



PORT KEMBLA GAS TERMINAL Construction Water Quality Management Plan

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REFERENCE DOCUMENTS

Reference	Document Title
EIS	Port Kembla Gas Terminal – Environmental Impact Statement – GHD November 2018
Infrastructure Approvals	Section 5.19 of the Environmental Planning & Assessment Act 1979. Application Number SSI 9471

ACRONYMS AND DEFINITIONS

Acronym / Definition	Description
AIE	Australian Industrial Energy
AMB	Automated Monitoring Buoys
ASS	Acid Sulphate Soils
ASSMAC	Acid Sulphate Soils Management Advisory Committee
APGA	Australian Pipelines and Gas Association
BHD	Backhoe Dredger
CEMP	Construction Environmental Management Plan
CFFMP	Construction Flora and Fauna Management Plan
COC	Contaminants of Concern
CoEP	Code of Environmental Practice
CPESC	Certified Professional in Erosion and Sediment Control
DPE	Department of Planning and Environment
EPA	Environmental Protection Authority
EPL	Environmental Protection License
ESCP	Erosion and Sediment Control Plan
DPM	Dredging Project Manager
NGP	Natural Gas Pipeline
NSW	New South Wales
NTU	Nephelometric Turbidity Unit
OHDSKA	Outer Harbour Dredging and Spoil Containment Areas
PASS	Potential Acid Sulphate Soils
PKGT	Port Kembla Gas Terminal
PKHD	Port Kembla Height Datum
SHB	Split Hopper Barges

Acronym / Definition	Description
TBA	To be advised
TSS	Total Suspended Solids
CWQMP	Construction Water Quality Management Plan

1 Introduction

1.1 BACKGROUND

Australian Industrial Energy (AIE) is developing the Port Kembla Gas Terminal (the Project) which involves the development of a liquefied natural gas (LNG) import terminal at Port Kembla, south of Wollongong. The Project will be the first of its kind in NSW and provide a simple and flexible solution to the state’s gas supply challenges.

NSW currently imports 95% of the natural gas it uses from other eastern states. In recent years, gas supplies to the Australian east coast market have tightened, resulting in increased natural gas prices for both industrial and domestic users.

The Project provides an immediate solution to address the predicted shortages and will result in significant economic benefits for both the Illawarra region and NSW. The project will have a capacity to deliver 100 petajoules of natural gas, equivalent of more than 70% of NSW gas needs and provide between 10 to 12 days of natural gas storage in case of interstate supply interruption. LNG will be sourced from worldwide suppliers and transported by LNG carriers to the gas terminal at Port Kembla where it will be re-gasified for input into the NSW gas transmission network.

The Project has been declared Critical State Significant Infrastructure (CSSI) in accordance with section 5.13 of the Environmental Planning and Assessment Act 1979 (EP&A Act) and Schedule 5 of the State Environmental Planning Policy (SEPP) State and Regional Development (SRD). The project received Infrastructure Approval from the Minister for Planning and Public Spaces on the 29th of April 2019. The project also received approval for a modification to that consent (SSI 9471 Mod 1) on the 20th of April 2020. There were no changes to the construction requirements of the project proposed in the modification and so it is not addressed in this Construction Water Quality Monitoring Plan.

The Project comprises four key components:

- LNG carrier vessels;
- Floating storage and re-gasification unit;
- Wharf facilities; and
- Natural gas pipeline.

As required by Schedule 4, Condition 12 of the Development Consent for the Project, AIE will make copies of the following information publicly available on its website:

- the PKGT EIS;
- current statutory approvals for the development;

- approved strategies, plans or programs required under the conditions of this approval;
- a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs;
- a summary of complaints, which is to be updated monthly;
- any independent environmental audit, and the Proponent's response to the recommendations in any audit;
- any other matter required by the Planning Secretary

AIE commits to keeping this information up to date for the life of the Project.

1.2 PURPOSE OF THIS CWQMP

This Construction Water Quality Management Plan has been developed as an Appendix to the overarching Construction Environment Management Plan (CEMP). This CWQMP addresses the requirements of the Project Approval, and fulfils the commitments made in the EIS.

This CWQMP has been prepared to apply to all construction activities associated with the Project to be carried out by the SCSB JV. Of the Project components listed in 1.1, these activities include the construction of wharf facilities and a natural gas pipeline. This plan does not cover water quality management associated with the FSRU or LNG carrier components of the Project. These concern the operational phase of the Project, and will be addressed in operational plans to be developed.

Throughout construction, unless permitted under an environmental protection licence (EPL), SCSB remains committed to compliance with Section 120 of POEO Act which makes it an offence to pollute any waters. This commitment aligns with the requirements of Schedule 3, Item 1 of the Project's Infrastructure Approval.

This CWQMP provides an assessment of SCSB JV's potential to comply with this condition during the construction of the Project and contains site-specific management measures to successfully mitigate impacts identified in the EIS.

From time to time, this CWQMP may require revision after its initial approval. Events which might trigger a review of the adequacy of the Plan may include (not exhaustive):-

- The occurrence of a reportable incident (See Section 6.7)
- The Project seeks a modification to its existing development consent which results in a change to construction-related water conditions
- A request from the planning Secretary

In line with Schedule 4, Condition 4, within 3 months of any of these events occurring this CWQMP must be reviewed for adequacy, and if necessary revised. Within 4 weeks of any revision to the Plan occurring, or indeed any other related document, the Plan or plans will be submitted to the Planning Secretary for approval, unless otherwise agreed with the Planning Secretary. Any measures identified in the revised Plan to improve the environmental performance of the Project will be implemented as soon as practicable following the Secretary's approval.

2 Project Overview

2.1 SITE DESCRIPTION

The site of the project is situated at Port Kembla within the Illawarra region of NSW, about 80 kilometres south of Sydney. Port Kembla is mainly characterised by the existing import and export terminal and multiple other business, cargo, logistics, bulk goods and heavy industrial facilities in the vicinity.

Port Kembla is situated about two kilometres south of the centre of Wollongong. Other localities surrounding Port Kembla and the project site include Mangerton, Mount St. Thomas and Figtree to the north-west; Unanderra to the west; Berkeley to the south-west; and Cringila, Lake Heights, Warrawong and the residential region of Port Kembla to the south.

The zoned land use in the region include special use and industrial use at Port Kembla and a mix of primarily residential and commercial uses at the surrounding localities. Major infrastructure in the region of Port Kembla includes the Princes Highway, which is a major state and regional highway connecting Sydney and Wollongong and regional areas further south. Princes Highway provides access to Port Kembla through turnoffs at Masters Road, Five Islands Road and Northcliffe Drive and is broadly utilised including by heavy vehicles from the port.

The South Coast railway line runs along the periphery of Port Kembla including the stations Port Kembla, Port Kembla North, Cringila and Lysaghts. The rail line services commuters and is also used to transport bulk solid goods like coal, grain, copper and steel from Port Kembla. The environmental features of Port Kembla and the surrounding region are limited given the extensive industrial, commercial and residential development. Waterways in the region include the Gurungaty Waterway, Allans Creek, American Creek and Byarong Creek. Green space includes JJ Kelly Park and Wollongong Golf Club to the north and a larger open area to the south west.

The project will be predominantly located within land zoned for dedicated port and industrial uses as shown on Figure 1. Berth and wharf facilities and the FSRU would be situated at Berth 101 at the Inner Harbour while the gas pipeline would extend around the periphery of port operations from Berth 101 to a tie-in point at Cringila. A small section of the pipeline will traverse beneath Bluescope sporting fields in Cringila, which are zoned RE2 Private Recreation under the Wollongong Local Environmental Plan 2009.

2.2 EXISTING MARINE ENVIRONMENT

Port Kembla is a disturbed environment, marine sediments within both the Inner and Outer Harbour are known to be contaminated as a result of the historical industrial land use in surrounding areas (Berth 101 having a lower degree of contamination).

Several investigations have previously been undertaken to assess the contamination of the marine sediments in Port Kembla Harbour, including:

- Port Kembla Outer Harbour Development Environmental Assessment (AECOM 2010)
- Berth 101 Upgrade Project Marine Assessment Dredge Spoil Contamination Assessment - Stage 2 Detailed Site Investigation. (Worley Parsons 2012)
- Pilot sediment investigation for potential maintenance dredge areas (Geochemical Assessments 2013)

Based on the background information review, the following points are noted:

- Commonly two main sedimentary units were identified with a soft silty clay layer overlying a stiffer clay layer.
- The upper soft silty clays were contaminated throughout all sampling areas.
- Heavy metals commonly exceeded the screening levels for cadmium, chromium, copper, lead, nickel, mercury and zinc.
- Tributyltin (TBT), dioxins and polycyclic aromatic hydrocarbons (PAHs) were reported above the nominated guidelines in several studies
- A number of dredge campaigns have been completed since 1994 which have resulted in the deposition of sediments within the Outer Harbour reclamation area, including approximately 45000 m³ of uncrushed blast furnace rock slag which was deposited as part of the 2006 major Inner Harbour dredging and deposition campaign

The marine sediment within the Berth 101 footprint, and OHДСA footprint include spoil units Harbour Muds (HM) and Harbour Silts (HS). Both HS and HM layers correspond to the contaminated sedimentary units described in the previous investigations.



<p>Paper Size ISO A4 0 50 100 Metres</p> <p>Map Projection: Transverse Mercator Horizontal Datum: GDA 1994 Grid: GDA 1994 MGA Zone 58</p>		<p>Australian Industrial Energy Port Kembla Gas Terminal</p> <p>Project layout</p>	<p>Project No. 21-27477 Revision No. A Date 05 Nov 2018</p> <p>Figure E-1</p>
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Figure 1: Site Overview

2.3 CONSTRUCTION SCOPE OF WORK (SOW)

The construction scope of works has been divided into the three main packages:

2.3.1 Marine Berth Construction, dredging and disposal (MBD)

The MBD consists of:

- Early Enabling Works - includes relocation of existing services as necessary, demolition and disposal of the Berth 101 wharf and removal of all in ground services/infrastructure from within the footprint of the new facility
- Quay Wall Construction - Construction of a bulkhead wall including all onshore mooring requirements and facilities
- Excavation/Dredging – Excavation, dredging and disposal of bank spoil including rock of varying strength.
- Construction of Storm Water diversion in the Outer Harbour.
- Complete installation of mooring system including monitoring system (where applicable) and associated civil works.
- Complete installation of fenders and associated civil works.
- Complete installation of navigation aids with complete E&I (where applicable)
- Construction of a perimeter bund and containment of dredged spoil and sediment.
- Reclamation of the Outer Harbour within the perimeter bund.

The dredging works include some rock excavation. Rock that could be encountered is expected to have an unconfined compressive strength (UCS) of less than 10 MPa and is described as highly to moderately weathered rock [rock quality designation (RQD) of less than 30%]. Its expected volume is less than 1500m³. The relatively low RQD value corresponds with the verbal description of the weathered nature of the rock. It also indicates that the rock is not solid/virgin and has a considerable amount of cracks, which will assist in its dredgeability. Based on the information provided, the dredge depth to be achieved, and the proposed use of the backacter BA900 (which has a penetration force of 100 tonnes), there is no requirement for pre-treatment (blasting or drilling).

2.3.2 Onshore Receiving Facilities (ORF)

The ORF is an unmanned facility with all control signals back to the Central Control Room (CCR) on the FSRU. The ORF comprises of three (3) areas:

- Wharf Topside Area,
- Utility Area and
- Common Area.

2.3.3 Pipeline Installation including tie-ins (NGP)

The NGP scope covers the works as described below:

- DN450mm onshore natural gas pipeline of 6km in length from ORF to Tie-in Facility at Cringila (alternative location at Kembla Grange (Jemena). This shall include all related civil works (excavation, crossings, backfilling etc.), HDD crossings (where applicable), cathodic protection for buried pipeline and any related activities. The pipeline route is shown in Figure 1. The Contractor shall conduct a route survey and confirm with the relevant authorities on the pipeline ROW.
- Instrument cables designed to piggyback alongside the onshore pipeline.

2.4 OVERALL PROGRAM

An indicative PKGT Project Program including Water Quality Monitoring periods is outlined below in Table 1. Construction commencement date is yet to be finalised, however over-water works are scheduled to commence in the quarter following mobilisation.

Table 1 Project Program

	Q1	Q2	Q3	Q4	Q5
Site Mobilisation EPL granted					
Berth Demolition and Service relocation		On water			
MBD D-Wall Construction					
Land Dredging		On water			
Marine Dredging and Cell Construction			On water		
Storm Water Diversion		On water			
Pipeline Installation					
ORF					
Pre-Commissioning and Commissioning					

Over water works include demolition of the former berth, dredging and cell construction. This CWQMP will be implemented during baseline monitoring commencing six weeks before works on water.

3 Planning and Legislative Requirements

3.1 STANDARDS AND CODES OF PRACTICE

The following standards and codes of practice are relevant the PKGT Project;

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018)
- Department of Environment and Conservation (DEC): Bunding & Spill Management.
- Managing Urban Stormwater: Soils and Construction. Landcom, (4th Edition) March 2004 (reprinted 2006) (the “Blue Book”). Volume 1 and Volume 2. - Volume 2A
- National Code of Practice for the Storage and Handling of Workplace Dangerous Goods [NOHSC: 2017 (2001)] AS 2885.0-2018 Gas and Liquid Petroleum: General Requirements;

Table 2 Relevant state and federal legislation

Legislation referenced in the preparation of this CWQMP			
Legislation	Project Relevance	Relevance to this CWQMP	Reference
Federal			
EPBC Act 1999	<p>The EPBC Act implements Australia’s obligations to protect and conserve biodiversity and heritage under a range of international treaties and agreements. In relation to projects, the Act requires assessment and approval of actions that may have a significant impact on a range of Matters of National Environmental Significance (MNES), including (as relevant to the Project) threatened species and ecological communities, migratory species, World Heritage areas and national heritage places.</p> <p>The project is not considered to have potential to have a significant impact upon any listed matters of national environmental significance including listed threatened species and communities.</p>	<p>No threatened ecological communities were identified within the project area.</p> <p>Ten listed bird species were identified as having the potential to fly over site either during migration or forage in the surrounding area.</p> <p>A total of 69 threatened marine species were considered likely to occur in or relate to the project area, of these the following species or groups were identified as likely to occur in the port; Southern right whale, Humpback whale, Long-nosed fur seal, Australian fur seal, Indian ocean bottlenose dolphin, Bottlenose dolphin and 21 species of a family of slow moving fish species known as Syngnathids including; Pipefish, Seahorses, Seadragons etc.</p> <p>A Flora and Fauna Management Plan has been prepared for the Project and includes daily checklists and procedures to observe and prevent impacts.</p>	Flora and Fauna Management Plan

<p>Environment Protection (Sea Dumping) Act 1981</p>	<p>The loading and dumping of waste at sea is regulated under the Environment Protection (Sea Dumping) Act 1981 (the Sea Dumping Act). Permits are required for all sea dumping operations with Commonwealth waters. The Project includes placement of up to 720,000 cubic metres of excavated and dredged material within the Outer Harbour of Port Kembla. The Outer harbour has sufficient capacity to receive all dredged material generated by the project</p>	<p>Port Kembla Inner and Outer Harbours comprise 'Internal Waters'. Therefore, the provisions of the Environment Protection (Sea Dumping) Act, 1981 do not apply to the proposed dredging works.</p>	
<p>State Legislation</p>			
<p>The Ports and Maritime Administration Act 1995</p>	<p>The Ports and Maritime Administration Act 1995 (Ports and Maritime Act) regulates the operation of ports in NSW across a range of matters including commercial operation and port charges that apply, management of port infrastructure, port safety and the functions of port corporations as well as NSW Roads and Maritime Services in relation to port operations.</p>	<p>Vessels operated as part of the project would be subject to the provisions of the Marine Safety Act including requirements to obtain marine safety licenses. Pilotage would also be compulsory under Part 7 of the Marine Safety Act as Port Kembla is defined as a pilotage port. Further details on safe navigation within Port Kembla are provided in the Port Navigation Plan prepared for the Project.</p>	<p>Port Navigation Plan.</p>
<p>Protection of the Environment Operations Act 1997</p>	<p>The POEO Act aims to; Protect, restore and enhance the quality of the environment in New South Wales, having regard to the need to maintain ecologically sustainable development. To reduce risks to human health and prevent the degradation of the environment The reduction to harmless levels of the discharge of substances likely to cause harm to the environment</p>	<p>Water quality management measures will be implemented with reference to this plan throughout the construction of the project to mitigate the impact of construction activities and maintain the water quality as outlined in Section 120 of the POEO Act which states;</p> <ul style="list-style-type: none"> • It is an offence to pollute any waters 	<p>Section 5 of this CWQMP</p>

<p>Fisheries Management Act, 1994</p>	<p>The objectives of the Fisheries Management Act 1994 (FM Act) are to conserve, develop and share the fishery resources of NSW for the benefit of present and future generations.</p>	<p>The potential impacts associated with dredging and disposal of sediments upon fisheries and marine vegetation has been investigated as part of the Port Kembla Gas Terminal EIS and specifically Appendix G of the EIS. There are not anticipated to be any significant detrimental impacts to fisheries resources as a result of the project.</p>	<p>Appendix G of PKGT EIS</p>
<p>Water Management Act 2000</p>	<p>The objects of the Water Management Act 2000 are to provide for the sustainable and integrated management of the water sources of the state for the benefit of both present and future generations.</p> <p>The regulator and policy maker for water resource management is the NSW Department of Industry – Water</p>	<p>Construction of the Project will involve excavation within 40 metres of the shoreline and has the potential to intercept water within an aquifer during excavation or directional drilling. However, the Project is not anticipated to require major dewatering of water from a water source and is not expected to trigger the need for a water use approval, water management works approval or controlled activity approval under sections 89, 90 or 91 of the WM Act as these approvals are not required for SSI in accordance with Section 5.23 of the EP&A Act</p>	
<p>Biodiversity Conservation Act 2016</p>	<p>The Biodiversity Conservation Act 2016 (BC Act) aims to conserve biodiversity at a bioregional and state scale and lists a number of threatened species, populations and ecological communities to be considered in deciding whether there is likely to be a significant impact on threatened biota, or their habitats.</p>	<p>The Project would be unlikely to have a significant impact on any threatened species, populations or ecological communities listed under the BC Act.</p>	<p>A biodiversity assessment report has been prepared in accordance with Section 7.9 of the BC Act as part of the Port Kembla Gas Terminal EIS</p>

3.2 RESPONSIBILITIES

The SCSB JV Port Kembla Gas Terminal Project Org Chart is provided for reference in the CEMP.

Environmental management is a responsibility of the project team, and the Project Manager shall report to the client on environmental issues as they occur and on a weekly and monthly basis.

Amongst other obligations, SCSB JV shall be responsible for:

- Development of Systems, Procedures and Reporting mechanisms which will ensure, and demonstrate in a tangible way, compliance with the approved CWQMP;

- Development and implementation of appropriate training to all staff and contractors on the requirements of the approved CWQMP. This shall range from detailed training for supervisors, through to inclusion of environmental matters in project induction for other workers;
- Providing a suitably qualified and experienced Environmental Manager.
- Participating in audits and reviews and undertaking corrective actions and system improvements as required.

SCSB JV will take an active role in ensuring that all aspects of the approved CWQMP are implemented and managed. All project roles will be filled with suitably qualified and experienced personnel, and are outlined below in Table 3.

Table 3: Project Roles and Responsibilities

Project Role	Responsibility
Project Manager	<ul style="list-style-type: none"> • Demonstrate proactive support for environmental requirements, including ensuring sufficient resourcing for the Environmental Team, Engineering and Construction Teams; • On-site project management and control; • Decision-making authority relating to environmental performance of the construction program; • Authority over project construction and site activities in accordance with the CEMP including this CWQMP; • Ensure relevant training is provided to all project staff prior to commencing individual activities; • Reports to NSW EPA, Ports NSW and AIE Representative on environmental matters; • Ensures appropriate contractor resources are allocated to implement the environmental requirements; • Orders STOP WORK for relevant environmental breaches and reports incidents to NSW EPA, Ports and AIE Project Manager; • Monitors performance against environmental Key Performance Indicators (KPI's).
Deputy Project Manager/ Construction Manager(s)	<ul style="list-style-type: none"> • Responsible for planning and scheduling of construction, and to ensure operations are conducted in accordance with statutory requirements and the CWQMP; • Ensures that all environmental objectives associated with the Project are achieved; • Day-to-day decision-making authority relating to environmental performance of construction activities and direct site activities and construction in accordance with the CWQMP; • To provide resources to ensure environmental compliance and continuous improvement; • Ensure all personnel are aware of any changes to CWQMP and improved procedures. • Orders STOP WORK for relevant environmental breaches and reports incidents to SCSB JV Project Manager
Dredging Project Manager	<ul style="list-style-type: none"> • Implement requirements contained in the CWQMP, work procedures and standard drawings; • Maintaining open and transparent communication with each other, project discipline Managers and other areas of the project (such as Workshop and Yard Manager etc.);

Project Role	Responsibility
	<ul style="list-style-type: none"> • Reporting of hazards and incidents and implementing any rectification measures; • Ensures appropriate contractor resources are allocated; • Orders STOP WORK for relevant environmental breaches and reports incidents to SCSB JV Project Manager; • Report any potential Incident, near miss or environmental issue rising from the dredging; • Maintain Marine environmental controls in working order • Assist in response to an elevated monitoring result. Investigation, reporting and or mitigation. • Fulltime observation for turbidity plumes, oil and grease at the silt curtain (to be added in daily reports). • Pre-starts including checking of machinery prior start of the shift.
Environment Manager	<ul style="list-style-type: none"> • Delivery of environmental induction program and environmentally focussed toolbox talks • Provides environmental advice, assistance and direction to Project Manager to ensure construction activities are conducted in accordance with regulatory legislation and CWQMP; • Reports on the performance of the CEMP and CWQMP. Recommends changes or improvements to Project Manager; • Co-ordinates internal audits of the CEMP and CWQMP; • Prepares Incident Reports and undertakes corrective actions close out; • Maintains environmental registers and undertakes reporting requirements; • Ensures that environmental measures are effectively implemented and monitored for whole of project; • Develop strong working relationships with the AIE team; • Provide NSW EPA with regular reporting in relation to all documents which are required to be kept under approval conditions; • Identify and propose solutions to environmental issues in consultation with key construction personnel; • Ensure environmental risks are appropriately identified, communicated and effectively managed; • The Environmental Manager can order Stop Work for relevant unacceptable environmental risk or breach of conditions • Coordinate the preparation and review/amendment of the CEMP and the WQMP; • Coordinate investigation and response to environmental complaints and inquiries where required; • Ensure communication of relevant environmental information to project personnel; • Instruct and advise management team on compliance issues; • Ensure construction manager, superintendents and field supervisors fully understand the environmental constraints and how construction practices must ensure any such constraints are considered and mitigated against during construction; • Have input to design development to ensure that all applicable environmental mitigation measures are incorporated into design. • Manages Aboriginal and historic heritage protocols for the project; • Conduct fauna spotter catcher duties during all pipeline clearing and trenching activities;

3.3 WATER QUALITY MANAGEMENT

The management program contained in this CWQMP plan focuses on the key water quality parameters that are important to the overall health of the Harbour.

Data collection will commence six weeks prior to work on water to establish baseline levels at 5 monitoring points

The inclusion of an additional trend water quality monitoring location will increase data acquisition for monitoring of harbor wide trend conditions prior to and during the dredging program.

The program has been specifically designed to ensure close alignment of parameter selection with similar recent dredging and spoil emplacement campaigns. This will ensure that the acquired data contributes to understanding the long-term water quality trends for the Harbour.

Monthly drone fly-overs will also be carried out and provide an additional assessment measure of the Harbour.

Measures taken to comprehensively manage and monitor water quality are seen in more detail in Sections 5 and 6 of this CWQMP.

Table 4 Implementation of Water Quality Management Measures

Water Quality Management - Implementation			
Reference Documents	<ul style="list-style-type: none"> • PKGT EIS • Infrastructure Approval SSI 9471 dated 24th April 2019 and Modified April 2020 • Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018) 		
Management Objectives	<ul style="list-style-type: none"> • To minimise impacts identified in the EIS to the Inner and Outer Harbour during construction • To protect Aquatic Ecosystems and Visual Amenity 		
Performance Criteria	<ul style="list-style-type: none"> • Prevent exceedance of monitoring limits outlined in (Table 6) • AIE complies with Section 120 of the POEO Act. 		
Measure/Requirement	Responsibility	Reference/Approval Requirements	Evidence
Unless an environment protection licence authorises otherwise, the Proponent must comply with Section 120 of the POEO Act. Notes:	Environmental Rep Dredging Project Manager	Infrastructure Approval SSI 9471 Schedule 3, Item 1	Section 5

Water Quality Management - Implementation			
<ul style="list-style-type: none"> Section 120 of the POEO Act makes it an offence to pollute any waters. The EPA has recommended the following limits for water pollutants should apply for the development: <ul style="list-style-type: none"> - an equivalent suspended sediment of no more than 50 mg/L above background turbidity levels during the construction stage; 	Project Manager		
The Proponent must minimise any soil erosion associated with the construction of the development in accordance with the relevant requirements in the <i>Managing Urban Stormwater: Soils and Construction</i> (Landcom, 2004) manual, or its latest version.	Environmental Rep Dredging Project Manager Project Manager	Infrastructure Approval SSI 9471 Schedule 3, Condition 5	See ESCP and Waste and Spoil Management Plan for PKGT
The Proponent must ensure that any construction activities in identified areas of acid sulphate soil risk are undertaken in accordance with <i>Acid Sulfate Soil Manual (Acid Sulfate Soil Management Advisory Committee, 1998)</i>	Environmental Rep Dredging Project Manager Project Manager	Infrastructure Approval SSI9471 Schedule 3, Condition 6	Acid Sulphate Soils Management Plan for the PKGT
Implementation of a Water Quality Monitoring Program to monitor Turbidity and Pollutant concentrations in areas surrounding dredging and disposal works, including real time turbidity monitoring	Environmental Rep Dredging Project Manager	Infrastructure Approval SSI 9471 Schedule 3, Condition 11(C)	Section 5
A broader program to monitor harbour-wide water quality trends and the ecological health of Port Kembla Harbour;	Environmental Rep	Infrastructure Approval SSI 9471 Schedule 3, Condition 11 (C)	<p>CFMFP Section 6.3 Measures carried out as part of this CWQMP will provide information on the overall health of the Harbour Including:</p> <ul style="list-style-type: none"> Water monitoring carried out 6 weeks prior to commencement

Water Quality Management - Implementation			
			<p>of work on water</p> <ul style="list-style-type: none"> Data from 1 background monitoring buoy Trend from 1 additional buoy. Monthly flyovers of the Harbour by drone
Objectives and performance criteria, including trigger levels for investigating any potential or actual adverse impacts associated with construction activities on water quality and the ecology of Port Kembla Harbour	<p>Environmental Rep</p> <p>Dredging Project Manager</p> <p>Project Manager</p>	<p>Infrastructure Approval SSI 9471 Schedule 3, Condition 11 (C)</p>	<p>Sections 6.2.2, 6.2 and 6.6</p>
A plan to respond to any exceedances of the trigger levels and/or performance criteria, and minimise any adverse water quality impacts of the development; and	<p>Environmental Rep</p> <p>Dredging Project Manager</p> <p>Project Manager</p>	<p>Infrastructure Approval SSI 9471 Schedule 3, Condition 11 (C)</p>	<p>Sections 6.6, 6.7 and 6.8</p>
Reporting procedures for the results of the monitoring program.	<p>Environmental Rep</p> <p>Dredging Project Manager</p> <p>Project Manager</p>	<p>Infrastructure Approval SSI 9471 Schedule 3, Condition 11 (C)</p>	<p>Section 6.5</p>
<p>Revision of the CWQMP as a result of ;-</p> <ul style="list-style-type: none"> An incident report A Modification of Consent A request from the Planning Secretary 	<p>Environmental Rep</p> <p>Dredging Project Manager</p> <p>Project Manager</p>	<p>Infrastructure Approval SSI 9471 Schedule 4, Condition 4</p>	<p>Section 1.2, 6.7</p>
Compliance reporting in line with <i>Compliance Reporting</i> (DPE 2018)	<p>Environmental Rep</p> <p>Dredging Project Manager</p> <p>Project Manager</p>	<p>Infrastructure Approval SSI 9471 Schedule 4, Condition 7</p>	<p>Section 6.5</p>

Water Quality Management - Implementation			
Regular reporting on the environmental performance of the CWQMP	Environmental Rep Dredging Project Manager Project Manager	Infrastructure Approval SSI 9471 Schedule 4, Condition 8	Section 6.5
Preparation of a Construction Environmental Management Plan (CEMP) including specific dredge management plan (DMP) to provide a framework for the environmental management of construction activities to minimise the environmental risks to a level that is as low as practically possible for this project.	Environmental Rep Dredging Project Manager Project Manager	EIS Condition W5. Water Quality	PKGT CEMP and PKGT DEMP
Design and implement a Water Quality Monitoring Program that is generally in accordance with other recent WQMPs for similar activities within Port Kembla, such as the Berth 103 Stage 2 Dredging & Spoil Disposal EPL 20563).	Environmental Manager	EIS Condition W6. Water Quality	Section 5
Continuous turbidity monitoring would be undertaken using a series of monitoring buoys to provide impact and background data (turbidity (NTU), pH, temperature). Prior to commencement of the dredging works, buoys would be deployed for an agreed period of time to confirm background conditions in the vicinity of the monitoring points. Data would be logged and transmitted to an onshore recording station where it would be processed to allow automated comparison of median turbidity levels to a series of green, amber and red trigger levels. When exceeded, an alarm would be triggered, automated email and SMS	Environmental Manager	EIS Condition W6. Water Quality	Section 5.2 Section 6.6

