainder of the project site?	Covered by SWMP	08/06/2021	SWMP to be provided.	Soil and Water Management Plan provided 29/06/2021- JHSW requests this is removed as a condition of the IAA.	C	Provided in Appendix A of SWMP. High level review conducted, noting SWMP does not require approval.
40	c. Please consider whether there is a potential risk from the release of chemicals during sediment suspension.	Any suspended sediment will be contained within the coffer dam area and inside the double silt curtain. Some localised mobilisation may occur however it is considered to be well contained.	08/06/2021	Dissolved chemicals may not be protected by silt curtain. Mitigation measures included in the EWMS should take this into consideration.	JHSW considers a practicable and reasonable position has been put forward to minimise disturbance to bed sediments as a result of the JHSW works. There are no additional controls that can reasonably be put in place. JHSW notes that the EWMS can be provided to the Auditor for information. It is not considered that review of the EWMS falls within the scope of the Auditor for this Plan as the EWMS are a 'process' to be implied as the on site management tool which details the controls included in the Plan (not withstanding JHSW has no concerns providing this to the Auditor for information). We understand the role of the Auditor is to confirm the appropriateness of the Plan. JHSW requests this condition is amended to refer to the EWMS being provided for information	CS	Noted, condition amended.
41	d. Typographic error - Last bullet point is missing.	Thank you- this has been amended.	08/06/2021	Addressed		C	-
42	12. Section 6: Construction Methodology and Environment control- it is noted that sufficient detail regarding the measures to protect impact from activities are not included in this section or the document noting the design drawings have not been included in the current version of this document. As such please provide comment on the following:	This section has been significantly updated (including the addition of Appendix D) to provide more details on construction methods and controls. Appendix B has also been provided in a preliminary form and consistent with information that has been provided to Sydney Water as well.	08/06/2021	Comments 70-73 added. Condition for EWMS	JHSW notes that the EWMS can be provided to the Auditor for information. It is not considered that review of the EWMS falls within the scope of the Auditor for this Plan as the EWMS are a 'process' to be implied as the on site management tool which details the controls included in the Plan (not withstanding JHSW has no concerns providing this to the Auditor for information). We understand the role of the Auditor is to confirm the appropriateness of the Plan. JHSW requests this condition is amended to refer to the EWMS being provided for information	C	Noted, condition amended.

