



# Port Kembla Gas Terminal

**Spoil Management Plan  
Stage 2A and Stage 2B Marine Berth  
Construction and Dredging – Land and  
Marine Based**

Australian Industrial Energy

30 May 2022

→ **The Power of Commitment**



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# Acronyms

| Acronym   | Definition                                           |
|-----------|------------------------------------------------------|
| ACM       | asbestos containing material                         |
| AHD       | Australian Height Datum                              |
| AIE       | Australian Industrial Energy                         |
| AQMP      | Air Quality Management Plan                          |
| AS        | Australian Standards                                 |
| ASS       | Acid Sulfate Soils                                   |
| ASSMP     | Acid Sulfate Soils Management Plan                   |
| BaP       | Benzo(a)Pyrene                                       |
| BaP (TEQ) | Benzo(a)Pyrene (Toxicity Equivalence Quotient)       |
| Berth 101 | MBD Site Compound                                    |
| CD        | Chart Datums                                         |
| CLM Act   | <i>Contaminated Land Management Act 1997</i>         |
| CSP       | Contaminated Spoil Protocol                          |
| CSSI      | Critical State Significant Infrastructure            |
| CTMP      | Construction Traffic Management Plan                 |
| DEMP      | Dredge and Excavation Management Plan                |
| DGV       | Default Guideline Values                             |
| DP&E      | Department of Planning and Environment               |
| ECR       | Emplacement Cell Report                              |
| EIS       | Environmental Impact Statement                       |
| EMS       | Environmental Management Strategy                    |
| ENM       | Excavated Natural Material                           |
| EPA       | NSW Environment Protection Authority                 |
| EP&A Act  | <i>Environmental Planning and Assessment Act 197</i> |
| EPL       | Environment Protection Licence                       |
| ESCP      | Erosion and Sediment Control Plan                    |
| FSRU      | Floating Storage and Re-gasification Unit            |
| GHD       | GHD Pty Ltd                                          |
| GML       | General Mass Limits                                  |
| GSW       | General Solid Waste                                  |
| HAT       | Highest Astronomical Tide                            |
| HDD       | horizontal directional drilling                      |
| HIL       | Health Investigation Level                           |
| HM        | Harbour Muds                                         |
| HS        | Harbour Silts                                        |
| HSE       | Health, Safety and Environment                       |
| HSL       | Health Screening Levels                              |
| LAT       | Lowest Astronomical Tide                             |

| Acronym                           | Definition                                                                             |
|-----------------------------------|----------------------------------------------------------------------------------------|
| LNG                               | liquefied natural gas                                                                  |
| KPI                               | Key Performance Indicators                                                             |
| m <sup>3</sup>                    | cubic metres                                                                           |
| MBD                               | Marine Berth Construction and Dredging                                                 |
| mbgl                              | Metres below ground level                                                              |
| MHW                               | Mean High Water                                                                        |
| MLA                               | Marine Loading Arms                                                                    |
| MLW                               | Mean Low Water                                                                         |
| NAPL                              | non-aqueous phase liquid                                                               |
| NEPC                              | National Environmental Protection Council                                              |
| NEPM                              | <i>National Environment Protection (Assessment of Site Contamination) Measure 1999</i> |
| OHDSCA                            | Outer Harbour Dredged Spoil Containment Area                                           |
| ORF                               | Onshore Receiving Facilities                                                           |
| PANSW                             | Port Authority of NSW                                                                  |
| PCB                               | Polychlorinated Biphenyls                                                              |
| PIRMP                             | Pollution Incident Response Management Plan                                            |
| PKCT                              | Port Kembla Coal Terminal                                                              |
| PKGT                              | Port Kembla Gas Terminal                                                               |
| PKGT EIS                          | Port Kembla Gas Terminal Environmental Impact Statement                                |
| PKHD                              | Port Kembla Height Datum                                                               |
| Planning Systems SEPP             | State Environmental Planning Policy (Planning Systems) 2021                            |
| POEO Act                          | <i>Protection of the Environment Operations Act 1997</i>                               |
| POEO Regulation                   | <i>Protection of the Environment Operations (General) Regulation 2009</i>              |
| POEO (Waste) Regulation           | <i>Protection of the Environment Operations (Waste) Regulation 2014</i>                |
| POMP                              | Port Operations Management Plan                                                        |
| PPE                               | Personal Protective Equipment                                                          |
| RL                                | Reduced level                                                                          |
| RSW                               | Restricted Solid Waste                                                                 |
| SDS                               | Safety Data Sheets                                                                     |
| SMEC                              | SMEC Australia Pty Ltd                                                                 |
| SMP                               | Spoil Management Plan                                                                  |
| TEQ                               | Toxicity Equivalence Quotient                                                          |
| The Project                       | Port Kembla Gas Terminal Project                                                       |
| Transport and Infrastructure SEPP | State Environmental Planning Policy (Transport and Infrastructure) 2021                |
| TRH                               | Total recoverable hydrocarbons                                                         |
| UFP                               | Unexpected finds protocol                                                              |
| VENM                              | Virgin Excavated Natural Material                                                      |
| WQMP                              | Water Quality Monitoring Plan                                                          |



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# 1. Introduction

## 1.1 Overview

This Spoil Management Plan (SMP) has been developed as a Sub-plan to the Port Kembla Gas Terminal Project (the Project) Environmental Management Strategy (EMS). This SMP has been prepared by GHD Pty Ltd (GHD) on behalf of Australian Industrial Energy (AIE) to apply to construction activities associated with Stage 2A and Stage 2B of the Project. This Stage 2A and Stage 2B SMP supersedes the Stage 2A SMP.

This SMP interfaces with the other associated Sub-plans, which together describe the proposed structure for environmental management and monitoring requirements for the Project. This SMP addresses the requirements of the Port Kembla Gas Terminal Environmental Impact Statement (PKGT EIS) and associated Infrastructure Approval (SSI 9471) and Environment Protection Licence (EPL) No. 21529 and has been prepared in consultation with the NSW Environment Protection Authority (EPA), Department of Planning and Environment (DP&E) Water, NSW Ports, Port Authority of NSW (PANSW) and an EPA accredited contaminated site auditor.

Sub-plans to the SMP are included as the following appendices:

- Acid Sulfate Soils Management Plan (ASSMP) as Appendix A.
- Water Quality Monitoring Plan (WQMP) as Appendix B.
- Contaminated Spoil Protocol (CSP) as Appendix C.
- Erosion and Sediment Control Plan (ESCP) as Appendix D, and
- Dredge and Excavation Management Plan (DEMP) as Appendix E

## 1.2 Background

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

NSW currently imports more than 95 percent 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 more than 100 petajoules of natural gas, equivalent to more than 70 percent of NSW gas needs and will 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) (NSW) and Schedule 5 of the State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP). The Project received Infrastructure Approval from the Minister for Planning and Public Spaces on 29 April 2019.

The construction of the Project is primarily associated with the establishment of a new berth facility at Port Kembla to enable an LNG carrier to berth alongside the Floating Storage and Re-gasification Unit (FSRU) and new infrastructure to connect the terminal to the existing gas network. Excavation and dredging would be required to establish the new berth facility, with spoil deposited in a cell (referred to as the 'Emplacement Cell') in the Outer Harbour.

The development has progressed to Stage 2A and Stage 2B works located at Berth 101 (referred to as the 'Marine Berth Construction and Dredging (MBD) Site Compound') and the Outer Harbour Dredged Spoil Containment Area (referred to as 'OHDSCA' or the Emplacement Cell). Collectively, these two locations are referred to as "the site". The Stage 2A works include:

- Completion of excavation works undertaken during Stage 1 (including transport of spoil materials to the Emplacement Cell Construction Site).

- Construction of the quay wall at the MBD Site Compound.
- Construction of Onshore Receiving Facilities (ORF) at the MBD Site Compound (including construction of Wharf Topside Area, Utility Area, and Common Area).
- Installation and commissioning of power, communications, and potable water.
- Installation of gas pipeline within the MBD Site Compound as part of ORF.

The Stage 2B works include:

- Continuation of Stage 2A works.
- Excavation and dredging of the MBD Site Compound in the Inner Harbour and the Emplacement Cell in the Outer Harbour.
- Construction of the Emplacement Cell in the Outer Harbour.
- Marine based construction activities including installation of navigational aids and revetments at the MBD Site Compound.

## 1.3 Purpose

This SMP has been prepared in accordance with the PKGT EIS and associated Infrastructure Approval (SSI 9471) and EPL No. 21529. It describes how the management measures and commitments in the PKGT EIS, Infrastructure Approval (SSI 9471) and EPL No. 21529, relating to spoil are to be implemented by the Principal Contractor's during Stage 2A and Stage 2B construction of the Project. Specifically, this plan addresses the following requirements:

- Performance criteria for spoil management and mitigation.
- Mitigation strategies to minimise impacts related to spoil and contamination.

AIE and its contractors acknowledge that maintaining spoil in the vicinity of the Project site is paramount to the successful delivery of the construction phase of the Project. AIE is committed to ensuring this SMP is implemented, reviewed and updated regularly to ensure its objectives are met and that the conditions outlined in the Infrastructure Approval (SSI 9471) and EPL No. 21529 are achieved. Staging of the SMP has been approved in accordance with Condition 3 of Schedule 4 of Infrastructure Approval (SSI 9471).

This SMP is applicable to all staff, employees, subcontractors, and any statutory service authorities undertaking the Stage 2A and Stage 2B works described in Section 2 of this SMP. The SMP implementation and on-going development will be managed by the Project Team (refer to Section 3).



## 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 an 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 includes 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. Berth and wharf facilities, as well as 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. The Emplacement Cell will be located in the Outer Harbour. A site overview is provided as Figure 2.1.

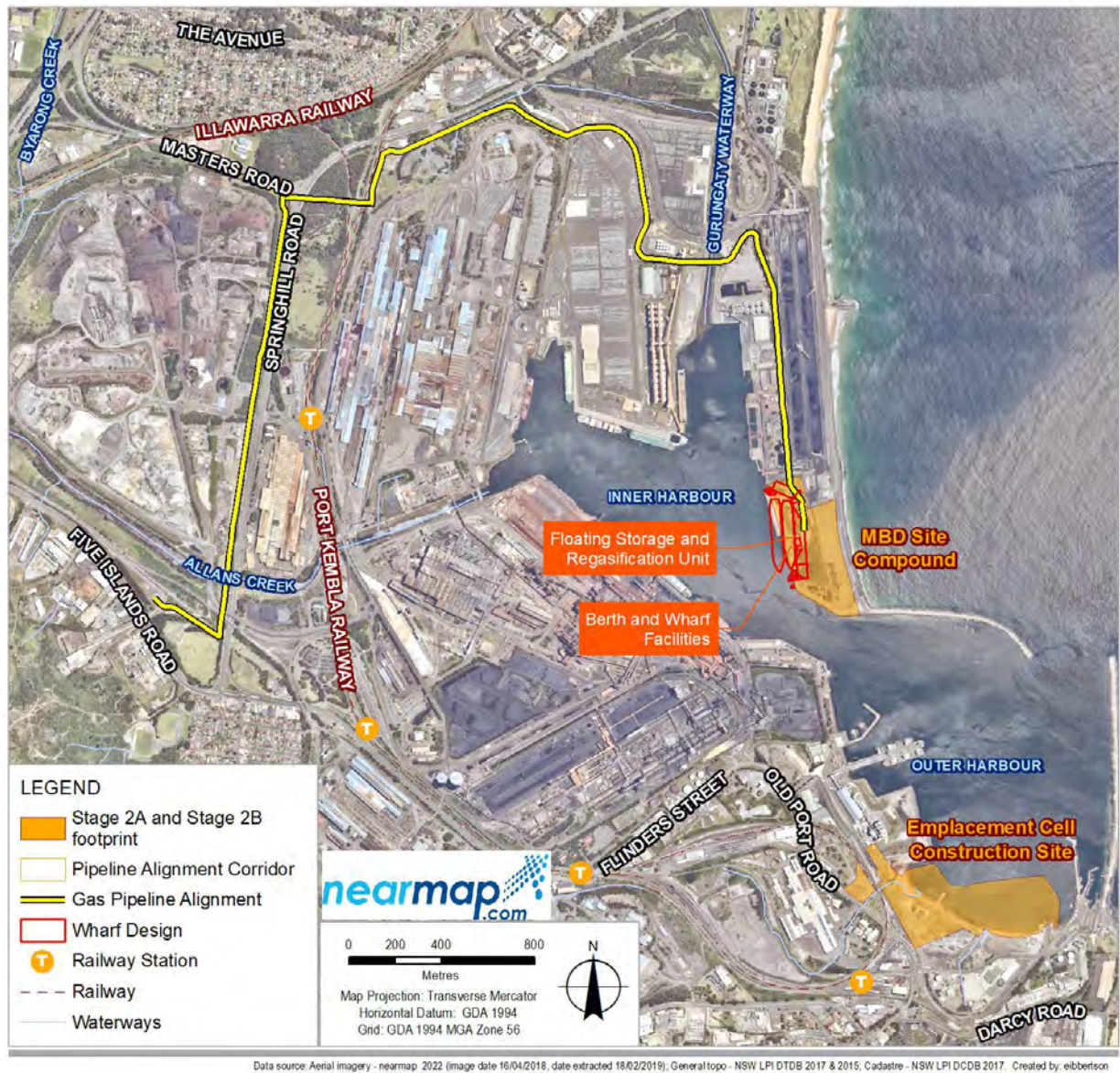


Figure 2.1 Site overview

## 2.2 Project construction scope of works

The Project construction scope of work has been divided into three main packages (with associated activities), as outlined in Table 2.1. Construction staging of the Project has been approved in accordance with Condition 3 of Schedule 4 of Infrastructure Approval (SSI 9471) as per correspondence from DP&E dated 27 October 2021. This SMP applies only to the works associated with Stage 2A and Stage 2B.

**Table 2.1** Construction stages/work packages

| Stage | Package                                                        | Proposed commencement | Activities                                                                                                                                                                                                                                                                                            |
|-------|----------------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | Early Enabling Works                                           | May 2021              | Demolition of Berth 101, removal of structures and land-based excavation works, and Cone Penetration Testing in the Outer Harbour to inform Emplacement Cell design and relocation of Bunker Oil Pipeline.                                                                                            |
| 2A    | Marine Berth Construction – Land Based                         | January 2022          | Completion of excavation works undertaken during Stage 1.<br>Transport of spoil materials to Emplacement Cell Construction Site.<br>Quay wall construction.                                                                                                                                           |
|       |                                                                | February 2022         | Installation of communications conduit, potable water line, 11kV power cable, and padmount substation within the MBD Site Compound.                                                                                                                                                                   |
|       |                                                                | April 2022            | Construction of the ORF, which comprises three areas: Wharf Topside Area; Utility Area; and Common Area.                                                                                                                                                                                              |
|       |                                                                | June 2022             | Pipeline construction and associated ancillary infrastructure within MBD Site Compound                                                                                                                                                                                                                |
| 2B    | Marine Berth Construction and Dredging – Land and Marine Based | March 2022            | Continuation of Stage 2A with addition of the following activities:                                                                                                                                                                                                                                   |
|       |                                                                |                       | Excavation/dredging of the MBD Site Compound in the Inner Harbour and construction of the Emplacement Cell in the Outer Harbour                                                                                                                                                                       |
|       |                                                                |                       | Marine based construction activities including installation of navigational aids and revetment shore protection.                                                                                                                                                                                      |
| 3     | Pipeline Installation including tie-ins (NGP)                  | June 2022             | Construction of an 18" onshore natural gas pipeline approximately 6.3km in length from the Berth 101 site boundary to tie-in facility at Cringila for connection to the Eastern Gas Pipeline<br>Pipeline construction to occur concurrently with Jemena, subject to separate set of management plans. |

\*Proposed dates and may be subject to change.

The following will be undertaken as part of the Stage 2A works:

- Construction of the quay wall at MBD Site Compound incorporating finalisation of excavation works undertaken during Stage 1 (including transport of spoil materials to Emplacement Cell Construction Site).
- Installation of and commissioning of power, communications, and potable water line.
- Construction of ORF at MBD Site Compound (including construction of Wharf Topside Area, Utility Area, and Common Area).
- Installation of gas pipeline within MBD Compound site.

The following will be undertaken as part of the Stage 2B land and marine-based works:

- Continuation of Stage 2A works.
- Installation of site facilities and preparatory earthworks at Emplacement Cell Construction Site.
- Marine-based construction activities including installation of silt curtains, navigational aids, and revetment shore protection at the MBD Site Compound.
- Construction of the Emplacement Cell in the Outer Harbour.
- Excavation and dredging of the MBD Site Compound in the Inner Harbour.



An outline of the tasks associated with Stage 2A and Stage 2B is provided in Section 2.3 through Section 2.7. The site includes the MBD Site Compound, the Emplacement Cell Construction Site, and the Emplacement Cell located in the Outer Harbour. The location of the Stage 2A and Stage 2B works is shown in Figure 2.2.

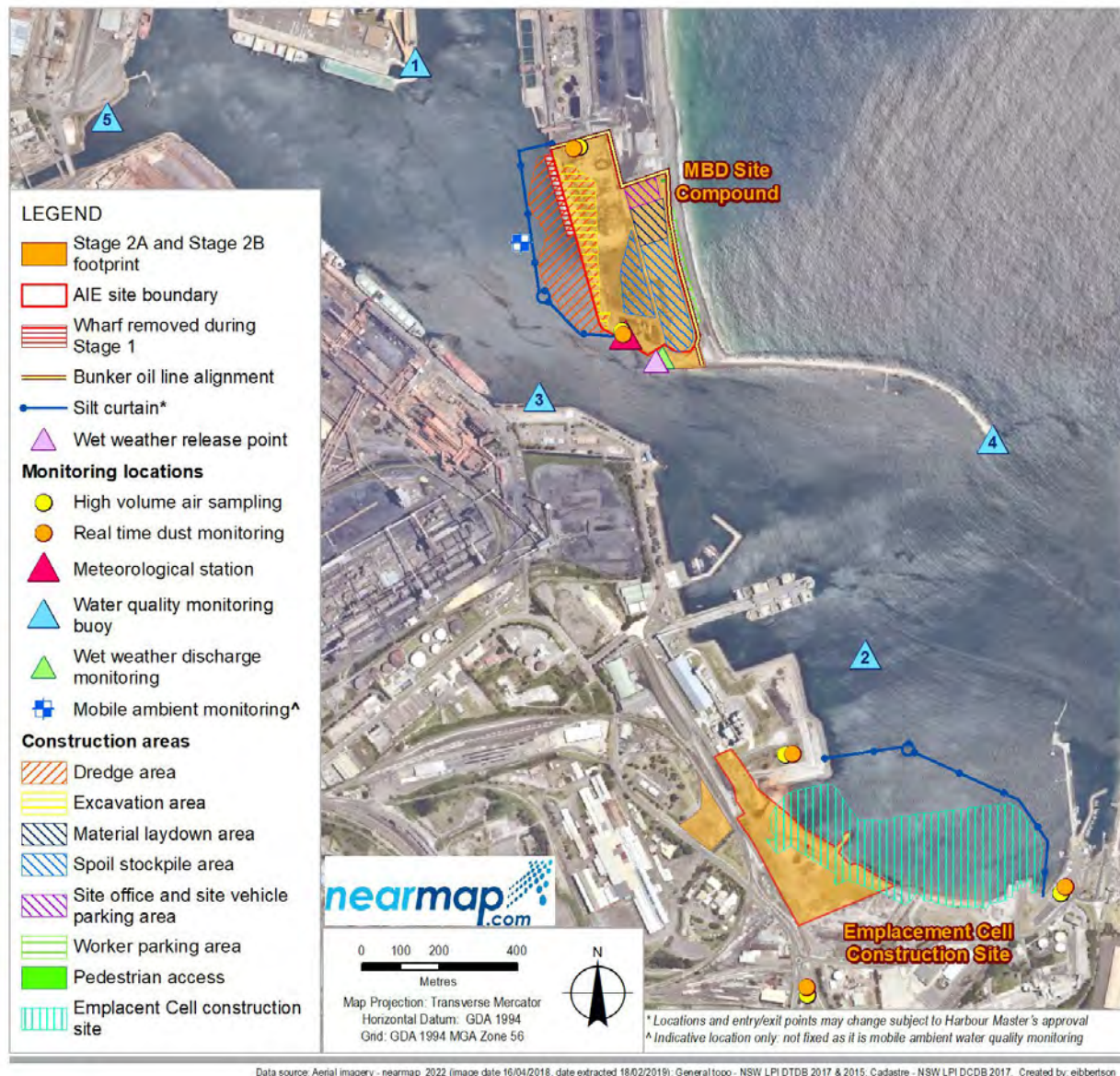


Figure 2.2 Stage 2A and Stage 2B works and location of MBD Site Compound, Emplacement Cell and Emplacement Cell Construction Site

## 2.2.1 Traffic

Road traffic generated by Stage 2A and Stage 2B will be controlled through the gate on Sea Wall Road. Heavy vehicle movements will be generated by the delivery of materials, equipment, and plant to the MBD Site Compound and transport of stockpiled material to the Emplacement Cell Construction Site.

In addition to the material that has already been transported to Emplacement Cell Construction Site (Outer Harbour Laydown Area) during Stage 2A, up to 30,000 cubic metres (m<sup>3</sup>) of material from the MBD Site Compound is anticipated to be transported via road to the Emplacement Cell Construction Site during Stage 2B. The activities associated with this task will involve loading, road transportation via truck and trailer (approximately 30-tonne capacity), unloading, stockpiling, and management of the stockpiles.

Light vehicle movements will be generated from construction workers accessing the MBD Site Compound and Emplacement Cell Construction Site. Parking will be provided for up to approximately 100 workers on the MBD Site Compound and approximately 37 workers at the Emplacement Cell Construction Site (refer to Figure 2.3 and Figure 2.4).



Road traffic movements will be undertaken in accordance with the Stage 2A and Stage 2B Construction Traffic Management Plan (CTMP).

The road traffic generated by Stage 2B will mainly be associated with the delivery of the quarry materials from quarries located in the surrounding area. It is anticipated that about 40-50 daily truck movements will be required, consisting of three - five axle semi-trailers or rigid truck and five axle dog-trailers of less than 40 tonnes (GML). The activities will take place during the standard daytime construction working hours, averaging approximately eight heavy truck movements per hour (four vehicles in and out of site). The total number of vehicles required for the operation will be 12-16.

The majority of traffic generated during Stage 2B activities will be marine traffic movements during dredging operations. Marine traffic navigation and management will be undertaken in accordance with a Port Navigation Plan, herein referred to as the Port Operations Management Plan (POMP). The POMP has been produced by the Stage 2B Principal Contractor in consultation with the PANSW and is consistent with the principles in the CTMP for Stage 2A.