Water Quality Management - Implementation

<p>alerts sent and agreed the procedures implemented. Such procedures may include hand-held monitoring to verify readings, reduction in the rate of dredging, relocation of dredging activities or cessation of turbidity generating works until turbidity readings reach acceptable levels.</p>			
<p>Daily visual observations would be undertaken during dredging operations to monitor the potential release of oil or grease.</p>	<p>Environmental Manager</p>	<p>EIS Condition W6. Water Quality</p>	<p>Section 6.2.1</p>
<p>Collection of water samples and laboratory analysis for an agreed set of contaminants would be undertaken on a weekly basis during dredging operations.</p>	<p>Environmental Manager</p>	<p>EIS Condition W6. Water Quality</p>	<p>Sections 2.4 and 6.</p>
<p>Minimising the spread of sediment inside the port will be controlled through the use of silt and bubble curtains. These will be installed in the water column prior to works commencing and maintained throughout during dredging and disposal operations.</p>	<p>Environmental Rep Dredging Project Manager Project Manager</p>	<p>EIS Condition W7. Water Quality</p>	<p>Sections 4.3 & 4.4</p>
<p>The use of Mechanical dredging (Backhoe Dredge) of subaqueous sediment will be undertaken (rather than hydraulic dredging). Ensuring that sediments are removed, transported and placed as close to their insitu density as possible. Thereby minimising the suspension and mobilisation of sediments at the dredge and disposal sites.</p>	<p>Environmental Rep Dredging Project Manager Project Manager</p>	<p>EIS Condition W8. Water Quality</p>	<p>Section 4.1 and Section 4.2</p>

Water Quality Management - Implementation			
A perimeter bund will be constructed within the Outer Harbour placement area to ensure long term stability of dredged materials and to minimise sediment migration during placement	Environmental Rep Dredging Project Manager Project Manager	EIS Condition W9. Water Quality	Section 4.5
A site-specific erosion and sediment control plan (ESCP) has been prepared as part of the CEMP to provide control of all land-based excavation and stockpiling requirements.	Environmental Manager	EIS Condition W10. Water Quality	See ESCP for PKGT
A site-specific Emergency Spill Plan has been developed and includes spill management measures in accordance relevant EPA guidelines. The plan addresses measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Roads and Maritime and EPA officers)	Environmental Manager Dredging Project Manager	EIS Condition W11. Water quality, chemical and fuel impacts on flora and fauna	Emergency Spill Plan
An emergency spill kit will be kept on site at all times. All staff will be made aware of the location of the spill kit and trained in its use.	Environmental Rep Dredging Project Manager Project Manager	EIS Condition W12. Water Quality. Chemical and Fuel effects on Flora and Fauna	Emergency Spill Plan
Machinery will be checked daily to ensure there is no oil, fuel or other liquids leaking from the machinery. All staff will be appropriately trained through toolbox talks for the minimisation and management of accidental spills.	Environmental Rep Dredging Project Manager	EIS Condition W13. Water Quality. Chemical and Fuel effects on Flora and Fauna	Induction Register
An Acid Sulphate Soil Management Plan (ASSMP) has been prepared to dictate appropriate procedures for the identification, treatment and / or management of potential and/or actual acid sulphate soils.	Environmental Manager	EIS Condition C04 Contamination; Dredging and disposal	ASSMP

Water Quality Management - Implementation

<p>The Plan was prepared using the ASSMAC Guidelines.</p>			
<p>A Dredge and Excavation Management Plan will be prepared prior to the dredging of Berth 101, outlining the contamination management measures, including:</p> <ul style="list-style-type: none"> • surface water monitoring, which will be implemented during the course of the works to minimise potential impacts to the receiving waters • use of a turbidity curtain to restrict the generation of turbidity plumes and localise any water quality issues 	<p>Environmental Rep Dredging Project Manager</p>	<p>EIS Condition C08 Contamination; Dredging and disposal</p>	<p>Section 4.3 Section 5</p>

4 Water Quality Controls

4.1 DREDGING METHOD

The Dredging Contractor (Hall Contracting Pty Ltd) will manage the impacts of the dredging and material placement works on the marine environment in order to maintain compliance with monitoring limits. The footprint of the dredging and disposal works areas is shown in **Error! Reference source not found..** Dredging and placement operations are composed of the following major elements;

- Installation of silt curtains and bubble curtains at the Outer Harbour Dredging and Spoil Containment Areas (OHDSCA)
- Dredge unsuitable material in the footprint of the perimeter bund of the OHDSCA and dispose of inside the OHDSCA
- Installation of silt curtains and bubble curtains at the dredge area of Berth 101
- Removal of existing rock armour materials and stockpiling for future use in Berth 101's new southern and northern revetment.
- Dredging of the Berth 101 to -13.3m PKHD.
- Transport of dredged materials and placement within the perimeter bund of the emplacement cell. Fill material (uncontaminated) /type [1A /1B] is to be used to construct the perimeter bund of the emplacement cell. Type 2/3/HM/HS (including potentially contaminated) materials are to be deposited behind the perimeter bund
- Construction of the new Berth 101 southern and northern rock revetment.

During the dredging and disposal works the Dredging Contractor will implement a number of control procedures including:

- the installation of a GPS vessel monitoring system on the dredge, allowing a track plot analysis to ensure maximum efficiency of the dredging effort and that no dredging occurs outside the required area
- use of suitable dredging plant and equipment to minimise turbidity, including ensuring water tight bottom doors and maintaining calibration of the hydrographic survey systems on board the dredge.
- Positioning systems fitting on the tugs transporting the barges to control deposition of material location.

Prevention of exceedance of the trigger levels as outlined in Section 6.6 will be primarily the responsibility of the Dredging Contractor, however effective management of any incident or exceedances will be done in conjunction with the Project's Environmental Manager, who will be on site and undertaking daily marine works inspections seen in Appendix D.



Figure 2 Inner Harbour Dredging Footprint and OHDSCA Footprint

4.2 EQUIPMENT

4.2.1 Dredging Equipment

The Dredging Contractor, Hall, will use a Backacter dredge for the project. The Backacter dredge is based on a conventional excavator platform, mounted to a barge. The dedicated dredging machine is mounted to a fabricated pedestal located at one end of a spud-rigged pontoon. The spud location of the pontoon is necessary to provide positive reaction to the hydraulic digging action, particularly when dredging in difficult ground. The dredge is picture below in **Error! Reference source not found..**

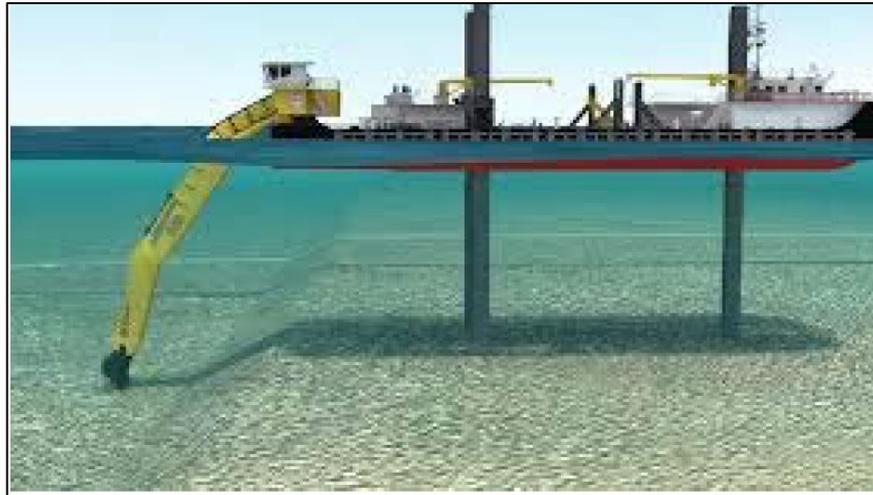


Figure 3 Backacter Dredge and spud configuration in disposal works areas

The Backacter dredge will side cast spoil directly into a barge, side hipped to a tugboat. The barge will transport the spoil directly to the emplacement cell. Bottom dump barges (Split Hopper Barges) will be used at early stages, depositing spoil either to construct the lower sections of the bund wall or inside the emplacement cell. A flat top barge will be used for subsequent transport, unloaded at the emplacement cell by conventional earthwork equipment. The approach minimises changes in density of the spoil material. The transport and discharge configuration are presented in **Error! Reference source not found.** below.



Figure 4 Backacter dredge transport and discharge configuration

4.3 SILT CURTAIN

Silt curtains will be installed prior to commencement of the dredging works in order to define the works areas and minimise the spread of any sediments entrained within the water column during dredging and disposal operations.

The top of the curtain is supported by a floating boom, whilst the lower portion of the curtain is anchored or weighted with appropriate ballasting (eg. bars or chains) to ensure that the full length (6M drop) of the curtain is always maintained. The curtain is to be anchored or fixed to existing structures as necessary. An example of a silt curtain is seen below in Figure 5.

A typical installation would be:

- Setting anchors along the curtain run and really focussing on the corners, using 2 x 300KG dump weights stacked up on the corners to mitigate movement, more if required
- Use land point anchors by either using a mass of weight or a structure that's available. If nothing is available then either cement a post, place a dump weight
- 300kg dump weights at 60m intervals will be used and some extra in load area - this is going to be where/when the body of water turns and longer runs of curtains now facing more of the tide adding load.



Figure 5 Silt Curtain to deployed around dredging and disposal works areas

Appropriately-sized silt curtains will also be used during the storm water construction in the Outer Harbour, during demolition of the deck on pile in the Inner Harbour and while land dredging from +5 m PKHD to 1+ m PKHD in the Inner Harbour. Those appropriately-sized silt curtain will not need to be of the same Category nor as deep as the one that will be installed for dredging. They will be appropriate for the type of work they are being used for.

The Contractor will carry out visual inspections during day light of the silt curtains from the surface of the Harbour to ensure they are operating currently. The contractor will carry out visual inspection from the surface. At no time diving will be used.

The use of silt curtains during construction will guarantee monitoring values in accordance with the assessment criterion described in Chapter 6 of this CWQMP.

4.4 BUBBLE CURTAIN

Bubble curtains enable movement of equipment over the works zone barrier. They minimise the migration of sediment and other suspended matter beyond the immediate works zone, by redirecting currents which may otherwise carry suspended sediment beyond the works zone. Bubble curtain entrance gates will be utilised and maintained for barges to enter and exit the excavation and dredging areas.

The final location of the silt curtain and bubble curtains for the OHDSCA is under discussion with NSW Ports. Approximate alignments are outlined in Figure 6



Figure 6 Approximate Silt and Bubble Curtain alignment in Outer Harbour

4.5 OUTER HARBOUR DREDGE SPOIL CONTAINMENT AREA

The OHSDCA, also referred to as the Emplacement Cell, is comprised of three components:

- The perimeter bund
- Emplaced material (on the landward side of the bund) and
- Capping.

The perimeter bund is to be constructed using the material of Berth 101 categorised as type 1A/1B sandy material and uncontaminated fill material (Yellow areas in Figure 7). Soil investigation has shown that these layers extend to approximately - 8 m PKHD / - 9 m PKHD. The dredging plan includes sequencing to ensure potentially and known contaminated materials are placed behind the bund, and non-contaminated materials are used to create the perimeter bund.

The dredged material will be loaded onto a Split Hopper Barge (SHB). Once loaded the tugboat, hipped up to the SHB, will bring the SHB to the perimeter bund. Dumping operations are to be controlled using a dump grid system.

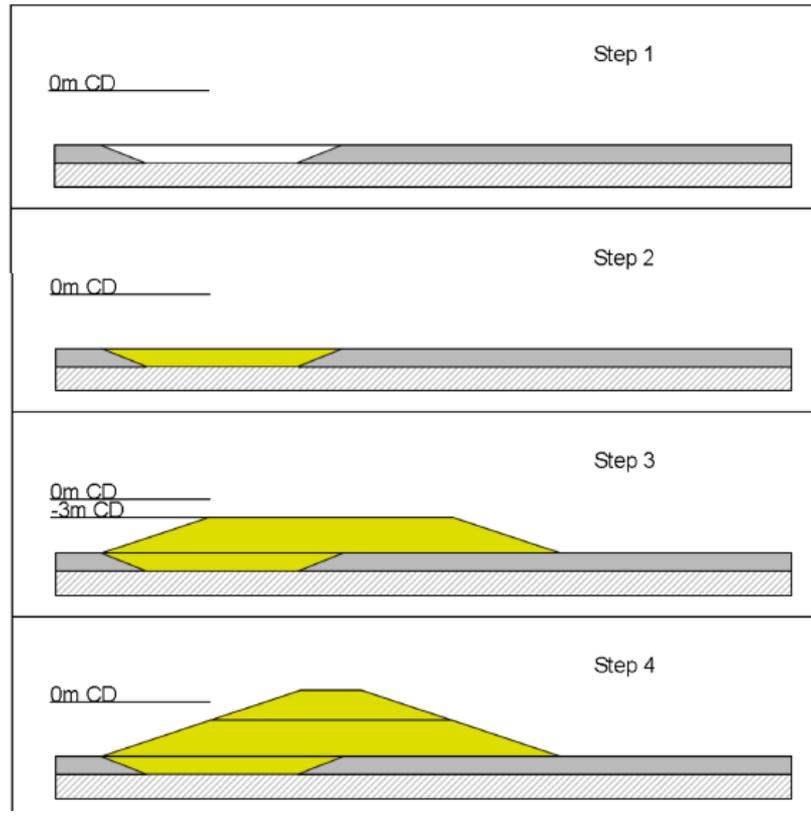


Figure 7 Sequencing of perimeter bund construction

Once established the Outer Harbour Perimeter bund will serve as the primary sediment control measure, with the Silt curtains and Bubble curtains providing a secondary layer of protection. Indicative Location and footprint of the Perimeter Bund is shown below in Figure 8.



Figure 8 Outer Harbour Perimeter Bund

Note: The scale shown is for information only and should not be used to take measurements

5 Water Quality Monitoring

5.1 MONITORING LOCATIONS

Water quality monitoring inside Port Kembla Harbour is to be undertaken at a total of five locations.

Three (3) locations have been selected to monitor at the zone of impact (WQM 2) and at nearby management zones upstream and downstream of Berth 101 (WQM 1 and WQM 3). Another single (1) location has been selected to monitor background conditions (WQM 4). The sampling point will be at a depth of 1.6 m. The choice of locations and depth was adopted from recommendations made in the PKGT EIS section 12.4, and generally align with the locational criteria used during the dredging campaign at Berth 103 in 2015.

The same water quality parameters will be monitored as previous dredging campaigns. This will ensure consistency in the parameters that have been collected, which can be used to build a more comprehensive data set for the Port that is based on both historic and contemporary information and be available for use in future projects.

Each Water quality monitoring point will be securely anchored/moored in its location (see Table 5 and Appendix B).

On top of those four locations, a fifth buoy will be installed for collection of trend data only.

Table 5 Monitoring point descriptions

ID Number	Location Description	Type of Monitoring
WQM 1	North of Berth 101,	Primary/Impact Works Area Receiver Turbidity, Temperature, pH, salinity, Dissolved Oxygen and Weekly grab sample for contaminants, TSS etc
WQM 3	South west of Berth 101	Primary/Impact Works Area Receiver Turbidity, Temperature, pH, salinity, Dissolved Oxygen and Weekly grab sample for contaminants, TSS etc
WQM 2	North of the emplacement Cell	Primary/Impact Works Area Receiver Turbidity, Temperature, pH, salinity, Dissolved Oxygen and Weekly grab sample for contaminants, TSS etc
WQM 4	Near the outer harbour	Background Monitoring Receiver Turbidity, pH, Temperature, salinity, Dissolved Oxygen and Weekly grab sample for contaminants, TSS etc
WQM 5	Near Bluescope Steel	Trend Receiver Turbidity, pH, Temperature, salinity, Dissolved Oxygen and Weekly grab sample for contaminants, TSS etc

5.2 AUTOMATED WATER QUALITY MONITORING BUOYS

The effectiveness of controls will continually be assessed at the monitoring locations through the sampling conducted by Automated Monitoring Buoys (AMB).

AMBs will be deployed at the monitoring locations to provide impact and background data prior to commencement of the dredging works and at least until the completion of both dredging and disposal works. The AMBs will monitor:

- Temperature
- Electrical Conductivity
- pH
- Turbidity and
- Dissolved Oxygen.

Indicative images are presented below in Figure 9

5.2.1 Calibration and Maintenance of AMBs

Once deployed, an initial calibration of the AMBs will be done in accordance with manufacturer's specification and a maintenance program will be established. The Environmental Representative and Team will inspect each AMB twice weekly, or in response to any observed 'drift' in results. Inspection will also be undertaken as part of an investigation into a triggered alarm level, or anomalous reading. Additional maintenance measures are included in Appendix C.

5.2.2 Real-Time Monitoring of AMBs

During operation, data is logged at 15 minute intervals, based on a moving 15-minute median and transmitted to an onshore recording station where it would be processed to allow automated comparison of median turbidity/TSS levels to a series of green, amber and red trigger levels. When exceeded, an alarm is triggered, automated email and SMS alerts sent to the Environmental Team with appropriate procedures to be implemented, as outlined in Table 9.

The average value of the 3 buoys will be compared to the background value. In other words, the average value of WQM 1,2,3 will be compared against WQM 4. If there is an exceedance, a comparison of each individual value will provide direction on where is the exceedance coming from.

Real time data will be displayed in the dredging project superintendent's site office.

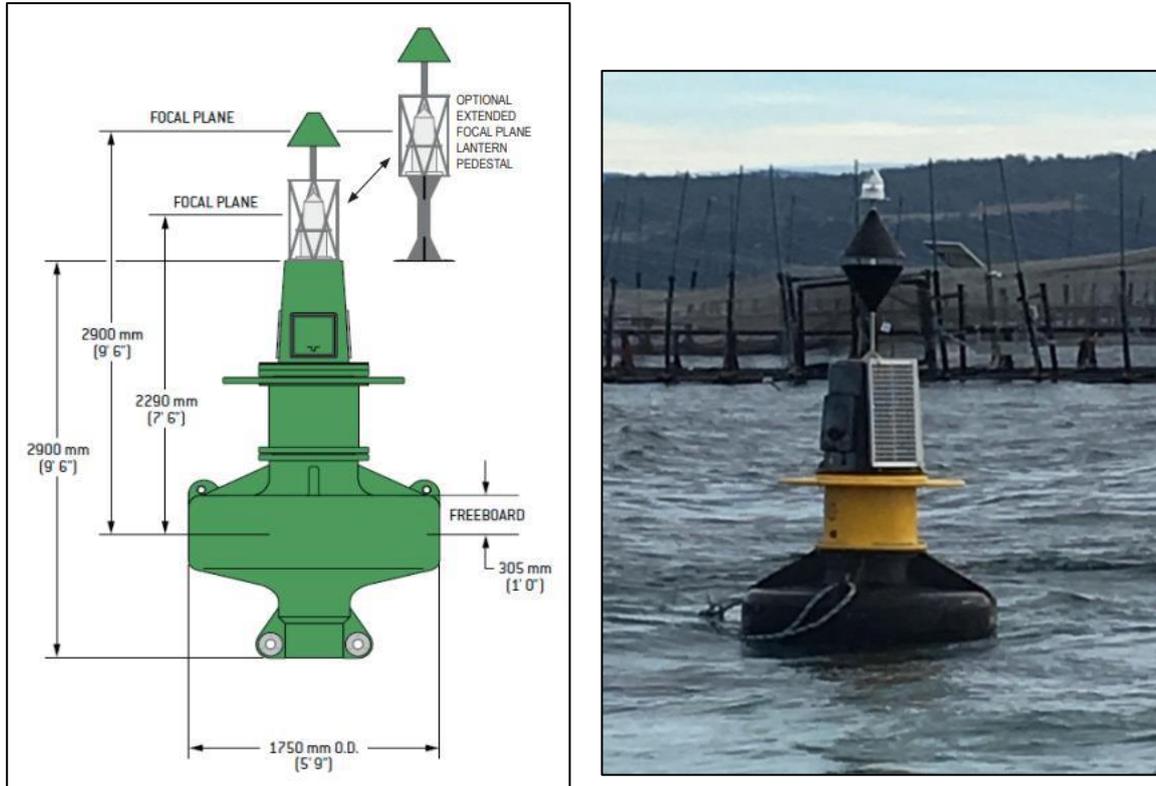


Figure 9 Automated Water Quality Monitoring Buoy dimensions

5.2.3 Harbour Wide Water Quality monitoring

An additional water quality monitoring point (WQM 5) will be included in the monitoring program for the purpose of monitoring harbour wide water quality monitoring trends and ecological health of port Kembla Harbour. The information obtained for WQM 5 will be used to track water quality indicators in the harbour, remote of the PKGT project. The trends will be reported monthly for information only.

WQM #5 may also, at times be used as an alternative background data point. In the event of tidal, ship movement or weather event impacts the quality of the data from the primary background monitoring buoy (WQM #4), the Environmental representative may adopt the use of WQM #5 based on observation of the event and data. Both data sets will be recorded throughout the project.

6 Monitoring Assessment Criteria

Water quality monitoring assessment criterion have been established to measure satisfactory performance of the CWQMP against the objectives. The monitoring limits proposed in Table 6. may be revised to include those required by the Pending EPL. Monitoring limits are also used for the basis of staged responses as outlined in Section 6.6.

We note the reference for monitoring limits considered in the EIS were the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000). We note that this CWQMP refers to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018) Default Guideline Values (DGVs). The limits are generally unchanged, with the exception of pH. The adopted DGV's correspond to the Marine Water 95% toxicant DGVs or unknown reliability DGVs.

Turbidity will be assessed against background levels taken from the background monitoring location, to account for harbour wide variations to turbidity.

Table 6 - Monitoring Assessment Criterion

Pollutant	Monitoring Limit	Reference
Contaminants of Concern		
Aluminium	Baseline	
Arsenic	Baseline	
Cadmium	5.5 µg/L	ANZG 2018 – 95% DGVs
Chromium (total)	4.4 µg/L	ANZG 2018 – 95% DGVs
Cobalt	1 µg/L	ANZG 2018 – 95% DGVs
Copper	1.3 µg/L + baseline	ANZG 2018 – 95% DGVs
Lead	4.4 µg/L + baseline	ANZG 2018 – 95% DGVs
Mercury	0.4 µg/L	ANZG 2018 – 95% DGVs
Nickel	70 µg/L	ANZG 2018 – 95% DGVs
Silver	1.4 µg/L	ANZG 2018 – 95% DGVs
Zinc	15 µg/L + baseline	ANZG 2018 – 95% DGVs
Tributyltin	0.006 µg/L	ANZG 2018 – 95% DGVs
Anthracene	0.1 µg/L	ANZG 2018 – unknown reliability DGVs
Naphthalene	70 µg/L	ANZG 2018 – 95% DGVs
Benzo(a)pyrene	Baseline	ANZG 2018 – unknown reliability DGVs
TSS	Background + 50mg/L	
pH	Background -0.5 pH units	
Temperature	-	
Electrical Conductivity	Background +/- 20% (+ baseline)	
Dissolved Oxygen	Background - 20% (+ baseline)	

Note: If the baseline of any contaminant listed above exceed the indicated thresholds, thresholds will be adjusted prior to the start of dredging.

Note: The above criteria apply to all components of the project, meaning construction of the ORF, NGP and MBD as described in Chapter 2.3 of this CWQMP.

6.1 CONTAMINANTS OF CONCERN

Indicative environmental protection parameters have been adopted as outlined below. Monitoring locations include a reference to a ‘background’ value measured at the same time (real time data) or same day (water samples) and referred to as WQM 4 on top of comparison to the baseline readings.

Table 7 - Monitoring Summary

Pollutant	Frequency	Sampling method	Location
Contaminants of Concern			
Aluminium	Once weekly	Water sample	Points WQMs 1,2,3 and 4
Anthracene	Once weekly	Water sample	Points WQMs 1,2,3 and 4
Arsenic	Once weekly	Water sample	Points WQMs 1,2,3 and 4
Benzo(a)pyrene	Once weekly	Water sample	Points WQMs 1,2,3 and 4
Cadmium	Once weekly	Water sample	Points WQMs 1,2,3 and 4
Chromium (total)	Once weekly	Water sample	Points WQMs 1,2,3 and 4
Cobalt	Once weekly	Water sample	Points WQMs 1,2,3 and 4
Copper	Once weekly	Water sample	Points WQMs 1,2,3 and 4
Fluoranthene	Once weekly	Water sample	Points WQMs 1,2,3 and 4
Lead	Once weekly	Water sample	Points WQMs 1,2,3 and 4
Mercury	Once weekly	Water sample	Points WQMs 1,2,3 and 4
Naphthalene	Once weekly	Water sample	Points WQMs 1,2,3 and 4
Nickel	Once weekly	Water sample	Points WQMs 1,2,3 and 4
pH	Once weekly	Water sample	Points WQMs 1,2,3 and 4
Total PAHs	Once weekly	Water sample	Points WQMs 1,2,3 and 4
Tributyltin	Once weekly	Water sample	Points WQMs 1,2,3 and 4
Zinc	Once weekly	Water sample	Points WQMs 1,2,3 and 4
TSS	Once weekly	Water sample	Points WQMs 1,2,3 and 4
Visual indicators			
Oil and grease	Daily	Inspection	From tugs, dredge daily
Sediment plume	Daily	Inspection	From tugs, dredge daily
Marine mammals, Dinoflagellate Cyst Bloom	Daily	Inspection	From tugs, dredge daily
Physical Parameters			
Temperature	Continuous (15-minute recording intervals)	Automated monitoring buoys	Points WQMs 1,2,3 and 4
pH	Continuous (15-minute recording intervals)	Automated monitoring buoys	Points WQMs 1,2,3 and 4
Electrical Conductivity	Continuous (15-minute recording intervals)	Automated monitoring buoys	Points WQMs 1,2,3 and 4
Dissolved Oxygen	Continuous (15-minute recording intervals)	Automated monitoring buoys	Points WQMs 1,2,3 and 4
Turbidity	Continuous (15-minute recording intervals)	Automated monitoring buoys	Points WQMs 1,2,3 and 4

Note: Data for DO (Dissolved Oxygen) and EC (Electrical Conductivity) are provided for Wider Harbour trend

purposes only.

6.1.1 Correlation from TSS to Turbidity

Total Suspended Solids (TSS) is the primary parameter for the measurement for Turbidity at Water Quality Monitoring Points until the EPA has been provided, and subsequently approves, onsite statistical correlation and assessment methodology and results. Previous EPL’s issued at Port Kembla indicate that 50mg/l of suspended sediment is equal to 25 NTU. An example of Turbidity and TSS correlation graph is seen below in **Figure 10**. Following establishment of NTU values, weekly testing of TSS will be undertaken concurrently with COC Grab sampling. The results of which will be compared and correlated monthly to enable refinement and accuracy of the real-time TSS data relayed by the AMB.

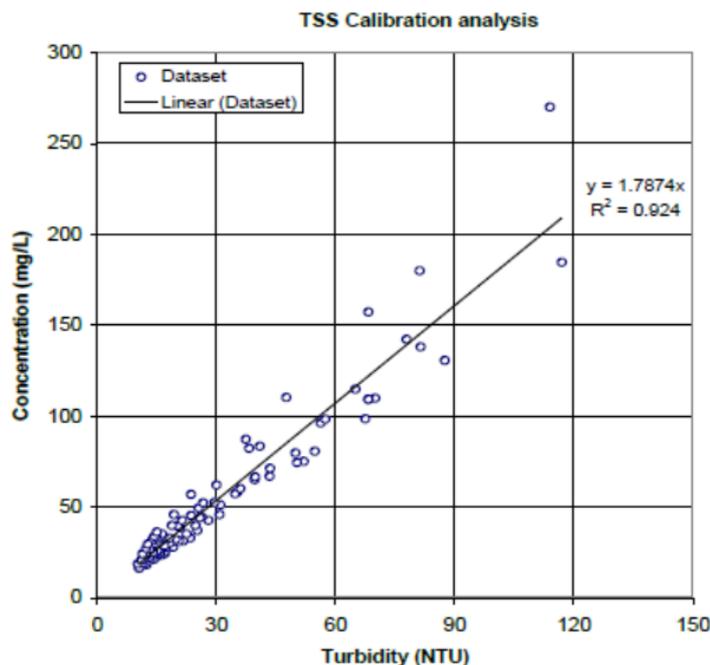


Figure 10 Example of a TSS (mg/L) and Turbidity (NTU) Correlation analysis

TSS and turbidity samples will be taken at three depths; 1.5m below surface, half depth and 2 m above the sea bed. All these samples will be taken at the same location as the buoys for the sake of comparison. If the reading 2 m above the sea bed is high, the contractor will redo one to confirm that the sea bed was not disturbed by the sampling causing high value. The average value between the three depth readings will be compared to the automatic monitoring in order to validate the manual sampling values.