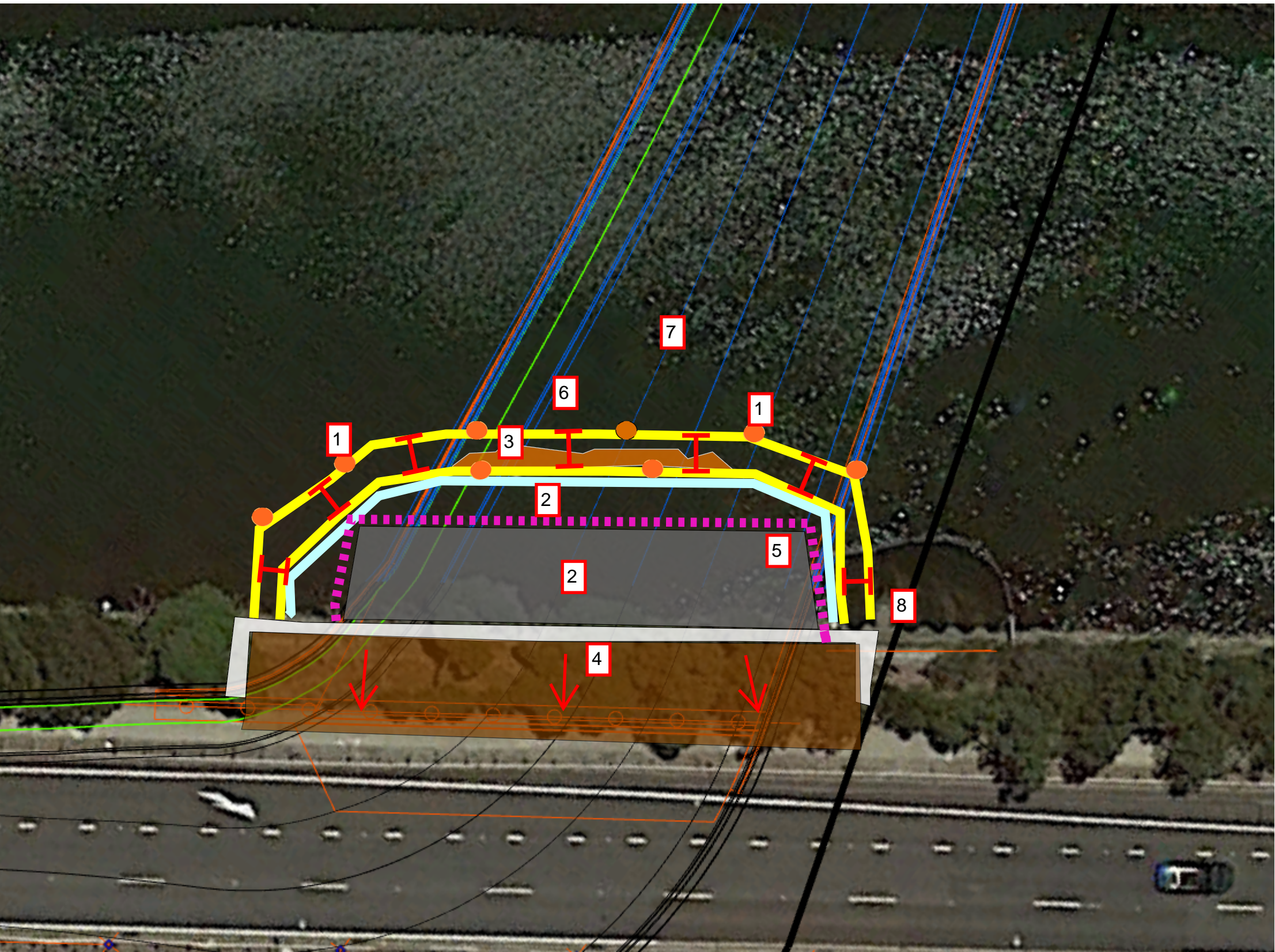
Comment No.	Description	Document Owner Response	Response Date	Outstanding Comment	Outstanding Comment addressed by JHSW	Compliance Status	Auditor comment
43	a. Please document the order of actions in a clear step wise fashion. For example, when will the silt curtain be constructed, will it have an impermeable sealing skirt, will the coffer dam sit on top of the sediments or be keyed into the sediments?	The preliminary EWMS and Environmental Control Plan are now provided in App D of this Plan and show step by step installation and controls.	08/06/2021	Comments 70-73 added. Condition for EWMS	JHSW notes that the EWMS can be provided to the Auditor for information. It is not considered that review of the EWMS falls within the scope of the Auditor for this Plan as the EWMS are a 'process' to be implied as the on site management tool which details the controls included in the Plan (notwithstanding JHSW has no concerns providing this to the Auditor for information). We understand the role of the Auditor is to confirm the appropriateness of the Plan. JHSW requests this condition is amended to refer to the EWMS being provided for information	C	Noted, condition amended.
44	b. What is proposed for the water removed from inside the coffer dam? How will it be stored and disposed?	It is envisaged that the water pumped from within the coffer dam will be pumped out to the outside of the coffer dam but within the double silt curtain. This is detailed in Section 6.5. In addition, monitoring will be undertaken during this dewatering activity and in line with any EPA requirements.	08/06/2021	Comments 70-73 added. Condition for EWMS	JHSW notes that the EWMS can be provided to the Auditor for information. It is not considered that review of the EWMS falls within the scope of the Auditor for this Plan as the EWMS are a 'process' to be implied as the on site management tool which details the controls included in the Plan (notwithstanding JHSW has no concerns providing this to the Auditor for information). We understand the role of the Auditor is to confirm the appropriateness of the Plan. JHSW requests this condition is amended to refer to the EWMS being provided for information	C	Noted, condition amended.
45	c. The Auditor notes that we have not been provided with Flora and Fauna Management Plan. Will removal of vegetation be required and will it cause impact to sediments? What measures are required to ensure disturbance of sediments are minimised?	The Auditor can be provided with the Flora Fauna Mgmt Plan is required. It is considered this query is covered by Section 6.4.	08/06/2021	Flora Fauna Management Plan is to be provided.	Flora Fauna Management Plan provided 29/06/2021- JHSW requests this is removed as a condition of the IAA.	C	High level review of Flora Fauna Management Plan was conducted. The following was sighted: - Procedure for vegetation removal (Appendix B) - Rehabilitation and landscaping (Section 6.6). - Requirement of soil and water management measures to be implemented in accordance with SWMP and Progressive Erosion and Sediment Control Plans (not sighted).
46	d. The Auditor has not been provided with the SWMP. As per the Sediment Management Plan, the SWMP shall also include:	A link will be provided as part of this response to provide the SWMP.	08/06/2021	SWMP to be provided.	Soil and Water Management Plan provided 29/06/2021- JHSW requests this is removed as a condition of the IAA.	C	High level review has been conducted on SWMP.
47	i. Acid sulfate soil management plan, including investigation plan prior to commencement of construction	the SWMP includes the ASS Mgmt Plan	08/06/2021	SWMP to be provided.	Soil and Water Management Plan provided 29/06/2021- JHSW requests this is removed as a condition of the IAA.	-	See response 29. No further comment here.
48	ii. Testing of water discharge throughout project including during cofferdam installation.	Water quality monitoring (of the Canal) and monitoring of discharge (from the WTP) are both detailed in the SWMP.	08/06/2021	SWMP to be provided.	Soil and Water Management Plan provided 29/06/2021- JHSW requests this is removed as a condition of the IAA.	CS	Please include following additional COPCs Major cations and anions VOCs phenols OPPs OPPs Tributyltin PCBs
49	iii. What criteria will water discharged into Alexandra Canal be required to meet. Will this discharge cause disturbance of sediments? What measures will be enacted to minimise disturbance of sediments?	At this stage, the final discharge criteria from the WTP into the Canal is being negotiated with the EPA. The current draft EPL provides for criteria that are more stringent than Appendix E of the Submissions Report and are aligned to the Commonwealth Ministers Conditions of Approval (MCoA 9e).	08/06/2021	SWMP and EPA approval on the discharge criteria are to be provided.	Soil and Water Management Plan provided 29/06/2021- JHSW requests this is removed as a condition of the IAA. In regards to EPA approval on the discharge criteria-Please refer to the Response to Comment 6 above. This response also applies here.	NC	Addressed
50	e. Section 6 focuses on installation of cofferdams. Will there be other management measures throughout the construction to prevent sediment disturbance or sediment runoff from the greater project site?	surface water and sediment management (erosion) for the main project works is covered in the SWMP.	08/06/2021	SWMP to be provided.	Soil and Water Management Plan provided 29/06/2021- JHSW requests this is removed as a condition of the IAA.	C	Provided in Appendix A of SWMP. High level review conducted, noting SWMP does not require approval.
51	13. Table 6-1: Management and Mitigation Measures		08/06/2021	-		-	
52	a. CAS1: Appendix B has not been provided. The mitigation measures provided in Section 6 (i.e., installation of cofferdams) are conceptual only and require additional detail.	This has now been updated and included. Please refer to Section 6 and Appendix B now with details.	08/06/2021	Addressed		C	-
53	b. CAS7: Should Evidence be included in the design drawings to account for tidal variability?	It is not considered that the design drawings are best suited for this detail. The construction method statement and EWMS need to manage this detail and ongoing planning with the environment manager ahead of the works. A task risk assessment is completed ahead of all activities commencing which would also consider the weather conditions- noting that working on/over/above water is a key WHS risk and management falls under a Global Mandatory Requirement for the JHSW works.	08/06/2021	To be provided in EWMS - see comment 70.	JHSW notes that the EWMS can be provided to the Auditor for information. It is not considered that review of the EWMS falls within the scope of the Auditor for this Plan as the EWMS are a 'process' to be implied as the on site management tool which details the controls included in the Plan (notwithstanding JHSW has no concerns providing this to the Auditor for information). We understand the role of the Auditor is to confirm the appropriateness of the Plan. JHSW requests this condition is amended to refer to the EWMS being	CS	Noted, condition amended.