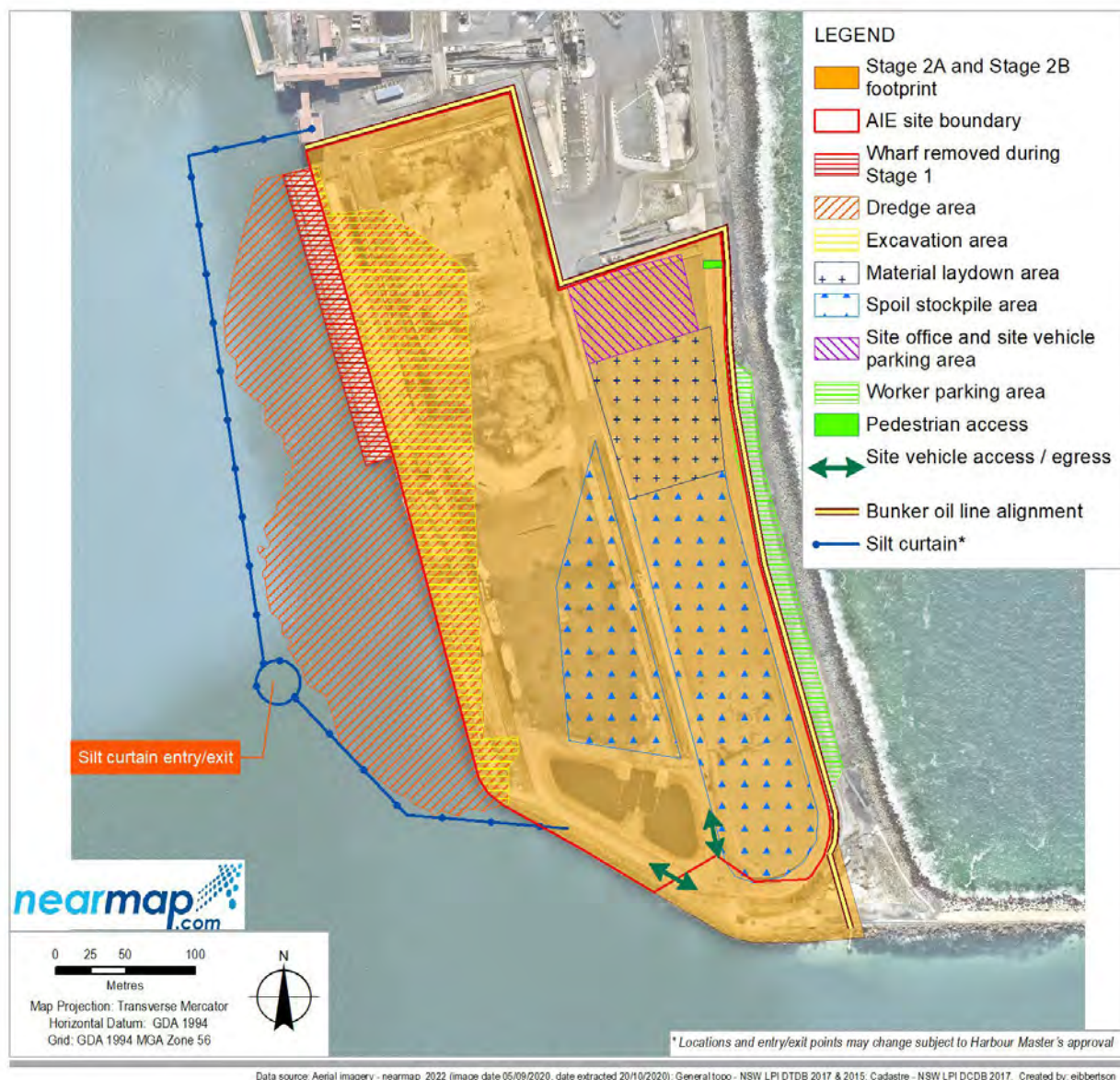


Figure 2.3 Layout of MBD Site Compound

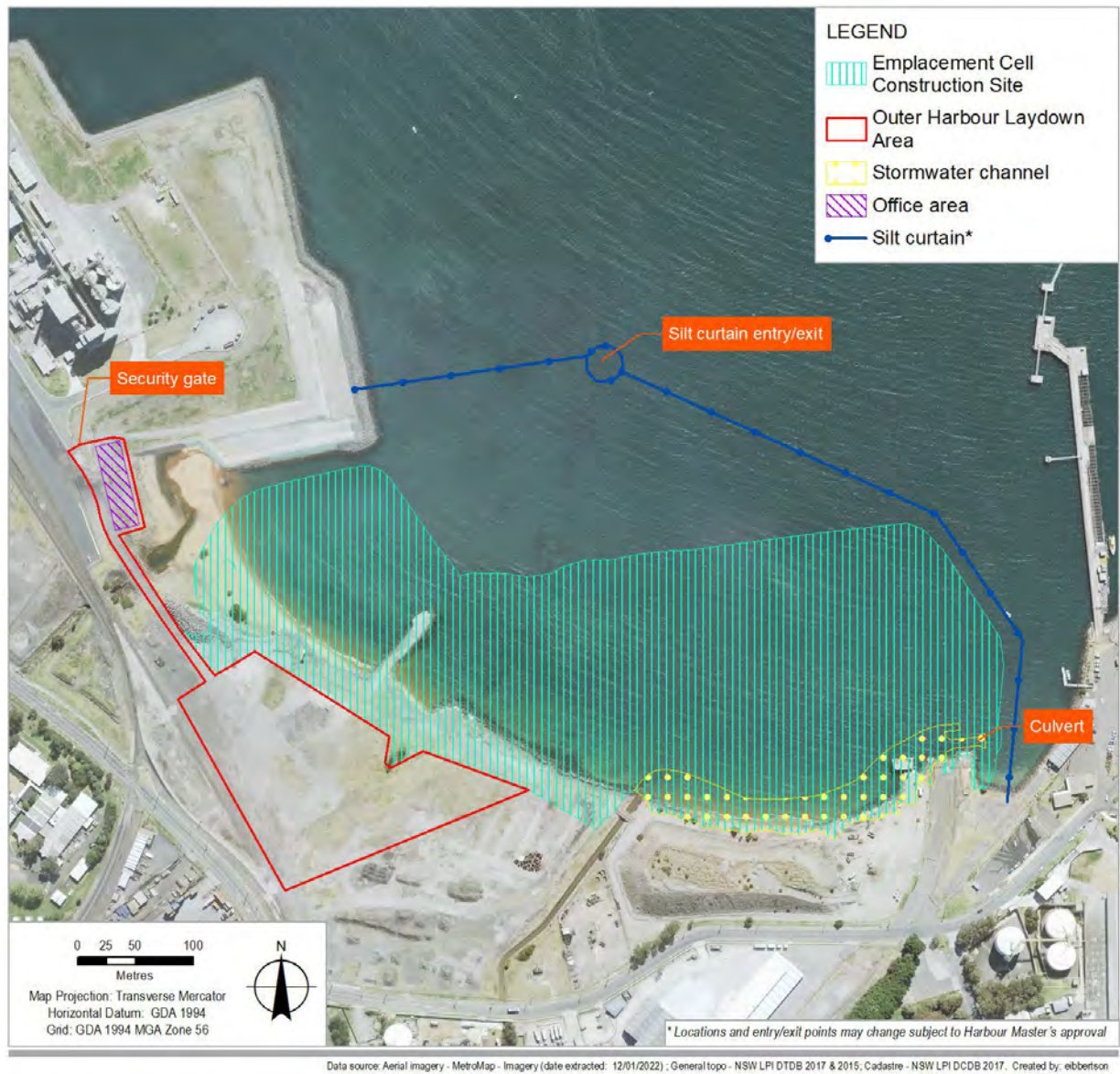


**Figure 2.4** Layout of Emplacement Cell Construction Site

## 2.2.2 Program

The Stage 2A works commenced in January 2022. Stage 2B, which includes the continuation of land-based construction and marine-based works, are then anticipated to commence in March 2022 (refer to Table 2.1 for construction staging). As noted in Section 2.2, these dates are only proposed and may be subject to change.



## 2.3 Stage 2A: Construction of quay wall (MBD – Land Based)

A number of structures will be constructed within the MBD Site Compound to accommodate the FSRU and LNG carrier for the Project. Excavation and stockpiling activities from the Stage 1 Early Enabling Works will continue on-site during Stage 2A to lay the platform for ongoing construction activities at the MBD Site Compound.

The new structures that will commence construction during Stage 2A are summarised in Table 2.2. The location of the quay wall and layout of the marine berth and wharf facilities is shown in Figure 2.5.

**Table 2.2** Marine berth and wharf structures to be constructed during Stage 2A

| Component                            | Works required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Earthworks and stockpiles            | <ul style="list-style-type: none"> <li>– Completion of excavation and backfilling works from Stage 1 Early Enabling Works.</li> <li>– Excavated materials from the Early Enabling Works have been stockpiled within the Eastern and Western Stockyards of the MBD Site Compound and the Emplacement Cell Construction Site.</li> <li>– The excavated materials stockpiled at the MBD Site Compound include: <ul style="list-style-type: none"> <li>• Approximately 9,700m<sup>3</sup> of demolished concrete crushed to nominal 70mm minus.</li> <li>• Approximately 12,500m<sup>3</sup> of heavily bound base course crushed to nominal -150mm minus.</li> <li>• Approximately 33,900m<sup>3</sup> of mixed slag, general fill, and coal nominally &lt; 150mm in size.</li> <li>• Approximately 10,700m<sup>3</sup> of predominantly sand material.</li> <li>• Approximately 8,600 m<sup>3</sup> of asbestos impacted soils.</li> </ul> </li> <li>– The excavated materials stockpiled at the Emplacement Cell Construction Site include: <ul style="list-style-type: none"> <li>• Approximately 44,000 m<sup>3</sup> of sand material. *</li> </ul> </li> <li>– The excavated materials will be used/reused for quay wall construction and to backfill the landside area of the quay wall or transported to the Emplacement Cell Construction Site for storage and use in construction of the Emplacement Cell.</li> </ul> |
| Quay wall                            | <ul style="list-style-type: none"> <li>– Construction of a new piled quay wall keyed into bedrock where necessary complete with sheet pile anchor wall, capping beam and tie rods to the south of the existing coal terminal.</li> <li>– Excavated and processed materials from the Stage 1 Early Enabling Works are stockpiled within the MBD Site Compound and will be used during construction of the quay wall and to backfill on landside area of the wall.</li> <li>– Installation of a marine fender system attached to the capping beam along the quay wall to protect the quay wall from berthing and mooring loads.</li> <li>– Installation of a cathodic protection system to the quay wall and associated elements, including assessment of the potential impacts the FSRU and pipeline cathodic protection will have on quay wall.</li> <li>– Backfilling and compaction on landside area of wall utilising the site stockpiled materials.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Mooring dolphins                     | <ul style="list-style-type: none"> <li>– Installation of landside mooring dolphin structures on reinforced concrete platforms supported by steel piles.</li> <li>– Mooring equipment will be installed and comprise the following: <ul style="list-style-type: none"> <li>• 20 load sensing quick release hooks.</li> <li>• Up to four land-based mooring winches on mooring dolphins may be required.</li> <li>• Up to four swivel fairleads may be required to enable each mooring line to land-based winches to be fed in a horizontal alignment.</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Marine Loading Arm (MLA) foundations | Construction of a new reinforced concrete foundation supported on steel piles, located behind the new quay wall.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Gangway tower foundation             | Construction of foundation for Gangway tower.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Fire monitor foundation              | Fire monitor foundations, subject to risk studies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

\*The volumes provided are approximate and may vary.

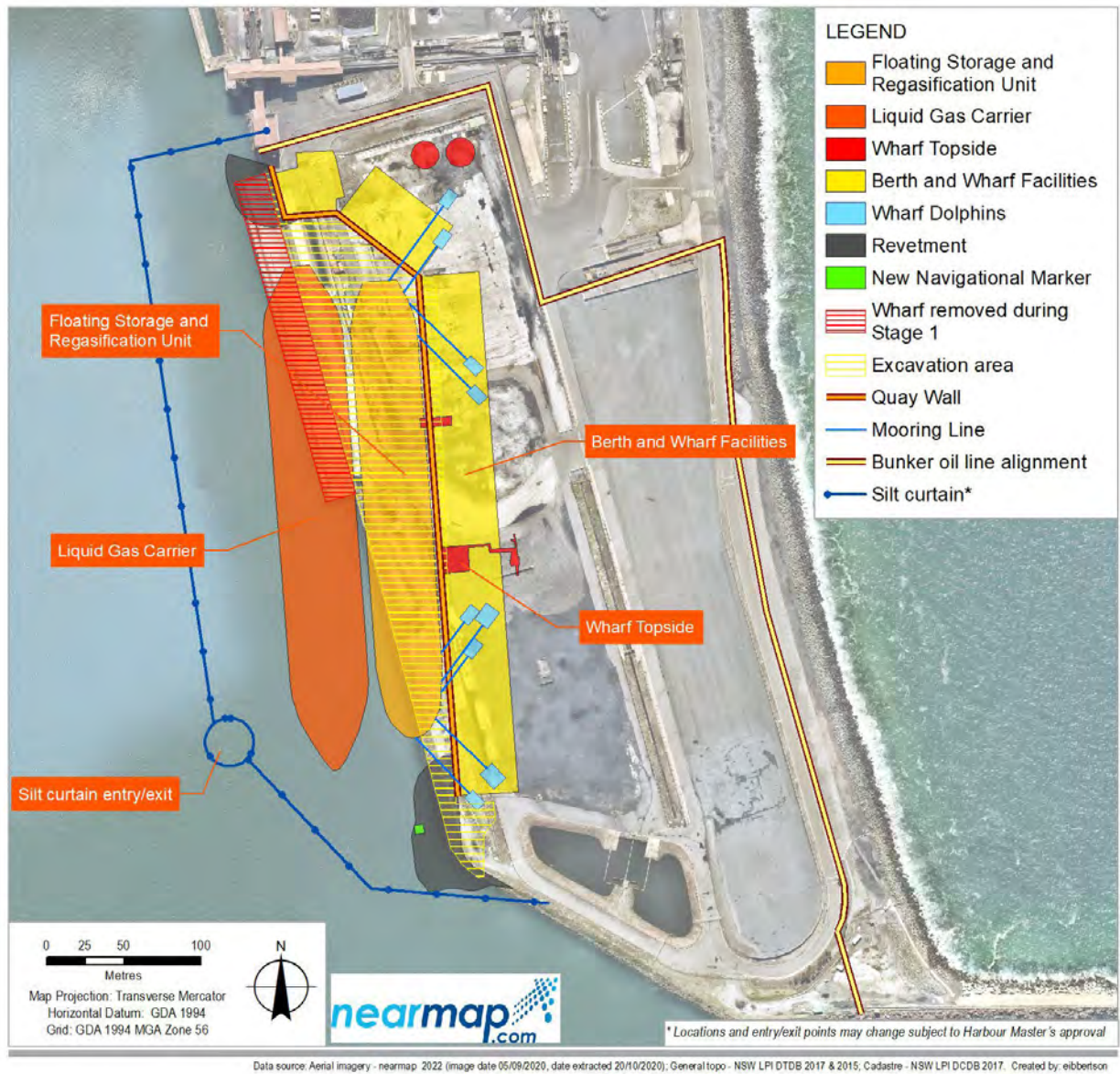


Figure 2.5 Location of quay wall and layout of MBD and ORF



## 2.4 Stage 2A: Power, communications, and water connections

Works required for power, communications, and water connections for Stage 2A are summarised in Table 2.3.

Table 2.3 Construction of utility connections for Stage 2A

| Component                | Works required                                                                                                                                                                                                                                                                               |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power and communications | <ul style="list-style-type: none"> <li>Construction and installation of a new 11kV power cable in a buried conduit and Substation.</li> <li>Energisation of the padmount substation and 415kV temporary building supply.</li> <li>Installation of communication conduit and pits.</li> </ul> |
| Potable water            | <ul style="list-style-type: none"> <li>Extension of existing potable waterline within MBD Site Compound.</li> </ul>                                                                                                                                                                          |

## 2.5 Stage 2A: Construction of ORF

The general layout of the ORF areas is shown in Figure 2.5. Works required for the three ORF areas during Stage 2A are summarised in Table 2.4.

Table 2.4 Structures to be constructed for ORF during Stage 2A

| Component                          | Works required                                                                                                                                                                                                                                                                                                                      |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Wharf Topside Area</b>          |                                                                                                                                                                                                                                                                                                                                     |
| MLAs                               | Installation of MLAs, including: <ul style="list-style-type: none"> <li>Civils and structures.</li> <li>Associated works such as piping, hydraulics, electrical, instrumentation, and auxiliary systems.</li> </ul>                                                                                                                 |
| Piping and valving                 | <ul style="list-style-type: none"> <li>All necessary piping and valving.</li> <li>Odorant injection facilities.</li> <li>Pig launcher, downstream of the MLAs to tie-in to the natural gas pipeline.</li> </ul>                                                                                                                     |
| Gangway                            | <ul style="list-style-type: none"> <li>Gangway access tower to provide connection between the wharf and FSRU.</li> </ul>                                                                                                                                                                                                            |
| Utility connections                | FSRU utilities connections for: <ul style="list-style-type: none"> <li>Communications.</li> <li>Marine Diesel Oil.</li> <li>Freshwater.</li> <li>Sewage, bilge, and grey water.</li> </ul>                                                                                                                                          |
| <b>Utility Area</b>                |                                                                                                                                                                                                                                                                                                                                     |
| Site utilities                     | Site utilities including: <ul style="list-style-type: none"> <li>Potable water and sewerage.</li> <li>Instrument air and bottled nitrogen.</li> <li>Diesel storage.</li> <li>Electrical distribution (including UPS and emergency diesel generators).</li> <li>Control and instrumentation.</li> <li>Telecommunications.</li> </ul> |
| <b>Common Areas</b>                |                                                                                                                                                                                                                                                                                                                                     |
| Firefighting systems and equipment | Firefighting equipment including: <ul style="list-style-type: none"> <li>Firewater storage.</li> <li>Pumps.</li> <li>Firewater monitors.</li> </ul>                                                                                                                                                                                 |
| Security systems and equipment     | <ul style="list-style-type: none"> <li>CCTV.</li> <li>Fencing and gates.</li> </ul>                                                                                                                                                                                                                                                 |

| Component                            | Works required                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                      | <ul style="list-style-type: none"> <li>– Security access and monitoring systems.</li> </ul>                                                                                                                                                                                                                                                                               |
| Equipment housing                    | Equipment shelters and buildings to house: <ul style="list-style-type: none"> <li>– Electrical, control, and operating equipment, critical spares, emergency response and site monitoring facilities.</li> <li>– Buildings will include appropriate building services e.g., heating, ventilation and air conditioning, potable water, amenities, sewerage etc.</li> </ul> |
| Site roadways, lighting and drainage | <ul style="list-style-type: none"> <li>– Roads and car parking areas.</li> <li>– General lighting, earthing, lightning system.</li> <li>– Drainage system to tie into the existing Port Kembla drainage system.</li> </ul>                                                                                                                                                |
| Gas Pipeline                         | A section of gas pipeline will be installed within the MBD Compound site as part of the Stage 2A works. Final safety studies will be prepared prior to the construction of the gas pipeline and prior to commencement of operation as per Schedule 3, Condition 21 of Infrastructure Approval (SSI 9471).                                                                 |

## 2.6 Stage 2B: Excavation and dredging

An Emplacement Cell Report (ECR) has been developed by SMEC Australia Pty Ltd (SMEC) titled 'Port Kembla Gas Terminal Development – Emplacement Cell Report' in accordance with Infrastructure Approval (SSI 9471) Schedule 3, Condition 8 and 9. The ECR outlines the design and construction methodology of the Emplacement Cell.

Approximately 450,000 m<sup>3</sup> of materials will be excavated/dredged from the MBD Site Compound and placed within the boundaries of the Emplacement Cell. Further details, including detailed design drawings, can be found in the ECR (SMEC, 2022). A summary of the excavation and dredging works is provided in Section 2.6.2 and Section 2.6.3.

### 2.6.1 Silt curtains

Prior to the commencement of dredging activities, silt curtains will be installed within the Inner Harbour (MBD Site Compound) and Outer Harbour (Emplacement Cell). A fixed gate or bubble curtain gate will be installed to allow for the entrance and exit of barges whilst also controlling the dispersion of silt.

Silt curtains will be suitable for tidal and working harbour conditions.

Navigation and special markers will be installed to the satisfaction of the Harbour Master to alert marine vessels operating in the port harbours of the presence of silt curtains any other risks to navigation.

Further information regarding the use of silt curtains is provided in the DEMP for Stage 2A and Stage 2B.

### 2.6.2 Excavation and dredge staging

Construction activities undertaken during Stage 1 involved the excavation of fill materials at the MBD Site Compound. Excavation has continued through Stage 2A and will continue as part of Stage 2B. On completion of existing fill materials being excavated, dredging operations will commence at the MBD Site Compound as part of the Stage 2B works.

Dredging activities at the MBD Site Compound and Emplacement Cell will be staged to accommodate other construction works occurring at the MBD Site Compound.

Construction staging for excavation and dredging activities to be undertaken are summarised in the ECR (SMEC, 2022). Excavation and dredging at the MBD Site Compound is shown in Figure 2.6. An overview of the Emplacement Cell is shown in Figure 2.7.

### 2.6.3 Marine-based construction activities at MBD Site Compound

Marine based construction works required at the MBD Site Compound during Stage 2B are summarised in Table 2.5.

**Table 2.5**      *Marine based construction works during Stage 2B*

| Component                  | Works required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Navigational aids          | <ul style="list-style-type: none"> <li>– Construction of new navigation aid pile through the new southern revetment.</li> <li>– Installation of navigation platform, tower, and lights, including all access requirements such as ladders, platforms, and handrails.</li> <li>– Lights will be battery powered and charged via solar panels.</li> <li>– Existing navigation aid to be removed after the commission of the new navigation aid.</li> </ul>                                                                           |
| Revetment shore protection | <ul style="list-style-type: none"> <li>– Revetments will be constructed at the north and south embankments of the new MBD Site Compound wharf (refer to Figure 2.6) following completion of dredging works.</li> <li>– Works will comprise: <ul style="list-style-type: none"> <li>• Laydown of Texcel 1200R geotextile.</li> <li>• Placement of thick quarry run to a depth of 190mm.</li> <li>• Placement of underlay rock to a depth of 400mm.</li> <li>• Placement of armour rock to a depth of 900 mm.</li> </ul> </li> </ul> |
| Revetted Trench            | <ul style="list-style-type: none"> <li>– Dredging of an approximate 10x10m trench to -14.5 reduced level (RL) Port Kembla Height Datum (PKHD) for accommodating the under-keel requirements of the FSRU strainers. An approach channel may also be required.</li> <li>– The trench should have sufficient scour protection.</li> </ul>                                                                                                                                                                                             |
| Berthing box               | <ul style="list-style-type: none"> <li>– Dredging will be undertaken to facilitate berthing boxes to be constructed.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                    |

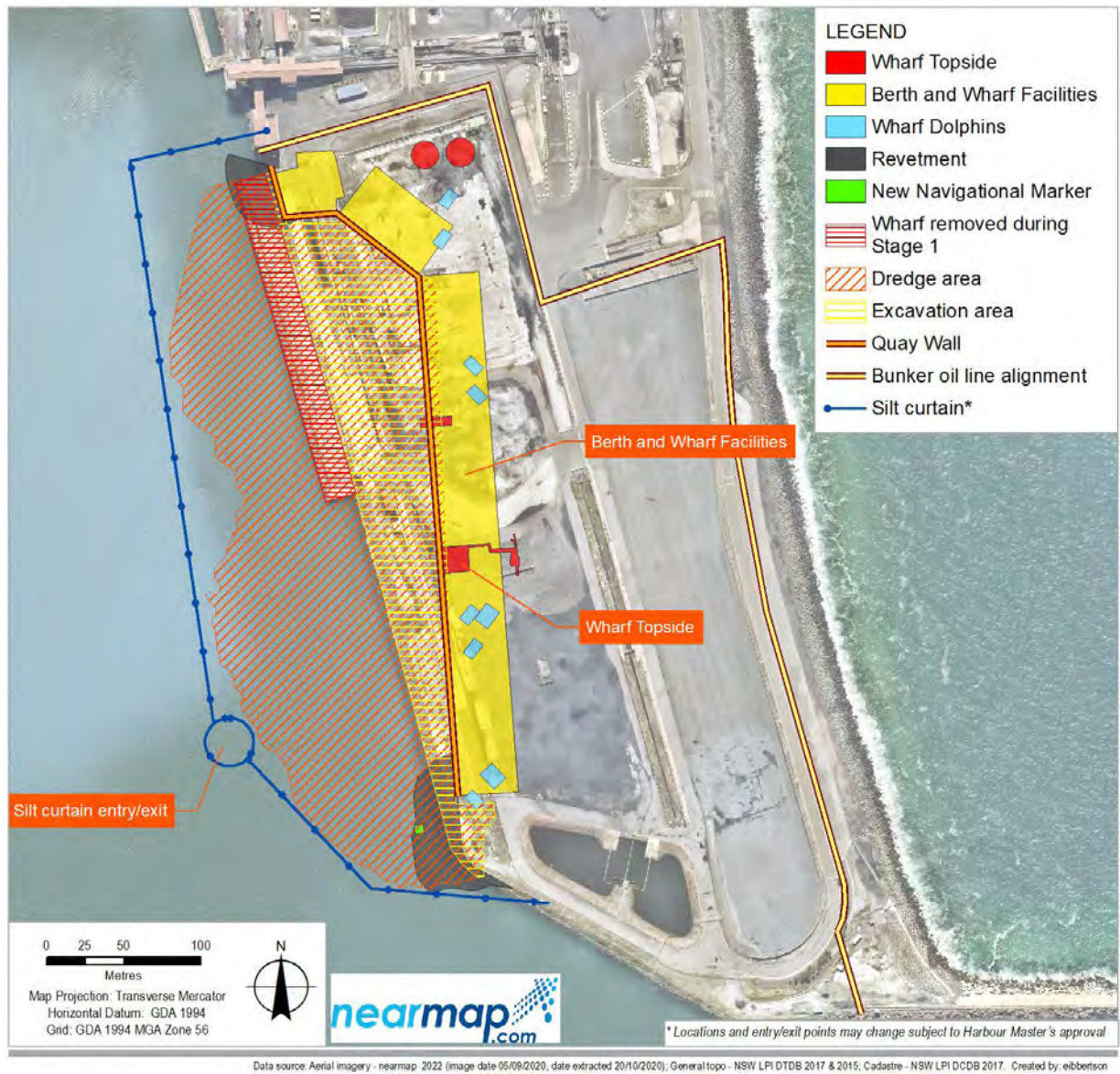


**Figure 2.6** Dredging and excavation works for MBD Site Compound (Stage 2B)



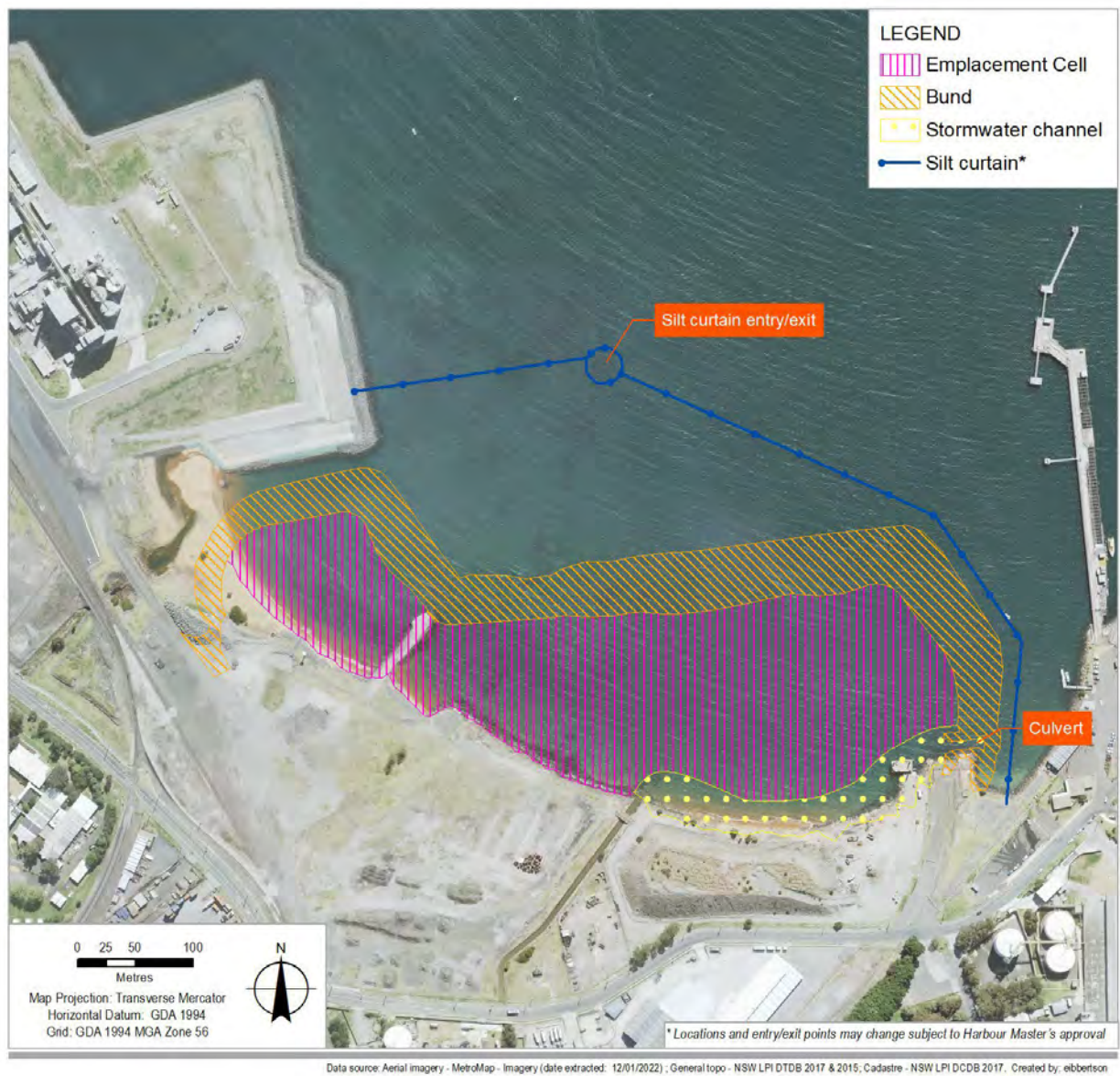


**Figure 2.7**      **Emplacement Cell overview (Stage 2B)**

## 2.7 Stage 2B: Construction of the Emplacement Cell

The Emplacement Cell will be located within the Outer Harbour, comprising of an approximate 800-metre perimeter bund. The Emplacement Cell has been designed and constructed to receive approximately 450,000 m<sup>3</sup> of dredged materials from the MBD Site Compound. Harbour Muds (HM)/Harbour Silts (HS) is to be placed below -1 m PKHD and at a maximum below LAT (below ~-0.02 m PKHD), and Potential Acid Sulfate Soils (PASS) will be placed below +0.9m PKHD within the Emplacement Cell

The construction work components and key features of the Emplacement Cell are summarised in Table 2.6. An overview of the Emplacement Cell is shown in Figure 2.7. Further details are provided in the ECR (SMEC, 2022).