6.1.2 Onsite Contaminant Guideline Establishment Process

Baseline levels for each contaminant/pollutant will be recorded at each of the monitoring points weekly, over a 6-week period prior to the beginning of the dredging and disposal works. Results will be tabulated with mean baseline levels produced. Using mean baseline = (6-week background average) x 1.2 (to allow for seasonal fluctuations) values for each contaminant listed in **Table 6** Monitoring Assessment Criterion can be established and once done will form the Marine Water Contaminant Management Criteria for the Project. In the event that a baseline value is higher than the ANZG 2018 – 95% DGVs, the baseline will be adopted.

6.2 MONITORING OF TURBIDITY AND PHYSICAL PARAMETERS

Physical parameters monitored at the sites will include turbidity, temperature, electrical conductivity, and dissolved oxygen. Monitoring of physical parameters will be conducted at four fixed monitoring locations as presented in Appendix B. A Marine daily inspection checklist enclosed in Appendix D will be undertaken and completed daily by the Environmental Manager. Included are items such as presence of Oil and Grease, signs of Dinoflagellate Cyst Blooms, and presence absence of marine mammals. Physical parameters being monitored include:

- Temperature
- pH
- dissolved oxygen
- turbidity

Monitoring limits are presented in Table 6.

6.2.1 Daily Inspection

Daily inspection of the silt curtain will be completed by the Dredging Contractor during dredging and placement works. Additionally, the Environmental Manager (or delegate) will inspect the curtain a minimum of twice per week, generally following ship movements in the Inner Harbour, weather events or observation communicated from the dredge. The Dredging Contractor will inspect and record observations of:

- Sediment Plumes;
- Oil and grease
- Potential toxic Dinoflagellate blooms within the Inner Harbour

The inspection by the Environment Manager will include real time sampling to delineate the plume, at any location related to the project. The inspection will include

- measurement of turbidity at multiple locations;
- collection of water samples for analysis for the contaminants of concern
- photograph of the plume;
- documentation of duration, extent cause and rectification of plume.

6.2.2 Investigation of Exceedance in COC's

A case by case investigation process will be implemented for exceedance in COC trigger levels throughout the PKGT Project. Further to this an Environmental Incident will be completed by the Environmental Manager if the values of the COCs or TSS/Turbidity exceed those listed in the Project EPL. Information recorded in the investigation will include but not limited to;

- Weather (tides, rainfall, winds etc.)
- Port activities on the day
- Dredging, disposal and construction works on the day
- Shipping movements in and out of the Port not related to the dredging works

The initial goal of the investigation will be to identify the source of the exceedance, then determine the responsible party(s) for the exceedance and report on how the problem can be solved. A process flow diagram for exceedance of trigger level is shown in Section 6.8. An example investigation report template is included in Appendix F.

6.2.3 Monthly Aerial Inspection

A monthly flyover, by drone, of the site, including the dredge footprint, the emplacement cell and barge routes will be undertaken. A high-resolution image will be produced, including a qualitative assessment of visible impacts of:

- Sediment plumes;
- Silt curtain condition and position;

The monthly image will be included in the report with actions, and may be used to assist in investigation of incidents.

6.3 ACID SULPHATE SOILS MONITORING

Material classified as high risk of containing PASS and ASS has been identified during geotechnical investigations carried out as part of the EIS. As a result, an ASSMP has been developed for construction which details the management methodologies to be used during construction.

The AMBs have capacity to identify any decreasing trends in pH. These readings will be monitored by the Environmental Manager. If a drop >0.5 over 2 consecutive readings (15 minute intervals) is detected an investigation will ensue as outlined in Section 6.6. Further information on ASS can be found by consulting the ASSMP.

6.4 SAMPLING METHODOLOGY

Grab sampling of contaminants and TSS will be undertaken weekly at each of the four monitoring locations during the dredging and disposal works.

Sampling will be undertaken by appropriately qualified and trained personnel and with reference to relevant statutory requirements, standards and quality assurance (QA/QC) protocols. This includes sampling personnel wearing powderless nitrile gloves during sampling and the sampling equipment being decontaminated between samples.

Samples will be submitted to a NATA accredited laboratory on 48 hour Turn Around Times (TATs) to facilitate a timely response to elevated concentrations. Sampling procedure is included in Appendix E.

6.5 REPORTING COMMITMENTS

Under the requirements of the Development Consent, SBSC will provide regular reports on compliance and other matters during the construction phase. This will include reporting to the DPIE in accordance with Schedule 4, Conditions 7 and 8, with specific reference to the Compliance Reporting Requirements (DPE 2018). Included in these requirements are:

A Pre-Construction Compliance Report, which will be a 'one-off' report that will be prepared and submitted to the Department no later than 4 weeks prior to the commencement of construction; and

Six-monthly Construction Compliance Reports, which will be prepared at 26-week intervals for the duration of the Construction period. These reports will describe AIE's performance during previous 6 months' construction period, and will be prepared in accordance with the Compliance Reporting requirements. The Construction Compliance Reports will be submitted to the Department no later

than 4 weeks after the end of each 26-week Construction period.

The format and structure of the Pre-Construction Compliance Report and the Construction Compliance Reports will be consistent with the format and structure described in Section 3 of the Compliance and Reporting Guidelines (DPE, 2018).

In addition, the Department will be notified in writing of the date of commencement of each of the relevant phases in accordance with Schedule 2, Condition 8 of Infrastructure Approval SSI 9471.

The project will also be undertaken in accordance with an Environmental Protection Licence (EPL) (yet to be issued). In general, some of the key reporting requirements include:

- The issue of fortnightly report containing; Water Quality Monitoring Results, Marine Ecological Health data, construction works progress and appraisal of Water Quality controls.
- Environmental Incident Report(s) as required by DPE and EPA
- Annual returns as required by the EPL

A summary of monthly data will be published on the PKGT website, noting any exceedance of EPL trigger values, the subsequent investigation and response. SBSC JV will also report to the relevant regulator in the event of an exceedance in EPL or Infrastructure Approval Conditions. A draft example of the monthly report is included in Appendix D.

6.6 TRIGGERED EVENT RESPONSE

Strategically placed AMBs will compare immediate impact of TSS / Turbidity Levels, if any, at both the dredging and disposal sites to background levels recorded near the harbour ocean interface. Data recording at these monitoring points is continuous and 3 Trigger Levels have been chosen to represent and identify exceedances relative to background levels. Trigger Levels are seen below in Table 8 and scaled according to severity.

Table 8 Trigger Levels and Concentration Limits for Monitoring locations

Parameter	Monitoring Location	Level 1 Trigger	Level 2 Trigger	Level 3 Trigger	Concentration Limit
Total Suspended Solids (mg/l)	1, 2, 3	Background + 25 mg/l	Background + 35 mg/l	Background + 45 mg/l	Background + 50 mg/l
pH	1, 2, 3	Background - 0.2 pH units	Background - 0.3 pH units	Background - 0.4 pH units	Background -0.5 pH units
Contaminants of Concern	1, 2, 3		Lesser value of either 2x Baseline	Lesser value of either 4x Baseline	Table 6
Dissolved Oxygen	1, 2, 3	Background - 20 %	Background -25%	Background -30%	
Electrical Conductivity	1, 2, 3	Background + 20 %	Background + 25%	Background + 30%	

6.6.1 Turbidity Action Response Plan

Any exceedance is to be analysed in order to confirm if it has been caused by dredging operations.

The Project will adhere to the Turbidity Action Response Plan seen below in Table 9 which provides a framework for environmental management and response at respective trigger levels, that are confirmed to be attributed to the Project’s dredging works.

Table 9 Turbidity Action Response Plan

Normal Situation	Level 1 Trigger (Background + 25mg/l)	Level 2 Trigger (Background + 35mg/l)	Level 3 Trigger (Background + 45mg/l)
Controls effective	Check controls and Work Practices	Respond, check work practices and controls, reduce suspended sediment	Respond, intervene, reduce and investigate
	<p>Alert Dredging Project Manager</p> <p>Employ adaptive work management practices to minimize suspended sediment, examples include;</p> <p>Work speed and Timing – Brief suspension of dredging operations depending on tide and/or optimisation/alteration of dumping schedule</p> <p>Location – Change location of dredging equipment and/or optimise dump location within spoil ground</p> <p>Magnitude – adjust layer thickness (reduce output) and/or optimise placement of coarser material over finer material at spoil ground.</p>	<p>Alert Dredging Project Manager</p> <p>Reduce suspended sediment attributable to dredging by implementing one or more adaptive management practices.</p> <p>A check of Water Quality Controls must be undertaken to ensure they are functional</p> <p>Return to normal operations can only take place if sediment generating activities are reduced by employing adaptive work management practices to minimize suspended sediment, examples include;</p> <p>Work speed and Timing – Brief suspension of dredging operations depending on tide and/or optimisation/alteration of dumping schedule</p> <p>Location – Change location of dredging equipment and/or optimise dump location within spoil ground</p> <p>Magnitude – adjust layer thickness (reduce output) and/or optimise placement of coarser material over finer material at spoil ground.</p>	<p>Alert Marine Dredging Project Manager</p> <p>Dredging Project Manager to immediately instruct all Plant to go to established operational modes known to reduce sediment generating activities or temporarily suspend dredging operations until such time SBSC JV can demonstrate that the operation is “environmentally secure” and all controls are functioning and in place</p> <p>Dredging contractor to Investigate and identify the source of the exceedance (This can be in conjunction with the environmental rep)</p> <p>Return to normal operations can only take place if sediment generating activities are reduced by employing adaptive work management practices to minimize suspended sediment, examples include;</p> <p>Work speed and Timing – Brief suspension of dredging operations depending on tide and/or optimisation/alteration of dumping schedule</p> <p>Location – Change location of dredging equipment and/or optimise dump location within spoil ground</p> <p>Magnitude – adjust layer thickness (reduce output) and/or optimise placement of</p>

Normal Situation	Level 1 Trigger (Background + 25mg/l)	Level 2 Trigger (Background + 35mg/l)	Level 3 Trigger (Background + 45mg/l)
			coarser material over finer material at spoil ground.

Additionally, possible mitigating measures that can be considered in the event of an exceedance that has been attributed to the dredging works include:

- 1 Inspection of silt curtains, replace any part that is worn out/broken
- 2 Inspection of bubble curtain. Replace bubble bar where needed; Replace underperforming compressors/hoses where needed
- 3 Inspection of bucket to ensure it is in good condition [no large holes/ cracks though which material falls out], Repair where needed
- 4 Replacement of blunt / worn out chisels [pick points when dredging in rock];

The above action points are covered in the daily inspections. Nonetheless they need to be repeated when an exceedance has been attributed to the dredging works. The following mitigating measures need to be considered when the inspections mentioned above do not reveal probable cause:

- 1 Consider using flares [wide teeth]
- 2 Reduce hoisting speed of full bucket through water column
- 3 Reduce lowering speed of empty bucket through water column
- 4 Do not swing during hoisting towards flattop barge / split hopper barge with full bucket underwater
- 5 Reduce filling of bucket [i.e. avoid large "head" on bucket]
- 6 Relocate dredge further from impact point
- 7 Reconfigure silt curtain / bubble curtain layout
- 8 Increase bubble density of bubble curtain
- 9 Reduce bubble curtain length
- 10 Schedule maintenance periods around spring tides

The local conditions / circumstances and analysis of the exceedance will indicate which of these measures will best address the issue.

6.6.2 Other Sampling and Mitigation Measures in the event of a Triggered Response

Port Kembla has an average annual rainfall of 1,320.9 mm therefore it is possible other factors are affecting the level of TSS in the water column. When excessive rainfall has occurred (>50mm in 48 hours) then extra background readings can be taken by using a handheld turbidity probe. The recording of such data from points both in the Inner and Outer Harbour adjacent to known waterways and drainage line can indicate if extra external sources of sediment are being discharged into the harbour. Shipping around the construction area is also known as an external source having impact on the readings.

6.7 EXCEEDENCE EVENT MANAGEMENT PROCESS

In the event where physical parameters, turbidity/TSS or COC's exceed the recommended trigger values, the Environmental Manager (or delegate) will assess the situation with the Site Manager (or

delegate) with the primary aim to identify the likely cause(s) of any trigger event.

If the elevated turbidity or contaminant levels of concern are determined to be a direct result of PKGT Project activities, then the Environmental Manager (or delegate) will determine the appropriate mitigation measures to be implemented. These measures may include undertaking further sampling and/or installation of additional silt curtains, absorbent booms and/or further modifications of the activities.

The proposed measures will consider the significance of the exceedance and the impacts that the increased turbidity/contaminants may be having on the physical and ecological parameters of Port Kembla Harbour (Inner and Outer).

Any exceedance that is found to be caused solely by SBSC JV activities will be recorded by the Environmental Manager (or delegate) and lodged as an official Environmental Incident Report. These details will include but not be limited to location, time, date, tidal movements, location of dredging operations, details of construction processes and level of contaminants of concern (from grab samples taken prior to the event and following the event).

This information will be reported to DPE, EPA and other government authorities as required in the project approvals.

Where there has been an exceedance of monitoring limits, the Site Manager will:

- a. establish that all plant, equipment and environmental controls, including silt curtains and booms, are operating in a proper and efficient manner;
- b. identify the likely source of contamination;
- c. implement any required corrective measures;
- d. Apply rules and controls established in Table 9 of this WQMP if an exceedance is suspected or confirmed to be dredge related;
- e. Stop dredging activities if required as per Table 9 of this WQMP when an exceedance is demonstrated to be caused by the dredging and is above the background +50 mg/l trigger level.

Incidents are defined as an occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a noncompliance. The consequences of such incidents may result in material environmental harm, damage or asset loss.

All incidents including those involving SCSB JV, its subcontractors and visitors that occur during construction will be managed in accordance with the Incident Notification and Response Flow Chart (Figure 8). The incident will be recorded and managed according to SCSB JV's Safety Management Plan. All environmental incidents and near misses must be reported to the Department as per approval requirements and AIE Project Manager, incidents may include:

- Loss of containment incidents or releases of liquids, solids, or gas
- Any Dangerous goods or hazardous substance spills to waters and over 20 litres in volume to ground (less than 20 litres to be recorded and managed as a corrective action in the Corrective Actions Register)
- Complaints received from regulatory authorities

- Regulatory breaches – fines, prosecutions, improvement notices, breaches of licence conditions
- All incidents of third party property damage or loss
- Any loss or damage to native vegetation outside approved work areas or flora and fauna of significance
- Incidents involving impact or potential damage to Aboriginal or Historic Heritage significant areas
- Loss of sediment downstream in a watercourse or other sensitive areas

SCSB JV's environmental representative will notify AIE as soon as possible and in a timeframe that allows them to meet their regulatory reporting deadlines for notifiable incidents shown in Section 7.7. The SCSB JV Project Manager is responsible for the initial reporting of significant non-compliances with the CEMP or relevant legislation to the AIE Project Manager.

In accordance with EPA Guidelines a specific pollution incident response management plan (PIRMP) will be developed and implemented prior to construction.

In the event that a CEMP condition or limit is not met, a non-compliance may result. The non-compliance will be investigated and reported to EPA and AIE immediately, and in writing within 48 hours. AIE will then communicate the non-compliance to Department of Planning and the Environment will be notified in writing to compliance@planning.nsw.gov.au within 7 days of the Project Management Team become aware of the Non-Compliance.

The written notification will identify the development, including the application number, set out the condition of approval that the development is non-compliant with, the way in which it does not comply, the reasons for the non-compliance (if known) and what actions have been taken, or will be taken, to address the non-compliance.

Furthermore, as specified in Schedule 4, Condition 4, within 3 months of any incident report this Construction Water Quality Management Plan must be reviewed for adequacy, and if necessary revised. Within 4 weeks of any revision to the Plan occurring, or indeed any other related document, the Plan or plans will be submitted to the Planning Secretary for approval, unless otherwise agreed with the Planning Secretary. Any measures identified in the revised Plan to improve the environmental performance of the Project will be implemented as soon as practicable following the Secretary's approval.

6.8 PROCESS FLOW DIAGRAM

A flow diagram illustrating the water quality assessment and management processes is depicted below.

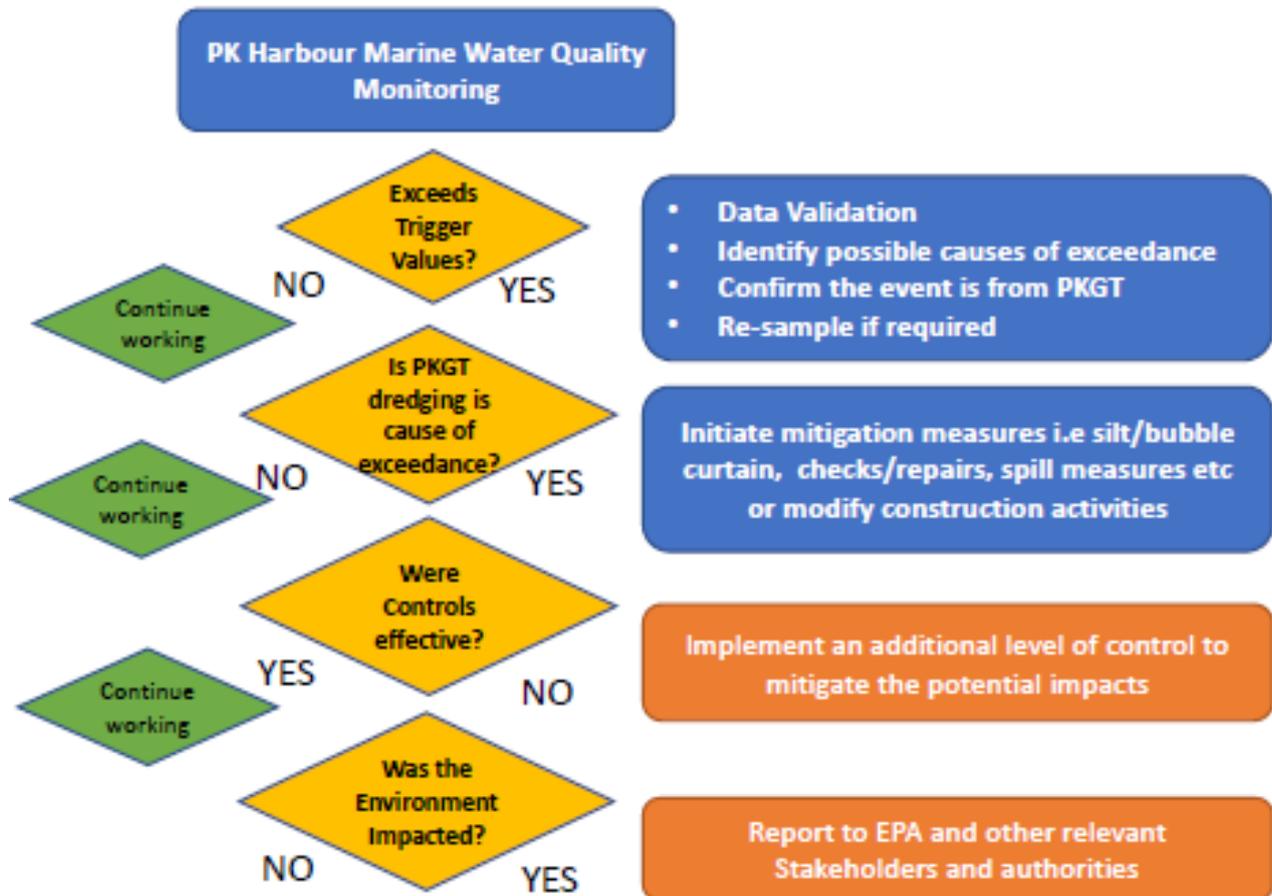


Figure 11 Triggered event process flow chart

7 Pipeline and ORF Water Management

This section provides a brief summary of water management as relevant to the onshore construction element of the project. It should be noted that this plan will be updated and additional subordinate plans produced to provide detail on Hydrotest Water Management (including sourcing, additives and disposal) and Trench Dewatering.

SCSB have developed an Overarching Erosion and Sediment Control Plan- SCSB-AIE-PKGT-ENV-EMP-005, to ensure appropriate measures are implemented across the Project to control any surface water.

During construction of the ORF and pipeline, work will be carried out in line with the Onshore Water Management Overview (see below).

Water management during construction of the ORF is expected to be minimal as all work will be land-based on Berth 101.

The pipeline alignment crosses Allans Creek in the south and Gurungaty Waterway in the north east. All parts of the alignment will ultimately drain into Inner Harbour (Tom Thumbs Lagoon) either through surface runoff and stormwater drainage systems. Tom Thumbs Lagoon is a remnant saline coastal lagoon that has been progressively reclaimed.

Both Allans Creek and Gurungaty Waterway crossings will be installed by HDD, therefore, eliminating any open cut trenching and conventional construction activities in the vicinity. Detailed methodology including environmental control measures will be produced as part of the design on these sections.

Onshore Water Management Overview	
Aim	<i>To avoid degrading water quality and to minimise the impact and degradation to ecosystems.</i>
Environmental Objectives	<ul style="list-style-type: none"> No adverse impacts on water quality or water flow as a result of construction activities
Management Strategies	<p>Work near Waterways</p> <ul style="list-style-type: none"> All major waterway crossings to be performed by HDD An exclusion zone will be established 100 m either side of a watercourse within which only linear construction activities are to be undertaken i.e. no facilities, refuelling etc permitted within this zone. SCSB will remain vigilant regarding flood warnings, receiving daily weather reports and subscribing to flood warning services where relevant to ensure compliance with the above. <p>Sourcing Water</p> <ul style="list-style-type: none"> Source surface water from approved sources in accordance with agreements. Do not extract water from watercourses. Water will be sourced and extracted from existing infrastructure. No water will be extracted from surface watercourses. SCSB will not take surface water or construct new bores unless via agreement with the landholders. No water is to be extracted from watercourses. <p>Hydrotest Water</p> <ul style="list-style-type: none"> Hydrostatic testing will be conducted in accordance with APGA CoEP: Onshore Pipelines (2013).

	<ul style="list-style-type: none"> • Develop and implement a Hydrostatic Testing Management Plan outlining: <ul style="list-style-type: none"> ○ Volume and source of test water. ○ Proposed method and location of reuse/or disposal. ○ Proposed management measures to avoid and minimise environmental impacts for testing procedures. • Where hydrostatic test water will be released, water will first be sampled and analysed to ensure that the quality meets acceptable standards for release to land. • Pre-fill water is to be filtered via sediment filters prior to release • Discharge water to approved locations only. • All testing of hydrostatic water quality will be conducted by a laboratory with NATA accreditation where an available laboratory is available for testing of each particular analyte. • Hydrostatic test water and pre-fill water will be released in a manner that does not cause visible scouring or erosion. <p>Trench De-watering</p> <ul style="list-style-type: none"> • No trench water will be discharged to watercourses. • Trench water will be discharged to land via level spreaders and erosion and sediment controls (e.g. grassed areas or filter socks) to minimise sediment loads and avoid creating erosion in discharge zone. • The trench construction layout will include drainage, erosion and sediment controls to minimise the volume of water captured in the open trench • Approval from landholders or authorities will be sought prior to discharge as required.
<p>Performance Indicators</p>	<ul style="list-style-type: none"> • All controls and devices in Erosion and Sediment Control Plans installed • CPESC will develop progressive ESCP's for high risk areas and sign off on the installation of controls within 14 days of installation. • All water and waste water discharge within acceptable parameters • All sampling compliant with reporting requirements
<p>Monitoring, Reporting and Corrective Action</p>	<ul style="list-style-type: none"> • Daily Environmental Inspection Checklist • Environmental Line List • Themed Toolbox Talks and update of register • Register of all discharges and records of water quality • Watercourses covered in project induction • Water quality monitoring within watercourses undertaken • If sediment basins are installed, monitoring to be performed • Regular audits of the CEMP will be undertaken and recommendations and corrective actions shall be implemented • Specific inspections for rainfall events • Water monitoring in accordance with requirements • Non-Compliance and Incident Reporting will be reported to, and regulated by, senior management to ensure prompt rectification and change management as required
<p>Training</p>	<p>All personnel shall attend an environmental induction prior to entering the work site.</p>

8 SITE AUDIT REPORT

A Site Audit Report will be prepared for the construction element of the PKGT.

The Site Audit report is intended to list all construction reports that will be presented to the EPA-accredited Auditor to inform the Site Audit (Schedule 3, Clause 13) and the Emplacement Cell Audit (Schedule 3, Clause 10).

The construction reports will be made available during the course of the project as per the required time frames. They will be available in the SCSB JV's Environmental Manager Office in the form of paper copy organized in folders.

At the completion of site works, all the reports related to Schedule 3 - Clause 13, will be provided to the EPA- accredited Site Auditor in a form of 1 paper copy (organized in folder) and 1 USB stick. A summary page will be provided to list the numbers of reports and findings.

At completion of the Emplacement Cell, all the reports related to Schedule 3 - Clause 10, will be provided to the EPA-accredited Site Auditor in a form of 1 paper copy (organized in folder) and 1 USB stick. A summary page will be provided to list the numbers of reports and findings.

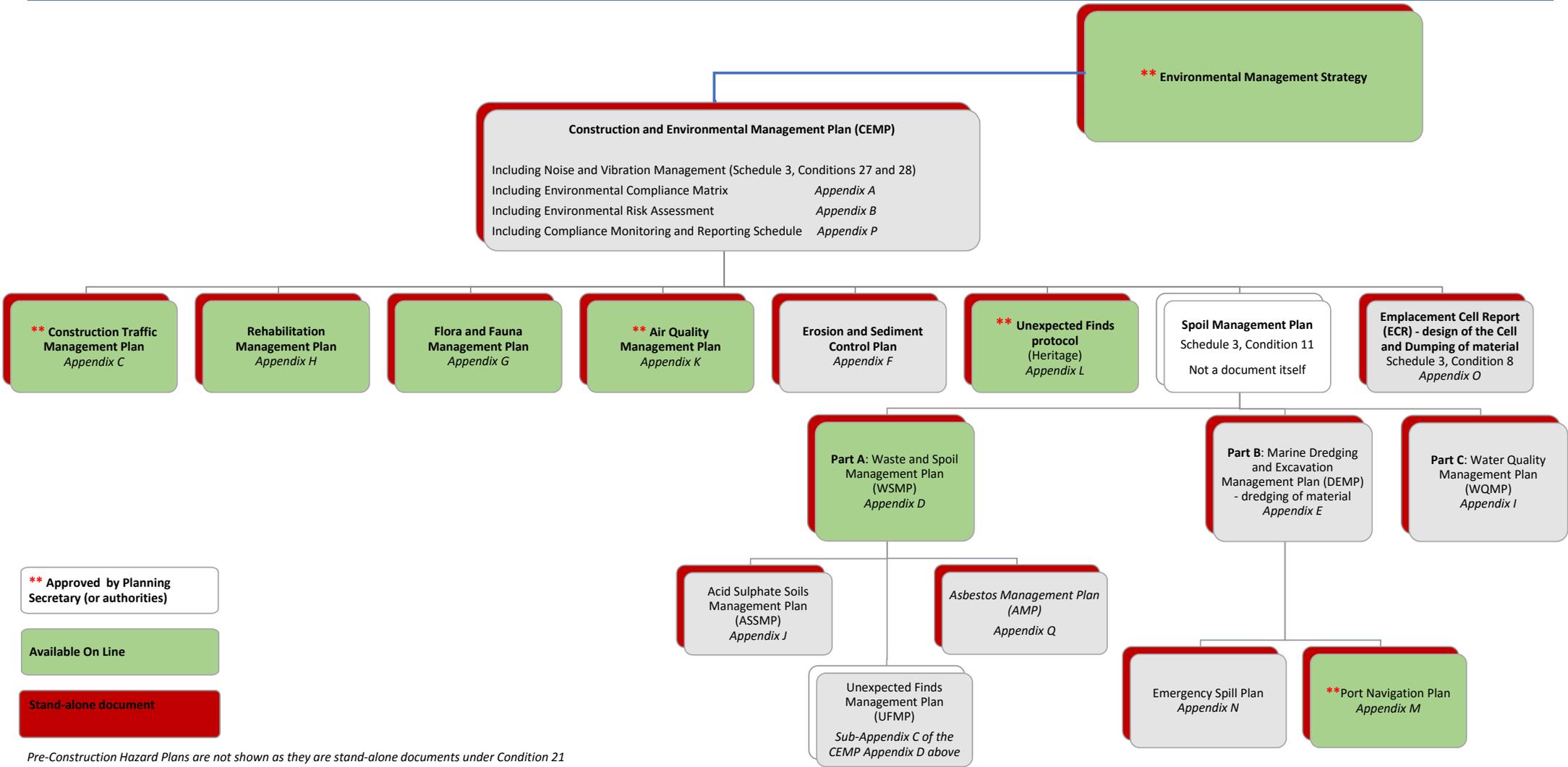


9 REPORTING SCHEDULE

	Daily	Weekly	Monthly	Prior to Construction	Prior to Dredging	6-monthly	Annually	Practical Completion
CEMP Compliance								
Marine Daily Works Checklist	X							
Gas Pipeline Daily Works checklist	X							
Berth 101 Daily works checklist	X							
Continuous real time dust monitoring	X							
Continuous real time Water Quality monitoring	X							
Water Quality Sampling		X						
CEMP Reporting Summary		X						
CEMP Compliance Report			X					
CEMP Compliance Audit				X		X		X
DPE Compliance								
Emplacement Cell Design Report					X			
Emplacement Cell Construction Audit								X
Contaminated Site Audit Statement								X
EPL Compliance								
Annual Returns							X	X
EPL Monitoring Results			TBC					X

	PORT KEMBLA GAS TERMINAL	
SCSB-AIE-PKGT- ENV-PRO-003	CONSTRUCTION WATER QUALITY MANAGEMENT PLAN	18/AUG /2020

Appendix A. CEMP MATRIX



**** Approved by Planning Secretary (or authorities)**

Available On Line

Stand-alone document

Pre-Construction Hazard Plans are not shown as they are stand-alone documents under Condition 21
 Pre-Operational plans, such as Water Verification Management Plan Air Verification Management Plan and others are not shown on this matrix

Appendix B. KEMBLA OVERVIEW

The scale is for information only and should not be used to take measurements.