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54	c. CAS8: Should the construction compliance report be part of the evidence?	JHSW is not clear on what the Auditor is asking here- do you mean the review of design by EPA and Sydney Water? This is a clear approval required to be in place prior to works commencing in accordance with the Remediation Order. Failing to get this approval would constitute a breach of the Order. This approval would be documented in the Construction Compliance Report (as in once it is received/date recorded etc)	08/06/2021	The Auditor is referring to compliance assessment report, or design and independent verifier records to provide evidence that this has been appropriately constructed.	Apologies- understood. Evidence relating to ER and JHSW inspection records and compliance records (including site diaries, photos etc) has not been included in Rev G of this Plan. As such, JHSW requests this is removed as a condition of the IAA on the basis that close out of this comment is achieved.	C	Addressed
55	d. CAS9: Should the construction compliance report and environmental inspection records be part of the evidence?	These controls will form part of the EWMS and the ER/TfNSW/EPA etc will conduct regular site surveillance to ensure controls are in place in accordance with approved documents.	08/06/2021	The Auditor is referring to compliance assessment report, or design and independent verifier records to provide evidence that this has been appropriately constructed. Should inspection records by ER/TfNSW/EPA also form as part of the evidence?	Apologies- understood. Evidence relating to ER and JHSW inspection records and compliance records (including site diaries, photos etc) has not been included in Rev G of this Plan. As such, JHSW requests this is removed as a condition of the IAA on the basis that close out of this comment is achieved.	C	Addressed
56	e. CAS10: Should acid sulfate soil assessment report be part of the evidence?	This measure has been removed on the basis that it is covered by the SWMP	08/06/2021	Noted, SWMP to be provided.	Soil and Water Management Plan provided 29/06/2021- JHSW requests this is removed as a condition of the IAA.	C	Addressed
57	f. CAS12: Should environmental inspection records be part of the evidence?	updated to include inspection records	08/06/2021	Addressed		C	-
58	g. CAS14: Please separate "Construction management plan" with "Environmental inspection records". Should EWMS be part of the evidence?	CAS 14 evidence has been amended to be more specific to AMS's and EWMS.	08/06/2021	If a Section A Site Audit Statement is Required Activity Method Statement should be provided for review and endorsement.	A Section A Site Audit Statement is not required by the CoA.	C	Noted
59	14. Table 7-1: Monitoring program during construction in Alexandra Canal		08/06/2021	The proposed change 'At an incident occurrence (Ebb Tide)' may have some typographical error. Is the sampling location meant to read 'Alexandra Canal - downstream of construction site'?	Thank you. The words have been amended to be 'In the event of an incident occurrence' and also amended sampling location to be downstream of construction site.	C	Addressed
60	a. Please include measurement at both high tide and low tide or justify one measurement only noting that high tide can have higher chance for impacting construction work.	As detailed in Sect 7.3, Environmental monitoring is proposed to be undertaken during the ebb tide only so as to provide a consistent measure of water quality within the Alexandra Canal, and provide a means to assess the effects of construction activities through a comparison of water quality upstream of the sediment disturbance zone with water quality downstream of the sediment disturbance zone. Happy to discuss further.	08/06/2021	Measurement should be conducted at high and low tide.	Ebb tide does not preclude high tide or low tide. The measurement is being taken when the water flow in the Canal is travelling towards Botany Bay/Cooks River which was considered to be more sensitive receivers than the upstream of the Canal.	C	Addressed
61	b. Please justify why only physio-chemical parameters are proposed to be measured during construction of permanent structures within coffer dams?	As these works are include the coffer dam which is inside the double silt curtain, it is expected that the physio chemical parameters would be sufficient. In the event sediment is observed between the 1st and 2nd layer of the silt curtain then works are reviewed and in the event sediment is outside of the double curtain then an incident is triggered. This is considered to be a reasonable hierarchy of monitoring. Happy to discuss further.	08/06/2021	Whilst a hierarchy of monitoring may be appropriate, the current discussion does not provide confidence that mitigation methods are appropriate to protect human health and the environment.	The risk of sediment disturbance is during coffer dam installation and removal. The permanent works construction is occurring inside the coffer dam which is also surrounded by a double silt curtain. These works are not expected to mobilise bed sediments. It is considered that weekly lab analysis is not warranted for this phase of works. We note that the surface water quality monitoring program within the SWMP occurs monthly and will capture areas upstream and downstream of the work zones in any case.	C	Addressed
62	c. Please justify why sampling and laboratory analysis is only proposed for upstream and SW8 (during coffer dams installation and removal and at incident occurrence)?	Table 7-1 has been updated to try and capture the constant upstream monitoring location (SW2) and constant downstream monitoring locations (SW6 and 8) as well as 'downstream' the relevant works areas. Given there will be a number of work areas along the canal, we need to ensure that measurement occurs near the works zone but is also comparable to the reference points (being SW2, SW6, SW8) to determine any potential impacts that may be attributable to JHSW works.	08/06/2021	Proposed change to downstream of construction site is considered acceptable. Please amend the proposed sampling and laboratory analysis to: - At the start and completion of installation/removal activities - During dewatering of coffer dam areas	JHSW notes that the commitment to sampling and lab analysis is already included 'at the start and completion of installation/removal activities'. Lab analysis was not proposed during dewatering as this will be a daily activity during the JHSW Works (ie despite the coffer dam installation there will be some water that needs to be removed). We note that this is subject to confirmation with the EPA as part of the Final EPL and this is recognised in the plan (new dot point added in Rev G).	C	Noted, noting that it is assumed that the dewatering will need to meet EPL for discharge.
63	d. This section only provides monitoring for surface water, please include sediment monitoring or justify the absence.	The purpose of this plan is to minimise bed sediment disturbance. The measures eg use of coffer dams, will minimise the sediment disturbance. It is not envisaged that sediment monitoring outside of the silt curtain will be an effective measure of impact from the works. The controls such as monitoring outside the double curtain, regular reviews of the silt curtain etc are considered to be the right controls to manage potential sediment disturbance.	08/06/2021	Addressed		C	-