**Table 2.6**      *Emplacement Cell key features – Stage 2B*

| Component          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Emplacement Cell   | <ul style="list-style-type: none"> <li>– All contaminated soils, including HM/HS and PASS, will be placed within the Emplacement Cell generally below lower than -1.0m PKHD and in no instances above the LAT (~-0.02m PKHD).</li> <li>– The final Emplacement Cell levels will be graded towards the proposed stormwater channel.</li> <li>– Design life of 15 years.</li> </ul>                                                                                                                                                                                                                                 |
| Perimeter bund     | <ul style="list-style-type: none"> <li>– The design bund crest level was derived based on tide, storm surge, sea level rise and wave overtopping and assumed to be +3.55m PKHD. The adopted crest level also includes allowance for assessed post-construction settlement of up to 250mm.</li> <li>– Minimum crest width of 6m and 11m at passing bays.</li> <li>– Maximum permanent batter slopes of 1V:3H for seaward slopes and 1V:2H for landward/internal slopes.</li> <li>– The bund is to accommodate a 110t long reach excavator, fully loaded semi-trailer and temporary material stockpiles.</li> </ul> |
| Rock revetment     | <ul style="list-style-type: none"> <li>– Rock revetment structure will extend to the toe of the main bund to provide protection to the bund structure against coastal processes.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Stormwater channel | <ul style="list-style-type: none"> <li>– Stormwater channel to extend from the existing Darcy Road drain outlet to the eastern side of the Emplacement Cell.</li> <li>– Stormwater channel outlet is to comprise a box culvert structure on the eastern end of the Emplacement Cell, providing vehicular access onto the bund at the Jetty 3 abutment and within the NSW Ports property boundary.</li> </ul>                                                                                                                                                                                                      |

### 3. Roles and responsibilities

The Project Team is responsible for all activities associated with Stage 2A and Stage 2B, including the implementation and maintenance of the various mitigation/management measures outlined in this SMP. Relevant roles and responsibilities of the Project Team are outlined in Table 3.1.

**Table 3.1** Roles and responsibilities of Project Team

| Project Role                                                                                              | Responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AIE Project Director                                                                                      | <ul style="list-style-type: none"> <li>Responsible for the overall funding and direction of works associated with Stage 2A and Stage 2B.</li> <li>Ensuring provision of adequate resources to achieve the environmental objectives for the Project including ensuring sufficient resourcing for the Environmental Team, Engineering and Construction Teams.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| AIE Construction Manager                                                                                  | <ul style="list-style-type: none"> <li>Proactively stewards the effective implementation of Stage 2A and Stage 2B in accordance with requirements of the Infrastructure Approval (SSI 9471), this SMP, Environmental Strategy, and all related Sub - plans.</li> <li>Demonstrate proactive support for environmental requirements.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| AIE HSE Manager                                                                                           | <ul style="list-style-type: none"> <li>Develop and update all Health, Safety and Environmental (HSE) Management Strategies and Sub - plans.</li> <li>Ongoing liaison and engagement with government agencies and point of escalation for any environmental incidents.</li> <li>Identifying environmental issues as they arise and proposing solutions.</li> <li>Coordinate and facilitate periodic environmental inspections with the key contractors.</li> <li>Environmental Reporting.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Emplacement Cell Auditor                                                                                  | <ul style="list-style-type: none"> <li>Audit the construction of the Emplacement Cell and verify that works have been completed in accordance with the design intent (Emplacement Cell), The auditor role is to satisfy Condition 10 Schedule 3 of the Infrastructure Approval and any other relevant conditions therein.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager           | <ul style="list-style-type: none"> <li>On-site Project management and control.</li> <li>Decision-making authority relating to environmental performance of the construction program.</li> <li>Authority over Project construction and site activities in accordance with the EMS.</li> <li>Ensure relevant training is provided to all Project staff prior to commencing individual activities.</li> <li>Reports to AIE Construction Manager on environmental matters.</li> <li>Ensures appropriate Contractor resources are allocated to implement the environmental requirements.</li> <li>Responsible for planning and scheduling of construction, and to ensure operations are conducted in accordance with statutory requirements and the EMS.</li> <li>Monitors performance against environmental Key Performance Indicators (KPI's).</li> <li>Ensures that all environmental objectives associated with the Project are achieved.</li> <li>Day-to-day decision-making authority relating to environmental performance of construction activities and direct site activities and construction.</li> <li>To provide resources to ensure environmental compliance and continuous improvement.</li> <li>Ensure all personnel are aware of any changes to EMS, this SMP and improved procedures.</li> <li>Ensure this SMP is implemented for the duration of Stage 2A and Stage 2B.</li> </ul> |
| Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman | <ul style="list-style-type: none"> <li>Implement requirements contained in the EMS and Sub - plans, work procedures and standard drawings.</li> <li>Maintaining open and transparent communication with other Project discipline managers and other areas of the Project.</li> <li>Reporting of hazards and incidents and implementing any rectification measures.</li> <li>Ensures appropriate contractor resources are allocated.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| Project Role                                                                                                              | Responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                           | <ul style="list-style-type: none"> <li>– Orders STOP WORK for any environmental breaches and reports incidents to the Project Manager.</li> <li>– Ensure this SMP is implemented for the duration of Stage 2A and Stage 2B.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Stage 2A Principal Contractor Environmental Representative and Stage 2B Principal Contractor Environmental Representative | <ul style="list-style-type: none"> <li>– Delivers environmentally focussed toolbox talks and provides applicable site inductions.</li> <li>– Provides environmental advice, assistance, and direction to Project Manager to ensure construction activities are conducted in accordance with regulatory legislation and this SMP.</li> <li>– Participate and cooperate with AIE HSE Manager with regards to undertaking of joint environmental site inspections.</li> <li>– Coordinate / undertake wet-weather inspections as per EPL No. 21529 and report accordingly to the AIE HSE Manager.</li> <li>– Develop strong working relationships with the AIE team and Consultants.</li> <li>– Ensure environmental risks are appropriately identified, communicated, and effectively managed.</li> <li>– Ensure communication of relevant environmental information to Project personnel.</li> <li>– Provide specialist advice and input as required.</li> <li>– 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.</li> <li>– Orders STOP WORK for any environmental breaches and immediately reports incidents to Principal Contractor Project Manager and AIE HSE Manager.</li> </ul> |
| AIE Environmental Representative and AIE Environmental Contractor                                                         | <ul style="list-style-type: none"> <li>– Develop strong working relationships with the Principal Contractor Team and Consultants.</li> <li>– Ensure environmental risks are appropriately identified, communicated, and effectively managed.</li> <li>– Instruct and advise management team on compliance issues.</li> <li>– Provide specialist advice and input as required.</li> <li>– Co-ordinate internal audits of this SMP.</li> <li>– Conduct audit review as required.</li> <li>– Reports on the performance of this SMP and recommends changes or improvements to Project Manager.</li> <li>– Orders STOP WORK for any environmental breaches and immediately reports incidents to the AIE Construction Manager and AIE HSE Manager.</li> <li>– Conducts investigation and response to environmental complaints and inquiries, where required.</li> <li>– Undertake all required environmental monitoring for this phase of the Project.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Subcontractors and construction personnel                                                                                 | <ul style="list-style-type: none"> <li>– Undertake an environmental induction prior to accessing to site.</li> <li>– Comply with legislative requirements.</li> <li>– Participate in inspections and audits.</li> <li>– Follow environmental procedures.</li> <li>– Report all environmental incidents and hazards.</li> <li>– Introduce environmental topics to prestart meetings.</li> <li>– Ensure that all relevant permits and clearances are in place prior to commencing work.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



## 4. Legislative requirements and guidelines

### 4.1 Legislation

The legislative requirements applicable to Stage 2A and Stage 2B are listed in Table 4.1.

**Table 4.1** Legislation and relevant policy applicable to this SMP

| Legislation and Regulation                                                                        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Applicability                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>State</b>                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                               |
| <i>Contaminated Land Management Act 1997</i> (CLM Act)                                            | The CLM Act outlines accountabilities of the NSW EPA in managing and regulating contamination, provides for the accreditation of site auditors and ensures contaminated land is managed with regard to principles of ecologically sustainable development.                                                                                                                                                                                                                                                                            | A number of contamination and waste guidelines are administered by the NSW EPA (refer to Section 4.2). A site auditor has also been appointed for the Project (refer to Section 3) accredited by the EPA to issue a Section A Site Audit Statement confirming the suitability of the site for its intended use (in addition to the requirements of Schedule 3, Condition 10). |
| EP&A Act                                                                                          | The EP&A Act describes the processes for development assessment in NSW, managing land use and implementing environmental planning instruments. The Act outlines certain permitting, licensing and exclusion provisions that will apply to the work.                                                                                                                                                                                                                                                                                   | The Project has been approved under Section 5.19 of the EP&A Act as CSSI. Relevant consent conditions applicable to Stage 2A and Stage 2B are outlined in Section 5.                                                                                                                                                                                                          |
| <i>Protection of the Environment Operations Act 1997</i> (POEO Act)                               | The objectives of the POEO Act are to protect and enhance the environment of NSW with regard to the need for ecologically sustainable development. The Act provides the statutory framework for managing pollution in NSW, including the procedures for issuing licences for environmental protection on aspects such as waste, air, water, and noise pollution control. Companies and property owners are legally bound to control emissions (including particulates and deposited dust) from construction sites under the POEO Act. | EPL No. 21529 has been issued by the NSW EPA for the Project. Applicable conditions from the EPL are considered in Section 5.2.                                                                                                                                                                                                                                               |
| <i>Protection of the Environment Operations (General) Regulation 2009</i> (POEO Regulation)       | The POEO Regulation contains penalty notice provisions for infringements under the POEO Act.                                                                                                                                                                                                                                                                                                                                                                                                                                          | Applicable in the case of infringement of the POEO Act.                                                                                                                                                                                                                                                                                                                       |
| <i>Protection of the Environment Operations (Waste) Regulation 2014</i> (POEO (Waste) Regulation) | The POEO (Waste) Regulation provides requirements for the transport of waste, reporting and record-keeping requirements, and provides special requirements related to asbestos waste, re-use and recycling.                                                                                                                                                                                                                                                                                                                           | Transport of waste materials and management of asbestos materials will be undertaken in accordance with the POEO (Waste) Regulation (refer to Section 8.1).                                                                                                                                                                                                                   |

### 4.2 Guidelines

The framework for the management of spoil for the Project was developed with reference to guidelines listed below, with detailed assessment criteria included in Section 6 of the CSP (Appendix C).

## 4.2.1 National Environmental Protection (Assessment of site Contamination) Measure 1999 (as amended 2013) (NEPC, 2013)

The *National Environment Protection (Assessment of Site Contamination) Measure 1999* (referred to here as the NEPM) was produced by the federal National Environmental Protection Council (NEPC) in 1999 and was revised and updated in 2013 by way of the National Environmental Protection (Assessment of site Contamination) Amendment Measure 2013 (NEPC, 2013). The amended NEPM is still referred to as the NEPM 1999. The NEPM provides a national framework for conducting assessments of contaminated sites in Australia.

## 4.2.2 State guidelines

NSW has a comprehensive suite of guidelines relating to assessment and management of contamination, administered by the EPA under the CLM Act and the POEO Act. These include the following:

- NSW EPA (1995), *Contaminated Sites: Sampling Design Guidelines* (NSW EPA, 1995).
- NSW EPA (2020), *Consultants reporting on contaminated land – Contaminated land guidelines* (NSW EPA, 2020).
- NSW EPA (2017), *Contaminated Sites: Guidelines for NSW Site Auditor Scheme (3rd ed.)* (NSW EPA, 2017).
- NSW EPA (2014a). *Waste Classification Guidelines Part 1: Classification of Waste* (NSW EPA, 2014a).
- NSW EPA (2014b). *Waste Classification Guidelines Part 4: Acid Sulfate soils* (NSW EPA, 2014b).

Guidelines approved under the CLM Act also include:

- *National Environment Protection (Assessment of Site Contamination) Measure 1999* as amended 2013 (NEPC, 2013).
- Australian and New Zealand - *Toxicant Default Guideline Values for Sediment Quality* (ANZG, 2018a).
- Australian and New Zealand *Guidelines for Fresh and Marine Water Quality*. Canberra ACT, Australia and New Zealand Governments and Australian state and territory governments (ANZG, 2018b).
- Friebe, E and Nadebaum, P (2011). *Health screening levels for petroleum hydrocarbons in soil and Groundwater*. CRC CARE Technical Report no. 10. CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia, 2011. (Friebe & Nadebaum, 2011).

As there is a potential for asbestos to be encountered within fill or as subsurface structures at the site, the primary legislative requirements detailing AIE's obligations regarding the presence of asbestos (if it is encountered) on the site are listed as follows:

- *Work Health and Safety (National Uniform Legislation) Act 2011* (NSW).
- *Work Health and Safety Regulations 2017* (NSW).
- *How to Manage and Control Asbestos in the Workplace*, 2019 SafeWork NSW (SafeWork NSW, 2019a).
- *How to Safely Remove Asbestos*, 2019 SafeWork NSW (SafeWork NSW, 2019b).

## **5. Planning requirements**

### **5.1 Conditions of approval**

The planning requirements and the corresponding spoil management measures applicable to Stage 2A and Stage 2B are listed in Table 5.1 and Table 5.2. Management measures are detailed in Section 7 through Section 8.

The planning requirements include the conditions set out in the Infrastructure Approval (SSI 9471) dated 13 October 2021, the EPL No. 21529 conditions and the mitigation/management measures outlined in the PKGT EIS.

Table 5.1 Planning requirements

| Requirement                                                                                                                                                                                                                                       | Reference                | Responsibility                                                                                                                                                                                                                                                                                                                                                  | Evidence                        | Applicability to this SMP          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------------------------------------|
| <b>Infrastructure Approval Requirements (SSI 9471)</b>                                                                                                                                                                                            |                          |                                                                                                                                                                                                                                                                                                                                                                 |                                 |                                    |
| The Proponent must ensure that all demolition work is carried out in accordance with AS 2601-2001: <i>The Demolition of Structures</i> , or its latest version                                                                                    | Schedule 2, Condition 11 |                                                                                                                                                                                                                                                                                                                                                                 |                                 | Not applicable (Completed Stage 1) |
| <b>Soil and Water Management</b><br><b>Water Pollution</b><br>Unless an environment protection licence authorises otherwise, the Proponent must comply with Section 120 of the POEO Act.                                                          | Schedule 3, Condition 1  | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– AIE Environmental Representative</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Stage 2A Principal Contractor Environmental Representative and Stage 2B Principal Contractor Environmental Representative</li> </ul> | Appendix B                      | Applicable                         |
| <b>Acid Sulfate Soils (ASS)</b><br>The Proponent must ensure that any construction activities in identified areas of ASS risk are undertaken in accordance with Acid Sulfate Soil Manual (Acid Sulfate Soil Management Advisory Committee, 1998). | Schedule 3, Condition 6  | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> </ul>                                                                                                                                                                                  | Appendix A                      | Applicable                         |
| <b>SPOIL MANAGEMENT</b><br>The Proponent must not transport more than 360,000 cubic metres of spoil to the disposal area by road and must maintain records of the volume of spoil transported by road to track compliance against this condition. | Schedule 3, Condition 7  | <ul style="list-style-type: none"> <li>– AIE Construction Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> </ul>                                                                                                                                                                         | Section 7<br>Also refer to CTMP | Applicable                         |
| <b>Spoil Management Plan</b><br>Prior to the commencement of construction, the proponent must prepare a SMP to the satisfaction of the Planning Secretary and in consultation with the EPA, DP&E -Water,                                          | Schedule 3, Condition 11 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> </ul>                                                                                                                                                                                                                                                                                             | This Plan                       | Applicable                         |



| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Reference | Responsibility                                                                                                                                                                                                                                                                                                                | Evidence                                                                              | Applicability to this SMP |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------|
| NSW Ports, PANSW and an EPA accredited contaminated site auditor. The plan must be consistent with the ECR (SMEC, 2022) and include:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |                                                                                                                                                                                                                                                                                                                               |                                                                                       |                           |
| (a) CSP that includes: <ul style="list-style-type: none"> <li>– procedures for identifying and managing unexpected finds of contaminated or asbestos containing materials along the pipeline route and at Berth 101.</li> <li>– a strategy for addressing any contamination that has been encountered, if required (including the remediation and/or removal of contaminated soil or groundwater); and</li> <li>– details on how environmental and health risks will be mitigated and managed.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Environmental Representative and Stage 2B Principal Contractor Environmental Representative</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Appendix C                                                                            | Applicable                |
| (b) DEMP that: <ul style="list-style-type: none"> <li>– includes an investigation of all reasonable and feasible measures to reduce the road haulage of spoil</li> <li>– describes all activities to be undertaken during dredging, excavation and disposal works</li> <li>– describes in detail the location and depth of disposal areas during all stages of construction, including the final form of the emplaced material</li> <li>– includes procedures for handling, transporting, storing, and disposing of dredge and excavated material, including:               <ul style="list-style-type: none"> <li>• potentially acid forming material</li> <li>• contaminated material; and</li> <li>• asbestos containing materials.</li> </ul> </li> <li>– includes a description of measures that would be implemented to:               <ul style="list-style-type: none"> <li>• minimise the generation and dispersion of sediments during dredging and disposal</li> <li>• minimise soil erosion and discharge of sediment and other pollutants to lands and/or Port Kembla harbour</li> <li>• monitor and manage odours and air emissions during handling of sediments or from stored material prior to emplacement within the disposal area; and</li> <li>• includes contingency measures in the event of a failure of the silt curtains.</li> </ul> </li> </ul> |           | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Environmental Representative and Stage 2B Principal Contractor Environmental Representative</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Appendix D<br>Appendix E<br>Also refer to Air Quality Management Plan (AQMP) and CTMP | Applicable                |
| – a WQMP that includes:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           | – AIE HSE Manager                                                                                                                                                                                                                                                                                                             | Appendix B                                                                            | Applicable                |

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Reference                | Responsibility                                                                                                                                                                 | Evidence  | Applicability to this SMP          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------|
| <ul style="list-style-type: none"> <li>– description of the water quality monitoring that would be undertaken to monitor turbidity and pollutant concentrations surrounding dredging and disposal works, including real-time turbidity monitoring.</li> <li>– a broader program to monitor harbour- wide water quality trends and the ecological health of Port Kembla Harbour.</li> <li>– 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.</li> <li>– 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</li> <li>– reporting procedures for the results of the monitoring program.</li> </ul> |                          | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Environmental Representative and Stage 2B Principal Contractor Environmental Representative</li> </ul>  |           |                                    |
| The Proponent must implement the approved SMP for the development.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Schedule 3, Condition 12 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Principal Contractor Project Manager</li> </ul>                                                            | This Plan | Applicable                         |
| The Proponent must notify the Department and the EPA when responsibility for the emplacement cells is transferred to NSW Ports, or another entity approved by the Department, and provide evidence that NSW Ports or another entity has accepted that responsibility.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Schedule 3, Condition 14 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Principal Contractor Project Manager</li> </ul>                                                            | This Plan | Applicable                         |
| <b>WASTE</b><br>The Proponent must: <ul style="list-style-type: none"> <li>a. minimise the waste generated by the development</li> <li>b. classify all waste generated on site in accordance with the Waste Classification Guidelines (NSW EPA 2014), or its latest version</li> <li>c. store and handle all waste generated on site in accordance with its classification; and</li> <li>d. ensure all waste is disposed of off-site at appropriately licenced facilities.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                               | Schedule 3, Condition 36 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> </ul> | Section 8 | Applicable                         |
| <b>PKGT EIS Management Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                          |                                                                                                                                                                                |           |                                    |
| One or more of the following is proposed for assessing the potential risk to human health the two Benzo(a)Pyrene (BaP) Toxicity Equivalence Quotient (TEQ) hotspots identified at GHB09 and GBH26:<br><br>Development of a human health risk assessment for BaP (TEQ), to further refine the potential risk posed by these contaminants to future construction workers. Given the short duration of the works relative to the standard exposure assumptions in a commercial/industrial scenario, it is likely that derived site-specific target levels for BaP (TEQ) would be higher than adopted for this assessment.                                                                                                                                                                                                                                                              | EIS Measure C01          |                                                                                                                                                                                |           | Not applicable (Completed Stage 1) |

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Reference       | Responsibility                                                                                                                                                                                                                                                                                                                                            | Evidence                  | Applicability to this SMP |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|
| Additional investigation to delineate the vertical and lateral extent of BaP (TEQ). The investigation would involve step out borehole locations which will target materials at depths between 4 m and 5 m, to assess if the contamination is isolated or widespread. The source of BaP (TEQ) at GHB09 and GBH26 was not identified nor was there apparent evidence of this contamination present at the time of sampling. The contamination may be a characteristic of the fill material, meaning it could be randomly distributed throughout the fill matrix. Therefore, in addition to further investigation, bioavailability testing is also recommended so that the risk to human health is better understood, and appropriate safety control measures can be adopted during construction. The laboratory is presently maintaining these samples pending further analysis. |                 |                                                                                                                                                                                                                                                                                                                                                           |                           |                           |
| Removal of any remnant asbestos containing material (ACM) fragments from the ground surface. The removal should be undertaken by a licenced removalist in accordance with relevant SafeWork NSW codes of practice. Following removal, a licenced asbestos assessor should inspect the site and provide a clearance certificate confirming removal of asbestos.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | EIS Measure C02 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Stage 2A Principal Contractor Environmental Representative and Stage 2B Principal Contractor Environmental Representative</li> <li>– Licenced asbestos assessor</li> </ul> | Section 8.6               | Applicable                |
| Inclusion of an Unexpected Finds Protocol (UFP) for contamination in the EMS for the work associated with construction activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | EIS Measure C03 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> </ul>                                                                                                                                                                            | Section 7.4<br>Appendix C | Applicable                |
| Preparation of an ASSMP by a consultant experienced in the identification and management of ASS. This will also include appropriate management and/or treatment of ASS. The ASSMP will be developed in line with the requirements of the Acid Sulfate Soils Management Advisory Committee Guidelines (ASSMAC, August 1998 and as updated). The ASSMP will be prepared to identify, manage and treat the ASS encountered during excavation and dredging to minimise the production of acid leachate.                                                                                                                                                                                                                                                                                                                                                                            | EIS Measure C04 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> </ul>                                                                                                                                                                                                                                                                                       | Appendix A                | Applicable                |

| Requirement                                                                                                                                                                                                                                                                                                        | Reference       | Responsibility                                                                                                                                                                 | Evidence    | Applicability to this SMP |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------------------|
| Preparation and implementation of an EMS to include an UFP to effectively manage the potential contamination issues identified from both a human health and environmental perspective. This would include the assessment of materials to be disturbed across the site to inform appropriate management strategies. | EIS Measure C05 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> </ul> | Appendix C  | Applicable                |
| Assessment and classification of all material to be disposed of offsite as per NSW EPA (2014) <i>Waste Classification Guidelines, Part 1: Classifying Waste and Part 4: Acid Sulfate Soils</i> prior to off-site disposal.                                                                                         | EIS Measure C06 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> </ul> | Section 8.3 | Applicable                |

## 5.2 Environment Protection Licence

AIE have been issued an EPL under the POEO Act as of 2 June 2021. The conditions of EPL No. 21529 related to spoil management are provided in Table 5.2.