Appendix C. Automated Monitoring Buoys Maintenance Tips



10 Tips to Prevent Biofouling on Water Quality Instruments

BROUGHT TO YOU BY YSI, A XYLEM BRAND

With advances in electronics, power management and battery life, *biofouling* is now the key factor in determining the length of time a water quality instrument can stay deployed, particularly in long-term, continuous monitoring applications.

Using various available anti-fouling technologies will extend your deployment intervals, resulting in fewer trips to the field for instrument service and improved accuracy of water quality data.

For most users, field servicing of water quality sensors is a significant part of their monitoring budgets. The Alliance for Coastal Technologies estimates that maintenance costs due to biofouling consume 50% of operational budgets. So a reduction in the number of field servicing trips can have a huge cost savings. Using anti-fouling components is one of the best investments you can make to save money for your program.

Reducing the growth of biological organisms on your instruments:

- maintains the sensitivity and accuracy of your water quality sensors by reducing drift
- reduces needed site visits to clean instruments
- prolongs the life of the sensors and your investment
- makes cleaning and maintaining equipment faster and easier

Recommended Anti-fouling Items:

- Anti-fouling wipers
- Anti-fouling port plugs
- 2" wide copper tape
- Plastic anti-fouling sleeves
- Copper-alloy sensor guard
- Copper-alloy screen
- C-Spray protective probe solution
- Clear packing tape
- High-visibility duct tape
- Plastic cling wrap
- Anti-fouling paint



a xylem brand

The following tips are based on YSI's many years of instrument research and testing, as well as YSI customer successes.

In productive, high-fouling waters (such as warm marine waters), a water quality instrument equipped with anti-fouling features will easily allow you to **double** your deployment times. Furthermore, at less fouling intense sites, an anti-fouling equipped sonde could allow you to **triple or even quadruple** your deployment times!

Typical deployment results

	YSI EXO sonde with anti-fouling	YSI 6-Series sonde with anti-fouling	Sondes without anti-fouling
Freshwater	60-90 days possible, site dependent	30 days possible, site dependent	<5 days
Marine	45-90 days possible, site dependent	14-30 days possible, site dependent	<5 days

Anti-fouling Components for Water Quality Sensors and Sondes

To provide optimal protection, copper-based materials with anti-fouling properties are often coupled with mechanical systems that physically wipe or guard the sensing element between sampling intervals.

1 Wipers

Many water quality instruments designed for long-term monitoring utilize one or more wipers to clean the top surface of the sensors. It's important that the wiper is large enough to clean the entire top surface, not simply the optical sensing portion. A larger wiper prevents biofouling organisms from colonizing the edge of the probe and migrating towards the sensing element.

YSI EXO2 central wiper part number: 599090

YSI 6-Series copper-alloy wiper part numbers: 616625 (optical sensor wiper); 616630 (6600EDS wiper brush); 616445 (6600V2-4 wiper brush)

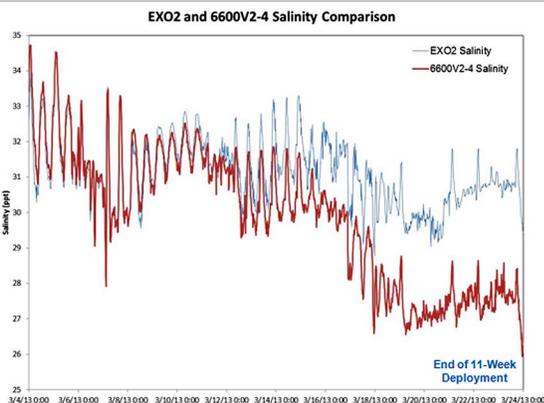


Case Study: South Carolina Estuary



At a long-term monitoring station in a productive South Carolina estuary, a YSI EXO2 sonde and YSI 6600 sonde with anti-fouling components were deployed. The sondes were connected to a data logger that transmitted real-time data back to our office.

At week 11 of the deployment, we observed that the EXO2 sonde was performing well, without any signs of biofouling accumulation. Around week 9, the salinity data from the 6600 began to experience fouling drift. *(Data from last 4 weeks shown below.)*



Without any anti-fouling precautions, either sonde would have likely begun to experience drift by as soon as week 2 or 3 in this environment.

★ Soft fouling organisms typically characterize freshwater systems and are often more easily controlled by mechanical wipers. Marine biofouling may present a greater challenge than freshwater biofouling due to presence of hard fouling organisms such as barnacles and mussels, so additional biofouling measures are recommended in marine monitoring environments.



Copper tape, copper-alloy sensor guard and mesh screen would provide additional anti-fouling protection to the equipment above and at left.

2 Sensor Port Plugs

Biofouling will adhere to just about any rough surface where it can get a foothold. If all the ports in your 6-Series water quality sonde are not occupied by probes, then replace the plastic port plug with a copper-alloy port plug. Not only does the port plug seal and protect the electronics inside the port, but the copper material in the plug will deter the settlement of organisms. Fouling will form on any unprotected surface of the instrument, so using anti-fouling port plugs reduces the risk of instrument damage from trying to remove a badly fouled plastic plug.

YSI 6-Series copper-alloy port plugs part number: 616151 (optical sensor port); 616161 (pH or DO sensor port); 616171 (ISE sensor port)



Case Study: St. Petersburg Harbor

Sondes deployed by the University of South Florida in St. Petersburg Harbor tested a variety of anti-fouling methods.

Sondes equipped anti-fouling components performed well over a **40-day deployment**, while the control sondes diverged from the norm 11 days after deployment.

Anti-fouling sondes utilized copper-

alloy sensor guards with copper wire mesh, copper-alloy sensor housings and copper tape. The control sondes used only the standard wiper design.

By using a combination of anti-fouling components, the monitoring program in St. Petersburg Harbor **decreased its yearly maintenance visits by 66% and saved \$10,000.**



3 Copper Tape

Many water quality probes have either plastic or metal housings. While copper-alloy housings offer some measure of biofouling protection, plastic and metal (non-copper) housings do not. You can apply excellent anti-fouling protection to these probes by wrapping the housings in copper tape in a two-step treatment.

YSI copper AF tape has excellent anti-fouling properties and uses a very strong water resistant adhesive. However, if you apply copper tape directly to the probe, you could end up with a sticky mess later when the spent copper has to be removed. To prevent this from happening, first apply clear packing tape to the water quality sensors. The clear tape acts as a barrier and makes removal of the old copper tape much easier after deployment.

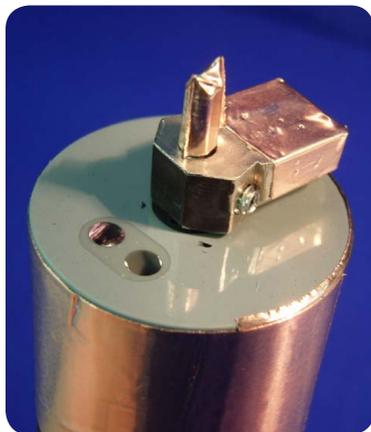
Cut a 3-inch piece of packing tape and press it onto the sensor so it is as tight and bubble free as possible. Press out any air bubbles or wrinkles by rubbing the surface with the body of a permanent marker.

Next cover the sensors with the copper tape. Press on the tape so it is as tight and bubble-free as possible. Press out any air bubbles or wrinkles by rubbing the surface with the body of a permanent marker. For the conductivity/temperature sensor, use a sharp Xacto knife to remove the tape from the round vent holes on the side of the probe.

★ You can expect the copper tape treatment to last 2-6 months before needing to remove and reapply the tape. It is a good idea to write the date applied on the taped sensor with the Sharpie marker.

Note: Do *NOT* apply copper tape to any EXO probes that will be submerged in Quinine Sulfate standard during an fDOM calibration. Quinine Sulfate will react negatively with the copper and degrade the standard. We recommend wrapping the sensors with copper tape *after* you have performed the Quinine Sulfate calibration.

YSI copper tape part number: 616189



4 Protective Plastic Sleeves

In deployments where fouling is minimal you can use specially sized plastic sleeves for the probes and sonde body of the YSI EXO1 or EXO2 sondes. The plastic sleeves slip easily over the parts and require an application of heat to shrink the sleeves to a tight fit on the parts.

Throughout a deployment, biofouling will collect on the sleeves rather than directly on the instrument. After deployment, the perforated sleeves can be easily removed and the biofouling comes right off, significantly reducing cleaning and maintenance.

If you do not have an EXO sonde, then see tip 3 about using copper tape and tip 8 about using duct tape and plastic wrap for similar anti-fouling effect.

EXO anti-fouling sleeves kit part number: 599663



5 Sensor Guards

For optimal biofouling deterrence, you can use a metal (copper alloy) anti-fouling sensor guard that fits on the end of the sonde and protects the water quality probes. This guard is used in place of the plastic guard usually supplied with the instrument. A copper-alloy guard very effectively prevents fouling organisms from attaching to it; these organisms could seriously affect optical sensor measurements and in severe cases make the sensor guard difficult to remove.

In lieu of a copper-alloy guard, you can also apply copper-based anti-fouling paint to a plastic guard (see tip 10).

EXO1 copper-alloy guard part number: 599563

EXO2 copper-alloy guard part number: 599564

6600 copper-alloy guard part number: 616145

6920/6820 copper-alloy guard part number: 616176

600OMS copper-alloy guard part number: 616175



Copper-alloy sensor guards effectively deter biofouling settlement on sensitive water quality sensors. As the guard ages, it naturally gains a patina.



6 Screens

Sensors: Pre-formed copper-alloy screens for conductivity-temperature probes and non-wiped pH probes are easy to apply and offer excellent biofouling deterrence benefits. The screens allow water to flow through the cells in conductivity-temperature and YSI 6-Series pH sensors for accurate measurements.

EXO sensor copper-alloy screen part number: 599867

6-Series sensor copper-alloy screen part number: 616270



Sensor Guards: You can also prevent debris and small animals from entering the sensor guard by using 0.25-inch plastic mesh around guard. Wrap the mesh around the outside of the guard 1.25 times and secure with a cable tie or rubber band. The mesh can also be sprayed with copper-based anti-fouling paint (see tip 10 below).

In marine applications with moderate to severe fouling, you can use copper mesh of the same size around the sonde guard. It is more expensive, but it's very effective and requires little maintenance.

Plastic mesh screen is available from Aquatic Ecosystems part #1170. Copper screen is available from McMaster Carr, an industrial supply company.



7 C-Spray Solution

C-Spray is an environmentally safe, nanopolymer spray that keeps non-wiped surfaces slick and challenging for biofouling settlement. C-Spray is based on a solution used in many marine and boat applications to keep the growth of microorganisms and barnacles to a minimum.

Once the prepared sensors are installed on the sonde, apply a light coating of C-Spray Protective Solution on the sensor bulkhead, the sides of the probes and the probe nuts to make cleaning after deployment much easier.

- Try **NOT** to spray the solution on the sensor optics (the top face of the sensors). If C-Spray is applied to the optics, then the optics will have to be buffed with a microfiber cloth to ensure optical clarity.
- Do **NOT** apply C-Spray on the pH or DO probe faces and allow to dry. If applied, rinse with tap water within a few minutes of application.



In testing in marine environments, *C-Spray plus the copper-mesh screen* around the conductivity-temperature sensor resulted in **90+ days of maintenance-free, accurate data.**

Conversely, an *untreated* conductivity-temperature sensor in the same waters was impacted by biofouling in as little as 18 days.

YSI C-Spray Protective Probe Solution part number: 616290

8 Duct Tape & Packing Tape

9 Plastic Wrap

Common household items—such as duct tape and plastic cling wrap—appear to have some fouling-resistant properties when used with C-Spray.

To create these anti-fouling layers around your instrument:

- Wrap the body of the sonde in plastic wrap and secure it with 2-inch clear packing tape.
- Apply two bands of clear packing tape on the lower section of the instrument. For example, over the 6600 sonde's depth sensor module and on the lower label section of the EXO2 sonde (this will allow you to see the magnet symbol and LEDs).
- Wrap the rest of the sonde body in high-visibility duct tape. Overlap slightly and press all seams firmly together. The layer of plastic wrap underneath makes removal of the tape much easier and prevents a sticky glue build-up on the sonde.
- Spray the top of the sonde, the duct tape and the base of the sensors with C-Spray, which will make these surfaces easier to clean especially when deploying in areas with hard fouling.



To illustrate this effect, a YSI 6600 sonde was deployed without any kind of anti-fouling protection. Alongside it, an EXO2 sonde wrapped in plastic wrap and covered in high-visibility Duck® brand duct tape was deployed.

After 2 weeks in the water, you can see that the 6600 sonde body was heavily encrusted in barnacles and sea squirts (top) whereas the EXO2 sonde only accumulated small barnacles and some slime (bottom). The EXO2 was easily scrubbed clean, while the 6600 had to be scraped, causing serious cosmetic damage to the labels.



Note: When wrapping sondes that are equipped with depth sensors on the side, make sure that you cut small holes in the plastic wrap/tape layers over the depth ports so that water can flow freely into the ports for correct pressure measurements.



10 Anti-fouling Marine Paint

Copper-containing paints can also be used as a biofouling countermeasure, but there are limitations. Be aware that the paint cannot cover the sensing technologies, may pollute the environment, and must be re-applied on a regular basis.

Because copper tape is so effective on water quality instruments, it is best to use anti-fouling paint instead on peripheral equipment—plastic screens, plastic deployment tube or other mooring hardware—to keep them free of biofouling.

If you use anti-fouling paint on your instrument, follow these guidelines:

- We recommend *waterbase* anti-fouling paint; it's easier to clean up and contains no solvents which may damage plastic parts
- Mix the paint well, as the copper in the paint will settle to the bottom
- Two thin coats applied with a small brush are better than one thick coat.
- Do not get paint on the optical sensing components of the water quality sensors, the CT electrode, or on any moving parts
- Paint ABS or PVC deployment tubes *at least once per year*, inside and out. Pipes that are not protected can have their flow-through holes sealed with growth in a short period of time, which will affect your data.

Petit Paint and Interlux anti-fouling paints are available from West Marine and Boat U.S., marine supply companies.



Next Steps

YSI's comprehensive monitoring sondes and anti-fouling components allow you to collect water quality data over long intervals and with high accuracy.

★ [Visit EXO Sonde web site](#)

★ [Request a Quote](#)

★ [Ask a Question](#) to Mike Lizotte, YSI Senior Applications Specialist and anti-fouling expert

About the Authors

Mike Lizotte has more than 35 years of experience with water quality instrumentation, field monitoring, and deployment. He spent his childhood summers on the beach and exploring marshes and estuaries. Now he works closely with YSI customers including the USGS,



NERRS, and many state and federal EPA and DEP offices to help improve their monitoring and data collection programs.

Danielle Dumont is a marketing communications manager for environmental monitoring systems at YSI Inc., a Xylem brand. She spent her childhood summers firmly planted on Midwest soil, usually with her nose buried in a book. She has more than 13 years of experience writing about water quality instrumentation and applications.



All photos courtesy of YSI Inc.

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Appendix D. AUDIT REPORT PROCEDURE

PORT KEMBLA GAS TERMINAL

Site Audit and Emplacement Cell Audit

This report is intended to list all construction reports that will form part of the document which will be presented to the accredited EPA’s Auditor in order for the SCSB JV to get the Site Audit (Schedule 3, Clause 13) and the Emplacement Cell Audit (Schedule 3, Clause 10).

Those reports will be made available at any time during the course of the project once available as per the required time frame. They will be made available in the SCSB JV’s Environmental Manager Office in form of paper copy organized in folders.

At completion of the Site, all the reports related to Schedule 3 - Clause 13, will be provided to the EPA’s Auditor in a form of 1 paper copy (organized in folder) and 1 USB stick. A summary page will be provided to list the numbers of reports and findings.

At completion of the Emplacement Cell, all the reports related to Schedule 3 - Clause 10, will be provided to the EPA’s Auditor in a form of 1 paper copy (organized in folder) and 1 USB stick. A summary page will be provided to list the numbers of reports and findings.

Site Audit, Infrastructure Approval Schedule 3, Clause 13:

Type of Report	Reference Management Plan	Frequency of Report	Responsible Company
Material Tracking Register	SWMP	Running process, daily updates	Rare-Environment
Stock Pile Register	SWMP	Running process, daily updates	Rare-Environment
Waste Classification reports	SWMP	Running process, Every 1000 m3, for land excavation only	Rare-Environment
Unexpected Finds Report	SWMP	On occurrence	Rare-Environment
Daily Dredge Report	DEMP	Daily	Hall Contracting
Daily Disposal Report	DEMP	Daily	Hall Contracting
Weekly Report	DEMP	Weekly	Hall Contracting
Monthly Report	DEMP	Monthly	Hall Contracting
Marine Works Daily Inspection Checklist	WQMP	Daily	Rare-Environment
Marine Weekly Compliance	WQMP	Weekly	Rare-Environment
Marine Monthly Compliance	WQMP	Monthly	Rare-Environment
Marine Works Investigation Report	WQMP	On occurrence	Rare-Environment

Visual Inspection Report of Silt Curtain	WQMP	Daily, Part of the Environmental Inspection sheet	Hall Contracting
Marine MegaFauna Observation Sheet	FFMP	Daily, Separate record sheet	Hall Contracting

Emplacement Cell Audit, Infrastructure Approval Schedule 3, Clause 10:

Type of Report	Reference Management Plan	Frequency of Report	Responsible Company
Bathymetric Survey	N/A	One report prior start of works	Hall Contracting
Material Tracking Register	SWMP	Running process, daily updates	Rare-Environment
Stock Pile Register	SWMP	Running process, daily updates	Rare-Environment
Laboratory Test Results	SWMP	Running process, Every 1000 m3, for land excavation only	Rare-Environment
Daily Disposal Report	DEMP	Daily	Hall Contracting
Weekly Report	DEMP	Weekly	Hall Contracting
Monthly Report	DEMP	Monthly	Hall Contracting
Capping Placement Report	ECR	Topographical survey charts when all available capping material has been placed used	Hall Contracting
Survey	N/A	Weekly survey topographic / bathymetric charts as applicable	Hall Contracting



Silt Screen and Bubble Curtain Inspection form
Port Kembla Gas Terminal

Location: Berth 101

Activity at location during inspection:

Inspection Date															Possible Actions	Comment	
Item	Inspection	Yes	No	Possible Actions	Comment												
1	Turbid water escaping into the larger water body?															Identify which section; follow actions mentioed below	
2	Silt curtain is maintained in correct position and is															check anchoring system and placement of anchors Check connection points, zips adjust / repair as required Remove any entanglements Replace silt curtain pannel if cause of leakage	
2	Silt curtain is free moving and not held down by sand or															Remove that what blocks its free movement	
3	Freeboard of silt curtain is being maintained.															Inspect curtain skirt for marine growth, sediment or debris that might cause reduced freeboard. Check floats for damage. Replace floats where needed Replace curtain panels where needed	
5	Check wear and tear, esp anchoring points															Replace worn / broken anchor lines	
6	Is refuse trapped by silt curtain															Remove refuse and dispose off as per procedure	
7	Marker buoys and lights present and operational															Replace defective lights and markers	
8	Spares for silt curtain available on site															anchor lines, anchors, floats, curtains; if ordered indicate delivery	
9	Bubble curtain is working at correct capacity															Check compressors; check hoses	
10	Air hoses not leaking [no bubbles at wrong places]															Replace defective hoses	
11	Spares for bubble curtain available on site															Airhoses, compressor parts [ie. Filters, couplings etc]	
Inspector																	
Initials																	

Location: Outer Harbour

Activity at location during inspection:

Inspection Date															Possible Actions	Comment	
Item	Inspection	Yes	No	Possible Actions	Comment												
1	Turbid water escaping into the larger water body?															Identify which section; follow actions mentioed below	
2	Silt curtain is maintained in correct position and is maintaining its anchored profile															check anchoring system and placement of anchors Check connection points, zips adjust / repair as required Remove any entanglements Replace silt curtain pannel if cause of leakage	
2	Silt curtain is free moving and not held down by sand or dispersed mud															Remove that what blocks its free movement	
3	Freeboard of silt curtain is being maintained.															Inspect curtain skirt for marine growth, sediment or debris that might cause reduced freeboard. Check floats for damage. Replace floats where needed Replace curtain panels where needed	
5	Check wear and tear, esp anchoring points															Replace worn / broken anchor lines	
6	Is refuse trapped by silt curtain															Remove refuse and dispose off as per procedure	
7	Marker buoys and lights present and operational															Replace defective lights and markers	
8	Spares for silt curtain available on site															anchor lines, anchors, floats, curtains; if ordered indicate delivery time	
9	Bubble curtain is working at correct capacity															Check compressors; check hoses	
10	Air hoses not leaking [no bubbles at wrong places]															Replace defective hoses	
11	Spares for bubble curtain available on site															Airhoses, compressor parts [ie. Filters, couplings etc]	
Inspector																	
Initials																	

**DAILY CLIENT DREDGE REPORT**

Date: Sun 13/06/21

Report No: 74

Client: SBSC JV

PROJECT: Port Kembla Gas Terminal DREDGER: WOOMERA

Page 1 of 4

Run Line	Berth 101	Berth 101	Berth 101	Berth 101
Dredge Area	Berth 101	Berth 101	Berth 101	Berth 101
Revetment area	NA	NA	NA	NA
Cut Lane	4	4	4	4
Reclamation Area	OHDSCA	OHDSCA	OHDSCA	OHDSCA
Name of Barge	SHB 101	SHB 102	SHB 101	SHB 102
Barge/trip no	21	22	23	24

Project Info	
Client	AIE
Main Con	SCSB JV
Subcon dredging	Hall Contracting
Contract no	AIE-oo1
Start date	01-Apr-2021
Completion date	21-Oct-2021

BARGE NUMBER ON DREDGE REPORT AND DISPOSAL REPORT REFER TO THE SAME LOAD

Cut Details						
Start Chainage	m	30	30	40	30	
End Chainage	m	41	50	30	50	
Progress	m	11	20	-10	20	
Width of cut	m	33	20	33	20	
Depth before	mPKHD	5	na	5	na	
Depth after	mPKHD	8	na	8	na	
Soil type	[-]	2	rock	1	rock	
Spillage	%	20%	20%	20%	20%	
Nearest Borehole	ID	BH5	BH5	BH6	BH6	

Soil type	
1	Granular soil /sand
2	Ass/Pass
3	Clay, weathered rock
HM/HS	Contaminated mud/silt

Production							Day	Avg. to date	To Date
Pre dredge OHDSCA									
Daily volume	m3	1,287					1,287	1,500	83,000
Barges loaded	#	1							
Revetment removal Berth 101									
Daily volume	m3		676				676	1,231	37,500
Dredging Berth 101									
Daily Vol - type 1	m3			-1,170			-1,170	1,231	37,500
Daily Vol - type 2	m3								
Daily Vol - type 3	m3								
Daily Vol - type HM/HS	m3								
Daily Vol - type others	m3								
Barges loaded	#	1		1			2	4	202
Revetment install Berth 101									
Filter layer	m3				225		225		
quarry run layer	m3								
Under layer	m3								
Armour layer	m3								
Revetment OHDSCA									
Filter layer	m3								
Armour layer	m3								

Efficiency							Day	Avg.	To Date
In Service Hours	hrs	24.00					24.00	24.00	240
Operational Hours	hrs	16.17					16.17	15.20	137
Efficiency	%	67%					67%	63%	57%

Consumable Use							Day	Avg.	To Date
Teeth Used	No.								
Type of Teeth	Type	Chisel							

Delays						
Out of service (min)	External delays (min)	Technical Delays (min)	Operational Delays (min)			
Mob / Demob on site	On order	Deck / Cranes	Shift dredge			
Planned maintenance	Weather (fog/wind)	Engine room 175	Greasing / inspection 70			
Scheduled stops	Sea (waves/current)	General maintenance	Change barge 85			
Holiday / Strike	Tide	Propulsion	Shift / Rotate barge			
Others (out of service)	Traffic	Spud	No barge			
DAY TOTAL (mins)	Survey	Spud carrier	Change teeth			
TO DATE (hrs)	Others (external)	Main engine(s)	Change bucket			
	DAY TOTAL (mins)	Electrics	Change stick			
	TO DATE (hrs)	0.0	Wear 20			
		Hydraulics - Pumps	Obstructions			
		Hydraulics - Hoses 120	Bunkering			
		Dredge system (incl. se	Environmental [WQM]			
		Pontoon levelling				
		Others (technical)				
TOTAL DELAY (hrs)		DAY TOTAL (min) 295	Others (operational)			
DAY	7.8	TO DATE (hrs) 0.0	DAY TOTAL (mins) 175			
TO DATE	0		TO DATE (hrs) 0			



DAILY CLIENT REPORT

Date: Sun 13/06/21
 Report No: 74
 Client: SBSC JV

PROJECT: PK Gas Terminal DREDGER: WOOMERA

Forecast

Pre dredge OHDSCA					
Volume dredged till date	m3	0	Forecast time to completion of dredging	days	
Volume completed to last survey	m3	N/A	Forecast completion of dredging	date	
Volume remaining	m3	360,000	Forecast production rate	m3/day	
revetment removal Berth 101					
Volume removal till date	m3	0	Forecast time to completion of removal	days	
Volume removed to last survey	m3	N/A	Forecast completion of removal	date	
Volume removal remaining	m3	360,000	Forecast removal rate	m3/day	
Dredging Berth 101					
Volume dredged till date	m3	0	Forecast time to completion of dredging	days	
Volume completed to last survey	m3	N/A	Forecast completion of dredging	date	
Volume remaining	m3	360,000	Forecast production rate	m3/day	
Revetment install Berth 101					
Volume installed till date	m3	0	Forecast time to completion of installation	days	
Volume installed to last survey	m3	N/A	Forecast completion of installation	date	
Volume remaining	m3	360,000	Forecast installation rate	m3/day	
Perimeter bund core construction					
m3 placed to date			Forecast time to completion of installation	days	
m3 to go			Forecast completion of installation	date	
linear m completed to design			Forecast installation rate	m3/day	
Perimeter bund revetment					
Volume installed till date	m3	0	Forecast time to completion of installation	days	
Volume installed to last survey	m3	N/A	Forecast completion of installation	date	
Volume remaining	m3	360,000	Forecast installation rate	m3/day	

equipment

Marine equipment	Status	Land based equipment	Status	Manpower	No
backhoe dredger Woomera	Working	Excavator CAT 330	Working	Supervisory staff	10
survey vessel edendragh	Working	Excavator CAT345 LR	Working	Marine crew	23
tug Mildred	Working	Wheelloader CAT 964	Working	Land crew	11
tug Seahorse	Working	ATD Volvo A40	Working	Visitor	1
Split hopper barge Hall 001	Working	ATD Volvo A40	Mainten.		
Split hopper barge Hall 002	Working	ATD Volvo A40	Working		
Flattop barge 1802	Working				
Flattop barge 1803	Working				

Comments

Hall Representative	Date	Signature
	Mon 14/06/21	
Client Representative	Date	Signature



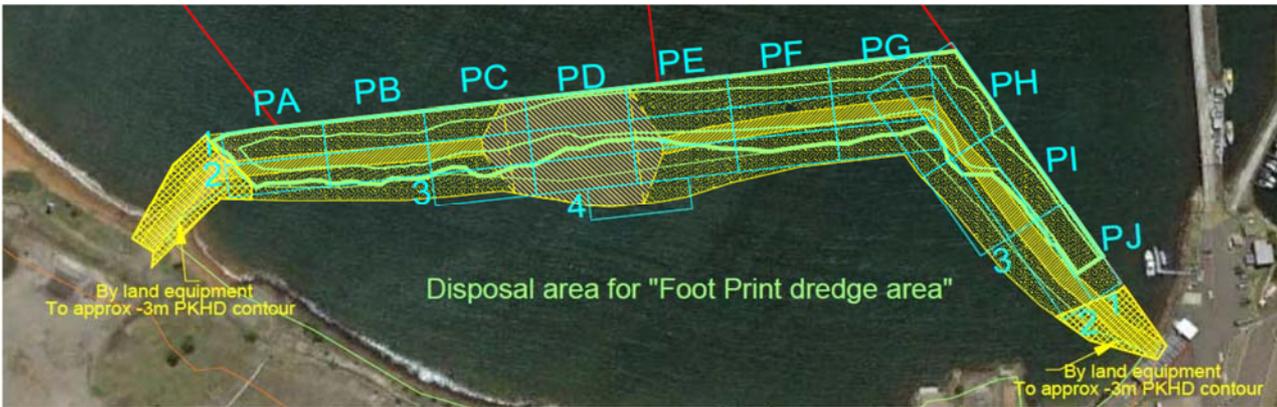
Barge/trip no	21	22	23	24		
Barge name	SHB 101	SHB 102	SHB 101	SHB 102		
Tug	Mildred	Sea horse	Mildred	Sea horse		
Start loading		9:15	13:25	18:10		
Start sailing full	8:55	13:05	17:15	22:35		
dump	9:25	13:50	17:50	23:05		
Dump Box [grid ref]	B5	B6	A7	C7		
Volume						
Soil type	1	2	2	2		