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64	15. Section 7.3: Monitoring and Inspection		08/06/2021	-		-	
65	a. Table 3-1 does not provide criteria for a number of analytes listed in Section 7.3. Please provide criteria for those missing analytes.	Table 3-2 (was Table 3-1) and Section 7.3 are now consistent.	08/06/2021	Some of the analytes (TDS, major cations and anions, VOCs, phenols, OCPs, OPPs and tributyltin) have been removed. The Auditor considers that this needs justification, noting that OCPs are part of the remediation order and other COPCs are considered relevant to the site, and can potentially be mobilised during construction.	JHSW has included a new reference under Table 7-1 which includes the analytes proposed to be monitored as part of the laboratory analysis on surface water quality monitoring-the analytes are consistent with those detailed in Section 3 as being Contaminants of Concern in the Response to Submissions Report. The other analytes indicated by the Auditor were not of concern in surface water. On the basis of above and the update within Rev G of this Plan, JHSW requests the Auditor to reconsider this as a condition of the IAA.	CS	Please include following additional COPCs Major cations and anions VOCs phenols OPPs OPPs Tributyltin PCBs
66	b. While Section 4.3 states that PCBs and pH comprise COPCs relevant to sediments, these have not been included in the list of laboratory analysis in Section 7.3. Please justify or include.	Linking to response to comment 63 above, the PCBs were found in the sediment in the canal but not the water. It is not considered necessary to include PCBs on the basis that we are proposing routine water quality monitoring.	08/06/2021	The Auditor does not agree given PCBs are considered to be part of remediation order, and can potentially be mobilised during construction.	JHSW notes that PCBs are listed as COC in terms of bed sediments however are not flagged wrt surface water quality. There is no background data or discharge triggers established as part of the Response to Submissions Report. On this basis we do not propose to include. JHSW requests the Auditor to reconsider this as a condition of the IAA.	CS	As discussed an indicator of sediment disturbance are concentrations of contaminants in sediments in water. PCBs are requested to be included.
67	c. As asbestos was considered to be COPC, how will the release of asbestos in sediment as a result of sediment disturbance be assessed?	Linking to response to comment 63 above, the asbestos was found in the sediment in the canal but not the water. It is not considered necessary to include PCBs on the basis that we are proposing routine water quality monitoring.	08/06/2021	Asbestos sampling is not required		C	-
68	16. Section 7 should provide provided proposed strategies should the monitoring outcomes exceed criteria.	Section 7.3 (towards the end) has been amended to provide more details here.	08/06/2021	The strategy is dependent to decision made by Environment Manager and Project Manager. The Auditor requests that exceedance to criteria and any decision made to be provided to the Auditor for review.	Section 7.3 of the Plan has been updated to include the following: <i>In the event that an incident is confirmed to have occurred, appropriate notification will be undertaken to TfNSW, ER, and EPA.</i> It is not considered that this monitoring be provided to the Auditor for review as there is no validation required for this monitoring by the Auditor.	C	Addressed
69	17. Section 8.2: Should the updated plan also be approved by Sydney Water and NSW EPA?	The CSSI approval requires a clear approval from the EPA Site Auditor. In the event there were material changes to the Plan (for example change in methods or level of impacts from works) then this would be provided to Sydney Water and the EPA in accordance with the Remediation Order- however this is not envisaged (note- the bridge and drainage works also required design approval from Sydney Water under the BOA process).	08/06/2021	Addressed		C	-
70	Appendix D EWMS: This document is preliminary and does not provide detail of mitigation measures. The Auditor will require details to be provided. Specifically:				Refer below:	-	Addressed
71	- Detailed methodology for installation, dewatering, implementation and removal of the temporary structures (drainage outlet works, coffer dam, rock work platform, etc.) to be placed on Alexandra Canal. The Auditor anticipates that the details in the EWMS will include mitigation measures for each of the hazards anticipated during the work. - Mitigation measures for management of sediment and water. - Mitigation measure to consider potential release of dissolved chemicals during sediment suspension. - Requirement for importation of material. the preferred imported DGB or other material shall comprise VENM or ENM. If other EPA approved material is imported, appropriate assessment must be conducted under the relevant EPA Order or Exemption. It is preferred that recycled aggregate is not used. - Requirement for assessment of reuse material (e.g. the sandstone blocks proposed to be reused elsewhere in canal). - Consideration of tidal variability.				JHSW notes that the EWMS can be provided to the Auditor for information. It is not considered that review of the EWMS falls within the scope of the Auditor for this Plan as the EWMS are a 'process' to be implied as the on site management tool which details the controls included in the Plan (notwithstanding JHSW has no concerns providing this to the Auditor for information). We understand the role of the Auditor is to confirm the appropriateness of the Plan. JHSW requests this condition is amended to refer to the EWMS being provided for information	CS	Noted, condition amended.