Table 5.2 EPL No 21529 conditions

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Reference             | Evidence      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|
| <b>Location of monitoring/discharge points and areas</b><br>The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for the emission of pollutants to the air from the point (refer to Figure 2.2).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Condition P1.1        | Refer to AQMP |
| The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point (refer to Figure 2.2).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Condition P1.2        | Appendix B    |
| <b>Pollution of waters</b><br>Except as may be expressly provided in any other condition of this licence, the licensee must comply with Section 120 of POEO Act.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Condition L1.1        | Appendix B    |
| <b>Concentration limits</b><br>For each monitoring/discharge point or utilisation area specified in the table below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Condition L3.1        | Appendix B    |
| Activities must be carried out in a competent manner<br>Licensed activities must be carried out in a competent manner.<br>This includes: <ul style="list-style-type: none"> <li>a. the processing, handling, movement and storage of materials and substances used to carry out the activity; and</li> <li>b. the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Condition O1.1        | Section 8     |
| <b>Processes and management</b><br>The licensee must implement all feasible and reasonable erosion and sediment controls as may be necessary throughout the life of construction works and activities to minimise sediment leaving the premises<br>The licensee must ensure erosion and sediment controls are designed (stability, location, type and size), constructed, operated and maintained in accordance with Managing Urban Stormwater – Soils and Construction, Volume 1, 4th Edition (Landcom, 2004).<br>The licensee must ensure: <ul style="list-style-type: none"> <li>a. all vehicular access points to the premises are designed, constructed, maintained and stabilised to minimise tracking of materials onto public roads and to ensure all-weather entry and exit.</li> <li>b. mud, splatter, dust and other material likely to fall from or be cast off the wheels, underside or body of any vehicle, trailer, motorised plant and equipment leaving the premises, is removed to the greatest extent practicable before it leaves the premises.</li> </ul> All erosion and sediment control measures on the premises must be inspected and works undertaken to repair and/or maintain these controls: <ul style="list-style-type: none"> <li>a. weekly during normal construction hours</li> <li>b. daily during periods of rainfall; and</li> <li>c. within 24 hours of cessation of a rainfall event causing runoff to occur on or from the premises.</li> </ul> The Licensee must record all such inspections including observations and works undertaken to repair and/or maintain erosion and sediment controls<br>The southern pond in Berth 101 must be maintained to ensure that sedimentation does not reduce their capacity by more than 20% of the design capacity. | Condition O4.1 – O4.5 | Refer to ESCP |



| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Reference               | Evidence                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------------|
| <p>Silt curtains must be installed and operated at the premises to minimise the pollution of waters beyond the boundary of the premises during any marine based works. Marine based works includes but is not limited to:</p> <ul style="list-style-type: none"> <li>– pile removal; or any dredging; or construction of the Outer Harbour Emplacement Cell.</li> </ul> <p>Note: Any reclamation of material to the Emplacement Cell is subject to a licence variation in accordance with Licence Condition A1.4.</p> <p>Care must be taken with the installation and maintenance of silt curtains to ensure that there are no gaps at the ends, or in the fabric, or in the floating boom.</p> <p>There must be no spillages of any materials from above the water surface into waters outside of the silt curtain/s.</p> <p>The silt curtain/s may only be removed following the prior written approval of the EPA.</p>                                                                                        | Condition O4.6 – O4.9   | Appendix B                  |
| <p>Vessels used for the transport of dredge spoil from the dredge site to the Outer Harbour stockpile area must not leak or release dredge spoil into waters on route. All dredgers and associated vessels must have their ballast &amp; bilge water pumped out prior to arriving in Port Kembla Harbour.</p> <p>The licensee must continue to treat water from the southern ponds in Berth 101 prior to discharge from Licensed Discharge Point 20. The treatment method must be provided in writing to the EPA and cannot be changed without EPA approval.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Condition O4.10 – O4.12 | Appendix B                  |
| <p><b>Waste management</b></p> <p>Excavated material and/or dredged spoil must not be stockpiled in Outer Harbour unless it will be re-used within the proposed Outer Harbour Emplacement Cell. Stockpiles of material stored at the premises must either be used as on-site backfill or emplacement cell construction or disposed offsite to a facility licensed to accept the material, within 12 months following stockpile creation.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Condition O5.1 – O5.2   | Section 8<br>Appendix C     |
| <p><b>Other operating conditions</b></p> <p>Any material that is proposed to be crushed or grinded or screened at the premises must not contain any asbestos.</p> <p>Excavated material will need an asbestos clearance certificate from a third party licensed asbestos assessor prior to being crushed or grinded or screened.</p> <p>For the purposes of the condition above, 'excavated material' excludes raw slag, concrete or basecourse.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Condition O6.1-O.62     | Section 7.3                 |
| <p><b>Monitoring records</b></p> <p>The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.</p> <p>All records required to be kept by this licence must be:</p> <ol style="list-style-type: none"> <li>in a legible form, or in a form that can readily be reduced to a legible form</li> <li>kept for at least 4 years after the monitoring or event to which they relate took place; and</li> <li>produced in a legible form to any authorised officer of the EPA who asks to see them.</li> </ol> <p>The following records must be kept in respect of any samples required to be collected for the purposes of this licence:</p> <ol style="list-style-type: none"> <li>the date(s) on which the sample was taken</li> <li>the time(s) at which the sample was collected</li> <li>the point at which the sample was taken; and</li> <li>the name of the person who collected the sample.</li> </ol> | Condition M1.1-1.3      | Appendix B<br>Section 10.2  |
| <p><b>Requirement to monitor concentration of pollutants discharged</b></p> <p>For each monitoring/discharge point or utilisation area specified below (by a point number, refer to Figure 2.2), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Condition M2.1 -2.4     | Appendix B<br>Refer to AQMP |
| <p>Water quality parameter probes on the Automated water quality buoys must be calibrated in accordance with manufacturer instructions, or relevant Australian Standards, whichever is more frequent.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Condition M2.5 – M2.6   | Appendix B                  |

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Reference             | Evidence                    |
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| <p>In the event that monitoring detects an exceedance of the total suspended solids/turbidity trigger level at monitoring point 24 of this licence, the licensee must:</p> <ol style="list-style-type: none"> <li>Enact their Trigger Action Response Plan (TARP); and</li> <li>Continue monitoring until the results are within the limits; and</li> <li>Notify the EPA in accordance with the notification provisions of this licence, including condition R4.1.</li> </ol> <p>Note: Enactment of the TARP requires ongoing checking and monitoring of water quality in addition to implementation of the following in sequential order:</p> <ul style="list-style-type: none"> <li>Locate the source of the pollution.</li> <li>Check and correct environmental controls as required.</li> <li>Modification of current activities/practices attributing to elevated suspended solids.</li> </ul> <p>Where required, cease associated works to prevent more than a localised water quality impact, and to prevent an exceedance at licensed water quality monitoring locations.</p>                                                                                                                                                                                                                                                                                                                          |                       |                             |
| <p><b>Testing methods - concentration limits</b></p> <p>Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:</p> <ol style="list-style-type: none"> <li>any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or</li> <li>if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or</li> <li>if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.</li> </ol> <p>Note: The <i>Protection of the Environment Operations (Clean Air) Regulation 2021</i> requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".</p> <p>Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.</p> | Condition M3.1 – M3.2 | Refer to AQMP               |
| <p><b>Environmental monitoring</b></p> <p><b>Port Kembla Harbour Water Quality and Ecological Monitoring Program</b></p> <p>The licensee must implement the Port Kembla Harbour Ecological Health Monitoring Program and associated reporting as per the GHD / AIE proposal dated September 2021, Rev G (EPA reference DOC21/864104-1).</p> <p>Note: the initial monitoring frequency is specified in the above proposal, from a baseline event to the first year of operation. Following the first operational report, the ongoing monitoring frequency will then redetermined by the EPA in consultation with the licensee.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Condition M5.1        | Appendix B                  |
| <p><b>Recording of pollution complaints</b></p> <p>The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.</p> <p>The record must include details of the following:</p> <ol style="list-style-type: none"> <li>the date and time of the complaint</li> <li>the method by which the complaint was made</li> <li>any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect</li> <li>the nature of the complaint</li> <li>the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and</li> <li>if no action was taken by the licensee, the reasons why no action was taken.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Condition M6.1-6.4    | Section 9<br>Section 11.1.2 |

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Reference             | Evidence                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------|
| <p>The record of a complaint must be kept for at least 4 years after the complaint was made</p> <p>The record must be produced to any authorised officer of the EPA who asks to see them.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |                            |
| <p><b>Telephone complaints line</b></p> <p>The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.</p> <p>The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Condition M8.1 - M8.2 | Section 9.3                |
| <p><b>Requirement to monitor volume or mass</b></p> <p>The licensee must record the volume of material that is crushed or grinded at the premises</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Condition M9.1        | Section 2.2                |
| <p><b>Other monitoring and recording conditions</b></p> <p>The licensee must carry out, as a minimum, daily inspections of all water pollution control measures required by this licence. A record of each inspection must be made and produced to an EPA authorised officer if requested. The record must include:</p> <ol style="list-style-type: none"> <li>Date and time of inspection</li> <li>Details of the location of dredging operations</li> <li>Condition of silt curtains and other water pollution controls.</li> </ol> <p>Note: No movement of dredge spoil is permitted when a silt curtain required by this licence has not been maintained or is not achieving the requirements of this licence.</p>                                                                                                                                                                                                                                                                                                       | Condition M10.1       | Section 10                 |
| <p><b>Notification of environmental harm</b></p> <p>Notifications must be made by telephoning the Environment Line service on 131 555.</p> <p>Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.</p> <p>The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Condition R2.1 – 2.2  | Section 10.4<br>Section 11 |
| <p><b>Other reporting conditions</b></p> <p><b>Water TARP Exceedance reporting requirements</b></p> <p>If there is an exceedance of the trigger level for Point 24 as described in Conditions L3.5 and L3.6, then the licensee must submit a Water Quality Impact Report to the EPA by 4pm the following working day.</p> <p>The Water Quality Impact Report described in Condition R4.1 must:</p> <ol style="list-style-type: none"> <li>include all water monitoring results (including background results from monitoring buoys Point 1, Point 16, Point 17, Point 18 and Point 19) obtained between 2 hours before and after the water quality trigger level in Condition L3.5 was exceeded; and</li> <li>provide an interpretation of those results; and</li> <li>detail the site management response.</li> </ol> <p>The Water Quality Impact Report described in Condition R4.2 must be submitted electronically to the Unit Head, EPA, Regulation Operations Metro South at RegOps.MetroRegulation@epa.nsw.gov.au</p> | Condition R4.1 – 4.3  | Appendix B                 |
| <p><b>Special Conditions</b></p> <p><b>Emplacement Cell Report</b></p> <p>Condition of consent No. 8 for the project (SSI 9471) requires that an ECR (report) is prepared to the satisfaction of the Planning Secretary prior to the commencement of dredging, disposal and emplacement activities.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Condition E1.1        | Refer to ECR (SMEC, 2022)  |

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Reference      | Evidence                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------------|
| The licensee must provide a ECR (Report) to the EPA for comment. The report must be provided to the EPA at least four weeks prior to commencement of dredging disposal and emplacement activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |                              |
| <p><b>Pollution Incident Response Management Plan (PIRMP)</b></p> <p>The Licensee must prepare a PIRMP that complies with Part 5.7A of the POEO Act (1997) in relation to the activity to which the licence relates. The PIRMP must be in the form required by the 'Regulations' and include the following:</p> <ul style="list-style-type: none"> <li>– the procedures to be followed by the holder of the relevant environment protection licence, or the occupier of the relevant premises, in notifying a pollution incident to: <ul style="list-style-type: none"> <li>• the owners or occupiers of premises in the vicinity of the premises to which the environment protection licence or the direction under section 153B relates, and</li> <li>• the local authority for the area in which the premises to which the environment protection licence or the direction under section 153B relates are located and any area affected, or potentially affected, by the pollution, and</li> <li>• any persons or authorities required to be notified by Part 5.7,</li> </ul> </li> <li>– a detailed description of the action to be taken, immediately after a pollution incident, by the holder of the relevant environment protection licence, or the occupier of the relevant premises, to reduce or control any pollution,</li> <li>– the procedures to be followed for co-ordinating, with the authorities or persons that have been notified, any action taken in combating the pollution caused by the incident and, in particular, the persons through whom all communications are to be made, any other matter required by the regulations, including 'Keeping of Plan', 'Testing of Plan', 'Making Plan Readily Available' and 'Implementation of Plan'.</li> </ul> | Condition E2.1 | Section 11.2<br>Section 12.3 |

## 6. Summary of site conditions

The following summary is based on information from previous GHD investigations (GHD, 2018a), (GHD, 2021a) and (GHD, 2021b). Reference should be made to these reports for more detailed information including aerial photographs and site photographs.

### 6.1 Site identification

Construction works for Stage 2A and Stage 2B will be undertaken within the MBD Site Compound and the Emplacement Cell Construction site located in the Outer Harbour.

The MBD Site Compound is bounded by the Port Kembla Coal Terminal (PKCT) to the north and the shoreline and breakwater to the south. Seawall Road along the eastern shore currently allows public access.

The Emplacement Cell Construction Site is located within the Outer Harbour to the south of the MBD Site Compound. Old Port Road provides access to the Emplacement Cell Construction Site.

Site identification details and surrounding land uses are summarised in Table 6.1 and Table 6.2.

**Table 6.1** Site identification details (MBD Site Compound)

|                               |                                                                                                                                      |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>Address:</b>               | Berth 101 and Bulk Product Area, Port Kembla, NSW                                                                                    |
| <b>Site co-ordinates:</b>     | 307013 m E; 6184616 m N (southern point of excavation area)                                                                          |
| <b>Title identification:</b>  | Part Lot 22 DP 1128396                                                                                                               |
| <b>Approximate area:</b>      | Approx. 10ha                                                                                                                         |
| <b>Current owner</b>          | NSW Ports                                                                                                                            |
| <b>Zoning:</b>                | SP1 – Special Activities State Environmental Planning Policy (Transport and Infrastructure) 2021 (Transport and Infrastructure SEPP) |
| <b>Local government area:</b> | Wollongong                                                                                                                           |
| <b>County / Parish:</b>       | Camden / Wollongong                                                                                                                  |
| <b>Current land use:</b>      | Industrial – Ports                                                                                                                   |
| <b>Adjoining land uses:</b>   | Industrial including coal terminal                                                                                                   |

**Table 6.2** Site identification details (Emplacement Cell Construction Site)

|                               |                                                            |
|-------------------------------|------------------------------------------------------------|
| <b>Address:</b>               | Emplacement Cell Construction Site, Port Kembla, NSW       |
| <b>Site co-ordinates:</b>     | 307687 m E, 6183129 m N (middle point of Emplacement Cell) |
| <b>Title identification:</b>  | Lot 6 DP 1236743                                           |
| <b>Approximate area:</b>      | Approx. 17 ha                                              |
| <b>Current owner</b>          | NSW Ports                                                  |
| <b>Zoning:</b>                | IN3 – Heavy Industrial Transport and Infrastructure SEPP   |
| <b>Local government area:</b> | Wollongong                                                 |
| <b>County / Parish:</b>       | Camden / Wollongong                                        |
| <b>Current land use:</b>      | Industrial                                                 |
| <b>Adjoining land uses:</b>   | Industrial                                                 |

## 6.2 Port Kembla Chart Datum and tidal fluctuations

The Australian Tides Manual Special Publication No 9 Version 5 (ICSM, 2018) summarises the various datums used around Australia to predict tidal behaviour. An understanding of the tidal terminology is required when comparing chart datums (CD), tidal effects on ASS and the potential for acid production. Table 6.3 provides a definition of the relevant terminology and gives the average limits observed at Port Kembla, and Figure 6.1 shows the tidal variation at Port Kembla from 1957 to 2020 (Fox Environmental Consulting, 2022).

**Table 6.3** Explanation of terms and datums used in Australian ports

| Term                            | Purpose                                                                                               | Definition <sup>1</sup>                                                                                                                             | Port Kembla                          |
|---------------------------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| Highest Astronomical Tide (HAT) | Landward limit of the tidal interface.                                                                | The highest level of water which can be predicted to occur under any combination of astronomical conditions.                                        | 2.33m CD (+1.458m AHD) <sup>2</sup>  |
| Lowest Astronomical Tide (LAT)  | Baseline for the purposes of defining Australia's maritime boundaries.                                | The lowest tide level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions. | -0.0217m CD (-0.8503 m AHD)          |
| Mean High Water (MHW)           | Common datum for cadastral mapping and common limit for topographic mapping.                          | The average of all high waters observed.                                                                                                            | ~1.80m CD (+0.928m AHD) <sup>2</sup> |
| Mean Sea Level                  | Average limit of tides                                                                                | Arithmetic mean of hourly heights of sea over a sufficient period of time.                                                                          | ~0.872m CD (0.0m AHD) <sup>3,4</sup> |
| Mean Low Water (MLW)            | Used as the limit of Australian States As definition of 'low water'                                   | Arithmetic mean of all low water heights of sea over a sufficient period of time.                                                                   | ~0.20m CD (-0.672m AHD) <sup>2</sup> |
| Australian Height Datum (AHD)   | National vertical Datum of Australia and refers to Australian Height Datum 71 for Australian Mainland | AHD71 is a surface that passes through approximate MSL measured between 1966 and 1968 at 30 tide gauges around the Australian mainland.             | 0.0mAHD (0.872m CD) <sup>3,4</sup>   |
| CD                              | Local Port Kembla Sea Level Datum                                                                     | In use since at least 1957.                                                                                                                         | 0.0m CD (-0.872m AHD) <sup>3,4</sup> |

Table notes:

<sup>1</sup> Definitions taken from Australian Tides manual v5 (ICSM, 2018)

<sup>2</sup> MHW and MLW taken from monthly recorded sea levels for Port Kembla - 1957 to 2020  
[http://www.bom.gov.au/ntc/IDO70000/IDO70000\\_60420\\_SLD.shtml](http://www.bom.gov.au/ntc/IDO70000/IDO70000_60420_SLD.shtml)

<sup>3</sup> Chart Datum from [http://www.bom.gov.au/oceanography/projects/ntc/NTC\\_glossary.pdf](http://www.bom.gov.au/oceanography/projects/ntc/NTC_glossary.pdf)

<sup>4</sup> MSL at Port Kembla also given as 0.910m CD on [http://www.bom.gov.au/ntc/IDO70000/IDO70000\\_60420\\_SLD.shtml](http://www.bom.gov.au/ntc/IDO70000/IDO70000_60420_SLD.shtml)



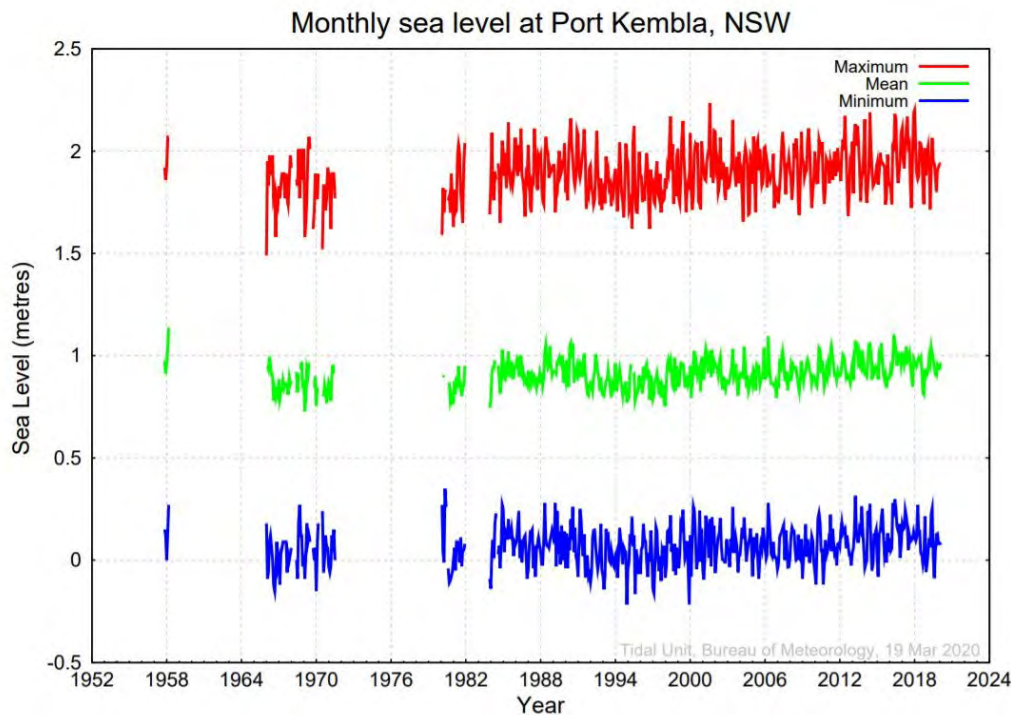


Figure 6.1 Monthly Tidal Range in LAT Port Kembla Harbour (source: Bureau of Meteorology website)

## 6.3 Sensitive environments

The Inner and Outer Harbours are highly modified, industrial settings, receiving stormwater runoff and waste discharge from neighbouring industries. Prior to 1955, the Inner Harbour was previously Tom Thumbs Lagoon, a remnant saline coastal lagoon, which has been progressively reclaimed by the Port Kembla Steelworks. Originally 500 hectares in area, the lagoon is now 50 hectares (GHD, 2018a).

The Tasman Sea is located east of the MBD Site Compound.

## 6.4 Topography and drainage

Google Earth Pro indicates the site lies at an elevation between 3 metres and 5 metres AHD. The elevation of previous investigation locations was surveyed by a registered survey and was recorded between 4.073 metres and 6.708 metres AHD (GHD, 2018a).

Information obtained from Google Earth Pro indicates that the MBD Site Compound gently slopes down towards the south and west.

Surface water runoff is managed through the use of the existing stormwater system, including drainage which drain towards a stormwater retention pond located at the southern end of the MBD site. The water captured in the retention pond is managed in accordance with the WQMP (Appendix B) to ensure compliance with relevant project approvals and EPL No. 21529 conditions.

## 6.5 Soil landscape

The Wollongong-Port Hacking 1:100 000 Soil Landscape Series Sheet 9029-9129 (Soil Conservation Service of NSW, 1990) indicates the MBD Site Compound is situated within a disturbed terrain soil landscape, which is described as:

- Disturbed terrain:
  - The topography varies from level plains to undulating terrain and has been disturbed by human activity to a depth of at least 100 centimetres. The original soil has been removed, greatly disturbed, or buried. Most of these areas have been levelled to slopes of <5 per cent. Landfill includes soil, rock, building and waste material. The original vegetation has been completely cleared.

- Limitations are dependent on the nature of fill material and include subsidence resulting in a mass movement hazard, soil permeability leading to poor drainage, and low fertility. Care must be taken when these sites are developed. A survey at a suitable scale as well as geotechnical analysis should be undertaken because of variability of materials throughout the sites. Seek advice from local councils concerning localised areas of disturbed terrain.

## 6.6 Acid Sulfate Soils

The ASS Risk Map (DLWC, 1997) indicates that the MBD Site Compound Berth (identified as a red polygon in Figure 6.2) is situated in an area mapped as disturbed terrain at an elevation of >4 metres AHD (shown in grey shading) in Figure 6.2. Estuarine sediments exist within the harbour and are mapped as high probability of ASS.

Low risk ASS was identified in probable reclaimed sands and alluvial / tidal sands encountered at depths between 0 and 25 metres below ground surface (mbgl). The probable reclaimed sands had pockets and lenses of high-risk ASS. Estuarine material encountered at depths between 0.4 metres and 25 mbgl, typically below the alluvium, was assessed as high-risk ASS.



Figure 6.2 ASS risk map (DLWC, 1997)

## 6.7 Geology

### 6.7.1 Regional geology

The 1:100,000 Geological Series Sheet of Wollongong-Port Hacking (Geological Survey of NSW, 1985) indicates that the regional underlying geology is Quaternary sediments described as quartz and lithic fluvial sand, silt, and clay. The Quaternary sediments are likely to be underlain by the Budgong Sandstone which is described as red, brown, and grey lithic sandstone.

### 6.7.2 Site specific geology

Fill was encountered at all previous investigation locations, typically comprising gravelly sand and sandy gravel (Fill) overlying sand (probable reclaimed sands, Units 1A, 1B and/or 1C) (refer to Table 6.4). Natural sands,

assumed to be likely alluvium, were encountered graduating to finer alluvial deposits (silts and clays) to the maximum depth of investigation (GHD, 2021d).