Project Info	
Client	AIE
Main Con	SCSB JV
Subcon dredging	Hall Contracting
Contract no	AIE-oo1
Start date	01-Apr-2021
Completion date	21-Oct-2021

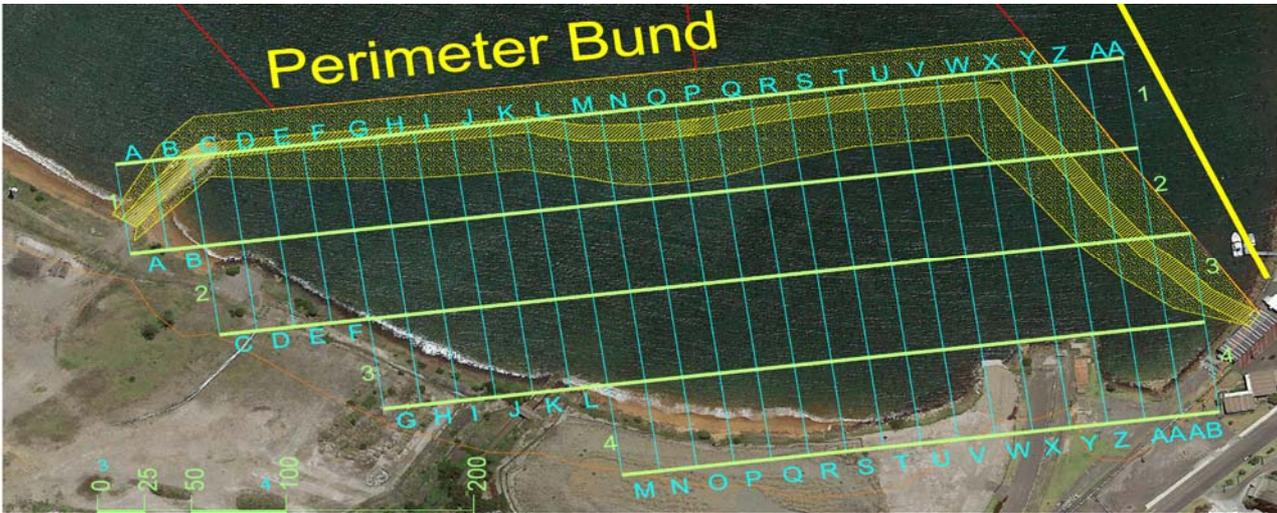
BARGE NUMBER ON DREDGE REPORT AND DISPOSAL REPORT REFER TO THE SAME LOAD

Summary	perimeter bund		inside perimeter bund		stockpiled	
	today	to date	today	to date	today	to date
type 1						
type 2						
type 3						
type HM/HS						
Type other						

Soil type	
1	Granualr soil /sand
2	Ass/Pass
3	Clay, weathered rock
HM/HS	Contaminated mud/silt
Other	Not one of the above



Top: Dump boxes used for disposal type 1A/1B/fill [all non contaminated] for forming perimeter bund
 Below: Dump boxes used for disposal if type 2/3/HM/HS/other, behind the perimeter bund



Comments

Hall Representative	Date	Signature
	Mon 14/06/21	
Client Representative	Date	Signature



WEEKLY CLIENT REPORT

PROJECT: **Port Kembla Gas Term** DREDGER: **Woomera**

Week Ending: **Mon 16/11/20**
 Project Manager: **Charlie Bicknell**
 Client: **SCSB JV**

Berth 101

Berth 101 Revetment removal	filter	
	from	to
Length		
height		
Length		
height		
Volume removed this week		
Volume removed to date		
Total volume to remove		

Berth 101 Revetment South Side	filter		quarry		under layer		armour	
	from	to	from	to	from	to	from	to
Length								
height								
Length								
height								
Volume placed this week								
Volume placed to date								
Total volume to place								

Berth 101 Revetment North Side	filter		quarry		under layer		armour	
	from	to	from	to	from	to	from	to
Length								
height								
Length								
height								
Volume placed this week								
Volume placed to date								
Total volume to place								

Dredge	Lane 1	lane 2	lane 3	lane 4	lane 5	lane 6	Total dredged this week	Total dredged to date	Total to dredge
From									
to									
total length									
Volume type 1	23000						23,000	143,015	160,000
Volume type 2		20020					20,020	20,020	90,000
Volume type 3							0	0	34,000
Volume type HS/HM							0	0	45,000
Volume type Others							0	0	1,500
Total volume dredged							43,020	163,035	330,500

OHDSKA

OHDSKA Revetment	filter		Armour	
	from	to	from	to
Length				
height				
Length				
height				
Volume placed this week				
Volume placed to date				
Total volume to place				

Dredge	Lane 1	lane 2
From	220	280
to	720	720
total length	500	440
Vol type 2/HS/HM	23,000	20,020
Vol dredge this wk		43,020
Vol dredged todate		53,040
Vol to go		29,960



WEEKLY CLIENT REPORT

PROJECT: **Port Kembla Gas Term** DREDGER: **Woomera**

Week Ending: **Mon 16/11/20**
 Project Manager: **Charlie Bicknell**
 Client: **SCSB JV**

SUMMARY WOOMERA PERFORMANCE

Efficiency		Week	To Date	Avg/d	Consumable Use		Week	To Date
Ops Hrs	hrs	99.67	2026.08	11.32	Teeth	No.	604	13,976
Delays	hrs	68	2256	13	Fuel	Ltr.	145,342	3,309,191
Prod. Rate	m3/hr	556	541	3				
Prod. Rate rock placement	m3/hr	230	131	3				

Delays WOOMERA

Out of service (hrs)		External delays (hrs)		Technical Delays (hrs)		Operational Delays (min)	
Mob / Demob on site	0.00	On order	0.00	Deck / Cranes	0	Shift dredge	0
Planned maintenance	0.00	Weather (fog/wind)	0.00	Engine room	175	Greasing / inspection	70
Scheduled stops	0.00	Sea (waves/current)	0.00	General maintenance	0	Change barge	85
Holiday / Strike	0.00	Tide	0.00	Propulsion	0	Shift / Rotate barge	0
Others (out of service)	0.00	Traffic	0.00	Spud	0	No barge	0
WEEK TOTAL	0.00	Survey	0.00	Spud carrier	0	Change teeth	0
TO DATE	288.58	Others (external)	0.00	Main engine(s)	0	Change bucket	0
		WEEK TOTAL	0.00	Electrics	0	Change stick	0
		TO DATE	0.33	Hydraulics - Pumps	0	Wear	0
				Hydraulics - Hoses	120	Obstructions	0
				Dredge system (incl. s	0	Bunkering	20
				Pontoon levelling	0	Environmental [WQM]	0
				Others (technical)	0		0
				DAY TOTAL (min)	295	Others (operational)	
				TO DATE (hrs)	0.0	DAY TOTAL (mins)	175
						TO DATE (hrs)	0

TOTAL DELAY (hrs)	
WEEK TOTAL	68.3
TO DATE	2,255.9

Delays OHDSCA



WEEKLY CLIENT REPORT

PROJECT: **Port Kembla Gas Term** DREDGER: **Woomera**

Week Ending: **Mon 16/11/20**
 Project Manager: **Charlie Bicknell**
 Client: **SCSB JV**

Forecast

Pre dredge OHDSCA						
Volume dredged till date	m3	44,000		Forecast time to completion of dredging	days	
Volume completed to last survey	m3	43,000		Forecast completion of dredging	date	
Volume remaining	m3	43,000	48%	Forecast production rate	m3/day	0
Revetment removal Berth 101						
Volume removal till date	m3	36,000		Forecast time to completion of removal	days	
Volume removed to last survey	m3	36,000		Forecast completion of removal	date	
Volume removal remaining	m3	36,000	0%	Forecast removal rate	m3/day	0
Dredging Berth 101						
Volume dredged till date	m3	123,000		Forecast time to completion of dredging	days	
Volume completed to last survey	m3	115,000		Forecast completion of dredging	date	
Volume remaining	m3	215,000	35%	Forecast production rate	m3/day	0
Revetment install Berth 101						
Volume installed till date	m3	0		Forecast time to completion of installation	days	
Volume installed to last survey	m3	0		Forecast completion of installation	date	
Volume remaining	m3	36,000	0%	Forecast installation rate	m3/day	0
Perimeter bund core construction						
m3 placed to date		63,000		Forecast time to completion of installation	days	
m3 to go		23,000		Forecast completion of installation	date	
linear m completed to design		720	92%	Forecast installation rate	m3/day	
Perimeter bund revetment						
Volume installed till date	m3	0		Forecast time to completion of installation	days	
Volume installed to last survey	m3	0		Forecast completion of installation	date	
Volume remaining	m3	43,000	100%	Forecast installation rate	m3/day	0

Comments on significant delays incurred

Time	Duration (hrs)	Cause
13/11/2018	5.25	BP2 flushing pump
14/11/2018	3.08	BP2 flushing pump
17/11/2018	11.00	Replace port swing wire
17/11/2018	3.00	UWP main engine fault
18/11/2018	5.42	Replace/repair EA deck pipe
18/11/2018	8.00	Main generator fault

Activities completed this week	Major activities planned next week
Continued dredging run lines 1 and 2 .	Continue dredging run line 1.
Continue management of discharge material within OHDSCA	Commence shaping perimeter bund for revetment works
Continue monitoring water quality	

Key milestone status (short-term)

Milestone	Commentary	Contract date	Forecast date	Progress

Current Risks and Issues

Description	Mitigation Measures	Impact
unexpected find	SCSB JV to advise how t proceed	High
arrival largest vessel to PK next week	reschedule maintenance for Wsoomera	Medium



WEEKLY CLIENT REPORT

PROJECT: **Port Kembla Gas Term** DREDGER: **Woomera**

Week Ending: **Mon 16/11/20**
 Project Manager: **Charlie Bicknell**
 Client: **SCSB JV**

Lag Indicators			Lead Indicators		
Description	Week	To Date	Description	Week	To Date
Man Hours	5,104	137,854	Safety Inspections Completed	38	731
Near Hit Incidents	0	4	Environmental Inspections	7	284
Plant, Equipment and Vehicle Damage	0	5	Task Observations Completed	51	994
Occupational Exposure / Illness	0	0	HSEQ Audits Completed	0	10
First Aid Injury (FAI)	0	3	Hazard Reports	5	190
Medical Treatment Injury (MTI)	0	0	Action Close Outs	18	251
Restricted Work Injury (RWI)	1	4	Inductions Completed	8	222
Lost Time Injury (LTI)	0	0	Tool Box Sessions	2	77
Significant incident (SI)	0	4	BAC conducted	435	11,384
Fatality or Permanent Disability	0	0	Drug Tests conducted	4	37
Lost Work Days	0	0	Other Training conducted	0	40
Complaints	0	0	Emergency Drills Conducted		
Environmental Incidents	0	7	Vessel: Collision, Flooding		
Significant Environmental Incidents	0	0			

Statistics			General HSE Comments / Issues
Frequency Rates	Y-to-D	Target	
CIFR : Classified Injury Frequency Rate	0	0	Looking out for your mates focus for the week
LTIFR: Lost Time Injury Frequency Rate	0	-	Safety Focus: Take 5 to be Job-ready
TRIFR: Total Recordable Injury Frequency Rate	21.8	-	Mabuiag removal well planned and executed
TRIFR: Total Recordable Injury Frequency Rate (as of 01/08/2018)	0	2.9	Pre-start discussions around fatigue
SIFR: Significant Incident Frequency Rate	29.0		

Hall Representative	Date	Signature
	Sun 18/11/18	

Attachments

- Dredge Progress Sketchs (incl. bore logs)
- Reclamation Progress Sketch
- Weekly Progress Survey of Dredge Area
- Weekly Progress Survey of OHSCA
- Marine Fauna Inspection Report
- Environmental Inspection

Monthly Report - Port Kembla Gas Terminal

Month: **Nov-2018**



Project Manager:	Charlie Bicknell
Client:	AIE

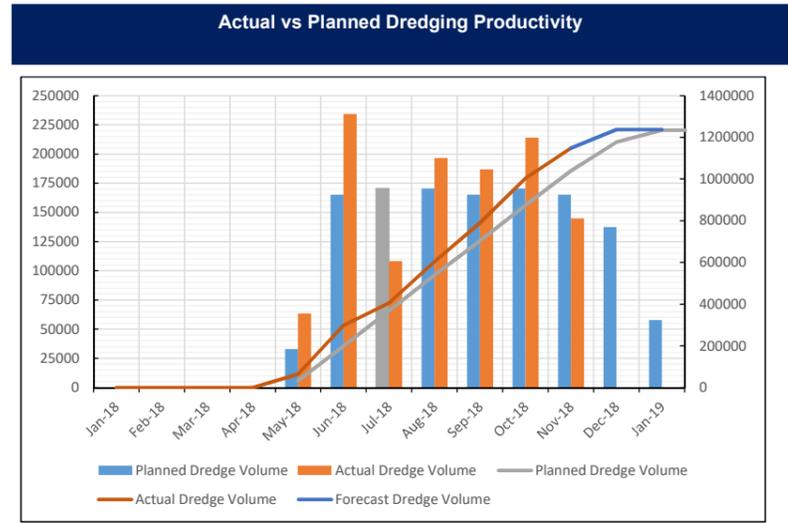
Project Commencement Date:	Thursday, 1 April, 2021
Forecast Completion Date:	Thursday, 21 October, 2021

Dredge Production	Month	To Date	Avg/d
Volume OHDSCA		83,000	2,300
Volume	144,833	230,000	3,000

Efficiency	Month	To Date	Avg/d
Ops Hrs	348	2,096	10.99
Delays (hrs)	373	2,427	12.72
Prod. Rate (m3/hr)	389	110	110

Revetments	Month	To Date	Avg/d
Volume OHDSCA		83,000	2,300
Volume South 101	144,833	230,000	3,000
Volume North 101	144,833	230,000	3,000

Consumables	Month	To Date
Teeth	2	4
Fuel	229,727	804,043



Run Line	Lane 1	lane 2	lane 3
Dredge Area	Berth 101	Berth 101	Berth 101
Reclamation Area	OHDS CA	OHDS CA	OHDS CA
Cut Details			
Start Chainage (m)	254	150	0
End Chainage (m)	335	332	70
Progress (m)	81	182	70
Width of cut (m)	90	90	90
Depth of cut (mCD)	-7.7	-8.8	-8.8

Delays			
Out of service	External delays	Technica Delays	
Mob / Demob on site	On order	Deck	Obstruction Pump
Planned maintenance	Weather (fog/wind)	Engine room	Pipeline floating
Scheduled stops	Sea (waves/current)	General maintenance	Pipeline submerged
Holiday / Strike	Tide	Sidewires	Pipeline shore
Others (out of service)	Traffic	Shift dredge	Reclamation
MONTH TOTAL (hrs)	32.8	Shift anchors	Booster delay
	Survey	Cutter change	Wear pumps
	Others (external)	Cutter check	Wear pipeline on board
	MONTH TOTAL (hrs)	0	Teeth change
		Obstruction cutter	Others (technical)
			MONTH TOTAL (hrs)
			339.9

TOTAL DELAY (hrs)	
Month	373
TO DATE	2,427

Forecast					
Revetment removed till date	m3	1,148,301	Forecast time to comple of revetment removal	days	9
Revetment removed to last survey	m3	1,148,301	Forecast complewion of revetment removal	date	22/11
Revetment to remove	m3	26,552	Forecast production rate	m3/day	5,000
Volume dredged till date	m3	1,148,301	Forecast time to completion of dredging	date	12
Volume completed to last survey	m3	1,148,301	Forecast completion of dredging	date	22/12
Volume remaining to dredge	m3	26,552	Forecast production rate	m3/day	5,000
Revetment south till date	m3	1,148,301	Forecast time to completion revetment south	date	12
Revetment south to last survey	m3	1,148,301	Forecast date completion revetment north	date	22/12
Revetment south to do	m3	26,552	Producion rate revetmentr south	m3/day	5,000
Revetment north till date	m3	1,148,301	Forecast time to completion revetment north	date	12
Revetment north to last survey	m3	1,148,301	Forecast date completion revetment north	date	22/12
Revetment north to do	m3	26,552	Producion rate revetment north	m3/day	5,000
Revetment OHDS CA till date	m3	1,148,301	Forecast time to completion revetment OHDS CA	date	12
Revetment OHDS CA to last survey	m3	1,148,301	Forecast date completion revetment OHDS CA	date	22/12
Revetment OHDS CA to do	m3	26,552	Producion rate revetment OHDS CA	m3/day	5,000

Activities Completed for the Month

Major Activities Planned for Next Month

Key Milestone Status				
Milestone	Commentary	Contract Date	Forecast Date	Progress

Current Risks and Issues		
Description	Mitigation Measures	Impact
		Medium
		Low

Monthly Report - Port Kembla Gas Terminal

Month: **Nov-2018**



Project Manager:	Charlie Bicknell
Client:	The Pilbara Infrastructure

Project Commencement Date:	Friday, 22 December, 2017
Forecast Completion Date:	Thursday, 28 February, 2019

Lag Indicators		
Description	Month	To Date
Man Hours	17,183	145,080
Near Hit Incidents	3	4
Plant, Equipment and Vehicle Damage	4	5
Occupational Exposure / Illness	0	0
First Aid Injury (FAI)	1	4
Medical Treatment Injury (MTI)	0	0
Restricted Work Injury (RWI)	1	4
Lost Time Injury (LTI)	0	0
Significant incident (SI)	0	4
Fatality or Permanent Disability	0	0
Lost Work Days	0	0
Complaints	0	0
Environmental Incidents	2	7
Significant Environmental Incidents	0	0

Lead Indicators		
Description	Month	To Date
Safety Inspections Completed	99	776
Environmental Inspections	17	291
Observations Completed	158	1066
HSEQ Audits Completed	2	12
Hazard Reports	10	191
Action Close Outs	23	256
Inductions Completed	12	224
Tool Box Sessions	4	77
BAC conducted	1,677	11,987
Drug Tests conducted	8	41
Other Training conducted	0	40
Emergency Drills Conducted	11	71

Statistics		
Frequency Rates	Year to Date	Target
CIFR : Classified Injury Frequency Rate	0	0
LTIFR: Lost Time Injury Frequency Rate	0	
TRIFR: Total Recordable Injury Frequency Rate	28	2.9
SIFR: Significant Incident Frequency Rate	28	

General HSE Comments/Issues
Look out for your mates campaign - Take 5 focus for demobilisation
Safety Positives
Demobilisation of Mabuag - Traffic management, Lifting and Rigging Activities

Attachments

- Stated Programme
- Monthly Progress Survey of Dredge Area
- Monthly Survey of Reclamation
- Project Cost & Forecast Report

Samuel Willianson
Hall Representative

10-Nov-18
Date

S. Williamson
Signature

Species that may occur or likely occur at the Project Site and are listed as Critically Endangered / Endangered/ threatened listed species under the EPBC 1999 /BC Act 2016/FM Act 1994 act



Gray Nurse Shark



Black rockcod/Black cod/Saddled rock cod



Long-nosed fur seal, New Zealand fur seal



Southern right Whale



Humpback Whale



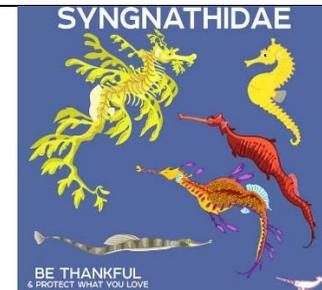
Australian fur seal, Australo-african fur seal



Indian Ocean Bottlenose Dolphin



Bottlenose dolphin



Syngnathids (i.e. seahorses, seadragons, pipefish and pipehorses)

PORT KEMBLA GAS TERMINAL

Marine Works Daily Inspection Checklist

Date:	Time:	Overnight Rainfall (mm):
Inspection Conducted by:		Weather and other meteorological conditions:
Current Activities: (eg. Dredging, Piling)		

Observations and Review of Site Activities		
Review of Current Site Activities and Environmental Aspects	Y/N/NA/NC	Comments
Access and Egress to all work areas is clear and unimpeded?		
Erosion and Sediment Controls are in place and functional?		
Are all siltation control measures working effectively (Silt Fences and Silt Curtains)?		
Are exclusion zones / no-go areas being adhered to?		
Are minor maintenance and cleaning of plant and vehicles conducted in appropriately designated area only?		
Is there appropriate storage of all Fuel products on site?		

Is there any oil and grease present on the surface of the water inside the Port		
Are on land dust control measures in place?		
Is material stockpiled in designated temporary stockpile areas only?		
Is the site clean and free of waste, weeds and debris?		
Are marine environmental controls (eg. Silt Curtains, Bubble Curtains and AMB's) in place and functional?		
If contaminated material is present is it properly located, segregated with functioning enviro controls?		
Is there any new contamination (or potential for contamination) on site caused by site activities		
Is Standard Procedure for Piling works being adhered to (i.e Soft Start etc.)?		
Are Fenders, Bollards and Safety equipment functional and in proper place?		
Is the site free of physical, liquid and chemical pollution?		
Have any Marine Species (such as Syngathids) been observed?		
Have any Marine fauna been observed inside the Port?		
Have any signs of Toxic Dinoflagellate Cysts been observed within the Port (Red colouring in water)?		



PORT KEMBLA GAS TERMINAL Marine Works Investigation Report

Date:	Time:	Overnight Rainfall (mm):
Inspection Conducted by:		Weather and other meteorological conditions:
Location:	Type: Contamination limit Exceedance	
Current Activities: (eg. Dredging, Piling)		

1 Description of Event

- Weekly water quality samples were collected on 19 August 2009. The laboratory results were reported on 25 August 2009. The results of the sample analysis recorded an exceedance of trigger values at EPL 06C.
- The Naphthalene trigger value is 2µg/l. The naphthalene concentration at EPL 06C was 3.1 µg/l at 11.21 on 19 August 2009.
- The event occurred during an outgoing tide.

Table 1: Turbidity Results

Location	Approx. Time	Turbidity (ntu)	Naphthalene (µg/l)
EPL07C (0.5m from surface up current)	10.41 am	7.6	<1.0
EPL08C (0.5m from bottom up current)	10.47 am	8.0	<1.0
EPL 11	10.55 am	7.9	<1.0
EPL 10	11.13 am	8.7	<1.0
EPL05C (0.5m from surface Down current)	11.15 am	8.9	<1.0
EPL06C (0.5m from bottom Down current)	11.21 am	6.1	3.1

Works actively being undertaken in close proximity to EPL06C at the time of the exceedance include:



- The Loadstar rig was actively piling
- Boskalis dredge was actively dredging the CSC;
- NCIG's survey boat was adjacent to the Boskalis dredge
- OSSPW preparation works were being undertaken;
- Silt curtain installation works were not being undertaken at the time of the event.
- The Bouganville dredge was observed to be operating adjacent to the Kopper's berth.

Figure 1 (attached) illustrates the general layout of the area when the samples were obtained. The locations of all vessels in the River was obtained from observation records taken on 19th August.

2 Data Validation

Laboratory results were collected using standard sample collection procedures. Laboratory QA for the samples were within acceptable quality limits. The data is considered representative.

3 Immediate Corrective Actions

Immediately following the laboratory reporting on the 25th August, the following investigation actions were undertaken:

- A review of the observational data and activities in the river at the time of the sample collection was undertaken
- Turbidity data collected during the sampling event was reviewed. The turbidity readings at the four locations adjacent to the Loadstar piling rig, EPL 5C, 6C, 7C and 8C ranged from 6.1 and 8.9 ntu. The turbidity data did not indicate that sediments had been disturbed adjacent to EPL6C at the Loadstar piling rig.
- Additional data collected at the NCIG dredging works were reviewed. Samples were collected at four locations adjacent to the NCIG dredging works on the 19th August 2009, in accordance with EPL 12740. Concentrations of naphthalene were below laboratory detection limits and trigger values in the four samples analysed. The NCIG data did not indicate the dredging works were contributing to the Naphthalene exceedence at EPL 6C;
- A slight plume was observed emanating from the Bouganville dredging rig adjacent to the Koppers berth. An additional turbidity reading was taken from the observed plume. Turbidity in the plume was 11.6 ntu. The Bouganville dredge was operating down current of EPL6C, and is not considered to be a contributing factor to the Naphthalene exceedence at EPL 6C.
- The laboratory results were reported on the 25th August 2009. DECC, was notified by CB, [the client/EPL holder] of the event via e-mail at 6.58pm on 25th August 2009 after [the client/EPL holder] was notified by [the contractor];
- Environmental controls were observed to be in place and in good condition on the 19 August during the hourly inspections of the piling works.



4 Cause of Event

The cause of the event was not determined by the review of observation data, turbidity readings and laboratory results at adjacent locations from the 19th August. The investigation did not indicate that HRRP activities were the cause of the Naphthalene exceedence.

5 Outcomes of the Investigation and Corrective Actions

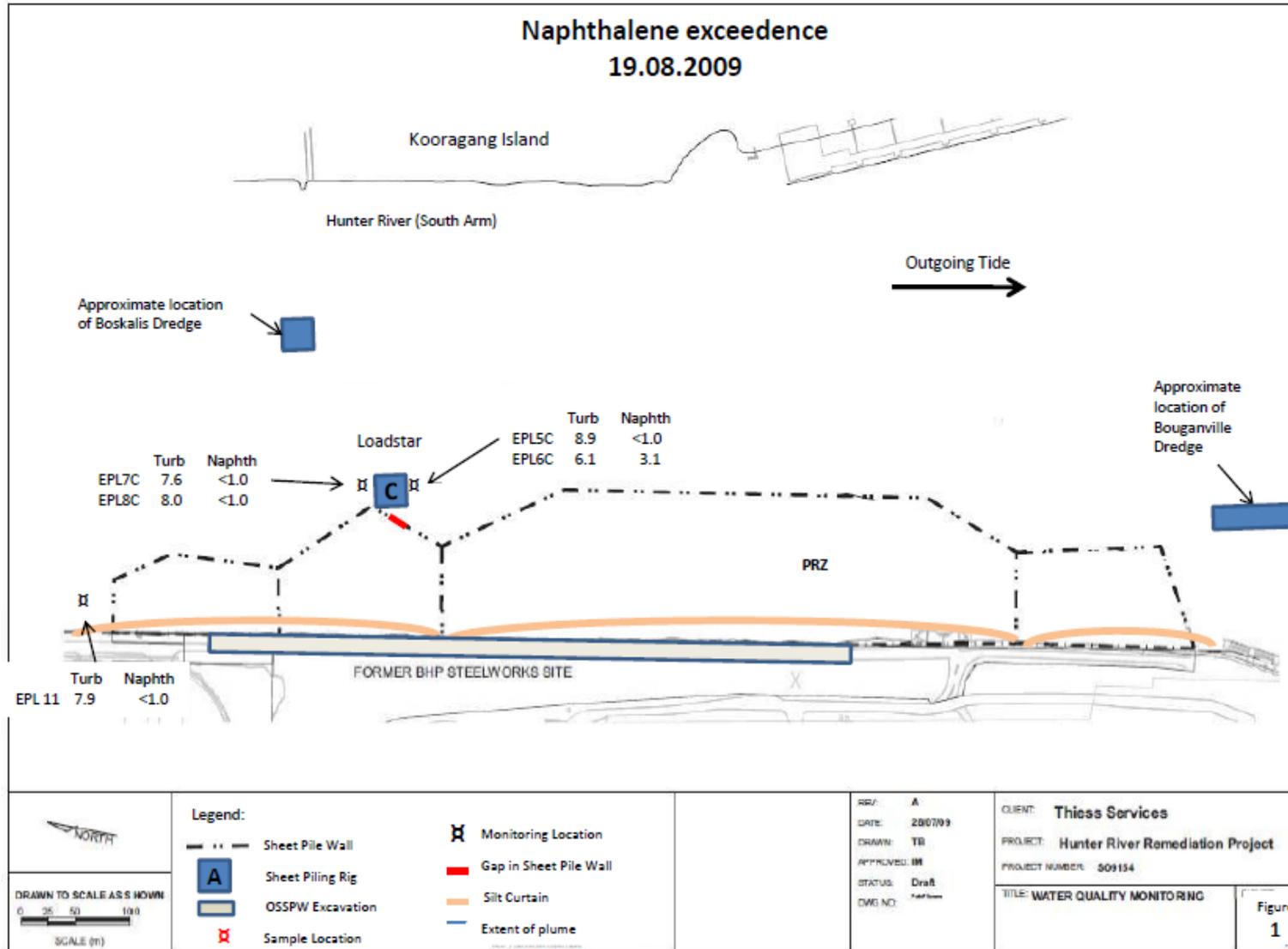
- The exceedence of the turbidity trigger value was not found to have been caused as a result of the INRSPW installation works.
- Environmental controls and work practices were checked on the Loadstar sheet piling rig.