Comment No.	Description	Document Owner Response	Response Date	Outstanding Comment	Outstanding Comment addressed by JHSW	Compliance Status	Auditor comment
72	Please provide justification that the proposed use of panolin oils during removal of the coffer dam will not result in contamination.				Batemans Bay and it is considered biodegradable and suitable for these types of marine applications. Panolin Oil is to be used in the vibrating hammer working over the Canal. If a spill occurs within the marine environment, the oil is biodegradable and there is less impact to marine ecosystems. The shorter chain hydrocarbons allow the Panolin oil to be digested or consumed by naturally occurring microorganisms present in water, air and soil systems, and be converted to inorganic substances, such as water, carbon dioxide,	CS	Noted, condition amended.
73	Is approval required for removal of mangroves and casuarinas from the bank? If so, please provide.				There is no removal of mangroves and casuarinas from the bank associated with JHSW works.	C	JHSWJV confirmed via email (1/7/2021) that there will be removal of mangroves and casuarinas and this is managed via the EIS and no further approval is required.
74	Table 6-1 Why has CAS13 been removed? Suggest to reinstate CAS13 and adjust the numbering after removal of CAS10.				CAS13 relating to monitoring has been reinstated as requested. Numbering has also been adjusted.	C	Addressed, although numbering for CAS10 is still missing. This is not considered to affect the plan.