The Worley Parsons (2012) geotechnical investigation extended below GHD's target investigation depths and encountered residual deposits of sandy clay and clay which were logged from 12 metres to 29.7 mbgl. Bedrock is understood to have been encountered at the geotechnical boreholes from a depth of 17.6 to 29.5 mbgl.

Sandstone/siltstone bedrock is described in the ECR (SMEC, 2022) and have been encountered at 16 metres below PKHD with no bottom depth recovered. Materials encountered during the GHD investigations and in the ECR (SMEC, 2021) are summarised in Table 6.4.

**Table 6.4** Generalised material descriptions for Fill and Unit 1

| Stratigraphic Unit<br>Average Thickness (m) | Unit Description                                                                                                                                                                                                                                                                                                                                                           | Comments                                                            | Depth range (mPKHD) |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------|
| Fill<br>3.9                                 | Gravelly SAND, sand, silt, black, dark brown, grey, some to trace, silts and cobbles.<br>Foreign materials, coal wash, coal, slag, steel, wood, concrete.                                                                                                                                                                                                                  |                                                                     | 5 to 2.5            |
| Unit 1A <sup>1</sup><br>5.1                 | SAND, brown, pale brown, yellow, orange, fine to coarse grained, trace amounts of shell fragments, fine to coarse gravel, silt bands and layers, clayey sand layers, trace iron-stained sand, fine black sand layers (probable heavy mineral sands), rounded to sub-rounded gravel, clay lenses and layers.<br>Foreign materials: charcoal, wood and coal.                 | Marine/Aeolian (SMEC, 2022)<br>Probable reclaimed sand (GHD, 2021a) | 4 to -6             |
|                                             | SAND, brown, pale brown, yellow, orange, fine to coarse grained, trace amounts of shell fragments, fine to coarse gravel, silt bands and layers, clayey sand layers, trace iron-stained sand, fine black sand layers (probable heavy mineral sands), rounded to subrounded gravel, clay lenses and layers.                                                                 | Possible Alluvium/Tidal Sands (GHD, 2021c)                          |                     |
| Unit 1B <sup>1</sup><br>5.5                 | Clayey SAND, black, dark grey, grey, fine to coarse grained sand, medium to high plasticity clay, trace silt, shell fragments, gravel.                                                                                                                                                                                                                                     | Estuarine (SMEC, 2022)                                              | -1 to -9            |
|                                             | Gravelly CLAY, black, dark grey, grey, low to medium plasticity, fine to coarse grained angular to sub-angular gravel, trace of fine to coarse grained sand                                                                                                                                                                                                                |                                                                     |                     |
| Unit 1C<br>varies                           | Clayey SAND, black, dark grey, grey, fine to coarse grained sand, medium to high plasticity clay, trace silt, shell fragments, gravel (SMEC, 2022).                                                                                                                                                                                                                        | Not observed by GHD (GHD, 2021d)                                    | N/A                 |
|                                             | Gravelly CLAY, black, dark grey, grey, low to medium plasticity, fine to coarse grained angular to subangular gravel, trace of fine to coarse grained sand (SMEC, 2022).                                                                                                                                                                                                   |                                                                     |                     |
| Unit 2<br>6.1                               | SAND, brown, pale brown, yellow, orange, fine to coarse grained, trace amounts of shell fragments, fine to coarse gravel, silt bands and layers, clayey sand layers, trace iron-stained sand, fine black sand layers (probable heavy mineral sands), rounded to sub-rounded gravel, clay lenses and layers.<br><br>Low to High Plasticity Clays and Sandy Clay (SMEC,2022) | Estuarine (SMEC, 2022)                                              | -9 to -16           |

| Stratigraphic Unit<br>Average Thickness (m) | Unit Description                                                                                                           | Comments                   | Depth range (mPKHD) |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------|---------------------|
| Unit 3<br>4.3                               | Sandy CLAY with lesser amounts of Silty CLAY, Silty/Clayey SAND and CLAY<br>SILTSTONE with lesser amounts of Sandy         | Residual Soil (SMEC, 2022) | -15 to -21          |
| Unit 4<br>N/A                               | SILTSTONE, Silty SANDSTONE and SANDSTONE                                                                                   | Bedrock (SMEC, 2022)       | -16 to unknown      |
| Harbour Muds & Harbour Sands                | Upper unit black-brown clayey silt mud (HM) with coarse sand and gravel sized coal and lower unit of grey silty clay (HS). | (Worley Parsons, 2012)     | unknown             |

<sup>1</sup> Unit 1A/1B often only display subtle variations and cannot always be easily distinguished.

## 6.8 Hydrogeology

### 6.8.1 WaterNSW database

A Lotsearch report (Lotsearch, 2020) indicates there are six registered groundwater bores east of the site, five of which are in Part Lot 22 as shown in Figure 6.3 in relation to the MBD Site Compound boundary. The bores were registered for monitoring purposes and installed in 2011 and 2012 to depths between 6 and 7.5 mbgl. No information on salinity, standing water level, or yield was recorded. The locations of these monitoring bores are generally consistent with those installed by Douglas Partners, except for GW112710 and Douglas Partners monitoring well 205 (Douglas Partners, 2014) Monitoring well 205 is located south-west of GW1127709 but does not appear to be registered.

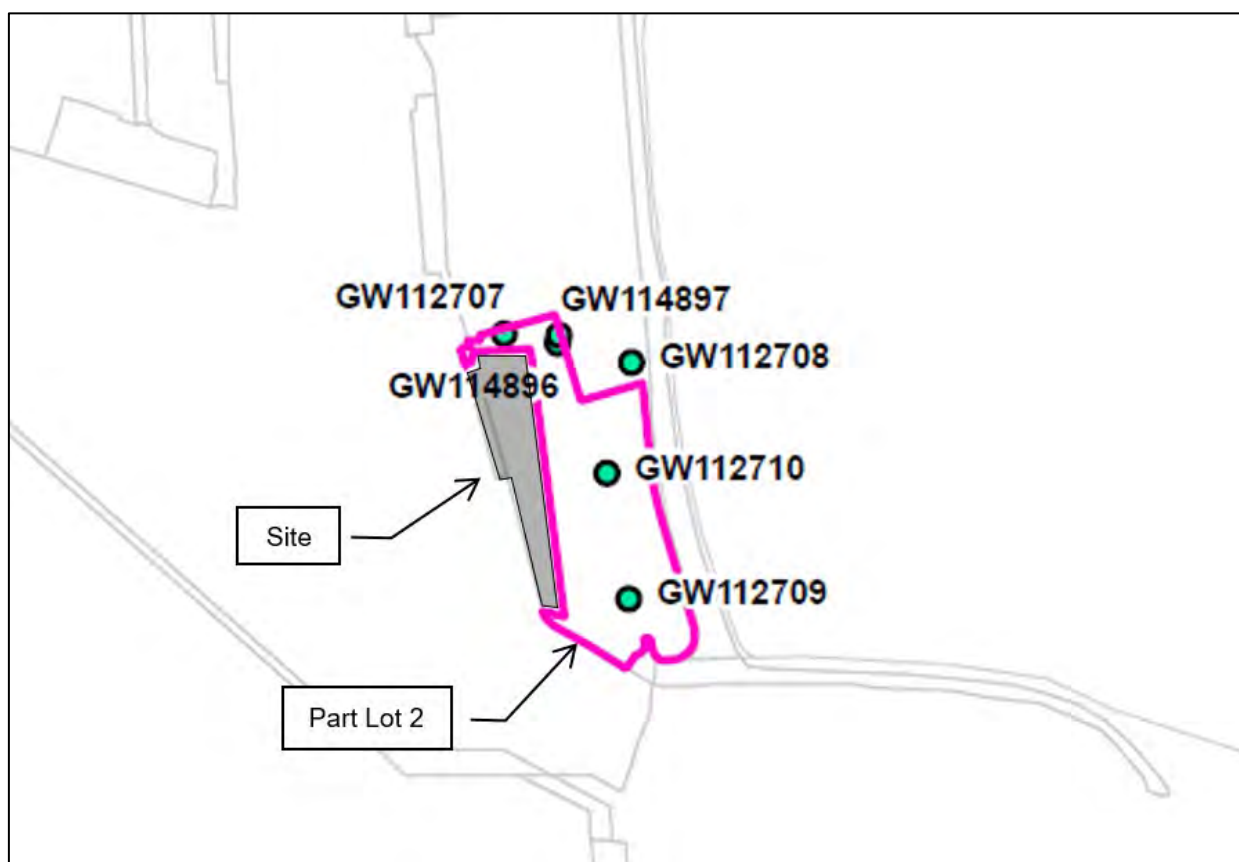


Figure 6.3 Registered groundwater bores (Lotsearch, 2020)

## 6.8.2 Site-specific groundwater

Groundwater inflows were encountered in all boreholes, except GBH34 and GBH36, at depths between about 3.7 metres and 5.0 mbgl. GBH36 refused at 0.15 mbgl. Six groundwater monitoring wells (MW2, MW3, MW6, 201, 204, 205) were installed on-site as part of previous investigations undertaken by Douglas Partners in 2011 and more recently by GHD in 2018. Groundwater was measured at depths between 4.01 metres and 4.90 mbgl on 18 October 2018.

No hydrocarbon odours were noted in groundwater during drilling or sampling at any of the wells. No evidence of non-aqueous phase liquid (NAPL) was observed during groundwater sampling. No odours or sheens were noted on the surface of the groundwater from monitoring wells during purging and sampling for the remaining locations.

Douglas Partners (2014) stated that groundwater flow direction was towards the south-west, that is, towards the Inner Harbour. However, it was further stated that groundwater flow direction was unlikely to be homogeneous across the site due to water bodies along three sides, various filling material and tidal influences. These factors were considered to form localised flow patterns.

## 6.9 Site contamination status

Investigation into the contamination status of the site have been undertaken on behalf of AIE for the purpose of the EIS and subsequent targeted site assessments and baseline condition reports. The results of the assessments are reported in GHD (2018a), (2021a) and (2021b) with further details included in the CSP (refer to Appendix C).

All areas identified for additional investigation in the Remediation Works Plan of Stage 1 Early Enabling Works addressed during Stage 1 of the Project and have been validated.

The CSP (Appendix C) will continue to be implemented for any unexpected contamination finds. Materials displaying distinct odours, unusual colour changes or containing suspected contaminated fill materials (ACM, extensive slag, or coke, etc.) should be segregated and analysed, as required, prior to a decision made for re-use or disposal off site. Any ACM will be managed in accordance with the CSP and the UFP contained therein. Each find of ACM will be managed on a case-by-case basis depending on the nature of the ACM encountered. A licenced asbestos removal contractor and a remediation specialist will be utilised to assist with the management and/or disposal of any ACM.

Based on the review of all previous investigations at the site, the following areas were identified as potentially posing a risk to human health and/or the environment for redevelopment of the site and were remediated and/or managed during Stage 1 works.

The current contamination status is summarised in Table 6.5 below.

**Table 6.5** Summary of identified and potential contamination currently on site

| Item                                                                                                                  | Location of impact | Outcome                                                                         | Current status                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Exceedance of human health criteria and management levels for BaP TEQ and TRH (NEPC, 2013). Identified in GHD (2018). | MBD Site Compound  | Further delineation samples were taken, no further exceedances were identified. | Following additional investigations, delineated vertically and in all directions and deemed to be localised.<br><br>Located at 4.2-4.4 metres below ground level (mbgl), this equates to 1.74 – 1.54 m Port Kembla Height Datum (PKHD). As this material is below +2.5 mPKHD (the depth of the current excavation) this material is still in situ and should be appropriately managed if excavation is to occur in this area.        |
| Exceedance of human health criteria and management levels for BaP TEQ and TRH F3 (NEPC, 2013)                         | MBD Site Compound  | Further delineation samples were taken, no further exceedances were identified. | Following additional investigations, the lateral extent for GBH26 is unknown to the west, as underground services and limited space prevented a borehole from being advanced in this direction.<br><br>Located in a sample at 4.75 – 4.90 mbgl, this equates to 0.13 – -0.02 mPKHD. As this material is below +2.5 mPKHD (the depth of the current excavation) this material is still in situ and should be appropriately managed if |



| Item                                                                                                      | Location of impact                 | Outcome                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Current status                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Identified in GHD (2018)                                                                                  |                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | excavation is to occur in this area. Risks can be managed by implementing standard contaminated site hygiene and OH&S measures.                                                                                                                                                                                                                                                   |
| Exceedance of human health criteria and DGV for BaP TEQ and TRH (NEPC, 2013)<br>Identified in GHD (2021a) | MBD Site Compound                  | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | The lateral extent has not been delineated however the impact is considered localised.<br><br>Located in a sample at 3.4-3.5 m (HIL-D exceedance), this equates to 1.49-1.39 mPKHD. As this material is below +2.5 mPKHD (the depth of the current excavation) this material is still in situ and should be appropriately managed if excavation is to occur in this area.         |
| Dioxins                                                                                                   | MBD Site Compound                  | Dioxins were identified in fill and natural soils across the site. The congener profile associated with the Berth 101 materials is similar to that reported by Horri <i>et al.</i> for kaolin clays, with OCDD being predominant and no furan compounds detected. This suggests a possibly natural rather than anthropogenic dioxin source.                                                                                                                                                                                                                         | Dioxins are ubiquitous within the fill and natural soils present on the site; however, concentrations are below those which would present an unacceptable risk to human health for workers who may come into contact with materials during works on the site. The risk can be further appropriately managed by implementing standard contaminated site hygiene and OH&S measures. |
| Asbestos impacted soil                                                                                    | Site wide                          | All asbestos has been removed from the excavation zone and validation complete. Impacted material has been disposed of offsite, contained onsite in T5 cell or segregated and stockpiled.                                                                                                                                                                                                                                                                                                                                                                           | Asbestos impacted soil relocated to former Conveyor C6 Stockpile and/or T5 containment cell.                                                                                                                                                                                                                                                                                      |
| ASS/PASS                                                                                                  | MBD Site Compound                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Refer to Stage 2A and Stage 2B ASSMP.                                                                                                                                                                                                                                                                                                                                             |
| Contaminated sediments (HM/HS) (GHD, 2018b)                                                               | Inner and Outer Harbour            | The presence of contaminated sediments, being heavy metals above screening criteria, were found within the proposed dredging and disposal areas. Sampling indicated PASS conditions present within the dredging footprint.<br><br>Dioxins were present in both the dredging and disposal areas within the range of Australian background levels.                                                                                                                                                                                                                    | Refer to Stage 2A and Stage 2B DEMP and ASSMP.                                                                                                                                                                                                                                                                                                                                    |
| Contaminated soil in Outer Harbour (GHD, 2021e) (GHD, 2021f)                                              | Emplacement Cell Construction Site | Eastern portion of the Emplacement Cell Construction Site "Site 1": lead exceedances of the human health criterion in boreholes to 1 mbgl at eastern and western ends of the site. Only identified at surface (0.0 – 0.2 m) in north-eastern corner of the site.<br><br>Western portion of the Emplacement Cell Construction Site "Site 2": BaP TEQ, PAH and TRH above the human health guideline criterion were detected to 1 mbgl in the eastern end of the site. Detections at surface levels (0.0 – 0.2 m) were restricted to two locations for BaP TEQ and one | Site 1: contamination identified still present at site.<br><br>Site 2: asbestos clearance has been undertaken. Other contaminants identified remain in situ.                                                                                                                                                                                                                      |



| Item | Location of impact | Outcome                                                          | Current status |
|------|--------------------|------------------------------------------------------------------|----------------|
|      |                    | location for TRH. Surface asbestos materials were also detected. |                |

BaP: Benzo(a)Pyrene

TEQ: Toxicity Equivalence Quotient

HM/HS: Harbour Muds/Harbour Silts

### Other contaminants

Per- and polyfluoroalkyl substances (PFAS) are not considered to be a potential contaminant of concern for the site. GHD understands that no storage of PFAS chemicals or firefighting activities have occurred at the site. There has been no evidence of disposal of other wastes or products that may contain PFAS chemicals (e.g., household waste) identified. Based on this, PFAS has not been included in the sampling program.

## 6.10 Site conditions

Following the completion of the Stage 1 Early Enabling Works (completion date of January 2022) the existing above and underground structures within the MBD Site Compound were demolished. Excavation down to level of RL +2.5 metres PKHD has been undertaken and the following materials stockpiled at the MBD Site Compound for Stage 2A and Stage 2B works:

- Approximately 9,700 m<sup>3</sup> of demolished concrete crushed to nominal 70mm minus.
- Approximately 12,500 m<sup>3</sup> of heavily bound base course crushed to nominal -150mm minus.
- Approximately 33,900 m<sup>3</sup> of mixed slag, general fill, and coal nominally < 150mm in size.
- Approximately 10,700m<sup>3</sup> of predominantly sand.
- Approximately 8,600 m<sup>3</sup> of asbestos impacted soils.

The excavated materials stockpiled at the Emplacement Cell Construction Site include:

- Approximately 44,000 m<sup>3</sup> of sand material.

## 7. Spoil management

This section provides a description of the steps and procedures required to protect health, safety, and the environment during Stage 2A and Stage 2B. The procedures have been developed as part of the detailed CSP (refer to Appendix C).

### 7.1 Site mobilisation for Stage 2A and Stage 2B

Management of the site mobilisation process is to be included in Stage 2A and Stage 2B Principal Contractor's work plans including the following:

- **Site access and security** – Principal Contractors will be responsible for ensuring the security of all work areas and all plant and equipment maintained on-site during the works. This includes signage, control of site access (authorised personnel and vehicles only) and safety inductions and documentation.
- **Plant re-fuelling/maintenance/cleaning** – Principal Contractors will be responsible for designating locations/areas for equipment refuelling, maintenance, and cleaning activities undertaken during the site works (as required) and to ensure all vehicles leaving the site are free of any contaminated material. Some equipment, such as static generators, drill rigs and cranes, may require re-fuelling in situ and not within designated areas. The refuelling procedure will be followed with spill controls outlined in the Emergency Spill Plan.
- **Traffic control** – Principal Contractors will be responsible for ensuring adequate traffic control measures are in place to ensure site safety and take into consideration the entry and egress of vehicles from the main site entrance in accordance with the CTMP.
- **Environmental controls** – Principal Contractors will be responsible for installing and maintaining environmental controls consistent with relevant management plans.

### 7.2 MBD Site Compound and Emplacement Cell Construction Site

GHD has prepared a CSP (Appendix C) to manage known contamination issues during Stage 2A and Stage 2B works, to support subsequent excavation of material and transfer to the Emplacement Cell Construction Site. The CSP provides a description of the remediation program (completed as part of the Stage 1 Early Enabling Works), and the procedures and standards to be followed during the course of the Project, to ensure the successful management of known contamination at the site and consequently the protection of the environment and human health (GHD, 2021a).

### 7.3 Additional investigation/validation

Soils beneath the above and below ground infrastructure at the MBD Site Compound have been investigated following their progressive removal as a part of Stage 1 Early Enabling Works. Any additional investigation and/or validation of material as a part of Stage 2A and Stage 2B works is to occur if there are any unexpected finds, and as such is to be managed per the UFP.

There may be a requirement to reprocess materials from the existing stockpiles resulting from the Stage 1 Early Enabling Works to ensure suitability for backfill and reuse during Stage 2A and Stage 2B. This may include crushing, screening and stockpiling. All such materials have already been validated and cleared with regards to contamination and asbestos and therefore will not require any additional validation. In the event of any unexpected contamination finds, the contingency plan outline in Section 8.6 will be applied.

### 7.4 Excavation

Completion of excavation and backfilling from Stage 1 Early Enabling Works will be required prior to construction of structures within the MBD Site Compound.

A small section of gas pipeline will be installed within the MBD Compound site as part of the Stage 2A and Stage 2B works through a combination of trenching and Horizontal Directional Drilling (HDD). Trenches would be progressively excavated to a depth of between about 1 and 1.5 metres and be progressively backfilled and restored to the existing landform. The PKGT EIS notes that groundwater inflows at Berth 101 were typically encountered at depths between about 3.7mbgl and 5mbgl, thus the pipeline installation is unlikely to intercept groundwater.

HDD would be utilised to enable the gas pipeline to pass beneath existing PKCT adjoining the site and involve the excavation of launch and receival pits at either end of the horizontal directional drill. An HDD rig would then be employed to drill a conduit between the launch and receive pits. The conduit would be drilled by progressively adding drilling head lengths at the drilling rig for the length of the horizontal directional drill. All spoil material would be brought back to the launch pit location where it would be managed with the remainder of the excavated materials at the MBD Site Compound. Excavated materials from the Stage 1 Early Enabling Works have been stockpiled within the MBD Site Compound as per Figure 2.3 and within the Emplacement Cell Construction Site (refer to Figure 2.3).

The excavated materials stockpiled at the MBD Site Compound include:

- Approximately 9,700m<sup>3</sup> of demolished concrete crushed to nominal 70mm minus.
- Approximately 12,500m<sup>3</sup> of heavily bound base course crushed to nominal -150mm minus.
- Approximately 33,900m<sup>3</sup> of mixed slag, general fill, and coal nominally < 150mm in size.
- Approximately 10,700m<sup>3</sup> of predominantly sand.
- Approximately 8,600 m<sup>3</sup> of asbestos impacted soils.

The excavated materials stockpiled at the Emplacement Cell Construction Site include:

- Approximately 44,000 m<sup>3</sup> of sand material.

In addition to land-based excavation, approximately 450,000 m<sup>3</sup> of materials will be excavated/dredged from the MBD Site Compound and placed within the boundaries of the Emplacement Cell. Further details, including detailed design drawings, can be found in the ECR (SMEC, 2022). A summary of the excavation and dredging works is provided in the DEMP. Dredging activities at the MBD Site Compound and Emplacement Cell will be staged to accommodate other construction works occurring at the MBD Site Compound. Construction staging for excavation and dredging activities to be undertaken are summarised in the ECR (SMEC, 2022).

## 7.4.1 Validation sampling

The resultant land-based excavation shall be validated to confirm the removal of any contaminated material (unexpected finds) to allow subsequent excavations to proceed without restriction, with sample results compared against nominated assessment criteria. The assessment criteria are outlined in detail in the CSP, which also includes the validation sampling protocol for the remediation works completed as part of the Stage 1 Early Enabling Works (refer to Appendix C).

## 7.4.2 Backfill or reinstatement requirements

On completion of excavation and subsequent validation approval, land-based backfilling of excavations will be required (i.e., for site levelling or safety reasons). Significant backfilling at the MBD Site Compound is not anticipated during the Stage 2A and Stage 2B works. If required, backfilling procedures will be as follows:

- Excavations are to be backfilled with either:
  - Materials excavated during Stage 1 Early Enabling Works which includes crushed concrete, heavily bound base course, mixed slag, general fill, and coal (refer to Table 2.2).
  - If required, Virgin Excavated Natural Material (VENM) or Excavated Natural Material (ENM) is to be sourced externally. Material considered to be VENM or ENM will be assessed by an appropriately qualified environmental consultant to confirm that the material meets the relevant regulatory requirements, and notification given to the EPA. Importation of VENM or ENM materials and use in backfilling will occur in accordance with the relevant guidelines and legislation.
  - Material sourced from a commercial / licensed premises and must be deemed uncontaminated and suitable for purpose. Such materials may include but not necessarily limited to:

- Quarry aggregates
- Sand materials
- Landscaping materials as required
- Materials that conform with NSW EPA Resource Recovery Exemptions 'Backfill material must be of suitable composition and must meet geotechnical and other material property requirements for the area of use and not present hazards to future development. VENM or ENM materials are not to be stockpiled in areas still undergoing remediation or come in contact with contaminated soils either through storage or from equipment/plant handling contaminated materials.
- Validation samples will be collected from on-site or imported material (if required) to confirm its suitability for use. Further details regarding the validation schedule are presented in the CSP (Appendix C).
- It is understood that it is also intended to use fill material and concrete suitable for reuse for the wharf construction. Materials have been crushed on site during Stage 1 Early Enabling Works and stockpiled at the MBD Site Compound. This material has been segregated and validated for use as per Section 8.2.

Reinstatement, compaction, and further redevelopment works will be undertaken in accordance with the requirements of AIE.

### 7.4.3 Material tracking control

A critical aspect of Stage 2A and Stage 2B is the manner by which materials are controlled throughout all stages of the works. The following tracking control requirements for each stage shall be implemented by the Principal Contractors to ensure all materials are accounted for:

- Excavation:
  - The area to be excavated shall be clearly delineated.
  - Qualified supervision shall be used during excavation to ensure that all contaminated materials are removed but disturbance of uncontaminated soils is minimised.
  - Materials shall be segregated to the extent practical during excavation to minimise mixing of materials with different degrees or types of contamination.
  - The final extent of excavation and location of validation sampling points shall be measured and recorded by GPS or survey, as required by AIE.
- Stockpiling/backfilling:
  - Stockpiles shall be kept separate, to minimise mixing of materials (as above).
  - All stockpiling and backfilling operations will only move material from one location to another when approved by the Principal Contractor Environmental Representatives. All such movements shall be clearly documented by the Principal Contractors in a material tracking register equivalent. The materials tracking register shall document (at a minimum) the following information:
    - Stockpile identification.
    - Source of material.
    - Volume of material.
    - Destination (including on-site locations for intermediate movement).
    - Date of movement.
    - Authorisation.
    - Material description.

It should be noted that all details regarding materials tracking for the dredging work associated with Stage 2B is contained within the DEMP.