6 Observed Environmental Impact

- The Naphthalene concentration observed was 3.1 µg/l, marginally above the trigger value of 2 µg/l. Naphthalene was not detected at other nearby sampling locations taken on the 19 August indicating the trigger value exceedence to be minor and not wide spread across the river.

7 Notification and Investigations

- E-mail notification
 - o 25 August 2009 - DECC
- Written notification
 - o 27 August 2009 - DECC





PORT KEMBLA GAS TERMINAL Construction Water Quality Management Plan [Example] Weekly Compliance Report

Document Number
SCSB-AIE-PKGT-ENV-PRO-003

	Name	Position
Compiled By	Rhys Blackburn	Environmental Manager
Reviewed By	Rhys Blackburn	Environmental Manager
Approved By	Ivan Bota	Project Manager
Rev	Reason for Issue	Issue Date
A	Template example	1 June 2020



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2.1 RESULTS1

2.2 INVESTIGATION REPORTS1

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APPENDIX B. INSPECTION PHOTOGRAPHS.....3

REFERENCE DOCUMENTS

Reference	Document Title
EIS	Port Kembla Gas Terminal – Environmental Impact Statement – GHD November 2018
Infrastructure Approvals	Section 5.19 of the Environmental Planning & Assessment Act 1979. Application Number SSI 9471

ACRONYMS AND DEFINITIONS

Acronym / Definition	Description
AIE	Australian Industrial Energy
PKGT	Port Kembla Gas Terminal
WQMP	Water Quality Management Plan
NGP	Natural Gas Pipeline
ASSMAC	Acid Sulphate Soils Management Advisory Committee
COC	Contaminants of Concern
OHDSCA	Outer Harbour Dredging and Spoil Containment Areas
PKHD	Port Kembla Height Datum
SHB	Split Hopper Barges
BHD	Backhoe Dredger
AMB	Automated Monitoring Buoys
ASS	Acid Sulphate Soils
PASS	Potential Acid Sulphate Soils
TBA	To be advised
MAF	Marine Area Foreman

1 Water Quality Monitoring

1.1 MONITORING REQUIREMENTS

Water quality Monitoring is a requirement of both the Infrastructure Approval and EPL [#pending]. The monitoring requirements include the collection of background turbidity data, observations for visible plumes and sheens, collection of real-time automated water quality results from five locations. Weekly samples are collected for laboratory analysis for Contaminants of Concern. A summary of from the monitoring is outlined below:

Table 1 Summary of sampling and monitoring commitments

Pollutant	Monitoring Limit	Reference
Contaminants of Concern		
Aluminium		
Anthracene	0.1	ANZG 2018 – 95% DGVs
Arsenic	-	
Cadmium	5.5	ANZG 2018 – 95% DGVs
Chromium (total)	4.4	ANZG 2018 – 95% DGVs
Cobalt	1	ANZG 2018 – 95% DGVs
Copper	1.3	ANZG 2018 – 95% DGVs
Lead	4.4	ANZG 2018 – 95% DGVs
Mercury	0.4	ANZG 2018 – 95% DGVs
Nickel	70	ANZG 2018 – 95% DGVs
Silver	1.4	ANZG 2018 – 95% DGVs
Zinc	15	ANZG 2018 – 95% DGVs
Tributyltin	0.006	ANZG 2018 – 95% DGVs
Anthracene	0.1	ANZG 2018 – unknown reliability DGVs
Naphthalene	70	ANZG 2018 – 95% DGVs
Benzo(a)pyrene		ANZG 2018 – unknown reliability DGVs
TSS	Background + 50mg/L	
pH	7.6-8.5	The EIS and ANZECC 2000
Temperature	-	
Electrical Conductivity	TBC	
Dissolved Oxygen	TBC	

2 Works Completed

Works completed include:

- Dredging Lane 1 – Chainage 0800-1200 – (Type 2
- Cell placement in containment cell – dump box Q2, Q3 and Q4

The monitoring period covers:

- Week Ending 06/09/2020

Table 2 Contaminants of Concern and Trigger Level for Marine 95% Protection Levels

Chemical	Trigger values for marine water (μgL^{-1})
Heavy Metals	95% Level of Protection1
Aluminum	-
Antimony	-
Arsenic	-
Cadmium	5.5
Chromium (VI)	4.4
Cobalt	1
Copper	1.3
Lead	4.4
Manganese	-
Mercury (Inorganic)	0.4
Nickel	70
Silver	1.4
Selenium	-
Tributyltin	0.006
Vanadium	100
Zinc	15
Polycyclic aromatic hydrocarbons (PAHs)	
Naphthalene	70
Benzo(a)pyrene	-
Total PAH's	-

*Note – No guideline value- TBC refers to the process described below in section **Erreur ! Source du renvoi introuvable.** ;*

2.1 TURBIDITY RESULTS

The result of water quality monitoring from the Automated Buiys is summarised below:

Table 3 Contaminants

	Turbidity		pH		Temperature		Disolved Oxygen		Electrical Conduc	
	Median	Maximum	High	Low	High	Low				
Background WQM #04										
WQM #01										
WQM #02										
WQM #03										

Median values were collected on a rolling 15 minute period, for a total of 672 data points for the week. The highlights above include:

- Temperature changes, associated with rainfall;
- Turbidity levels below the adopted trigger levels;
- pH and conductivity within background ranges

2.2 SAMPLING RESULTS

The results of water quality results collected from this reporting period are summarised below:

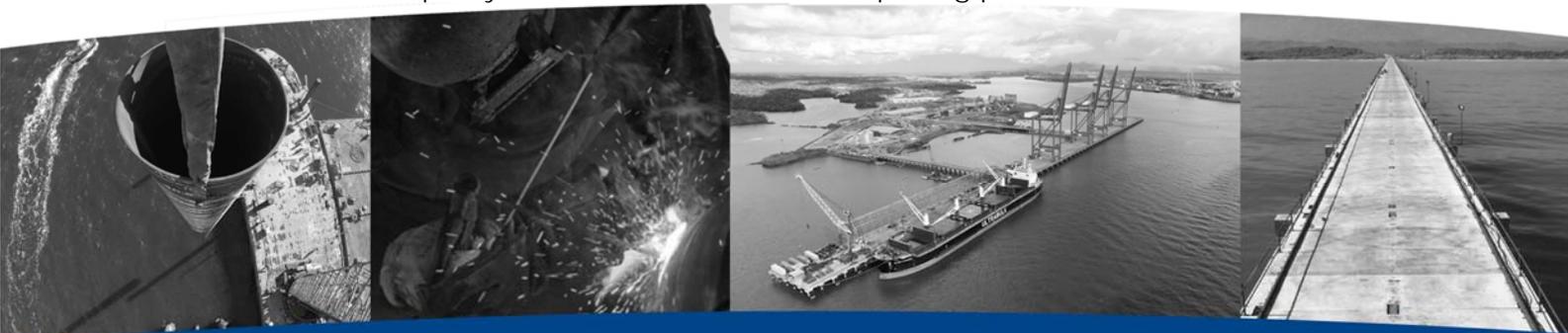


Table 3: WQM Observations and Analytical Results Summary

Week Ending	Turbidity Plume Observations	Sheen Observations	Turbidity Trigger Exceedences	Laboratory Sample Exceedences
06/09/20	0 (3)	0	0	0
13/9/2020	0 (8)	0	0	0
20/09/2020	0	0	0	0
27/09/2020	0	0	1(0)	0

Notes:

() – denotes exceedence attributable to harbour activities other than PKGT construction

Chemical	Heavy Metals	Aluminum	Antimony	Arsenic	Cadmium	Chromium (VI)	Cobalt	Copper	Lead	Manganese	Mercury (Inorganic)	Nickel	Silver	Selenium	Tributyltin	Vanadium	Zinc	Polycyclic aromatic hydrocarbons (PAHs)	Naphthalene	Benzo(a)pyrene	Total PAHs	
Trigger values for marine water (μgL^{-1})	95% Level of Protection1	-	-	-	5.5	4.4	1	1.3	4.4	-	0.4	70	1.4	-	0.006	100	15		70	-	-	
Background WQM #04																						

2.3 INVESTIGATION REPORTS

Discussion of results, assessment against trigger levels...



	PORT KEMBLA GAS TERMINAL	
SCSB-AIE-PKGT-ENV-PRO-003	CONSTRUCTION WATER QUALITY MANAGEMENT PLAN	01/JUN/2020

Appendix A. **Water Quality Monitoring Point Locations**

Appendix B. Inspection Photographs

Photograph 1. Water Quality Monitoring Buoy 04



Photograph 2. Water Quality Monitoring Buoy



Photograph 3. Silt Curtain in place



Photograph 4. Tugs moving coal ship into other berth in Harbour, contributing to plume observations **NOT** attributed to PKGT construction works

	PORT KEMBLA GAS TERMINAL	
SCSB-AIE-PKGT-ENV-PRO-003	CONSTRUCTION WATER QUALITY MANAGEMENT PLAN	03/OCT /2019

Appendix A. Water Quality Monitoring Point Locations

Appendix B. Inspection Photographs

Photograph 1. Water Quality Monitoring Buoy 04



Photograph 2. Water Quality Monitoring Buoy



Photograph 3. Silt Curtain in place



*Photograph 4. Tugs moving coal ship into other berth in Harbour, contributing to plume observations **NOT** attributed to PKGT construction works*



PORT KEMBLA GAS TERMINAL Construction Water Quality Management Plan [Example] Monthly Compliance Report

Document Number
SCSB-AIE-PKGT-ENV-PRO-003

	Name	Position
Compiled By	Tomas Anderson	Environmental Scientist
Reviewed By	Rhys Blackburn	Environmental Manager
Approved By	Ivan Bota	Project Manager
Rev	Reason for Issue	Issue Date
A	Template example	19 March 2020



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SHB	Split Hopper Barges
BHD	Backhoe Dredger
AMB	Automated Monitoring Buoys
ASS	Acid Sulphate Soils
PASS	Potential Acid Sulphate Soils
TBA	To be advised
MAF	Marine Area Foreman

1 Water Quality Monitoring

1.1 MONITORING REQUIREMENTS

Water quality Monitoring is a requirement of both the Infrastructure Approval and EPL [#pending]. The monitoring requirements include the collection of background turbidity data, observations for visible plumes and sheens, collection of real-time automated water quality results from five locations. Weekly samples are collected for laboratory analysis for Contaminants of Concern. A summary of from the monitoring is outlined below:

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Cadmium	5.5	ANZG 2018 – 95% DGVs
Chromium (total)	4.4	ANZG 2018 – 95% DGVs
Cobalt	1	ANZG 2018 – 95% DGVs
Copper	1.3	ANZG 2018 – 95% DGVs
Lead	4.4	ANZG 2018 – 95% DGVs
Mercury	0.4	ANZG 2018 – 95% DGVs
Nickel	70	ANZG 2018 – 95% DGVs
Silver	1.4	ANZG 2018 – 95% DGVs
Zinc	15	ANZG 2018 – 95% DGVs
Tributyltin	0.006	ANZG 2018 – 95% DGVs
Anthracene	0.1	ANZG 2018 – unknown reliability DGVs
Naphthalene	70	ANZG 2018 – 95% DGVs
Benzo(a)pyrene		ANZG 2018 – unknown reliability DGVs
TSS	Background + 50mg/L	
pH	7.6-8.5	The EIS and ANZECC 2000
Temperature	-	
Electrical Conductivity	TBC	
Dissolved Oxygen	TBC	

2 Works Completed

Works completed include:

- Dredging Lane 1 – Chainage 0800-1200 – (Type 2
- Cell placement in containment cell – dump box Q2, Q3 and Q4

The monitoring period covers:

- Week Ending 06/09/2020
- Week Ending 13/09/2020
- Week Ending 20/09/2020
- Week Ending 27/09/2020

Table 2 Contaminants of Concern and Trigger Level for Marine 95% Protection levels

Chemical	Trigger values for marine water (μgL^{-1})
Heavy Metals	95% Level of Protection1
Aluminum	-
Antimony	-
Arsenic	-
Cadmium	5.5
Chromium (VI)	4.4
Cobalt	1
Copper	1.3
Lead	4.4
Manganese	-
Mercury (Inorganic)	0.4
Nickel	70
Silver	1.4
Selenium	-
Tributyltin	0.006
Vanadium	100
Zinc	15
Polycyclic aromatic hydrocarbons (PAHs)	
Naphthalene	70
Benzo(a)pyrene	-
Total PAH's	-

Note – No guideline value- TBC refers to the process described below in section **Error! Reference source not found.** ;

2.1 RESULTS

The results of water quality results collected from this reporting period are summarised below:

Table 3: WQM Observations and Analytical Results Summary

Week Ending	Turbidity Plume Observations	Sheen Observations	Turbidity Trigger Exceedences	Laboratory Sample Exceedences

06/09/20	0 (3)	0	0	0
13/9/2020	0 (8)	0	0	0
20/09/2020	0	0	0	0
27/09/2020	0	0	1(0)	0

Notes:

() – denotes exceedence attributable to harbour activities other than PKGT construction

2.2 INVESTIGATION REPORTS

One investigation report were issued for the period on 25/09/20. An exceedence of a turbidity trigger level was investigated as documented in the attached investigation report. The exceedence resulted in adjustment of a silt curtain and re alignment of the dredge to suite prevailing tides.

11 Observations of plumes were not attributed to PKGT works, relating to coal ship movements at the nearby berth 103.

	PORT KEMBLA GAS TERMINAL	
SCSB-AIE-PKGT-ENV-PRO-003	CONSTRUCTION WATER QUALITY MANAGEMENT PLAN	03/OCT /2019

Appendix A. **Water Quality Monitoring Point Locations**

Appendix B. Inspection Photographs

Photograph 1. Water Quality Monitoring Buoy 04*Photograph 2. Water Quality Monitoring Buoy**Photograph 3. Silt Curtain in place*



Photograph 4. Tugs moving coal ship into other berth in Harbour, contributing to plume observations **NOT** attributed to PKGT construction works



Appendix E. SAMPLING PROCEDURE

Marine Water Sampling	Document ID	A.020 – Water Sampling Procedure
	Prepared by	Rhys Blackburn
	Reviewed by	Rhys Blackburn
Purpose: This procedure describes how to collect water quality readings and water samples from water from a boat.	Authorised by	Rhys Blackburn
	Date of Issue	01/04/2020

Key Definitions:

Grab Sample – means a sample of water collected in the field, and transferred to a laboratory supplied sample container.

Physical Parameters – Turbidity, temperature, pH,, electrical Conductivity and dissolved oxygen measure

Quality Reading – a field measurement taken by a Water Quality Meter, or other device, in the field.

Sample collection boat – The sample collection boat is where the samples are collected from. It will be crewed by a driver and environmental professional to collect samples or collect water quality data

Sample Location:

Fixed sample locations may as outlined in the project documentation. Locations may include lateral and vertical requirements. The Sample Collection boat should be positioned using either hand held GPS, or on board GPS. An onboard sounder may be used to determine depth at each location if required.

Non-fixed samples locations should be recorded using the same equipment. sample locations include samples or data collected in response to an incident, investigation or other reason



Photo 1 Sample vessel

Grab Samples:

Samples are to be collected using a dedicated (Project) submersible pump attached to a Teflon hose. The pump should be a waters typhoon, or similar purpose built water sampling pump. The pump and line should be a suitable length to achieve the required depth. A weighted line may be required to overcome current and reinforce the setup.

Once lowered to the sample location the pump should be activated and the pump and line purged for a minimum of 10 seconds, to ensure representative sample. The flow should be directed into a receptacle, where the Water quality meter’s probes can be accommodated, and Physical parameters can be observed to stabilise.

Physical parameters may be recorded at this time.

Once stable readings have been recorded, the sample hose should be directed to the laboratory supplied bottles for the required laboratory analysis

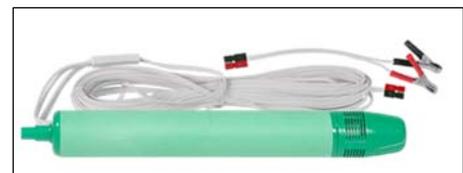


Photo 2 Submersible pump

Sample container and preservation:

<u>Analysis</u>	<u>Bottle Type</u>	<u>PQL</u>	<u>Preservation</u>	<u>Holding Time</u>
TSS or TDS	Plastic or glass, unpreserved 200ml	5mg/L	Cool to <6°C	2 days
Turbidity	Plastic or glass, unpreserved 50ml	0.1 NTU	Store in dark	2 days
BTEX+C6-C9 (or C6-C10)	2 x 40ml vials	1 µg / L	pH <2 (H2SO4 or HCl) or Sodium Bisulphate (NaHSO4)** + Cool to <6°C	14 days
Dioxins	2L Glass		Cool to <6°C + 0.008% Na2S2O3	30 days
PAHs and C10-C40	500ml Glass	1-2 µg / L	Cool to <6°C	7 days
Tributyltin	500ml Glass	0.002µg Sn/L	Cool to <6°C and dark	7 days

Metals (un-filtered)	Plastic or glass 50ml		pH <2 (HNO3)	6 months
Aluminium		0.01 mg/l		
Antimony		0.001 mg/l		
Arsenic		0.001 mg/l		
Cadmium		0.0001 mg/l		
Chromium		0.001 mg/l		
Cobalt		0.001 mg/l		
Copper		0.001 mg/l		
Lead		0.001 mg/l		
Mercury		0.0001 mg/l		
Nickel		0.001 mg/l		
Selenium		0.001 mg/l		
Silver		0.001 mg/l		
Vanadium		0.001 mg/l		
Zinc	0.001 mg/l			

Physical Parameters:

Physical parameters may be measured using a hand held water quality meter. The water quality meter can be used by either holding the measuring probes directly in the water being measured. Alternatively, a flow cell may be used (as outlined above). The manufacturers guidance should be followed regarding calibration and calibration testing.



Photo 3 Water Quality Meter

Sample Quality Assurance and Quality Control:

- All samples should be collected by an Environmental professional
- Appropriate sample labelling should be used including, Sample Point ID_Depth. Date and sample time should also be recorded on each sample container and COC.
- Physical parameter readings will be recorded on a field sheet, including date, time and location.
- Calibration records will be maintained in line with the manufacturers specification
- Sample preservation to include placing immediately into an insulated box, cooled with an ice brick.
- Transport under Chain of Custody (COC) procedures, and within the holding times for the relevant analytes.
- Laboratory analyses conducted within appropriate holding times
- An Intra-laboratory blind field duplicate analysis should be undertaken for each sampling event. A Relative Percent Differences (RPDs) will be calculated and assessed against an RPD criteria set for each project.
- A disposable pair of gloves should be worn for each sample collection to minimise the potential for cross contamination
- Samples shall be submitted to a laboratory that hold NATA accreditation for the sample analysis

Training & Certification:

- Coxswain grade 2 license
- Construction General Induction
- Site Specific induction

Equipment Required:

PPE Required:

Marine Water Sampling Procedure



<ul style="list-style-type: none">▪ Positioning system and sounder▪ Two way radio▪ Insulated sample container▪ Ice bricks▪ Submersible pump, Teflon hose▪ Calibrated hand-held water quality meter▪ Sample location figure or way-points▪ Digital camera▪ Sample bottles and marker pens	<ul style="list-style-type: none">▪ Personal flotation devices (PFD)▪ Disposable nitrile gloves
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Appendix F. INVESTIGATION REPORT



PORT KEMBLA GAS TERMINAL Marine Works Investigation Report

Date:	Time:	Overnight Rainfall (mm):
Inspection Conducted by:		Weather and other meteorological conditions:
Location:		Type: Contamination limit Exceedance
Current Activities: (eg. Dredging, Piling)		

1 Description of Event

- Weekly water quality samples were collected on 19 August 2009. The laboratory results were reported on 25 August 2009. The results of the sample analysis recorded an exceedance of trigger values at EPL 06C.
- The Naphthalene trigger value is 2µg/l. The naphthalene concentration at EPL 06C was 3.1 µg/l at 11.21 on 19 August 2009.
- The event occurred during an outgoing tide.

Table 1: Turbidity Results

Location	Approx. Time	Turbidity (ntu)	Naphthalene (µg/l)
EPL07C (0.5m from surface up current)	10.41 am	7.6	<1.0
EPL08C (0.5m from bottom up current)	10.47 am	8.0	<1.0
EPL 11	10.55 am	7.9	<1.0
EPL 10	11.13 am	8.7	<1.0
EPL05C (0.5m from surface Down current)	11.15 am	8.9	<1.0
EPL06C (0.5m from bottom Down current)	11.21 am	6.1	3.1

Works actively being undertaken in close proximity to EPL06C at the time of the exceedance include:



- The Loadstar rig was actively piling
- Boskalis dredge was actively dredging the CSC;
- NCIG's survey boat was adjacent to the Boskalis dredge
- OSSPW preparation works were being undertaken;
- Silt curtain installation works were not being undertaken at the time of the event.
- The Bouganville dredge was observed to be operating adjacent to the Kopper's berth.

Figure 1 (attached) illustrates the general layout of the area when the samples were obtained. The locations of all vessels in the River was obtained from observation records taken on 19th August.

2 Data Validation

Laboratory results were collected using standard sample collection procedures. Laboratory QA for the samples were within acceptable quality limits. The data is considered representative.

3 Immediate Corrective Actions

Immediately following the laboratory reporting on the 25th August, the following investigation actions were undertaken:

- A review of the observational data and activities in the river at the time of the sample collection was undertaken
- Turbidity data collected during the sampling event was reviewed. The turbidity readings at the four locations adjacent to the Loadstar piling rig, EPL 5C, 6C, 7C and 8C ranged from 6.1 and 8.9 ntu. The turbidity data did not indicate that sediments had been disturbed adjacent to EPL6C at the Loadstar piling rig.
- Additional data collected at the NCIG dredging works were reviewed. Samples were collected at four locations adjacent to the NCIG dredging works on the 19th August 2009, in accordance with EPL 12740. Concentrations of naphthalene were below laboratory detection limits and trigger values in the four samples analysed. The NCIG data did not indicate the dredging works were contributing to the Naphthalene exceedence at EPL 6C;
- A slight plume was observed emanating from the Bouganville dredging rig adjacent to the Koppers berth. An additional turbidity reading was taken from the observed plume. Turbidity in the plume was 11.6 ntu. The Bouganville dredge was operating down current of EPL6C, and is not considered to be a contributing factor to the Naphthalene exceedence at EPL 6C.
- The laboratory results were reported on the 25th August 2009. DECC, was notified by CB, [the client/EPL holder] of the event via e-mail at 6.58pm on 25th August 2009 after [the client/EPL holder] was notified by [the contractor];
- Environmental controls were observed to be in place and in good condition on the 19 August during the hourly inspections of the piling works.



4 Cause of Event

The cause of the event was not determined by the review of observation data, turbidity readings and laboratory results at adjacent locations from the 19th August. The investigation did not indicate that HRRP activities were the cause of the Naphthalene exceedence.

5 Outcomes of the Investigation and Corrective Actions

- The exceedence of the turbidity trigger value was not found to have been caused as a result of the INRSPW installation works.
- Environmental controls and work practices were checked on the Loadstar sheet piling rig.

6 Observed Environmental Impact

- The Naphthalene concentration observed was 3.1 µg/l, marginally above the trigger value of 2 µg/l. Naphthalene was not detected at other nearby sampling locations taken on the 19 August indicating the trigger value exceedence to be minor and not wide spread across the river.

7 Notification and Investigations

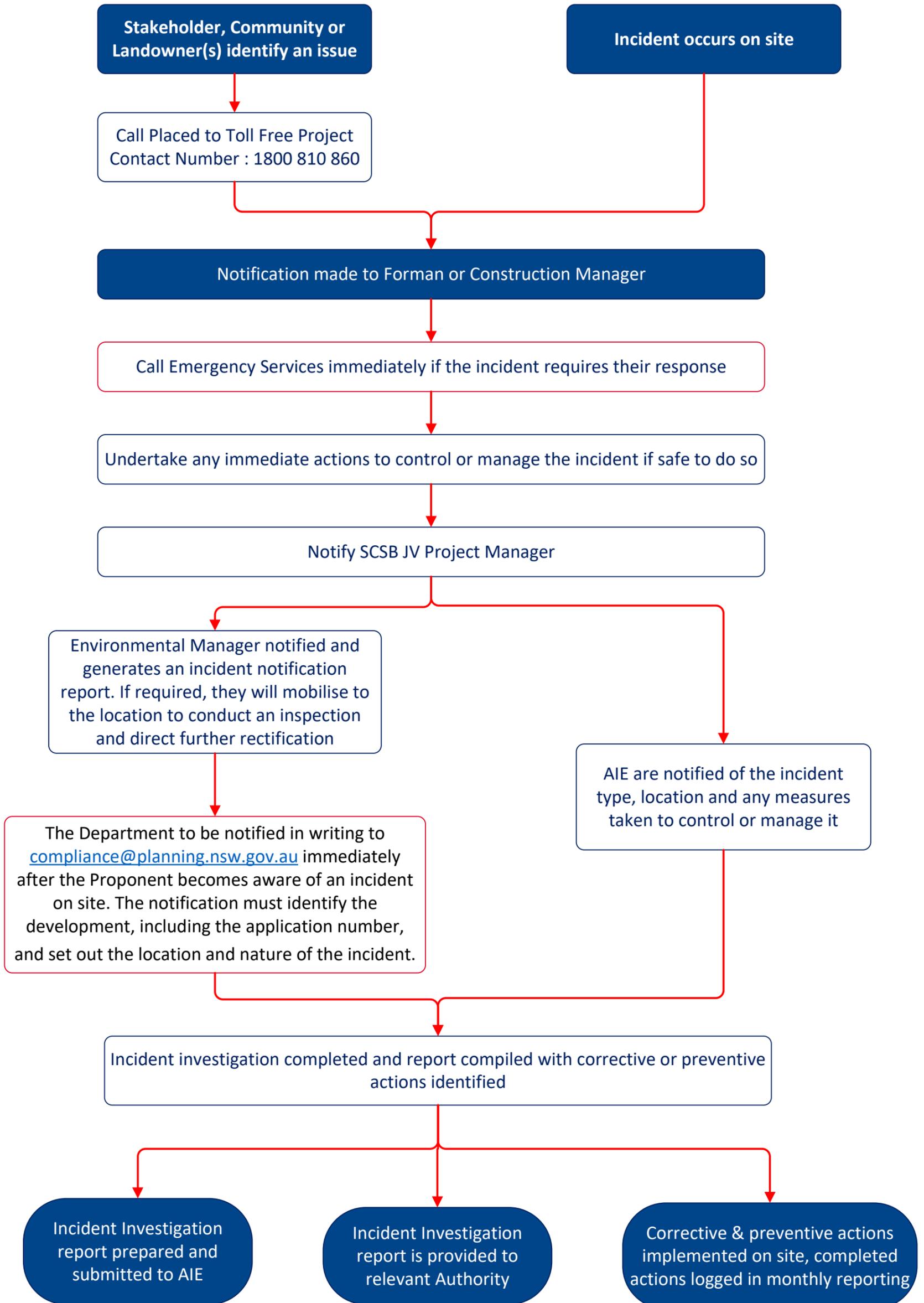
- E-mail notification
 - o 25 August 2009 - DECC
- Written notification
 - o 27 August 2009 - DECC



Appendix G. NOTIFICATION PROCEDURE



Port Kembla Gas Terminal (PKGT) Project Incident Notification & Response Flow Chart