Appendix D Preliminary EWMS and Environmental Control Plan



IMPORTANT NOTE:
Refer EWMS & AMS for related activities, including high tide time work restrictions and permanent design drawings

ENVIRONMENTAL CONTROL PLAN: DESCRIPTION

1 - Install anchors or small piles to tie and stabilise the two silt curtains. The curtains need to have braces (ie conduit pipes) to maintain a 2m separation distance. Install a hydro-carbon boom on the internal side of the silt curtain

2 - This is the zone of containment . The install & removal of the sheet piles and install of the scour rock will cause sedimentation in the waterway. This is approved zone of sediment disturbance.

3 - This is the zone of **STOP WORKS**. If sedimentation occurs within the 2m curtain separation zone. Works will be stopped and investigations undertaken. Works will recommence when environmental & engineering sign off. Sedimentation outside of the second curtain will be classed as an incident.

4 - The land side work area will need to be reshaped to allow access into the coffer dam. If required re-profile the edge of plat-form to create fall back away from the river. Ensure it has a raised geo-textile wrapped edge with bund.

5 - Excavation in this zone will create a batter slope into the coffer dam. The sides and front sheets will remain in place.

6 - The silt curtains will require maintenance from a small boat on a daily basis to ensure that they are effective and in place for the works.

7 - Conduct water quality monitoring during install and removal of the coffer dam

8- Ensure existing Drains and outlets do not flow into the floating silt curtains or zone of disturbance.