Safety Data Sheets (SDSs) are to be available for chemicals and hydrocarbons in locations nearby to where the chemicals and wastes are stored

## 8. Waste management

### 8.1 Transport of material

Materials will be transported to the stockpile areas both within the MBD Site Compound and the Emplacement Cell Construction Site as depicted in Figure 2.2 and Figure 2.3. Materials to be transported will include:

- Green waste.
- Spoil.
- Tie rods excavation.
- Revetment rock.

Movements to the stockpile areas are considered 'on-site'. Transportation documentation will include:

- Daily load counts, noting source location and load volume estimates.
- Individual Stockpile or EIS soil unit identifier (i.e., SP01 or Unit 1#A).
- Date, total number of loads, description of material.

Information will be recorded on an on-site material register and stockpile register. Stockpiles will be maintained separately, surveyed for location and volume, and maintained in accordance with the relevant air, water, and asbestos controls. Movements from the MBD Site Compound to the Emplacement Cell Construction Site are considered 'onsite' movements, however these will be tracked as outlined in Section 7.4.3. These movements will comply with all aspects of the CTMP, including specific requirements in the Infrastructure Approval (SSI 9471) conditions.

Once a stockpile is removed, a visual inspection will be undertaken to confirm that all stockpiled materials have been removed and the previous surface is clear of stockpiled materials.

Stockpiled material will be relocated to either:

- The Emplacement Cell Construction Site (on-site); or
- On-site reuse (MBD Site Compound); or
- Off-site recycling; or
- Off-site disposal.

Transportation of material will be undertaken in accordance with relevant management plans including:

- All material movements, including on-site movements, will be recorded on a material tracking plan documenting material source, type, description, volume, destination, reference to testing results, approval for movement and date(s) of movement. A register setting out this information shall be established as part of relevant management plans.
- Wastes will only be removed off-site after the material has been classified (in accordance with the EPA *Waste Classification Guidelines*, 2014) and written approval has been received for the disposal of the contaminated soil at the nominated licensed waste management facility, or evidence of appropriate recycling (in accordance with regulatory requirements and relevant codes of practice) has been provided.
- All asbestos debris and contaminated Personal Protective Equipment (PPE) should be doubled bagged prior to transportation to an appropriately licensed landfill that can accept asbestos waste. Management of asbestos waste is to be undertaken in accordance with the POEO (Waste) Regulation.
- Waste tracking will be undertaken in accordance with NSW EPA requirements (specifically the POEO (Waste) Regulation) and include evidence of instructions, load registers/records (source, classification, volume, date and time, vehicle details etc), weigh bridge dockets. Tracking and recording will be used to ensure no more than 360,000 m<sup>3</sup> is transported, per Schedule 3, Condition 7 of the Infrastructure Approval (SSI 9471).
- Any vehicles used to transport contaminated materials from the site will meet NSW EPA licensing requirements for the waste transported.

- All trucks carrying contaminated materials off-site will have the load covered, the exterior of the vehicle, including wheels, thoroughly cleaned down by the Principal Contractors after it has received its load and prior to the vehicle leaving the site. Only vehicles which have clean exterior bodywork, and which will not pollute the off-site transportation corridors will be permitted to leave the site.

AIE will notify DPIE and the EPA when responsibility for the emplacement cells is transferred to NSW Ports, or another entity approved by DPIE, and provide evidence that NSW Ports or another entity has accepted that responsibility.

## **8.2 Segregation of materials for re-use on-site**

The discussion presented below is based on the proposed re-use of uncontaminated materials generated during excavation of materials across the nominated area as bunding and/or fill within the MBD Site and Emplacement Cell.

Segregation methodology is presented in Table 8.1. For Stage 2A (land-based excavations), it is generally dependent on the frequency of occurrence and the nature of any contaminated materials (odorous, discoloured or ACM and other foreign materials) in excavated and dredged materials, as well as the physical characteristics of the materials themselves. During piling works, if ASS/PASS materials are encountered, appropriate management to be implemented in accordance with the ASS/PASS Management Plan.

For Stage 2B (marine based excavation and dredging, methodology and sequence of works are discussed in the DEMP.

If unexpected contaminated materials finds are encountered during Stage 2A and 2B works, the Unexpected Finds Protocol outlined in the CSP will be implemented.



**Table 8.1** Segregation, stockpiling and re-use responsibilities

| Activity                                                                                                                                                                                                                                                                                         | Responsibility                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Identify the area for excavation and the uncontaminated areas of the site containing materials suitable for re-use, based on previous analytical results and site observations.                                                                                                                  | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> <li>– AIE Environmental Representative</li> </ul> |
| Removal of hard stand as appropriate                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul>                                             |
| Excavation with segregation of different material streams if appropriate, based on previous results, visual assessment, mechanical screening or sampling and analysis i.e., materials suitable for re-use, materials for recycling, materials for disposal and materials for further management. | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> <li>– AIE Environmental Representative</li> </ul> |
| Validation of segregated materials by Environmental Consultant in accordance with the validation protocol detailed in the CSP (Appendix C) for re-use on site or within the Emplacement Cell bund.                                                                                               | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> <li>– AIE Environmental Representative</li> </ul> |
| Characterisation of unsuitable segregated materials (sampling and analysis) by Environmental Consultant, equipment by Contractor) if disposal off site is required (Waste Classification sampling as per CSP (Appendix C)).                                                                      | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> <li>– AIE Environmental Representative</li> </ul> |
| Transport of suitable materials to an appropriate portion of the site for stockpiling for future use, as directed by AIE/Environmental Consultant.                                                                                                                                               | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul>                                             |
| Transport of excess materials to the Emplacement Cell Construction site for future re-use or placement within the Emplacement Cell.                                                                                                                                                              | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul>                                             |
| If required, transport contaminated material by licensed waste transporter, to an appropriately licensed site for disposal.                                                                                                                                                                      | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> <li>– AIE Environmental Representative</li> </ul> |
| Reinstatement as required of excavated area.                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul>                                             |

A decision tree outlining the process for segregation and characterisation of the excavated materials for either re-use on-site, as the bund or cap in the Emplacement Cell Construction Site, for placement in the Emplacement Cell or for disposal off- site is presented in Figure 8.1. It should be noted that Figure 8.1 interfaces with the decision matrix of ASS/PASS detailed in the ASSMP, and thus should be read in conjunction with this decision tree.

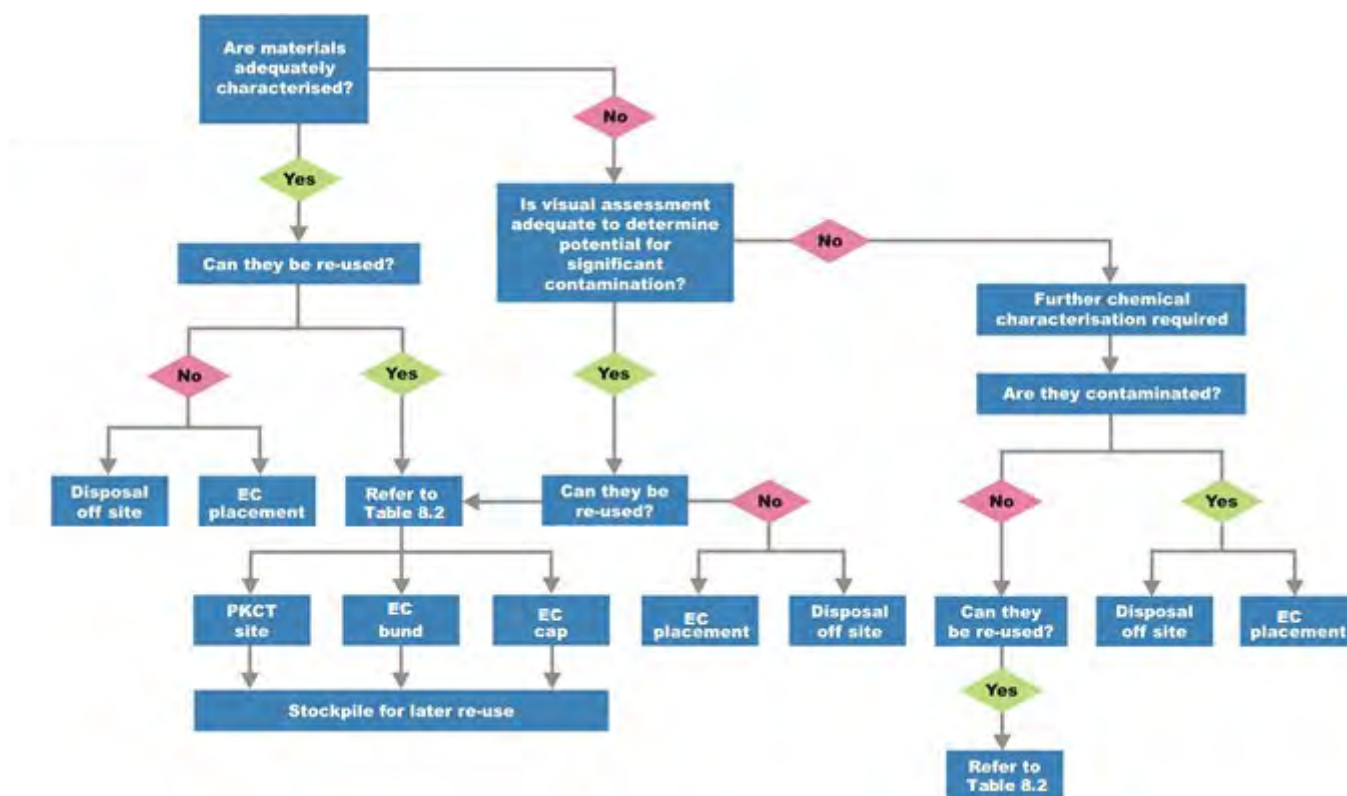


Figure 8.1 Decision tree for material segregation and characterisation

Table 8.2 details the criteria that will apply to the decision-making process with regard to the options for re-use on site.

Table 8.2 Criteria for re-use on site

| Re-use on site options <sup>1</sup>     | Decision criteria                                                                                                                                |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| MBD Site Compound                       | Less than HIL D or can be managed by capping.                                                                                                    |
| Emplacement Cell bund wall construction | Less than sediment DGV's. Where relevant, consideration of contaminant leachability will be applied, as per Section 7.5 of the CSP (Appendix C). |
| Emplacement Cell cap construction       | Less than HIL D.                                                                                                                                 |
| Emplacement Cell placement materials    | Unsuitable for all of the above.                                                                                                                 |
| Disposal off site                       | As directed by Stage 2A and Stage 2B Principal Contractor Project Managers or AIE Project Director                                               |

1. All materials for re-use must also be deemed suitable for the geotechnical requirements.

2. Consideration regarding use of materials which may be ASS/PASS must also be considered for the selected end use.

## 8.3 Disposal off-site

Any material that is required to be transported for off-site disposal by truck will be done so in accordance with the conditions of the Infrastructure Approval (SSI 9471) and the CTMP. The following will occur as the material is loaded from site:

- Trucks will be covered prior to exiting the MBD Site Compound and will remain covered until authorised to unload at the destination.
- Trucks carrying excavated material are to use a facility such as a wheel wash, if required, to ensure they are decontaminated at the before exiting site.
- Trucks will be fitted with seals to ensure that the movement of potentially saturated materials is undertaken appropriately. The integrity of the seals will be inspected prior to commencement of each day's haulage works.
- Trucks carrying construction general waste, including those listed below, will be by specialist contactors carrying appropriate licenses, spill kits, bunding and covering for each waste stream:

- Paper, glass, plastics, silt fences, survey pegs, aluminium, cans, hessian bags etc.
  - Tyres, batteries, waste fuels, oils, radiator fluids, sewage, hydraulic oils and drummed chemicals.
- Trucks will not wait in the streets surrounding the site.

All off-site movements will be tracked on the waste tracking summary. Additionally, Waste Locate, a NSW EPA system, will be used track all loads of asbestos waste, restricted or hazardous waste.

Waste Locate is not required for General Solid Waste (GSW) and cell placement. Waste Locate will be used for asbestos, Restricted Solid Waste (RSW) and hazardous waste only.

The following procedure will be undertaken for excavated materials that are required to be disposed of off-site:

- Soil to be disposed off-site must be classified for waste disposal purposes and disposed in accordance with the requirements of the POEO (Waste) Regulation made under the POEO Act and NSW EPA *Waste Classification Guidelines* (NSW EPA, 2014a). The Environmental Consultant shall be responsible to oversee the classification of the waste. Contractor will ensure its transport and disposal to an appropriately licensed landfill.
- Documentation of waste classification, transport and disposal will be provided in accordance with the POEO (Waste) Regulation and NSW EPA *Waste Classification Guidelines* (NSW EPA, 2014a) and/or *Waste Classification Guidelines Part 4: Acid Sulfate soils* (NSW EPA, 2014b) and provided for inclusion in the validation report. Documents required will include:
  - Materials tracking register.
  - Independent waste classification report in accordance with the requirements of NSW EPA.
  - NSW EPA online waste tracking documentation (Waste Tracker).
  - Receiving waste facility EPL (to show it can lawfully receive the waste), limit conditions and/or consent from appropriate regulatory authority.
  - Consignment authorisation/disposal receipts/tip dockets.
  - Reconciliation documents matching materials register and disposal receipts.

## 8.4 Stockpiling

All stockpiles will be maintained in an orderly and safe condition for a maximum period of up to 18 months. Batters will be formed with sloped angles that are appropriate to prevent collapse or sliding of the stockpiled material. The integrity of neighbouring stockpiles of differing materials will be maintained and all measures necessary to prevent mixing of material types will be undertaken.

Stockpile controls are outlined in the Stage 2A and Stage 2B AQMP and ESCP (Appendix D), and include:

- Polymer application:
  - When applied to a completed stockpile, polymer will reduce dust generation and sediment run off for up to six months. Polymer will be reapplied if the stockpile life is longer than six months. The polymer used will be suitable for use adjacent to marine environments.
  - Additional polymer may be applied to stockpiles prior to completion in response to elevated dust measurements where dust plumes are observed to be coming from stockpiles, or if visual inspections reveal deterioration of surface sealing.
- Bucket sealing of stockpiles, as they are formed.
- Minimising active stockpiling surface area. Stockpiling will be minimised, where possible. Land based excavations will be directly loaded to trucks and transported to the Emplacement Cell Site or for offsite disposal, without stockpiling, to reduce handling and potential dust generation. Stockpiling will be required when storage of material is required prior to the Emplacement Cell being ready to receive material.
- Control of runoff from stockpiles, to prevent sedimentation of marine environments.
- Management of surface water for onsite reuse for dust suppression.
- Maximum height will vary depending on space availability, ensuring safety is not compromised and dust generation during windy condition is minimised (e.g., polymer application, bucket sealing, stockpiled to be covered)

- Different types of material will be separated to minimise the mixing of materials (refer to Section 7.4.3).
- Potentially contaminated material will be delineated, not mixed with clean material and be clearly signposted
- Stockpiles are to have erosion and sediment controls where required to ensure runoff is contained within site. The application of the Stage 2A and Stage 2B ESCP and spoil tracking process (refer to Section 7.4.3) will ensure stockpiled materials are controlled. Additionally, stockpile surfaces will be stabilised to further reduce the risk of sediment runoff.

The above controls are considered appropriate for materials identified to date; but any stockpiles of unexpected contamination with a higher potential for leaching or contaminated dust (e.g., by asbestos fibres) would be securely covered with an appropriate material (e.g., tarp or geofabric specific to the contaminant risk) prior to disposal. Additional stockpiling considerations for materials suspected to be ASS/PASS are contained within the ASSMP.

Stockpiles will have a maximum volume of 10,000 m<sup>3</sup> at the Emplacement Cell Construction Site and up to 50,000 m<sup>3</sup> at the MBD Site Compound for backfill purposes. However, smaller stockpiles will be used to segregate unexpected finds. Any stockpiles of contaminated spoil requiring offsite disposal will only be located at the MBD Site Compound. Stockpiles will have proposed maximum height of 10 metres for temporary materials stockpile, and two metres for topsoil and mulch, if required. It is not anticipated that topsoil and mulch will be generated during Stage 2A and Stage 2B works. This is consistent with the findings of the PKGT EIS (GHD, 2018).

The stockpile location fate of waste will be monitored by the Stage 2A and Stage 2B Principal Contractor Environmental Representatives and the Construction Foremen.

## 8.5 Disposal locations

When results confirming classification of the waste have been received, these will be provided to the appropriately licensed waste management facility in order to obtain disposal approval. The destination waste management facility will be licensed to receive the relevant waste classification. Some identified potential disposal locations in proximity to the site are listed below in Table 8.3.

**Table 8.3** Potential licensed waste disposal locations

| Material Classification             | Name and Location                     | EPL No. |
|-------------------------------------|---------------------------------------|---------|
| Recyclable Concrete                 | Benedict's Recycling Wollongong       | 20870   |
| General Solid Waste, Asbestos Waste | Whyte's Gully Waste Disposal Facility | 5862    |
| Liquid Waste                        | Cleanaway Unanderra                   | 10771   |
| MBD and NGP Spoil                   | PKGT Emplacement Cell                 | (TBC)   |
| Restricted Waste                    | Suez Kemps Creek                      | 4068    |

## 8.6 Contingency plan

Site remediation and excavation of identified / known contamination hot spots has been undertaken as part of the Stage 1 Early Enabling Works. However, as with all excavations within areas of unknown fill and foreign materials, there is always a degree of inherent uncertainty with regards subsurface soils and contamination.

Table 8.4 outlines some of the unexpected situations that may arise with procedures noted for the Principal Contractor to follow if unexpected situations are encountered.

Table 8.4 Contingency procedures

| Issue                                                                         | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Encountering unexpected potential contamination (including ACM)               | <p>The presence of previously unidentified types of contaminants may be identified during the works. If previously unidentified types of contaminants are detected, then the validation criteria may have to be revised to incorporate those contaminants.</p> <p>Any potential contaminated material in addition to the type already identified will be treated in a method considered suitable for the type of contaminant. Additional testing would be undertaken to determine requirements in this respect.</p> <p>Any identified ACM fragments will be managed in accordance with the AIE UFP, including the removal of any visible fragments by a licenced removalist in accordance with relevant SafeWork NSW codes of practice. Following removal, a licenced asbestos assessor should inspect the site and provide a clearance certificate confirming removal of asbestos.</p> |
| Wastes, previously unidentified, buried in the work area may be encountered   | <p>In the event that buried wastes are encountered during the works, the extent of the impact from the buried wastes will be assessed. Following assessment, if required, the waste will be removed, stored, classified and disposed of in accordance with NSW EPA <i>Waste Classification Guidelines</i> (NSW EPA, 2014a) and/or <i>Waste Classification Guidelines Part 4: Acid Sulfate soils</i> (NSW EPA, 2014b).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Dewatering of excavations may be required.                                    | <p>If dewatering of excavations is required, the water will be pumped into suitable storage and either used for dust suppression or compaction (following appropriate testing), tested prior to discharge or disposed of at a licenced facility approved to accept potentially contaminated groundwater.</p> <p>In the event that excavations are unstable, excavation works will be reassessed in consultation with the AIE Project Manager.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Unacceptable Environmental Impacts as a result of Stage 2A and Stage 2B works | <p>The CSP (Appendix C) has considered the potential environmental impacts of side effects of the works such as noise, odour, dust and surface runoff. These will be further considered in relevant management plans prepared by the Principal Contractor. However, in the event that unacceptable levels of such side effects are detected at the site boundaries during the works, the Principal Contractors shall cease work and the Principal Contractor's Site Environmental Representative will assess the situation and direct corrective action in accordance with the following:</p> <ul style="list-style-type: none"> <li>– Existing management plans.</li> <li>– Current NSW EPA regulations and requirements.</li> <li>– In consultation with the AIE HSE Manager.</li> </ul>                                                                                              |

## 9. Communication and complaints

Effective communication between the Project Director, Project team, contractors and external stakeholders will be undertaken throughout the Project to ensure effective implementation of this SMP.

Project communication can be categorised into internal and external communications, as well as communications specifically dealing with complaints. The specific communication methods for each category are discussed below.

### 9.1 Internal communications

Communication on environmental issues related to spoil management within the Project team will be maintained, as a minimum, through the following forums (organiser as noted):

- Weekly project construction team meetings (AIE Construction Manager or delegate).
- Periodic Environmental management team meetings with relevant contractors (AIE HSE Manager or Delegate).
- Toolbox talks and daily pre-start briefings (Principal Contractor Project Managers or delegate).
- Minutes of formal meetings will be taken and distributed to record issues raised and actions required, with action status established at subsequent meetings.
- Monthly review of the internal AIE Environmental Compliance Tracking register (AIE HSE Manager or delegate).

All internal meetings include appropriate documentation in the form of agenda and formal distribution via the Project's document system.

In addition to the above, the AIE Environment Team will also undertake informal planning sessions and resource review meetings to plan and forecast for upcoming key construction dates, critical issues and other relevant matters associated with environmental planning and approvals.

### 9.2 External communications

AIE is committed to keeping the local community and relevant agencies informed about the development of the Project. The principal external communication objectives are, therefore, to:

- Continue to maintain open communication with relevant stakeholders.
- Minimise environmental impacts.
- Be proactive in addressing any concerns that the community / external stakeholder may express.

AIE will build upon the stakeholder and community engagement phase undertaken during project development including multiple group or one on one briefings. A project website ([www.ausindenergy.com](http://www.ausindenergy.com)) has been developed and provides comprehensive, clear, and accessible information that is updated on a regular basis.

As well as the local Port Kembla and broader community of the Wollongong region, extensive engagement was also undertaken with a range of other interested key stakeholders, such as local commerce organisations, the PANSW and local and state government.

Consultation with key stakeholders and the wider community on the Project will continue throughout Stage 2A and Stage 2B and subsequent construction phases. These measures will ensure the stakeholders, including the wider community, remain informed of the Project's progress.

Key methods of engagement are provided in the Stage 2A and Stage 2B EMS.

### 9.3 Complaints management

All complaints where a third party has identified a construction activity as being unsatisfactory or unacceptable will be dealt with promptly and efficiently in accordance with the complaint and dispute response outlined in the Project's Stage 2A and Stage 2B EMS.

AIE will operate a free 24-hour Community Information Line (1800 789 177) where members of the community can leave details about an inquiry, they may have regarding construction activities related to spoil and waste management. This message will be passed on to site personnel and/or the Stakeholder Engagement Team, as appropriate. The phone number is listed on the AIE website (<https://ausindenergy.com/contact-us/>) and will be provided on all community newsletters. The AIE HSE Manager has notified the Port Kembla Harbour Environment Group of the Community Information Line.

Initial responses to complaints will be provided within 24 hours of the complaint being received. As part of the response, a review of the activity will be undertaken. If required and possible, immediate changes will be made to reduce any impact on the community. In some cases, the issues cannot be resolved immediately, and ongoing actions might be required to resolve the issue.

All complaints related to spoil and waste management will be recorded in a Complaints and Disputes Register. The following information will be recorded for each complaint:

1. The date and time of the complaint.
2. The method by which the complaint was made.
3. Any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect.
4. The nature of the complaint.
5. The action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant.
6. If no action was taken by the licensee, the reasons why no action was taken.

The Complaints and Disputes Register will be maintained by the Project's HSE Manager or delegate, and will detail what the issue was, initial response provided, how and when the issue was resolved, and by whom. Records will be kept for at least four years after the complaint was made and will be produced on request by any authorised officer of the EPA.

Where resolving a complaint with a third party is protracted or develops into a dispute, the AIE HSE Manager shall escalate proactively to Senior Project Leadership (e.g., AIE Project Manager and/or Project Director) to assist with resolution. AIE will work proactively with the complainant to resolve the dispute including having face to face meetings, site familiarisation sessions and agreeing on actions to resolve the dispute. All communications and agreed actions shall be documented.

For the management and reporting of corrective actions (which may be required in response to a complaint), refer to the Project's Stage 2A and Stage 2B EMS.



## 10. Inspections, monitoring and audits

Monitoring and auditing will be undertaken to determine the impact on the environment and identify opportunities for improvement. Monitoring to be implemented for specific actions or environmental issues (e.g., water quality monitoring, air quality monitoring) will be detailed in their relevant Sub - plan and will specifically address the monitoring requirements for those issues.

### 10.1 Environmental inspections

#### 10.1.1 AIE and Principal Contractors joint environmental inspection

As a minimum, the AIE HSE Manager (or nominated delegate) will undertake periodic inspection of the work sites with the relevant Principal Contractor's environmental personnel (Environmental Representative or similar) to evaluate the effectiveness of environmental controls (inclusive of erosion and sediment control measures) and general compliance with the implementation of the SMP for site-based activities.

If any maintenance and / or deficiencies in environmental controls or in the standard of environmental performance are observed, they will be recorded on the checklist form. Records will also include details of any maintenance required, the nature of the deficiency, any actions required and an implementation priority.

Actions raised during inspections will be documented on the *Environmental Site Checklist* and will be issued formally through the Project's document management system to the relevant Contractor for action. If they represent an actual or potential significant environmental risk, these issues shall be reviewed at the Project Planning meetings and will have non-compliances raised if not closed out in the nominated timeframe (Non - compliance Report).

#### 10.1.2 Contractor environmental inspections

In addition to the joint periodic environmental site inspection with AIE, the Principal Contractors will be required to undertake daily site environmental inspections, targeting key environmental risks commensurate with the activity being undertaken. The environmental site inspection will be documented on a checklist, or similar, to be prepared and completed by the Principal Contractors.

Copies of the environmental site inspection records are to be provide to AIE on request.

The HSE Manager is responsible for the initial reporting of significant non-compliances with the SMP or relevant legislation to the AIE Project Director and government authorities (refer to Section 10.4).