Appendix H. AUTHORITIES CONSULTATION

Interim Audit Advice 004 - Review of WSMP and WQMP

No.	Reviewer	Initial Comment Date	Document Reference	Item	Proposal SCSB JV 01 April 2020
Item 1: WQMP					
1	Auditor Feedback	24-Mar-20	IAA 004	The number and locations and of monitoring buoys. The current number and location are likely to be inadequate to assess turbidity and contaminants beyond the silt curtains. The auditor suggests that fixed AMB locations be supplemented by hand-held water profiling closer to the silt curtains	We refer to Visio Visio Call dated 26th March 2020 (AIE/GHD/AIE Auditor - SCSB JV/HALL C./RARE E.) SCSB JV/AIE will proceed with the monitoring proposal as it stands
2	Auditor Feedback	24-Mar-20	IAA 004	Details on sampling methodology, e.g. sample depth(s) and filtration. Without the detail and appropriate sampling locations and methodology, there is a risk that adverse impacts from construction activities (e.g. turbidity plume) would not be detected and appropriate mitigation actions not triggered	We refer to Visio Visio Call dated 26th March 2020 (AIE/GHD/AIE Auditor - SCSB JV/HALL C./RARE E.) SCSB JV/AIE will proceed with the monitoring proposal as it stands
3	Auditor Feedback	24-Mar-20	IAA 004	Details on sampling methodology, e.g. sample depth(s) and filtration. These are currently insufficient to confirm whether this consent condition could be fulfilled.	We refer to Visio Visio Call dated 26th March 2020 (AIE/GHD/AIE Auditor - SCSB JV/HALL C./RARE E.) SCSB JV/AIE will proceed with the monitoring proposal as it stands
4	Auditor Feedback	24-Mar-20	IAA 004	A period of pre-works baseline monitoring of 4 weeks is proposed. This timeframe is unlikely to be sufficient to allow characterisation of seasonal variability. There is a risk that the baseline calculated across the proposed 4-week timeframe will not be representative over the entire project.	SCSB JV can propose 6 weeks
5	Auditor Feedback	24-Mar-20	IAA 004	Objectives and performance criteria are provided. Please include total suspended solids and criteria for total PAHs. To establish baseline conditions, monitoring for longer than 4 weeks is suggested to allow for seasonal variability.	TSS: we are using the IA Sched 3 part 1. limit. Samples will be total (non-filtered) as representative of contaminant mobilisation on sediments limited PAH speciated criteria in DGVs. where criteria not available we will refer to baseline or laboratory detection limits in that order for contaminants with no DGV we will use the background data (6 weeks pre works) to calculate an average *1.2 (for fluctual seasons) to be used as a trigger level. Coeff. of *2 and *4 are applied for trigger levels
6	Auditor Feedback	14-Apr-20	IAA 004	A response plan to exceedances of trigger levels is set out in the plan and is based on monitoring at 15-minute intervals. Consideration should be given to time averaging data to avoid alerts triggered by spurious or ephemeral turbidity events.	The median over 15 minutes will be calculated and updated every 15 minutes.
7	Auditor Feedback	24-Mar-20	IAA 004	An additional background monitoring location to represent "Primary/Impact Works Area" in the Outer Harbour should be considered to supplement WQM4. The EIS states 4 monitoring locations, however the current proposed locations comprise 3 monitoring locations and 1 background location. The current monitoring locations have the potential to be inadequate if the turbid plume from dredging and emplacement works reach this single background monitoring location. If this occurs there, in the absence of an additional background monitoring location with baseline data, there will be insufficient information available to assess potential impacts from the construction activities.	We refer to Visio Visio Call dated 26th March 2020 (AIE/GHD/AIE Auditor - SCSB JV/HALL C./RARE E.) SCSB JV/AIE will proceed with the monitoring proposal as it stands.
8	Auditor Feedback	24-Mar-20	IAA 004	The proposed validation strategy should be documented in a validation water quality monitoring plan to document the proposed validation strategy with reference to the above objectives. This may form a standalone document or may be incorporated into the Cell Design Plan. <ul style="list-style-type: none"> • Dispersal of sediments is prevented (condition 8a). • That the potential for contaminant mobilisation is minimised (condition 8b). • Acid generation from emplaced material has been prevented (condition 8c). 	SCSB JV will provide documentation and reports as per what is attached in appendix to the WQMP, SWMP and DEMP submitted to Secretary for Approval.
Item 3: CLOSE					
27	Auditor Feedback	14-Apr-20	IAA 004	The CWQMP focusses on construction related works. Additional validation monitoring plans are required as part of the Cell Emplacement Plan documentation to support the ultimate preparation of the Section A Site Audit Statement and Site Audit Report confirming the suitability of the site for its intended uses.	Noted

Authorities Comments on WQMP/SWMP - CRS

No.	Reviewer	Initial Comment Date	Document Reference	Item	Proposal SCSB JV 09 April 2020	
Port Authorities						
1	S. BHASIN	06-Apr-20	SWMP	No comments. Approved		
2	S. BHASIN	06-Apr-20	WQMP	No comments. Approved		
DPI Fisheries						
3	C. GANASSIN	18-Feb-20	SWMP Section 7.3	requests Section 7.3 of this plan includes further information on: - approximate timeframes that the stockpiles will be in place for – noting that these are to be of a temporary nature;	Noted. Added in next revision	
4	C. GANASSIN	18-Feb-20	SWMP Section 7.3	- an overall aim to manage sedimentation and dust from these stockpiles;	Noted. Added in next revision	
5	C. GANASSIN	18-Feb-20	SWMP Section 7.3	- further detail on the frequency of treatment measures will be used in achieving these aims.	Noted. Added in next revision	
6	C. GANASSIN	18-Feb-20	WQMP	No comments. Approved		

Authorities Comments on WQMP/SWMP - CRS

No.	Reviewer	Initial Comment Date	Document Reference	Item	Proposal SCSB JV 09 April 2020	Reference in WQMP Rev E
Port Authorities						
1	S. BHASIN	06-Apr-20	WQMP	No comments. Approved		N/A
DRI Fisheries						
2	C. GANASSIN	18-Feb-20	WQMP	No comments. Approved		N/A
NSW Ports						
3	G. WALLS	17-Feb-20	WQMP - Section 5.2.1	When automated monitoring systems have been deployed in Pk Harbour for past dredging/construction projects, we have had significant issue with marine growth fouling the sensors. It is recommended that preventative measures should be considered to minimise marine growth. Routine maintenance program should allow time and resources for thorough cleaning of all sensors and associated guards and inlet structures to remove marine growth.	Noted. Added in next revision	Addressed in Chapter 5.2 (p.26) and in Appendix C
4	G. WALLS	17-Feb-20	WQMP	Recommend using a less absolute term than "limits" here such as "assessment criteria" or "management threshold".	Noted. Added in next revision	Addressed in Chapter 6, (p. 27).
5	G. WALLS	17-Feb-20	WQMP	Why is there no criteria proposed for arsenic?	Noted. Added in next revision	Addressed in Chapter 6, (p. 27), Table 6.
6	G. WALLS	17-Feb-20	WQMP	Previous WQ monitoring campaigns have found some exceedances of the copper criterion, plus occasional exceedances of zinc, lead and arsenic criteria. It would be prudent to collect baseline data prior to commencement of dredging to measure "natural" variability in metals concentrations, particularly in response to ship movements and rain events.	Noted. Added in next revision	Addressed in Chapter 6, (p. 27), Table 6.
DRIE						
7	A. COLLAROS	12-Mar-20	WQMP	No comments. Approved		N/A
EPA						
8	P. BLOEM	08-Apr-20	General Comments	Under Condition 11 the Spoil Management Plan must be consistent with the Emplacement Cell Report (yet to be prepared) and requires consultation with an EPA accredited contaminated site auditor (not apparent from the Plan).	Noted. SWMP and CCR are dealt with separately. Closed here for sake of clarity.	N/A
9	P. BLOEM	08-Apr-20	General Comments	A broader program to monitor harbour-wide water quality trends and the ecological health of Port Kembla Harbour has not been included and this requirement (Approval Condition 11, c. bullet 2) should be addressed. It is not covered in section 6.3 as stated in the Plan. This program should be developed, and consultation be undertaken with the EPA	SCSB JV agrees with the comment that WQMP is a construction phase document, it does not deal with issues of Emplacement Cell monitoring after construction However this is partially addressed in CFFMP.	N/A
10	P. BLOEM	08-Apr-20	General Comments	A key component of the dredging spoil containment area is the emplacement cells. This Plan does not provide any detail on their construction of addressing specific conditions or cell requirements. That is, design objectives (Condition 8), cell report (Condition 9), and cell audit (Condition 10).	Noted. Those items are dealt with separately in the CRR.	N/A
11	P. BLOEM	08-Apr-20	Section 5.1 Monitoring Locations	Based on the scale of the Monitoring Locations map in Appendix A, it appears the monitoring locations, (WQMs 1-3) are over 200 metres away from the proposed silt curtains. EPA recommends that WQMs 1-3 are located in closer proximity to the impact areas so that appropriate trigger action and responses can be taken promptly in response to current data. EPA recommends the monitoring locations be within 20 metres of the dredging locations or justification provided for more distant locations.	The justification of the locations of WQM1 to WQM 4 is provided within the EIS: [1] Chapter 12.2.2 Water Quality Within the Port: Page 149 of the EIS " ... The 2002 2005 monitoring program undertaken by the Port Kembla Environment Group is considered to be the most comprehensive study of ambient water quality conditions within the Port. The program aimed to establish benchmarks to determine trends and future improvements in water quality and assess whether contaminant concentrations exceed the ANZECC / ARMCANZ Guidelines (2000). The program identified monitoring locations within the Inner and Outer Harbours which have been subsequently adopted by a number of programs and are presented below in Figure 12.2. Analysis of the following parameters was undertaken and the results compared to relevant trigger values derived from the ANZECC / ARMCANZ water quality guidelines (2000): Metals (Al, Cr, Mn, Fe, Ni, Cu, Zn, Sn, Pb, Cd, As, Se); Total Suspended Solids (TSS); Cyanide; Ammonia; Phenols More recent monitoring programs associated with the 2014 Maintenance Dredging Program also considered the following parameters: Temperature; Salinity; Dissolved Oxygen (DO); pH; Oxygen Reduction Potential (ORP); Turbidity. [2] Chapter 12.4 Management Measures, table 12.3 item W6 ... Design and implementation of a Water Quality Monitoring Program to ensure construction works do not cause exceedance of the marine water quality criterion of background plus 50 mg/L of suspended sediment. In accordance with recent Environmental Protection Licences (EPL) for similar activities within Port Kembla such as the Berth 103 Stage 2 Dredging & Spoil Isposal EPL20563). Continuous turbidity monitoring would be undertaken using a series of monitoring buoys to provide impact and background data (turbidity (NTU), pH, temperature). Prior to commencement of the dredging works, buoys would be deployed for an agreed period of time to confirm background conditions in the vicinity of the monitoring points. Data would be logged and transmitted to an onshore recording station where it would be processed to allow automated comparison of median turbidity levels to a series of green, amber and red trigger levels. When exceeded, an alarm would be triggered, automated email and SMS alerts sent and agreed the procedures implemented. Such procedures may include hand held monitoring to verify readings, reduction in the rate of dredging, relocation of dredging activities or cessation of turbidity generating works until turbidity readings reach acceptable levels. Daily visual observations would be undertaken during dredging operations to monitor the potential release of oil or grease. Collection of water samples and laboratory analysis for an agreed set of contaminants would be undertaken on a weekly basis during dredging operations. The WQMP would include regular reporting, evaluation and revision where required to ensure the project objectives and approval conditions are achieved.	Addressed in Chapter 5 (p. 25).
12					[3] The Outline Dredge Environmental Management Plan [part of the EIS in response to submissions] Chapter 6.2.2 Marine Water Quality table 11 on page 44 ... Implementation of a Water Quality Monitoring Program (WQMP) to assess the quality of water within zone of impact and nearby management zones ensuring that construction works do not cause exceedance of the marine water quality criterion of background plus 50 mg/L of suspended sediment. In accordance with recent Environmental Protection Licences (EPL) for similar activities within Port Kembla such as the Berth 103 Stage 2 Dredging & Spoil Disposal EPL20563). Although subject to liaison with the relevant government agencies, port stakeholders and successful Contractor, it is envisaged that continuous turbidity monitoring would be undertaken using a series of at least four monitoring buoys to provide impact and background data (turbidity (NTU), pH, temperature). Monitoring locations would be selected based on appropriate near field impact sites and appropriate background locations. Consideration would be given to the long term water quality monitoring program implemented within Port Kembla. Consideration would be given to the integration of the proposed monitoring activities with the locations, parameters and reporting of the existing and previous monitoring programs. This is expected to be of benefit to both programs. ... Indication that these considerations / suggestions have been applied to previous dredging and disposal works in the inner and outer harbour can be found in the documentation available with regard to the Berth 103 dredging campaign of 2015. The Dredging Environmental Management Plan for the Port Kembla Berth 103, Stage 2 Development Project (Boskalis Document No 036 10211 02 002 Rev 0 dated 10 June 2015) Shows on page 9 of 126 the dredge and disposal areas and on page 25 of 126 the water quality monitoring locations. Comparing the WQM locations of Berth 103 with the campaign of 2002 2005 shows that indeed the same pattern is followed. Following the suggestion of the EIS to consider previous campaigns and monitoring locations the locations of WQM 1 to WQM 4 have been chosen for the dredging and disposal works of the Port Kembla Gas Terminal Project. SCSB JV has not been made aware that these monitoring locations were unsatisfactory nor has it found evidence of being unsatisfactory. The dredging and disposal works for Berth 101 is similar in nature to the dredging and disposal works for Berth 103 and are planned to be executed in similar fashion [i.e. use of a backhoe dredge with split barges and flatpot barges]. Having to measure at 20m distance from the dredge location will cause a continuous exceedance recording. In order to comply with this recommendation, it will be necessary to deploy a silt curtain from surface down to the seabed encapsulating the immediate dredge area of the backhoe. Such frame [approximately 35m x 25m] will cause a loss of production as, amongst others, 1. More care is to be taken by the operator as not to damage the screen. 2. Relocation/moving forward with the backhoe will take longer Furthermore as the seabed is uneven the silt curtain will never close off 100%. As a result leakage will/can occur. Such leakage will have diluted well below exceedance levels at distance; However it will cause exceedances when measuring is undertaken at 20m from the source	
13	P. BLOEM	08-Apr-20	Section 4.1 Dredging Method	EPA has overseen previous dredging projects and implemented a policy where more contaminated dredge spoil is placed beneath less contaminated dredge spoil. EPA suggests this approach be incorporated into the dredging / excavation program and spoil management.	Contractor will endeavor to place the more contaminated material below the less contaminated material. At present it is scheduled to dredge the Harbour Mud and Harbour Silt before dredging the type 2 [clay possible PASS/ASS] /type 3 [clay weathered rock / rock material. In general this will lead to the contaminated material to be below the type 2/3/rock material However the contractor cannot give a guarantee. Tender specifications did not specifically mention this requirement. No allowance has been made in Contractor's proposal to ensure compliance with EPA's suggestion.	Refer to the DEMP, CCR and SWMP.
14	P. BLOEM	08-Apr-20	Section 4.4 Outer Harbour Dredge Spoil Containment Area	No detail is provided on capping the emplacement area. EPA requests the Plan be modified to include details on the material and the capping process. EPA also suggests the existing rock stockpile on Foreshore Road be assessed for inclusion in the perimeter bund walls or capping material or other component of the project.	Noted. Those items are dealt with separately in the CRR.	N/A
15	P. BLOEM	08-Apr-20	Section 6.7.1 Turbidity and Sedimentation Action Response Plan	EPA believes there should be a "stop work" response step in the proposed trigger responses for elevated pollutant levels.	STOP Work is in the procedure. However stop work is used on correlation between dredging and triggered limits is proven with justification. In the event we have to stop work each time a trigger limit goes off, it might happen that we stop works and have idle times of the dredging equipment when the limits were triggered for external reasons.	Addressed in Chapter 6.7 (p.35), Table 9 p. 33 and Table 3 p. 14

Auditor - SENVERSA

Authorities Comments on WQMP/SWMP - CRS

No.	Reviewer	Initial Comment Date	Document Reference	Item	Proposal SCS8 JV 09 April 2020	Reference in WQMP Rev E
16	Auditor Feedback	24-Mar-20	IAA 004	The number and locations and of monitoring buoys. The current number and location are likely to be inadequate to assess turbidity and contaminants beyond the silt curtains. The auditor suggests that fixed AMB locations be supplemented by hand-held water profiling closer to the silt curtains.	Noted.	Addressed in Appendix A
17	Auditor Feedback	24-Mar-20	IAA 004	Details on sampling methodology, e.g. sample depth(s) and filtration. Without the detail and appropriate sampling locations and methodology, there is a risk that adverse impacts from construction activities (e.g. turbidity plume) would not be detected and appropriate mitigation actions not triggered.	Noted.	Addressed in Appendix E
18	Auditor Feedback	24-Mar-20	IAA 004	Details on sampling methodology, e.g. sample depth(s) and filtration. These are currently insufficient to confirm whether this consent condition could be fulfilled.	Noted.	Addressed in Appendix E
19	Auditor Feedback	24-Mar-20	IAA 004	A period of pre-works baseline monitoring of 4 weeks is proposed. This timeframe is unlikely to be sufficient to allow characterisation of seasonal variability. There is a risk that the baseline calculated across the proposed 4-week timeframe will not be representative over the entire project.	SCS8 JV can propose 6 weeks	Addressed in Chapter 2.4, p. 10
20	Auditor Feedback	24-Mar-20	IAA 004	Objectives and performance criteria are provided. Please include total suspended solids and criteria for total PAHs. To establish baseline conditions, monitoring for longer than 4 weeks is suggested to allow for seasonal variability.	TSS: we are using the IA Sched 3 part 1. limit. Samples will be total (non-filtered) as representative of contaminant mobilisation on sediments limited PAH specified criteria in DGVs. where criteria not available we will refer to baseline or laboratory detection limits in that order for contaminants with no DGV we will use the background data (6 weeks pre works) to calculate an average *1.2 (for fluctuating seasons) to be used as a trigger level. Coeff. of *2 and *4 are applied for trigger levels.	Addressed in Table 8 p.33
21	Auditor Feedback	14-Apr-20	IAA 004	A response plan to exceedances of trigger levels is set out in the plan and is based on monitoring at 15-minute intervals. Consideration should be given to time averaging data to avoid alerts triggered by spurious or ephemeral turbidity events.	The median over 15 minutes will be calculated and updated every 15 minutes.	Addressed in Chapter 5.2.2 p. 26
22	Auditor Feedback	24-Mar-20	IAA 004	An additional background monitoring location to represent "Primary/Impact Works Area" in the Outer Harbour should be considered to supplement WQM4. The EIS states 4 monitoring locations, however the current proposed locations comprise 3 monitoring locations and 1 background location. The current monitoring locations have the potential to be inadequate if the turbid plume from dredging and emplacement works reach this single background monitoring location. If this occurs there, in the absence of an additional background monitoring location with baseline data, there will be insufficient information available to assess potential impacts from the construction activities.	Noted.	Addressed in Appendix A
23	Auditor Feedback	24-Mar-20	IAA 004	The proposed validation strategy should be documented in a validation water quality monitoring plan to document the proposed validation strategy with reference to the above objectives. This may form a standalone document or may be incorporated into the Cell Design Plan. <ul style="list-style-type: none"> • Dispersal of sediments is prevented (condition 8a). • That the potential for contaminant mobilisation is minimised (condition 8b). • Acid generation from emplaced material has been prevented (condition 8c). 	SCS8 JV will provide documentation and reports as per what is attached in appendix to the WQMP, SWMP and DEMP submitted to Secretary for Approval.	Addressed in Appendixes B, D and F. Refer to DEMP for dredging reports.

EPA comments on WQMP - CRS

No.	Reviewer	Initial Comment Date	Document Reference	Item	Proposal SCSB JV 09 April 2020
1	P. BLOEM	08-Apr-20	General Comments	Under Condition 11 the Spoil Management Plan must be consistent with the Emplacement Cell Report (yet to be prepared) and requires consultation with an EPA accredited contaminated site auditor (not apparent from the Plan).	Noted. SWMP and CCR are dealt with separately. Closed here for sake of clarity.
2	P. BLOEM	08-Apr-20	General Comments	A broader program to monitor harbour-wide water quality trends and the ecological health of Port Kembla Harbour has not been included and this requirement (Approval Condition 11, c. bullet 2) should be addressed. It is not covered in section 6.3 as stated in the Plan. This program should be developed, and consultation be undertaken with the EPA.	This is partially addressed in CFMP
3	P. BLOEM	08-Apr-20	General Comments	A key component of the dredging spoil containment area is the emplacement cells. This Plan does not provide any detail on their construction of addressing specific conditions or cell requirements. That is, design objectives (Condition 8), cell report (Condition 9), and cell audit (Condition 10).	Noted. Those items are dealt with separately in the CRR. Closed here for sake of clarity.
4	P. BLOEM	08-Apr-20	Section 5.1 Monitoring Locations	Based on the scale of the Monitoring Locations map in Appendix A, it appears the monitoring locations, (WQMs 1-3) are over 200 metres away from the proposed silt curtains. EPA recommends that WQMs 1-3 are located in closer proximity to the impact areas so that appropriate trigger action and responses can be taken promptly in response to current data. EPA recommends the monitoring locations be within 20 metres of the dredging locations or justification provided for more distant locations.	<p>The justification of the locations of WQM to WQM 4 is provided within the EIS</p> <p>[1] Chapter 12.2.2 Water Quality Within the Port Page 149 of the EIS "</p> <p>"... The 2002 2005 monitoring program undertaken by the Port Kembla Environment Group is considered to be the most comprehensive study of ambient water quality conditions within the Port program aimed to establish benchmarks to determine trends and future improvements in water quality and assess whether contaminant concentrations exceed the ANZECC/ANZ Guidelines (2000). The program identified monitoring locations within the Inner and Outer Harbours which have been subsequently adopted by a number of programs and are presented below in Figure 2. Analysis of the following parameters was undertaken and the results compared to relevant trigger values derived from the ANZECC/ANZ water quality guidelines(2000): □ Metals (Al, Cr, Mn, Fe, Ni, Cu, Zn, Sn, Pb, Cd, As, Se); □ Total Suspended Solids(TSS) □ Cyanide □ Ammonia □ Phenols More recent monitoring programs associated with the 2014 Maintenance Dredging Program also considered the following parameters: □ Temperature □ Salinity □ Dissolved Oxygen(DO) □ pH □ Oxygen Reduction Potential(ORP) □ Turbidity.</p> <p>[2] Chapter 12.4 Management Measures table 12.3 Item W6 "</p> <p>"... Design and implementation of a Water Quality Monitoring Program to ensure construction works do not cause exceedance of the marine water quality criterion of background 50 mg/L of suspended sediment in accordance with recent Environmental Protection Licences(EPL) for similar activities within Port Kembla such as the Berth103 Stage 2 Dredging & Spoil disposal EPL20563). Continuous turbidity monitoring would be undertaken using a series of monitoring buoys to provide impact and background data (turbidity (NTU), pH, temperature). Prior to commencement of the dredging works buoys would be deployed for an agreed period of time to confirm background conditions in the vicinity of the monitoring point. Data would be logged and transmitted to an onshore recording station where it would be processed to allow automated comparison of median turbidity levels to a series of green and red trigger levels. When exceeded, an alarm would be triggered, automated email and SMS alerts sent and agreed procedures implemented. Such procedures may include hand held monitoring to verify readings, reduction in the rate of dredging relocation of dredging activities or cessation of turbidity generating works until turbidity readings reach acceptable levels. Daily visual observations would be undertaken during dredging operations to monitor the potential release of oil or grease. Collection of water samples and laboratory analysis for an agreed set of contaminants would be undertaken on a weekly basis during dredging operations. The WQMP would include regular reporting evaluation and revision where required to ensure the project objectives and approval conditions are achieved</p> <p>[3] The Outline Dredge Environmental Management Plan part of the EIS in response to submission) Chapter 6.2.2 Marine Water Quality table 11 on page 44</p> <p>"... Implementation of a Water Quality Monitoring Program(WQMP) to assess the quality of water within zone of impact and nearby management zones ensuring that construction works do not cause exceedance of the marine water quality criterion of background 50 mg/L of suspended sediment in accordance with recent Environmental Protection Licences(EPL) for similar activities within Port Kembla such as the Berth103 Stage 2 Dredging & Spoil Disposal EPL20563). Although subject to liaison with the relevant government agency, port stakeholders and successful Contractor it is envisaged that continuous turbidity monitoring would be undertaken using a series of at least four monitoring buoys to provide impact and background data (turbidity (NTU), pH, temperature). Monitoring locations would be selected based on appropriate near field impact sites and appropriate background locations. Consideration would be given to the long term water quality monitoring program implemented within Port Kembla. Consideration would be given to the integration of the proposed monitoring activities with the location parameters and reporting of the existing and previous monitoring programs. This is expected to be of benefit to both programs..."</p> <p>Indication that these considerations' suggestions have been applied to previous dredging and disposal works in the inner and outer harbour can be found in the documentation available with regard to the Berth 103 dredging campaign of 2015. The Dredging Environmental Management Plan for the Port Kembla Berth103, Stage 2 Development Project (Boskalis Document No 036 10211 02 002 Rev 0 dated 10 June 2015) Shows on page 9 of 126 the dredge and disposal areas and on page 25 of 126 the water quality monitoring locations.</p> <p>Comparing the WQM locations of Berth103 with the campaign of 2002 2005 shows that indeed the same pattern is followed. Following the suggestion of the EIS to consider previous campaigns and monitoring locations the locations of WQM to WQM 4 have been chosen for the dredging and disposal works of the Port Kembla Gas terminal Project. SCSB JV has not been made aware that these monitoring locations were unsatisfactory nor has it found evidence of being unsatisfactory. The dredging and disposal works for Berth101 is similar in nature to the dredging and disposal works for Berth103 and are planned to be executed in similar fashion. i.e. use of a backhoe dredge with split barges and flatport barges.</p> <p>Having to measure at 20m distance from the dredge location will cause a continuous exceedance recording. In order to comply with this recommendation it will be necessary to deploy a silt curtain from surface down to the seabed encapsulating the immediate dredge area of the backhoe. Such frame (approximately 35m x 25m) will cause a loss of production as amongst others, 1. More care is to be taken by the operator as not to damage the screen. 2. Relocation/moving forward with the backhoe will take longer. Furthermore as the seabed is uneven the silt curtain will never close off 100%. As a result leakage will occur. Such leakage will have diluted well below exceedance levels at distance. However it will cause exceedances when measuring is undertaken 20m from the source</p>
5	P. BLOEM	08-Apr-20	Section 4.1 Dredging Method	EPA has overseen previous dredging projects and implemented a policy where more contaminated dredge spoil is placed beneath less contaminated dredge spoil. EPA suggests this approach be incorporated into the dredging / excavation program and spoil management.	Contractor will endeavor to place the more contaminated material below the less contaminated material. At present it is scheduled to dredge the Harbour Mud and Harbour Silt before dredging the type 2 (clay possible PASS/ASS) type 3 (Clay weathered rock / rock material. In general this will lead to the contaminated material to be below the type 2/3 rock material. However the contractor cannot give a guarantee. Tender specifications did not specifically mention this requirement. No allowance has been made in Contractor's proposal to ensure compliance with EPA's suggestion.
6	P. BLOEM	08-Apr-20	Section 4.4 Outer Harbour Dredge Spoil Containment Area	No detail is provided on capping the emplacement area. EPA requests the Plan be modified to include details on the material and the capping process. EPA also suggests the existing rock stockpile on Foreshore Road be assessed for inclusion in the perimeter bund walls or capping material or other component of the project.	Noted. Those items are dealt with separately in the CRR. Closed here for sake of clarity.