DRAWING FILE LOCATION / NAME				DESIGN LOT CODE DR-1450	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING				PLOT DATE / TIME		PLOT BY	CLIENT	CITY OF SYDNEY - INNER WEST & BAYSIDE COUNCILS NEW AIRPORT DRIVE AND QANTAS DRIVE			A3
EXTERNAL REFERENCE FILES				REV	DATE	AMENDMENT / REVISION DESCRIPTION			WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING		DRAWINGS / DESIGN PREPARED BY			
											0 10 20 30 40		CONTRACTORS			
											SCALE 1:1000m		SYDNEY GATEWAY			
											CO-ORDINATE SYSTEM MGA ZONE 56 (GDA94)		HEIGHT DATUM AHD			
													A Joint Venture Project JOHN HOLLAND SEYMOUR WHYTE			
													TITLE			
													DRAWN			DATE
													DRG CHECK			02.02.2021
													DESIGN			
													DESIGN CHECK			
													DESIGN MNGR			
													PROJECT MNGR			
													PREPARED FOR GREATER SYDNEY DIVISION MOTORWAYS INFRASTRUCTURE AND PLACE			
													RMS REGISTRATION No.			PART
													ISSUE STATUS DEVELOPED CONCEPT DESIGN			ISSUE
													EDMS No.			
													SHEET No.			

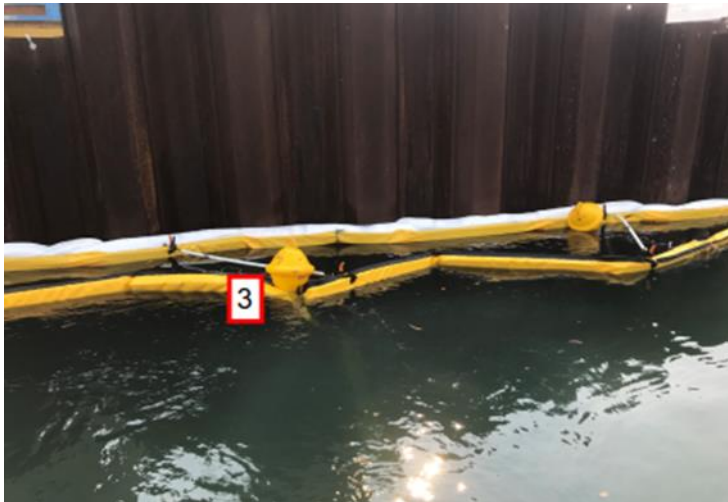
Appendix: Environmental Work Method – Cofferdam & Scour Rock (Example)



1) Manufacture the silt curtain separators from Erwin Clamps and strong aluminium conduit or similar. Test the curtain separator system before deployment of the floating silt curtains.



2) The floating silt curtains require buoys, chains and anchors. Ensure that the install of the anchors is conducted with a crane or a boat with a Hiab. Place the anchors gently on the river / canal bed to limit sediment disturbance.



3) Prior to the install of the Cofferd Dam. Install the double floating silt curtains, tie them off to the buoys and install separators. Install Hydro carbon boom on the inside of the curtains.



4) Installation and removal of the Cofferd Dam will create sedimentation. This sedimentation occurs in the approved 'zone of disturbance'. If sedimentation occurs between the silt curtains gaps the works is stopped to allow settlement.



5) This photo demonstrates the disturb sediments settle back in the approved 'zone of disturbance'. This method ensures sediment does not migrate into the wider river / canal water column or surrounding ecosystems.



6) Once the Cofferd Dams are installed and whaler beams fixed. Geotextile can be laid out inside the coffer dam to allow placement of the working platform.



7) Install the working rock platform to project specifications.



8) On completion of the structures work, remove rock platform. Install the permanent scour rock and permeant bank stabilisation.



9) During installation and removal of the Cofferd Dam conduct daily water quality monitoring.



10) Keep maintaining the silt curtains during the works to ensure the curtains are secure and have the separation. Remove the coffer dams with vibrating hammer with Panolin oils only.



11) Keep silt curtains in place while detailing the permeant rock scour. Ensure the upper bank has a 300mm high geo wrapped edge bund installed for erosion and sediment control.



12) Remove the silt curtains from the river / canal. Remove the hydrocarbon boom and remove the buoys and anchors.