#### 10.1.3 EPL inspection requirements

In accordance with Condition O4.4 of the EPL No 21529, the Contractor will undertake wet-weather inspections daily during periods of rainfall and within 24 hours of cessation of a rainfall event causing runoff to occur on or from the premises (based on site observation, this equates to 20 millimetres of rainfall in a 24-hour period).

Daily inspections of water pollution controls will be undertaken in accordance with Condition M.10.1 of the EPL No 21529 and recorded. Records will include the date and time of inspection, location of dredging operations and conditions of silt curtains and other water pollution controls. Records will be produced to an EPA authorised officer on request.

The Principal Contractors must record all such inspections including observations and works undertaken to repair and/or maintain erosion and sediment controls.

## 10.2 Monitoring

Monitoring will be undertaken to validate the impacts predicted for the work, to measure the effectiveness of management plans, environmental controls, and implementation of this SMP, and to address approval requirements.

Monitoring requirements applicable to the SMP include:

- Water quality (refer to Appendix B).
- Odour and air emissions (refer to AQMP).
- Contamination management (refer to Appendix C).

The results of any monitoring required to be conducted by the EPL or a load calculation protocol are to be recorded and retained as set out in Condition M1.1. All records required to be kept by the EPL must be:

- a) in a legible form, or in a form that can readily be reduced to a legible form;
- b) kept for at least 4 years after the monitoring or event to which they relate took place; and
- c) produced in a legible form to any authorised officer of the EPA who asks to see them.

The following records will be kept in respect of any samples required to be collected, to ensure compliance with Condition M1.3 of the EPL:

- the date(s) on which the sample was taken
- the time(s) at which the sample was collected
- the point at which the sample was taken; and
- the name of the person who collected the sample.

## 10.3 Auditing

AIE will conduct a program of internal audits for the purpose of verifying compliance with the following:

- The EMS and this SMP.
- Compliance with the requirements of relevant components outlined within the EMS and SMP, including but not limited to, site inspection compliance, document control / management, non - compliance, and incident management etc.
- Monitoring and reporting requirements as set out under EPL No. 21529.

Additional details regarding the auditing process are detailed in the Project's Stage 2A and Stage 2B EMS.

## 10.4 Environmental reporting

### 10.4.1 DP&E reporting

Regular reports on compliance and other matters will be provided during the construction phase of the Project. This will include reporting to the DP&E in accordance with Schedule 4, Conditions 7 and 8 of the Infrastructure Approval (SSI 9471), with specific reference to the *Compliance Reporting Post Approval Requirements* (2020).

In addition, DP&E will be notified in writing of the date of commencement of each of the relevant phases of the Project in accordance with Schedule 2, Condition 8 of the Infrastructure Approval (SSI 9471).

Reporting applicable to this SMP will consist of:

- Water and air quality monitoring results.
- Requirements of EPL No. 21529.
- Construction works progress and appraisal of water, air and spoil management quality controls.
- Environmental Incident Report(s), as required.
- Annual returns, as required by EPL No. 21529.

## 10.4.2 Other reporting requirements

A monthly environmental monitoring report will be developed for each calendar month which will include details of the monitoring results and frequencies and inclusion of any exceedance of EPL No. 21529 monitoring limits / criteria. A copy of the monthly environmental monitoring report will be made available on the AIE Project website. It should be noted that no specific monitoring results related to spoil management are required to be included in this report,

Further reporting requirements are provided in Section 10.6 and Section 11.1.

## 10.5 Compliance tracking register

A Compliance Tracking Register has been developed as a monitoring tool to assist with the compliance reporting requirement as set out under Condition 7, Schedule 4 of the Infrastructure Approval (SSI 9471).

The compliance tracking register includes a breakdown of the requirements from the following key approval and Project documents:

- Infrastructure Approval (SSI 9471).
- EPL No. 21529.
- Requirements of this SMP.
- *Compliance Reporting Post Approval Requirements* (DPIE, 2020), or its most recent edition.

The Compliance Tracking Register includes tabulation of reference conditions, the requirements, responsibility, status (i.e., ongoing, close - out, not triggered, etc.) and supporting evidence where required.

A routine review of the Compliance Tracking Register is undertaken by the AIE HSE Manager (or delegate) with input sought from the relevant contractors as required. The Compliance Tracking is a live document which is kept up to date for each stage of the construction works.

## 10.6 Non - compliance, corrective, and preventative actions

Non - compliances or potential non - compliances are situations or events that do not comply with the safeguards and procedures stipulated in the EMS or this SMP.

Non - compliances or potential non-compliances may be identified in any of the following situations:

- As part of site inspections, supervision or monitoring of construction activities.
- During internal audits.
- Following justified / supported verbal or written third party complaints.

All non - compliances related to spoil management will be managed and reported using the non - compliance function of the Project's document management system. Each non-conformance event and follow-up action will be documented and traceable, including identification of key dates and responsible personnel.

Additional details regarding corrective and preventative actions are outlined in the Project's Stage 2A and Stage 2B EMS.

The Department must be notified in writing via the Department's Major Projects Website within seven days after the identification of any non - compliance issue. 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.

# 11. Incident management and emergency response

## 11.1 Incident management

### 11.1.1 Overview

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 non – compliance. The consequences of such incidents may result in material environmental harm, damage, or asset loss. ‘Near misses’ are extraordinary events that could have reasonably resulted in an incident.

All incidents related to spoil and waste, including those of the Principal Contractors, its subcontractors, and visitors that occur during the undertaking of the construction works for the Project will be managed to satisfy the requirements of AIE’s Incident Reporting and Investigation System Requirements. Whilst it is noted that key Contractors will be implementing their own environmental management system procedures and processes, AIE will be responsible for ensuring that these systems and processes satisfy the requirements of the AIE EMS, including the incident management components. The Principal Contractors will be responsible for providing all necessary documentation with regards to the incident investigation and close - out actions where required. The timing of the provision of this documentation is to align with the AIE requirements.

The AIE HSE Manager must be notified immediately of any environmental incident or near miss related to spoil and waste. These may include, but are not limited to the following:

- Exceedance of water and air monitoring criteria as required under the Project EPL (EPL No. 21529).
- Spill of any dangerous goods or hazardous substance to ground or water.
- Substantiated complaints received from members of the community or regulatory authorities.
- Regulatory breaches such as fines, prosecutions, improvement notices, breaches of licence conditions.
- All incidents of third-party property damage or loss.
- Incidents involving impact or potential damage to items or places of cultural heritage significance.
- Land-based off-site sediment loss to the environment, including sediment tracking onto the roadway.

The AIE HSE Manager will be responsible for regulatory notification of all notifiable environmental incidents (refer to Section 11.1.2 for notifiable incidents). All environmental incidents will be reported immediately to DP&E in writing via the Planning Portal after AIE becomes aware of the incident, as per Schedule 4 Condition 5 of the Infrastructure Approval (SSI 9471). The notification must identify the development, including the application number, and set out the location and nature of the incident.

In the event of a notifiable non-compliance incident arising, the Principal Contractors will notify the AIE HSE Manager immediately to allow the AIE HSE Manager to notify DP&E in writing via the Department’s Major Projects Website within seven days of AIE becoming aware of the non - compliance, as per Schedule 4 Condition 6 of the Infrastructure Approval (SSI 9471). 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.

### 11.1.2 Notifiable incident under the POEO Act

In the event of a Notifiable Incident as defined under the POEO Act, AIE is responsible for immediately notifying the EPA, and any other relevant authority, of pollution incidents on or around the site via the EPA Environment Line (telephone 131 555) in accordance with Part 5.7 of the POEO Act. The circumstances where this will take place include:

- *If the actual or potential harm to the health or safety of human beings or ecosystems is not trivial.*

- If actual or potential loss or property damage (including clean-up costs) associated with an environmental incident exceeds \$10,000.

Follow-up written notification to the EPA and any other relevant authorities will be required in accordance with the POEO Act and requirements of the EPA. This includes the provision of written details of the notification to the EPA within seven days of the date on which the incident occurred.

All notifiable incidents will also be managed, documented, and reported in accordance with the AIE *Incident Reporting and Investigation System Requirement*.

In addition, an authorised officer of the EPA has the right to request a written report (in accordance with Condition R3 of the EPL No. 21529) if they suspect on reasonable grounds that an event has occurred at the licensed premises which has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies). The written report is to address all the requirements under Condition R3 of the EPL.

### 11.1.3 Notifiable incident under the Infrastructure Approval (SSI-9471)

In accordance with Condition 5 of Schedule 4, DP&E must be notified in writing via the Department's Major Projects Website immediately after AIE becomes aware of an incident on site.

Additional details regarding notifiable incidents and procedures are outlined in the Project's Stage 2A and Stage 2B EMS.

## 11.2 Emergency response

Actual or potential emergency situations will vary in type and severity. The required level of response and notification will be at the discretion of the AIE Construction Manager in consultation with the AIE HSE Manager.

Any emergency situation may require only isolated containment and control or may require the complete evacuation of the site and notification of relevant emergency services. Consideration should be made of the response requirements for different situations. If at any time there is uncertainty on how to proceed, response should be for the worst possible scenario. Ultimately, the AIE Construction Manager or representative has authority and responsibility to instigate an evacuation if he/she feels it is warranted.

In the event of an emergency, the following plans listed in Table 11.1 shall be consulted and implemented, as relevant.

**Table 11.1**      *Emergency plans*

| Plan                                               | Reference        | Application                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Principal Contractor Local Emergency Response Plan | -                | Principal Contractor's emergency response plan implemented in the event of any incident occurring during a Project activity as per the Contractor's policies and management framework.                                                                                                                                                                              |
| AIE Port Kembla Gas Terminal Emergency Spill Plan  | PKGT-AIE-PRO-039 | Developed as a Sub – plan to the EMS to be implemented detailing: <ul style="list-style-type: none"> <li>– Response plans in the event of land or water-based spill events.</li> <li>– Inspections, notification, and incident management requirements in accordance with the Infrastructure Approval (SSI 9471) and EPL No 21529 in relation to spills.</li> </ul> |
| PIRMP                                              | PKGT-AIE-PRO-007 | Implemented immediately in the event of a pollution incident occurring during a Project activity. The PIRMP: <ul style="list-style-type: none"> <li>– Outlines the actions to be taken during or immediately after a pollution incident.</li> <li>– Lists details of relevant authorities to be notified, as required.</li> </ul>                                   |

| Plan                                | Reference        | Application                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     |                  | <ul style="list-style-type: none"> <li>– Outlines community and neighbour notification details, as required.</li> </ul>                                                                                                                                                                                                                                                                                                                           |
| AIE Emergency Management Procedures | PKGT-AIE-PRO-014 | <p>Implemented immediately in the event of any emergency incident occurring during the Project. Procedures include:</p> <ul style="list-style-type: none"> <li>– Types of emergencies and the detailed steps to be taken in response.</li> <li>– Notification details to relevant authorities and AIE Project team.</li> <li>– Incident response to follow up from incident and preventative actions to be implemented, if applicable.</li> </ul> |

## **12. Document management and review**

### **12.1 Record management**

Records and registers specified in this SMP for Stage 2A and Stage 2B shall be maintained. Records to be kept may include but will not be limited to the following:

- Environmental Inspection Checklist.
- Environment Reporting.
- Environmental Monitoring Reports / Records.
- Fauna and Weed Register.
- Internal Audit Reports.
- Incident Reports and Register.
- Toolbox Talk Records.
- Induction Presentation and Register.
- Environmental Activities Safe Work Method Statement (SWMS).
- Corrective Actions Register.
- Waste and Resource Register.
- Material Tracking Register.
- Training Register / Matrix.
- Complaints Register.

### **12.2 Review and revision of SMP**

This SMP will be reviewed and updated, as required under Condition 3 of Schedule 4 of Infrastructure Approval (SSI 9471) to ensure the objectives of the applicable approval conditions contained within are being met throughout Stage 2A and Stage 2B.

In addition, as required under Condition 4 of Schedule 4 of Infrastructure Approval (SSI 9471), the SMP must be reviewed, and if necessary, revised within three months (unless otherwise agreed with DP&E) for any of the following:

- Following the submission of an incident report as per Condition 5, Schedule 4 of Infrastructure Approval (SSI 9471) (refer to Section 11).
- Following approval of any modification to the conditions of approval outlined in Infrastructure Approval (SSI 9471).
- At the direction of the Planning Secretary as per Condition 4, Schedule 2 of Infrastructure Approval (SSI 9471).

Where a review leads to revisions, 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

### **12.3 Access to information**

AIE will make the following information publicly available on the PKGT website, as per Schedule 4, Condition 12 of the Infrastructure Approval (SSI 9471) and the requirements as set-out under the Project EPL No. 21529:

- The PKGT EIS.
- Current statutory approvals for the Project.
- Approved strategies, plans or programs required under the conditions of Infrastructure Approval (SSI 9471).



- A comprehensive summary of the monitoring results of the development, reported in accordance with the specification of any conditions, or any approved plans and programs relating to Infrastructure Approval (SSI 9471).
- A summary of complaints (updated monthly).
- Any independent environmental audit, and responses to the recommendations in any audit.
- The approved premises map (EPL No. 21259, Condition A2.4).
- PIRMP (EPL No. 21529, Condition E2).
- Any other matter required by the Planning Secretary.

This information will be kept up to date by AIE when required.

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# Appendices

# **Appendix A**

## **Acid Sulfate Soils Management Plan**

# **Appendix B**

## **Water Quality Monitoring Plan**



# Port Kembla Gas Terminal

**Water Quality Monitoring Plan  
Stage 2A and 2B Marine Berth  
Construction and Dredging – Land and  
Marine Based**

Australian Industrial Energy

30 May 2022

→ **The Power of Commitment**



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| <b>Author</b>              | Nathan Alexander                                                                                                                                         |
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| A        | N Alexander | K Rosen  |  | K Rosen            |  | 28/01/2022 |
| B        | N Alexander | K Rosen  |  | K Rosen            |  | 22/02/2022 |
| C        | N Alexander | K Rosen  |  | K Rosen            |  | 23/03/2022 |
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# Acronyms

| Acronym / Definition | Description                                                              |
|----------------------|--------------------------------------------------------------------------|
| AIE                  | Australian Industrial Energy                                             |
| AMB                  | Automated Monitoring Buoys                                               |
| ANZECC               | Australian and New Zealand Environment and Conservation Council          |
| ARMCANZ              | Agriculture and Resource Management Council of Australia and New Zealand |
| ASS                  | Acid Sulfate Soils                                                       |
| ASSMP                | Acid Sulfate Soil Management Plan                                        |
| Berth 101            | MBD Site Compound                                                        |
| BG                   | Background                                                               |
| CSP                  | Contaminated Spoil Protocol                                              |
| CSSI                 | Critical State Significant Infrastructure                                |
| CTMP                 | Construction Traffic Management Plan                                     |
| DEMP                 | Dredge and Excavation Management Plan                                    |
| DO                   | Dissolved Oxygen                                                         |
| DP&E                 | Department of Planning and Environment                                   |
| EC                   | Electrical Conductivity                                                  |
| ECR                  | Emplacement Cell Report                                                  |
| EHMP                 | Ecological Health Monitoring Program                                     |
| EIS                  | Environmental Impact Statement                                           |
| EMS                  | Environmental Management Strategy                                        |
| EPA                  | NSW Environment Protection Authority                                     |
| EPL                  | Environment Protection Licence                                           |
| EP&A Act             | <i>Environmental Planning and Assessment Act 1979</i>                    |
| ESCP                 | Erosion and Sediment Control Plan                                        |
| FSRU                 | Floating storage and re-gasification unit                                |
| GHD                  | GHD Pty Ltd                                                              |
| GML                  | General Mass Limits                                                      |
| HM                   | Harbour Muds                                                             |
| HS                   | Harbour Silts                                                            |
| HSE                  | Health, Safety and Environmental                                         |
| KPIs                 | Key Performance Indicators                                               |
| LNG                  | Liquefied natural gas                                                    |
| m <sup>3</sup>       | Cubic metres                                                             |
| mg/L                 | Milligrams per litre                                                     |
| MBD                  | Marine berth construction and dredging                                   |
| MLAs                 | Marine Loading Arms                                                      |
| NATA                 | National Association of Testing Authorities                              |
| NTU                  | Nephelometric Turbidity Units                                            |
| OHDSKA               | Outer Harbour Dredged Spoil Containment Area                             |

| Acronym / Definition              | Description                                                             |
|-----------------------------------|-------------------------------------------------------------------------|
| ORF                               | Onshore receiving facilities                                            |
| PAH                               | Polycyclic aromatic hydrocarbons                                        |
| PANSW                             | Port Authority of NSW                                                   |
| PASS                              | Potential Acid Sulfate Soils                                            |
| PIRMP                             | Pollution Incident Response Management Plan                             |
| PKGT                              | Port Kembla Gas Terminal                                                |
| PKGT EIS                          | Port Kembla Gas Terminal Environmental Impact Statement                 |
| Planning Systems SEPP             | State Environmental Planning Policy (Planning Systems) 2021             |
| POC                               | Pollutants of Concern                                                   |
| POEO Act                          | <i>Protection of the Environment Operations Act 1997</i>                |
| QA                                | Quality Assurance                                                       |
| QC                                | Quality Control                                                         |
| RL                                | Reduced Level                                                           |
| SMEC                              | SMEC Australia Pty Ltd                                                  |
| SMP                               | Spoil Management Plan                                                   |
| TARP                              | Trigger Action Response Plan                                            |
| TfNSW                             | Transport for NSW                                                       |
| Transport and Infrastructure SEPP | State Environmental Planning Policy (Transport and Infrastructure) 2021 |
| TSS                               | Total Suspended Solids                                                  |
| µg/L                              | Micrograms per litre                                                    |
| µS/cm                             | microsiemens per centimetre                                             |
| WM Act                            | <i>Water Management Act 2000</i>                                        |
| WQM                               | Water quality monitoring                                                |
| WQMP                              | Water Quality Monitoring Plan                                           |

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# 1. Introduction

## 1.1 Overview

This Water Quality Monitoring Plan (WQMP) has been developed as a Sub -plan to the Port Kembla Gas Terminal Project (the Project) Spoil Management Plan (SMP). The SMP is Sub - plan to the Project's overarching Environmental Management Strategy (EMS). This WQMP has been prepared by GHD Pty Ltd (GHD) on behalf of Australian Industrial Energy (AIE) to apply to construction activities associated with Stage 2A and Stage 2B of the Project. This Stage 2A and Stage 2B SMP supersedes the Stage 2A WQMP.

This WQMP interfaces with the other associated Sub - plans, which together describe the proposed structure for environmental management and monitoring requirements for the Project. This WQMP addresses the requirements of the Port Kembla Gas Terminal Environmental Impact Statement (PKGT EIS) and associated Infrastructure Approval (SSI 9471) and Environment Protection Licence (EPL) No. 21529. This Plan has been prepared in consultation with the NSW Environment Protection Authority (EPA), Department of Planning and Environment (DP&E) Water, NSW Ports, Port Authority of NSW and an EPA accredited contaminated site auditor.

## 1.2 Background

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

NSW currently imports more than 95 percent 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 more than 100 petajoules of natural gas, equivalent to more than 70 percent of NSW gas needs and will 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) (NSW) and Schedule 5 of the State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP) . The Project received Infrastructure Approval from the Minister for Planning and Public Spaces on 29 April 2019.

The construction of the Project is primarily associated with the establishment of a new berth facility at Port Kembla to enable an LNG carrier to berth alongside the Floating Storage and Re-gasification Unit (FSRU) and new infrastructure to connect the terminal to the existing gas network. Excavation and dredging would be required to establish the new berth facility, with spoil deposited in a cell (referred to as the 'Emplacement Cell') in the Outer Harbour.

The development has progressed to Stage 2A and Stage 2B works located at Berth 101 (referred to as the 'Marine Berth Construction and Dredging (MBD) Site Compound') and the Outer Harbour Dredged Spoil Containment Area (referred to as 'OHDSCA' or the Emplacement Cell). Collectively, these two locations are referred to as "the site". The Stage 2A works include:

- Completion of excavation works undertaken during Stage 1 (including transport of spoil materials to the Emplacement Cell Construction Site).
- Construction of the quay wall at the MBD Site Compound.
- Construction of Onshore Receiving Facilities (ORF) at the MBD Site Compound (including construction of Wharf Topside Area, Utility Area, and Common Area).
- Installation and commissioning of power, communications, and potable water.
- Installation of gas pipeline within the MBD Site Compound as part of ORF.

The Stage 2B works include:

- Continuation of Stage 2A works.
- Excavation and dredging of the MBD Site Compound in the Inner Harbour and the Emplacement Cell in the Outer Harbour.
- Construction of the Emplacement Cell in the Outer Harbour.
- Marine based construction activities including installation of navigational aids and revetments at the MBD Site Compound.

## 1.3 Purpose

This WQMP has been prepared in accordance with the PKGT EIS and associated Infrastructure Approval (SSI 9471) and EPL No. 21529. It describes how the management measures and commitments in the PKGT EIS, Infrastructure Approval (SSI 9471) and EPL No. 21529, relating to water quality are to be implemented by the Principal Contractor's during Stage 2A and Stage 2B construction of the Project. Specifically, this plan addresses the following requirements:

- Ensure no waters are polluted as a result of the Stage 2A and Stage 2B works.
- Ensure compliance with water quality related requirements of EPL No 21529 issued for the construction phase of the Project.
- In the event of an incident (e.g., a spill), implement the Emergency Spill Plan.

This plan addresses the above requirements and includes, but is not limited to:

- Performance criteria for water quality mitigation.
- Mitigation strategies to minimise impacts on water quality.
- A Water Quality Monitoring Plan and reporting requirements with regards to the Project's performance during Stage 2A and Stage 2B and overall harbour monitoring

AIE and its contractors acknowledge that maintaining water quality in the vicinity of the Project site is paramount to the successful delivery of the construction phase of the Project. AIE is committed to ensuring this WQMP is implemented, reviewed and updated regularly to ensure its objectives are met and that the conditions outlined in the Infrastructure Approval (SSI 9471) and EPL No. 21529 are achieved. Staging of the WQMP has been approved in accordance with Condition 3 of Schedule 4 of Infrastructure Approval (SSI 9471).

This WQMP is applicable to all staff, employees, subcontractors, and any statutory service authorities undertaking the Stage 2A and Stage 2B works described in Section 2 of this WQMP. The WQMP implementation and on-going development will be managed by the Project Team (refer to Section 3).

## 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 an 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 includes 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. Berth and wharf facilities, as well as 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. The Emplacement Cell will be located in the Outer Harbour. A site overview is provided as Figure 2.1.



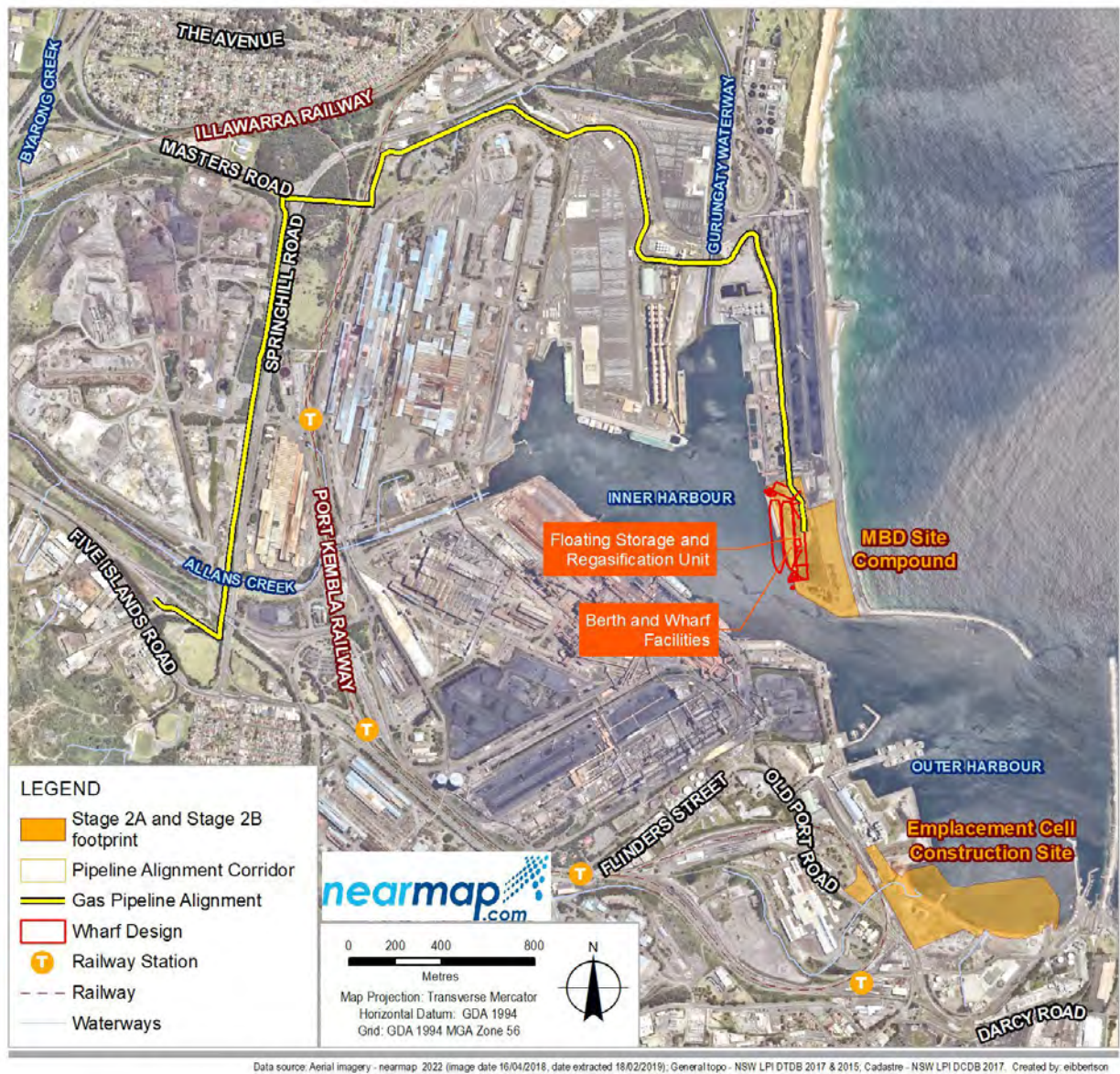


Figure 2.1 Site overview

## 2.2 Project construction scope of works

The Project construction scope of work has been divided into three main packages (with associated activities), as outlined in Table 2.1. Construction staging of the Project has been approved in accordance with Condition 3 of Schedule 4 of Infrastructure Approval (SSI 9471) as per correspondence from DP&E dated 27 October 2021. This WQMP applies only to the works associated with Stage 2A and Stage 2B.