Appendix I. DPIE PLANNING SECRETARY CONSULTATION

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Water Pollution Condition 1, Schedule 3	Satisfactory (Yes/No/Partial)	REV C Document reference and comment	Action Required	Company Reply	DPIE Review	Company Reply
<p>Unless an environment protection licence authorises otherwise, the Proponent must comply with Section 120 of the POEO Act.</p> <p>Notes: Section 120 of the POEO Act makes it an offence to pollute any waters. The EPA has recommended the following limits for water pollutants should apply for the development: an equivalent suspended sediment of no more than 50 mg/L above background turbidity levels during the construction stage; No more than 20 ug/L of Total Residual Chlorine and a temperature of no less than 7o C below ambient water temperature for water discharges from the FSRU.</p>	Partial	<p>Referred to in Table 4 in Section 5.0.</p> <p>Section 5.1 - construction works do not cause exceedance of the marine water quality criterion of background plus 50 mg/L of suspended sediment</p> <p>Assume addressed in another plan?</p>	<p>Include commitment that Proponent must comply with Section 120 of the POEO Act.</p>	<p>Commitment added in Table 4, section 3.3 for the construction only. Commitments for the Operation will be dealt with in separate Operation Management Plan that will be provided after pre FID</p>	<p>The wording in Table 4 in Section 3.3 should include a statement where AIE commits to compliance with Section 120 of POEO Act.</p> <p>Recommend revising text to reflect commitment to complying with S120</p>	<p>Commitment to compliance with Section 120 added in section 1.2. Table 4 in Section 3.3 refers to compliance with Section 120 as performance criteria of the CWQMP..</p>
Aquatic Habitat Condition 2, Schedule 3	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
<p>The Proponent must design and construct the water intake on the FSRU to minimise entrainment of aquatic organisms and plankton.</p>			<p>Addressed in another Plan? If so state so.</p>	<p>This will be covered in the pre-Operation Management Plans that will be</p>	<p>Condition applicable to Operation not construction</p>	

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				submitted after pre FID period.		
Discharge Limits Condition 2A, Schedule 3	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
The water discharge rate from the FSRU from the regasification process must not exceed 13,000 cubic metres per hour.			Addressed in another Plan? If so state so.?	This will be covered in the pre-Operation Management Plans that will be submitted after pre FID period.	Condition applicable to Operation not construction	
Discharge Limits Condition 2B, Schedule 3	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
The average annual water discharge rate from the FSRU from the regasification process must not exceed 8,125 cubic metres per hour.			Addressed in another Plan? If so state so.	This will be covered in the pre-Operation Management Plans that will be submitted after pre FID period.	Condition applicable to Operation not construction	
Condition 3, Schedule 3	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required		DPIE Review	
a) describe the water quality monitoring that would be undertaken to:	Partial	.	Addressed in another Plan? If so state so.	This will be covered in the pre-Operation	Condition applicable to Operation not construction	

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			Specify if this for construction only and for operations the management plan will be updated.	Management Plans that will be submitted after pre FID period.		
<ul style="list-style-type: none"> verify the assumptions and parameters used to model water discharges, including intake and ambient water quality variables 	No		Include assumptions and parameters used to model water discharges, including intake and ambient water quality variables for construction e.g. sediment plume modelling	This will be covered in the pre-Operation Management Plans that will be submitted after pre FID period.	Condition applicable to Operation not construction	
<ul style="list-style-type: none"> confirm whether discharges comply with a total residual chlorine (TRC) concentration of no more than 20 ug/L and temperature limit of no less than 7 degrees Celsius below ambient water temperature, under the full range of 	No	Operations?	Specify if this for construction only and for operations the management plan will be updated.	This will be covered in the pre-Operation Management Plans that will be submitted after pre FID period.	Condition applicable to Operation not construction	

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operating conditions and during all seasons;						
<ul style="list-style-type: none"> determine acute toxicity risks in the immediate area around the discharge point from sodium hypochlorite by-products generated by the antifouling system; 	No	Operations?	Specify if this for construction only and for operations the management plan will be updated.	This will be covered in the pre-Operation Management Plans that will be submitted after pre FID period.	Condition applicable to Operation not construction	
<ul style="list-style-type: none"> verify the TRC concentrations and temperature differential at the edge of the near field mixing zone comply with the guideline trigger values assessed in the EIS and that the impacts from water discharges from the FSRU are no greater than predicted in the EIS; 	No	Operations?	Specify if this for construction only and for operations the management plan will be updated.	This will be covered in the pre-Operation Management Plans that will be submitted after pre FID period.	Condition applicable to Operation not construction	
<ul style="list-style-type: none"> determine the impacts on marine biota from the water intake; 	No	Operations?	Specify if this for construction only and for operations the management plan will be updated.	This will be covered in the pre-Operation Management Plans that will be submitted after pre FID period.	Condition applicable to Operation not construction	

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b) assess the suitability of in-situ TRC monitoring to achieve a detection level below 20 ug/L	No	Operations?	Specify if this for construction only and for operations the management plan will be updated.	This will be covered in the pre-Operation Management Plans that will be submitted after pre FID period.	Condition applicable to Operation not construction	
c) assess toxicity risks associated with the full range of sodium hypochlorite by-products	No	Operations?	Specify if this for construction only and for operations the management plan will be updated.	This will be covered in the pre-Operation Management Plans that will be submitted after pre FID period.	Condition applicable to Operation not construction	
d) model the potential cumulative temperature impacts on Port Kembla Harbour, using a calibrated thermal plume model and validated model predictions based on the results of the monitoring program;	No	Operations?	Specify if this for construction only and for operations the management plan will be updated.	This will be covered in the pre-Operation Management Plans that will be submitted after pre FID period.	Condition applicable to Operation not construction	
e) verify that impacts from water discharges from the FSRU are no greater than predicted in the EIS;	No	Operations?	Specify if this for construction only and for operations the management plan will be updated.	This will be covered in the pre-Operation Management Plans that will be submitted after pre FID period.	Condition applicable to Operation not construction	

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				submitted after pre FID period.		
f) if required, recommend any modification to the proposed discharge limit(s) in the EPL for TRC and temperature based on the results of the verification program;	No	Operations?	Specify if this for construction only and for operations the management plan will be updated.	This will be covered in the pre-Operation Management Plans that will be submitted after pre FID period.	Condition applicable to Operation not construction	
g) if required, identify contingency measures that will be implemented to address any exceedances of predicted cold water impacts or TRC concentrations, residual risk of acute toxicity or chemical by-products or measures to reduce the entrainment of marine biota in the water intakes, including the timing for implementation of these measures;	No	Operations?	Specify if this for construction only and for operations the management plan will be updated.	This will be covered in the pre-Operation Management Plans that will be submitted after pre FID period.	Condition applicable to Operation not construction	
h) evaluate the effectiveness of the monitoring program and make recommendations for ongoing discharge and ambient water	No	Operations?	Specify if this for construction only and for operations the management	This will be covered in the pre-Operation Management Plans that will be	Condition applicable to Operation not construction	

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quality monitoring and management, including trigger levels for investigating and responding to any potential or actual adverse impacts associated with discharges on water quality and the ecology of Port Kembla Harbour; and			plan will be updated.	submitted after pre FID period.		
i) include routine and milestone reporting procedures for the results of the verification program, including a final report to be prepared in consultation with EPA and DPI Fisheries within 18 months of the commencement of operations, unless otherwise agreed by the Secretary	No	Operations?	Specify if this for construction only and for operations the management plan will be updated.	This will be covered in the pre-Operation Management Plans that will be submitted after pre FID period.	Condition applicable to Operation not construction	
Condition 4, Schedule 3	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
The Proponent must implement the approved Water Quality Verification and Monitoring Program			Addressed in another Plan? If so state so.	This will be covered in the pre-Operation Management Plans that will be	Condition applicable to Operation not construction	

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				submitted after pre FID period.		
<i>Acid Sulphate Soils Condition 6, Schedule 3</i>	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
The Proponent must ensure that any construction activities in identified areas of acid sulphate soil risk are undertaken in accordance with Acid Sulfate Soil Manual (Acid Sulfate Soil Management Advisory Committee, 1998).	Partial		Addressed in another Plan? If so state so.	This is addressed in the Spoil and Waste	Condition applicable to Construction but should be covered under the Contaminated Spoil Management Plan.	Table 4 Section 3.3 states an Acid Sulphate Soil Management Plan is being developed and that any construction activities in identified areas of acid sulphate soil risk are undertaken in accordance with Acid Sulfate Soil Manual (Acid Sulfate Soil Management Advisory Committee, 1998 Section 6.3 also refers to ASS monitoring
<i>Condition 11, Schedule 3</i>	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
c) a Water Quality Monitoring Plan that includes:						
<ul style="list-style-type: none"> a description of the water quality monitoring that would be undertaken to 	Partial	Bouys x 4	Include details of depth of sampling on	We are planning to	Recommend including more of these details in	Detail on monitoring has been added in

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<p>monitor turbidity and pollutant concentrations surrounding dredging and disposal works, including real-time turbidity monitoring;</p>		<p>Background Buoy like Berth 103? Grab Samples</p>	<p>Buoys and how that depth relates to plume modelling. Better clarify required on 'background levels' – is it and average of 4 buoys for 6 weeks preconstruction or against daily background buoy like Berth 103? Include grab sample depths or include 3 samples @ each location. Deep, shallow and surface level samples. Include land based activity monitoring and testing for other two scopes of work.</p>	<p>use 3 buoys and 1 background point. Sampling point is 1.6 m. single sampling. The location and sampling depth follows the locations and sampling depth used during the dredging campaign at Berth 103 in 2015. The reason to adopt the locations and sampling depth used at Berth 103 stems from the recommendations made in the EIS section 12.4 (amongst others). The background buoy is chosen at the same location as was used during the dredging campaign at Berth 103. The reason to adopt</p>	<p>CWQMP to address Actions Required.</p>	<p>Sections 5.1 and 6.1.1. An additional background WQM location (AMB) is now proposed to be located near Bluescope Steel.</p>
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				<p>the locations and sampling depth used at Berth 103 stems from the recommendations made in the EIS section 12.4 (amongst others) NSW Ports have no information, no background nor requirements in EIS or Berth 103, this can be done for information only for sake of collecting data only.</p> <p>This information will be added in the site reporting for future projects.</p> <p>SCSB JV added 1 sample at 1.6 m, 1 sample at half depth, 1 sample at 2 m above sea bed. If the reading</p>		
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				<p>2 m above sea bed is high, the contractor will redo one to confirm that the sea bed was not disturbed by the sampling and caused high value.</p> <p>The average value will be compared to automatic monitoring in order to validate the manual sampling values. Added in Section 6.1.1</p> <p>This has been added in Chapter 7.</p>		
<ul style="list-style-type: none"> a broader program to monitor harbour-wide water quality trends and the ecological health of Port Kembla Harbour; 	Partial	Includes monthly flyovers	Include detail of other wider monitoring and results undertaken in the vicinity of the PK Port	NSW Ports advised in writing they do not undertake any regular readings and that no readings are available.	Recommend AIE propose broader program to monitor harbour-wide water quality trends and the ecological health of Port Kembla Harbour in CWQMP	Water monitoring will commence six weeks prior to work on water beginning to provide baseline information.

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			e.g. Ports Authority etc			<p>The Proponent has included an additional Water Quality Monitor located near Bluescope Steel. (WQM 5) will be included in the monitoring program for the purpose of monitoring harbour wide water quality monitoring trends and ecological health of port Kembla Harbour</p> <p>Drone flyovers of the Harbour will take place monthly to provide a visual inspection.</p>
<ul style="list-style-type: none"> objectives and performance criteria, including trigger levels for investigating any potential or actual adverse impacts 	Partial	<p>Table 6 – Monitoring limits</p> <p>Table 8 OK Background average $1.2 \times 0.75 = 90\%$</p>	<p>Include monitoring limits for EC and DO</p> <p>Still TBC</p>	<p>DO (Dissolved Oxygen) and EC (Electrical Continuity) are already in Table 7.</p>	<p>Recommend including a note at the bottom of Table 7 that explains that limits for EC and DO will be developed</p>	<p>Recommended levels for EC and DO have been included in Table 6.</p>

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<p>associated with construction activities on water quality and the ecology of Port Kembla Harbour;</p>		<p>Table 8 refers to Table 6 note in accordance with Section 6.1.2 this monitoring limit Concentration limit in Table 8 could be 1.2 times the background level</p>		<p>However, the Contractor note there are not part of previous studies in PKCT area or at least not being referred to in the EIS. The contractor will provide those data for information only for future projects developments.</p> <p>The lowest value will be used, whichever it is.</p>		<p>Section 6 notes these levels do not appear to have been recorded in previous dredging campaigns in the Harbour.</p>
<ul style="list-style-type: none"> a plan to respond to any exceedances of the trigger levels and/or performance criteria, and minimise any adverse water quality impacts of the development; and 	<p>Partial</p>	<p>Table 9</p>	<p>Level 2 states implementing one or more adaptive management practices. Table 9 is silent on what these adaptive measures are. Where is optimum 'location' to</p>	<p>The adaptive measures are a list of possible measures.</p> <p>Additional possible measures have been added in Chapter 6.6.1. Detailing of</p>	<p>OK addressed in text after Table 9</p>	

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			<p>dump or what is a optimised layer thickness (what is the output? XX m3/sec?)</p>	<p>measures down to maximum / minimum thickness layer / production reduction, dump location will not be possible without a thorough modelling of the barge depending on currents, production rates, environmental factors etc. The list is provided by a competent contractor for a construction project. A more detailed list can be obtained from a R&D project.</p>		
<ul style="list-style-type: none"> reporting procedures for the results of the monitoring program. 	<p>Partial</p>	<p>Section 6.8</p>	<p>Include notification and formal reporting details in accordance with Schedule</p>	<p>This is addressed in Appendix G.</p>	<p>OK Appendix G</p>	

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Updating and Staging of Management Plans Condition 3, Schedule 4	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
<p>To ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development, the Proponent may submit revised strategies, plans or programs required under this approval at any time. With the agreement of the Planning Secretary, the Proponent may also submit any strategy, plan or program required by this approval on a staged basis.</p> <p>The Planning Secretary may approve a revised strategy, plan or program required under this approval, or the staged submission of any of these documents, at any time. With the agreement of the Planning Secretary, the Proponent may prepare the revised or staged strategy, plan or program without undertaking consultation with all parties nominated under the applicable condition in this approval.</p>	<p align="center">Partial</p>	<p>Section 2.3 refers to three scopes of construction work but the CWQMP only relates to the Marine Berth Construction, dredging and disposal (MBD).</p>	<p>Include details for Onshore Receiving Facilities (ORF) and Pipeline Installation including tie-ins (NGP).</p> <p>If these are addressed elsewhere please state so.</p>	<p>This has been added in Chapter 7.</p>	<p>OK Chapter 7</p>	

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<p>Notes:</p> <ul style="list-style-type: none"> • While any strategy, plan or program may be submitted on a progressive basis, the Proponent will need to ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times. • If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stages, and the trigger for updating the strategy, plan or program. 						
<p>Revision of Strategies, Plans or Programs Condition 4, Schedule 4</p>	<p>Satisfactory (Yes/No/Partial)</p>	<p>Document reference and comment</p>	<p>Action Required</p>			
<p>Within 3 months, unless otherwise agreed with the Planning Secretary, of: (a) the submission of an incident report under condition 5 below;</p>	<p>No</p>		<p>Include triggers and details of updating MPs as per condition.</p>	<p>Addressed in CEMP Appendix P</p>	<p>Recommend including triggers and details of updating MPs as per condition in each MP</p>	<p>This has been added in Section 9 table.</p>

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<p>(b) the submission of an audit report under condition 9 below; and (c) the approval of any modification to the conditions of this approval; or (d) a direction of the Planning Secretary under condition 4 of schedule 2; the Proponent must review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Planning Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted to the Planning Secretary for approval, unless otherwise agreed with the Planning Secretary. Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.</p>						
<p>Incident Notification Condition 5, Schedule 4</p>	<p>Satisfactory (Yes/No/Partial)</p>	<p>Document reference and comment</p>	<p>Action Required</p>			

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The Department must be notified in writing to compliance@planning.nsw.gov.au immediately after the Proponent becomes aware of an incident on site. The notification must identify the development, including the application number, and set out the location and nature of the incident.	Partial	Section 6.7 discusses exceedances, but not incidents in accordance with the Project Approval definition or POEO Act definition	Include incident notification in accordance with the approval. Revise Figure 11 to reflect approval condition notifications	This has been added in Appendix G	OK Appendix G	
<i>Non compliance Notification Condition 6, Schedule 4</i>	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
The Department must be notified in writing to compliance@planning.nsw.gov.au within 7 days after the Proponent becomes aware of any non-compliance. The notification must identify the development, including the application number, set out the condition of approval that the development is non-compliant with, the way in which it does not comply, the reasons for the non-compliance (if known) and what actions have been taken, or will be taken, to address the non-compliance.	No	No details on Non-Compliances	Include details on non-compliances as per condition	This has been added in Appendix G	Incident addressed in Appendix G Recommend including details on non-compliances as per condition	Added in Section 6.7
<i>Reporting – Compliance Reporting Condition 7, Schedule 4</i>	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			

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The Proponent must provide regular compliance reporting to the Department on the development in accordance with the relevant Compliance Reporting requirements (DPE 2018).	Partial			Those are the daily, weekly and monthly compliance reports in Appendix D.	Appendix C and D missing. Recommend including details on compliance reporting as per condition	Appendix C and D are provided in the .pdf format only. The .doc format is provided with track changes on the Body text only. Please refer to Appendix D provided in the .pdf copy. Section 8 added.
Regular Reporting Condition 8, Schedule 4	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
The Proponent must provide regular reporting on the environmental performance of the development on its website in accordance with the reporting requirements in any strategies, plans or programs approved under the conditions of this approval.	Partial	Section 6.5 - some reporting included	Include 'regular' reporting frequency and scope	Those are the daily, weekly and monthly compliance reports in Appendix D.	Appendix C and D missing. Recommend including details on regular' reporting frequency and scope as per condition	Same as above. Section 8 added.
Independent Audit Condition 9,10 and 11, Schedule 4	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
Twelve months after the commencement of operations and every 3 years thereafter, unless the Planning Secretary directs otherwise, the Proponent must commission and pay the full cost of an Independent	No	No reference to audit identified	Include reference to audit and qualifications, experience of auditor and timing	. As noted in the Development Consent, 12 months after the commencement of operations, AIE will commission an	Recommend including details on reference to audit and qualifications, experience of auditor and timing as per condition. Appendix D missing.	Referenced in Section 8

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Environmental Audit of the development. This audit must:				independent environmental audit of the development. This Audit will be conducted by a suitably qualified environmental auditor. A further independent environmental audit will be conducted every 3 years thereafter, unless otherwise agreed with the Secretary.	Or include a summary on auditing in each management plan and details in the CEMP or EMS.	Appendix D available in .pdf version. Added in Chapter 8
Access to Information Condition 12, Schedule 4	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
(a) Make copies of the following information publicly available on its website: • the EIS; • current statutory approvals for the development; • approved strategies, plans or programs required under the conditions of this approval; • a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications	Partial	Section 6.5 states a summary of monthly data will be published on the project's webpage	Ensure relevant information to be published is detailed in CWMP.	CEMP Section 6.1.1 will be updated	Recommend including relevant information to be published is detailed in CWMP as per condition. Or include a summary on access to information in each management plan and details in the CEMP or EMS.	Added in Chapter 1.1

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in any conditions of this approval, or any approved plans and programs; • a summary of complaints, which is to be updated monthly; • any independent environmental audit, and the Proponent's response to the recommendations in any audit; • any other matter required by the Planning Secretary; and						
(b) keep this information up to date.	No		Include in CWMP		Recommend including commitment to keeping relevant information up to date as per condition	Added in Chapter 1.1
Table 25-1 Mitigation Measures Commitment W5	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
Preparation of a Construction Environmental Management Plan (CEMP) including specific dredge management plan to provide a framework for the environmental management of construction activities to minimise the environmental risks to a level that is as low as practically possible for this project.	Yes	This CWMP	This CWQMP is part of the Spoil Management Plan		-	
Table 25-1 Mitigation Measures Commitment W6	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			

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<p>Design and implementation of a Water Quality Monitoring Program to ensure construction works do not cause exceedance of the marine water quality criterion of background plus 50 mg/L of suspended sediment, in accordance with recent Environmental Protection Licences (EPL) for similar activities within Port Kembla such as the Berth 103 Stage 2 Dredging & Spoil Disposal EPL20563).</p>	<p align="center">Partial</p>	<p>Section 2.3 refers to three scopes of construction work but the CWQMP only relates to the Marine Berth Construction, dredging and disposal (MBD). Is there a separate WQMP?</p>	<p>Include details for Onshore Receiving Facilities (ORF) and Pipeline Installation including tie-ins (NGP).</p>	<p>This has been added in Chapter 7</p>	<p>Other scopes added to Section 7. Please confirm the criteria in Table 6 apply to all components of construction, not just Marine Berth Construction, dredging and disposal (MBD).</p>	<p>Confirmed. Note added underneath Table 6</p>
<p>Continuous turbidity monitoring would be undertaken using a series of monitoring buoys to provide impact and background data (turbidity (NTU), pH, temperature). Prior to commencement of the dredging works, buoys would be deployed for an agreed period of time to confirm background conditions in the vicinity of the monitoring points. Data would be logged and transmitted to an onshore recording station where it would be processed to allow automated comparison of median turbidity levels to a series of green, amber and red trigger levels. When exceeded, an alarm would be triggered, automated email and SMS</p>	<p align="center">Partial</p>	<p>Background Buoy or not clear? Section 5.2.2 Real time monitoring</p>	<p>Confirm 3 or 4 buoys and background buoy being used or not?</p>	<p>3 buoys and 1 background buoys. Total of 4 buoys.</p>	<p>Section 5.2.2</p>	

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alerts sent and agreed the procedures implemented. Such procedures may include hand held monitoring to verify readings, reduction in the rate of dredging, relocation of dredging activities or cessation of turbidity generating works until turbidity readings reach acceptable levels						
Daily visual observations would be undertaken during dredging operations to monitor the potential release of oil or grease	Partial	Table 4	Confirm if both dredge and tugs undertake daily observations	The day reports of tugs will record daily observations to reflect monitoring of potential release of oil or grease. This is addressed in the DEMP. Noted in table 3.	Table 3	
Collection of water samples and laboratory analysis for an agreed set of contaminants would be undertaken on a weekly basis during dredging operations	Partial	Section 6.5	Include parameters to be tested – all in Table 6?	Yes all in Table 6 already.	Frequency - Table 3 Criterion - Table 6	
The WQMP would include regular reporting, evaluation and revision where required to ensure the project objectives and approval conditions are achieved.	Partial	Is there a separate WQMP?	Reporting needs to include all relevant components of the approval.	This is in Appendix D.	Appendix D not attached? Another note also specifies Appendix D for Auditing?	Appendix D is attached in the .pdf version.

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Table 25-1 Mitigation Measures Commitment W7	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
Silt curtains would be installed prior to commencement of the works in order to minimise the spread of any sediments entrained within the water column during dredging and disposal operations.	Yes	Section 4.2	-	-	-	
Table 25-1 Mitigation Measures Commitment W8	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
Subaqueous sediment removal would be undertaken using a backhoe dredge. The use of mechanical dredging (rather than hydraulic dredging) ensures that sediments are removed, transported and placed as close to their insitu density as possible. Thereby minimising the suspension and mobilisation of sediments at the dredge and disposal sites. Method statements would be prepared by the contractor to ensure that loading of dredged materials into the hopper barges is undertaken in a manner that reduces spillage and avoids overfilling barges.	Yes	Section 4.1.1	-	-	-	
Table 25-1 Mitigation Measures Commitment W9	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
A perimeter bund would be constructed within the Outer	Yes	Section 4	--	-	-	

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Harbour placement area to ensure long term stability of dredged materials and to minimise sediment migration during placement.						
Table 25-1 Mitigation Measures Commitment W10	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
A site specific erosion and sediment control plan (ESCP) will be prepared as part of the CEMP to provide control of all land based excavation and stockpiling requirements. All erosion and sediment control measures shall be designed, implemented and maintained in accordance with 'Managing Urban Stormwater: Soil and Construction Volume 1' (Landcom 2004) ('the Blue Book).	Yes	Table 4 – ESCP?	-	-	-	
Table 25-1 Mitigation Measures Commitment W11	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
A site specific emergency spill plan will be developed, and will include spill management measures in accordance relevant EPA guidelines. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of	Yes	Table 4 - Spill Response Plan?	-	-	-	

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emergency services and relevant authorities (including Roads and Maritime and EPA officers)						
Table 25-1 Mitigation Measures Commitment W12	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
An emergency spill kit will be kept on site at all times. All staff will be made aware of the location of the spill kit and trained in its use.	Partial	Table 4 - Spill Response Plan?	Include in CWMP.	This will be dealt with in a separate plan that will be provided during Construction phase after pre FID	Table 3.	
Table 25-1 Mitigation Measures Commitment W13	Satisfactory (Yes/No/Partial)	Document reference and comment	Action Required			
Machinery will be checked daily to ensure there is no oil, fuel or other liquids leaking from the machinery. All staff will be appropriately trained through toolbox talks for the minimisation and management of accidental spills.	No		Include in CWQMP.	This is available in the spill response plan. SOPEP is an appendix to it. This is also part of the Dredging Contractor Pre-Starts. This has been added in table 3.	Table 3	
General comments:						
1. Various Errors with references: Erreur ! Source du renvoi introuvable				This has been corrected.	OK	

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<p>2. Section 2.3 Refers to three scopes of work but the CWQMP only relates to the Marine Berth Construction, dredging and disposal (MBD) – where is Onshore Receiving Facilities (ORF) and Pipeline Installation including tie-ins (NGP) addressed?</p>	<p>This has been added in Chapter 7.</p>	<p>Chapter 7</p>	
<p>3. Reference to 4 monitors plus background by both the EPA and Auditor? Only 3 monitors? EPL 20563 Berth 103 had 5 monitors 2 background</p>	<p>The contractor refers to the EIS section 12. 4 where 4 locations, including background, are proposed.</p>	<p>Include text in CWQMP to reflect 3 monitoring 1 background</p>	<p>Details of the 5 monitoring locations are provided in section 5.1 and Table 5 This includes the additional fifth WQM location near Bluescope Steel</p>
<p>4. Proposed 200m vrs 20m prosed by EPA – What location was used at Berth 103? Expert advice required.</p>	<p>The distance between the nearest water quality monitoring location to the dredge area of Berth 103 was approximately above 250 m measured from the edge of the dredge area to the monitoring location. The distance between the nearest proposed water quality monitoring location</p>	<p>Requires correspondence with EPA to resolve.</p>	<p>A Letter from EPA has been received and a copy of the latest version of the WQMP has been sent to the EPA for consideration.</p>

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	to the dredge area of Berth 101 is approximately less than 215 m measured from the edge of the dredge area to the monitoring location.		
5. GPS on dredge but what about barges	The tugs transporting the barges are fitted with positioning systems	Include text in CWQMP	Line added in Section 4.1 and mentioned again in 4.4.
6. Different to Berth 103 proposing to go against past average of 4 buoys?	The average value of WQM 1,2,3 will be compared against WQM 4 and the trigger levels. Section 5.2.2 have been updated.	Include the text 'The average value of WQM 1,2,3 will be compared against WQM 4' in Section 5.2.2	Additional WQM location has been added, increasing locations to 5 as detailed in Table 5 and in section 5.1
7. Legend, scale and northing on each figure	This has been added.	Figure 1	
8. What depth autosamplers/sensors on Buoys – how does this compare to depth to plume from modelling?	The sampling of 1.6m below water level is as per Berth 103	Section 6.1.1	

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	monitoring buoys.		
9. What depth for grab samples – take three sample at each location	See reply to comment on Condition 11, Schedule 3, c)	Include this text in the CWQMP	Text added in section 5.1, underneath table 5.
10. Table 7 says tug and dredge visual daily – Section 6.2.1 says dredge but not barge and nor daily?	The tugs will add their observations on their respective day reports; The barges are not manned so do not provide observations	OK	
11. Different to Berth 103 proposing to go against past average of 4 buoys?	The contractor will average the values of WQM 1,2,3 and compare against WQM 4 and the trigger levels	OK	
12. Additionally, the Environmental Manager (or delegate) will inspect the curtain at a minimum of twice per week - how scuba gear?	The contractor will carry out visual inspection from the surface. At no time diving will be used. If diving / underwater inspections [i.e. ROV] are required,	Include the text in the CWQMP	Line added in section 4.2

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	these type of inspections are not included in our offer		
13. Section 6.5 - SBSC will provide regular compliance reporting to the DPE – nominate reporting schedule	Monthly reporting See appendix D	Appendix D not included	Appendix D available in the .pdf version.
14. Section 5.2.1 – commit to implementing additional maintenance measures included in Appendix C		Section 5.2.1	
15. Not 100% certain consultation questions have been addressed – suggest at least EPA and auditor review the revised document.	Noted.	DPIE has been in contact with EPA. EPA still have several concerns regarding the CWQMP. A letter from EPA regarding these issues will be forwarded to AIE.	A Letter from EPA has been received and a copy of the latest version of the WQMP has been sent to the EPA for consideration.



Appendix J. FAUNA REGISTER

APPENDIX D: SPECIES LIST

Table 3 Potential for Species listed under BC Act 2016 and EPBC Act 1999 to occur at the Project Site

Common Name(s) (Scientific Name)	BC Act	EPBC Act	Likelihood of Occurrence
Southern right whale (Eubalaena australis)	Endangered	Endangered, Migratory Listed marine species Whales and Cetaceans	Likely to occur Records of sightings for the Outer Harbour.
Blue whale (Balaenoptera musculus)	Endangered	Endangered, Migratory Listed marine species Whales and Cetaceans	Unlikely to occur Habitat unsuitable for species.
Leatherback turtle, Leathery turtle (Dermochelys coriacea)	Endangered	Endangered, Migratory Listed marine species	Unlikely to occur Foraging habitat not found within the Port.
Loggerhead turtle (Caretta caretta)	Endangered	Endangered, Migratory Listed marine species	Unlikely to occur Nesting and foraging habitat not found within the Port.
Green turtle (Chelonia mydas)	Vulnerable	Vulnerable, Migratory Listed marine species	Unlikely to occur Nesting and foraging habitat not found within the Port.
Long-nosed fur seal, New Zealand fur seal (Arctocephalus forsteri)	Vulnerable	Endangered, Migratory Listed marine species	Likely to occur Known haul-out site near Port Kembla.
Australian fur seal, Australo-african furseal (Arctocephalus pusillus)	Vulnerable	Endangered, Migratory Listed marine species	Likely to occur Known haul-out site near Port Kembla.
Black rockcod, Black cod, Saddled rockcod (Epinephelus daemeli)		Vulnerable	May occur Species likely to use habitat within Port as shelter.
Australian Grayling (Prototroctes maraena)		Vulnerable	Unlikely to Occur Habitat within Port Kembla not suitable for species.
Humpback whale (Megaptera novaeangliae)		Vulnerable, Migratory Listed marine species	Likely to occur Records of sightings within Outer Harbour.
Hawksbill turtle (Eretmochelys imbricata)		Vulnerable, Migratory Listed marine species	Unlikely to occur Nesting and foraging habitat not present within Port.
Flatback turtle (Natator depressus)		Vulnerable, Migratory Listed marine species	Unlikely to occur Nesting and foraging habitat not present within Port.
Grey nurse shark (east coast population) (Charcharias taurus)		Critically Endangered	May occur Individuals may transit the area during migrations between aggregation areas.

White shark, Great white shark (Carcharodon carcharias)		Vulnerable, Migratory	Unlikely to occur Habitat unsuitable for species.
Whale shark (Rhincodon typus)		Vulnerable, Migratory	Unlikely to occur Habitat unsuitable for species.
Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin (Tursiops aduncus)		Listed marine species Whales and Cetaceans	Likely to occur Species known throughout NSW and habitat occurs in Port area.
Bottlenose dolphin (Tursiops truncatus s. str.)		Listed marine species Whales and Cetaceans	Likely to occur Species known throughout NSW and habitat occurs in Port area.
Syngnathids 21 species (i.e. seahorses, seadragons, pipefish and pipehorses)		Listed marine species	May occur Habitat may be suitable for species.