**Table 2.1** Construction stages/work packages

| Stage | Package                                                        | Proposed commencement | Activities                                                                                                                                                                                                                                                                                            |
|-------|----------------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | Early Enabling Works                                           | May 2021              | Demolition of Berth 101, removal of structures and land based excavation works, and Cone Penetration Testing in the Outer Harbour to inform Emplacement Cell design and relocation of Bunker Oil Pipeline.                                                                                            |
| 2A    | Marine Berth Construction – Land Based                         | January 2022          | Completion of excavation works undertaken during Stage 1.<br>Transport of spoil materials to Emplacement Cell Construction Site.<br>Quay wall construction.                                                                                                                                           |
|       |                                                                | February 2022         | Installation of communications conduit, potable water line, 11kV power cable, and padmount substation within the MBD Site Compound.                                                                                                                                                                   |
|       |                                                                | April 2022            | Construction of the ORF, which comprises three areas: Wharf Topside Area; Utility Area; and Common Area.                                                                                                                                                                                              |
|       |                                                                | June 2022             | Pipeline construction and associated ancillary infrastructure within MBD Site Compound                                                                                                                                                                                                                |
| 2B    | Marine Berth Construction and Dredging – Land and Marine Based | March 2022            | Continuation of Stage 2A with addition of the following activities:                                                                                                                                                                                                                                   |
|       |                                                                |                       | Excavation/dredging of the MBD Site Compound in the Inner Harbour and construction of the Emplacement Cell in the Outer Harbour                                                                                                                                                                       |
|       |                                                                |                       | Marine based construction activities including installation of navigational aids and revetment shore protection.                                                                                                                                                                                      |
| 3     | Pipeline Installation including tie-ins (NGP)                  | June 2022             | Construction of an 18" onshore natural gas pipeline approximately 6.3km in length from the Berth 101 site boundary to tie-in facility at Cringila for connection to the Eastern Gas Pipeline<br>Pipeline construction to occur concurrently with Jemena, subject to separate set of management plans. |

\*Proposed dates and may be subject to change.

The following will be undertaken as part of the Stage 2A works:

- Construction of the quay wall at MBD Site Compound incorporating finalisation of excavation works undertaken during Stage 1 (including transport of spoil materials to Emplacement Cell Construction Site).
- Installation of and commissioning of power, communications, and potable water line.
- Construction of ORF at MBD Site Compound (including construction of Wharf Topside Area, Utility Area, and Common Area).
- Installation of gas pipeline within MBD Compound site.

The following will be undertaken as part of the Stage 2B land and marine-based works:

- Continuation of Stage 2A works.
- Installation of site facilities and preparatory earthworks at Emplacement Cell Construction Site.
- Marine-based construction activities including installation of silt curtains, navigational aids, and revetment shore protection at the MBD Site Compound.
- Construction of the Emplacement Cell in the Outer Harbour.
- Excavation and dredging of the MBD Site Compound in the Inner Harbour.

An outline of the tasks associated with Stage 2A and Stage 2B is provided in Section 2.3 through Section 2.7. The site includes the MBD Site Compound, the Emplacement Cell Construction Site, and the Emplacement Cell located in the Outer Harbour. The location of the Stage 2A and Stage 2B works is shown in Figure 2.2.



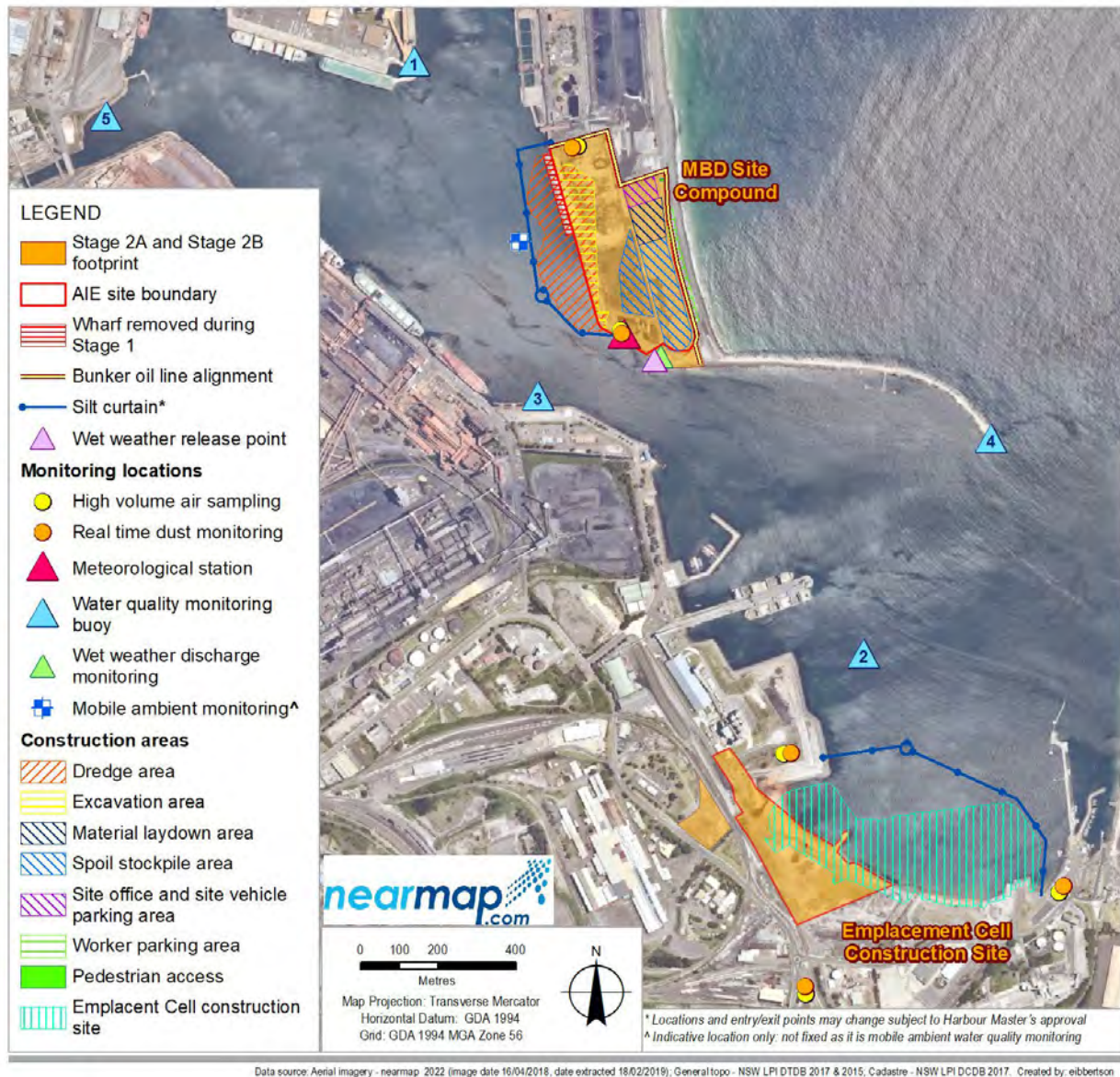


Figure 2.2 Stage 2A and Stage 2B works and location of MBD Site Compound, Emplacement Cell and Emplacement Cell Construction Site

## 2.2.1 Traffic

Road traffic generated by Stage 2A and Stage 2B will be controlled through the gate on Sea Wall Road. Heavy vehicle movements will be generated by the delivery of materials, equipment, and plant to the MBD Site Compound and transport of stockpiled material to the Emplacement Cell Construction Site.

In addition to the material that has already been transported to Emplacement Cell Construction Site (Outer Harbour Laydown Area) during Stage 2A, up to 30,000 cubic metres (m<sup>3</sup>) of material from the MBD Site Compound is anticipated to be transported via road to the Emplacement Cell Construction Site during Stage 2B. The activities associated with this task will involve loading, road transportation via truck and trailer (approximately 30-tonne capacity), unloading, stockpiling, and management of the stockpiles.

Light vehicle movements will be generated from construction workers accessing the MBD Site Compound and Emplacement Cell Construction Site. Parking will be provided for up to approximately 100 workers on the MBD Site Compound and approximately 37 workers at the Emplacement Cell Construction Site (refer to Figure 2.3 and Figure 2.4).



Road traffic movements will be undertaken in accordance with the Stage 2A and Stage 2B Construction Traffic Management Plan (CTMP).

The road traffic generated by Stage 2B will mainly be associated with the delivery of the quarry materials from quarries located in the surrounding area. It is anticipated that about 40-50 daily truck movements will be required, consisting of three - five axle semi-trailers or rigid truck and five axle dog-trailers of less than 40 tonnes (GML). The activities will take place during the standard daytime construction working hours, averaging approximately eight heavy truck movements per hour (four vehicles in and out of site). The total number of vehicles required for the operation will be 12-16.

The majority of traffic generated during Stage 2B activities will be marine traffic movements during dredging operations. Marine traffic navigation and management will be undertaken in accordance with a Port Navigation Plan, herein referred to as the Port Operations Management Plan (POMP). The POMP has been produced by the Stage 2B Principal Contractor in consultation with the Port Authority of NSW (PANSW) and is consistent with the principles in the CTMP for Stage 2A.

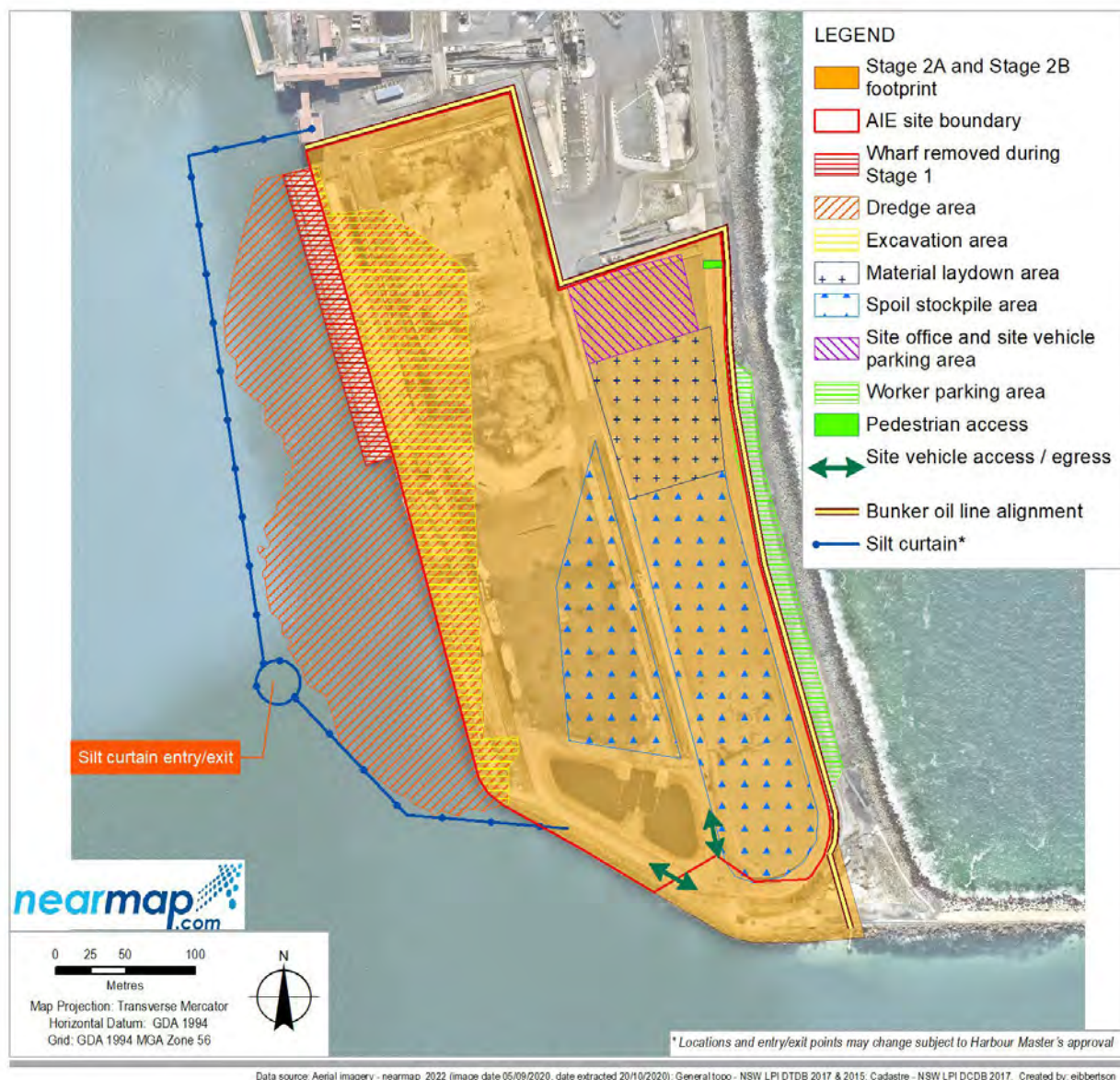


Figure 2.3 Layout of MBD Site Compound

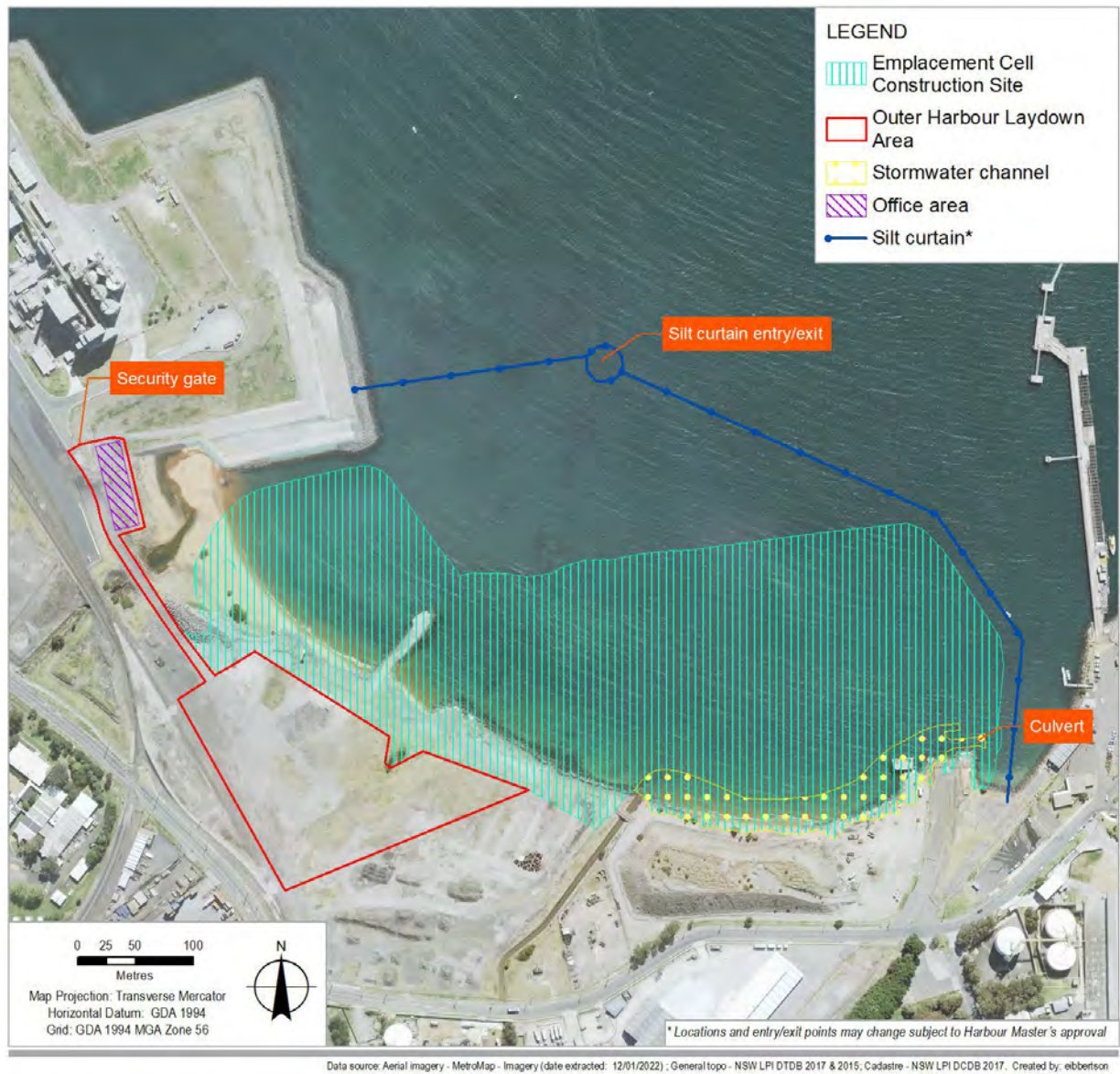


**Figure 2.4**      *Layout of Emplacement Cell Construction Site*

## 2.2.2 Program

The Stage 2A works commenced in January 2022. Stage 2B, which includes the continuation of land-based construction and marine-based works, are then anticipated to commence in March 2022 (refer to Table 2.1 for construction staging). As noted in Section 2.2, these dates are only proposed and may be subject to change.



## 2.3 Stage 2A: Construction of quay wall (MBD – Land Based)

A number of structures will be constructed within the MBD Site Compound to accommodate the FSRU and LNG carrier for the Project. Excavation and stockpiling activities from the Stage 1 Early Enabling Works will continue on-site during Stage 2A to lay the platform for ongoing construction activities at the MBD Site Compound.

The new structures that will commence construction during Stage 2A are summarised in Table 2.2. The location of the quay wall and layout of the marine berth and wharf facilities is shown in Figure 2.5.

**Table 2.2** Marine berth and wharf structures to be constructed during Stage 2A

| Component                            | Works required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Earthworks and stockpiles            | <ul style="list-style-type: none"> <li>– Completion of excavation and backfilling works from Stage 1 Early Enabling Works.</li> <li>– Excavated materials from the Early Enabling Works have been stockpiled within the Eastern and Western Stockyards of the MBD Site Compound and the Emplacement Cell Construction Site.</li> <li>– The excavated materials stockpiled at the MBD Site Compound include: <ul style="list-style-type: none"> <li>• Approximately 9,700m<sup>3</sup> of demolished concrete crushed to nominal 70mm minus.</li> <li>• Approximately 12,500m<sup>3</sup> of heavily bound base course crushed to nominal -150mm minus.</li> <li>• Approximately 33,900m<sup>3</sup> of mixed slag, general fill, and coal nominally &lt; 150mm in size.</li> <li>• Approximately 10,700m<sup>3</sup> of predominantly sand material.</li> <li>• Approximately 8,600 m<sup>3</sup> of asbestos impacted soils. *</li> </ul> </li> <li>– The excavated materials stockpiled at the Emplacement Cell Construction Site include: <ul style="list-style-type: none"> <li>• Approximately 44,000m<sup>3</sup> of sand material.</li> </ul> </li> <li>– The excavated materials will be used/reused for quay wall construction and to backfill the landside area of the quay wall or transported to the Emplacement Cell Construction Site for storage and use in construction of the Emplacement Cell.</li> </ul> |
| Quay wall                            | <ul style="list-style-type: none"> <li>– Construction of a new piled quay wall keyed into bedrock where necessary complete with sheet pile anchor wall, capping beam and tie rods to the south of the existing coal terminal.</li> <li>– Excavated and processed materials from the Stage 1 Early Enabling Works are stockpiled within the MBD Site Compound and will be used during construction of the quay wall and to backfill on landside area of the wall.</li> <li>– Installation of a marine fender system attached to the capping beam along the quay wall to protect the quay wall from berthing and mooring loads.</li> <li>– Installation of a cathodic protection system to the quay wall and associated elements, including assessment of the potential impacts the FSRU and pipeline cathodic protection will have on quay wall.</li> <li>– Backfilling and compaction on landside area of wall utilising the site stockpiled materials.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Mooring dolphins                     | <ul style="list-style-type: none"> <li>– Installation of landside mooring dolphin structures on reinforced concrete platforms supported by steel piles.</li> <li>– Mooring equipment will be installed and comprise the following: <ul style="list-style-type: none"> <li>• 20 load sensing quick release hooks.</li> <li>• Up to four land-based mooring winches on mooring dolphins may be required.</li> <li>• Up to four swivel fairleads may be required to enable each mooring line to land-based winches to be fed in a horizontal alignment.</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Marine Loading Arm (MLA) foundations | Construction of a new reinforced concrete foundation supported on steel piles, located behind the new quay wall.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Gangway tower foundation             | Construction of foundation for Gangway tower.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Fire monitor foundation              | Fire monitor foundations, subject to risk studies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

\*The volumes provided are approximate and may vary.

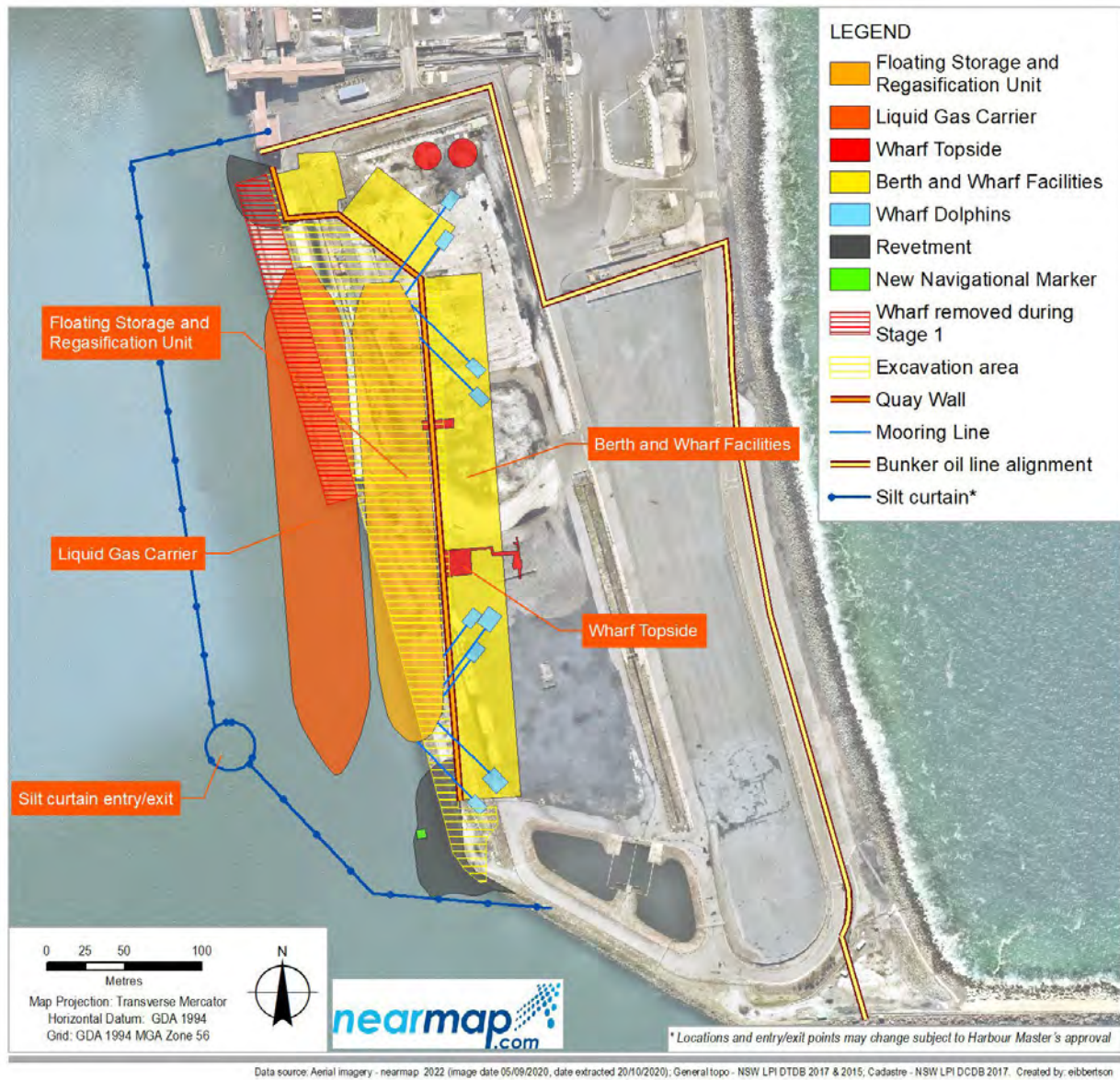


Figure 2.5 Location of quay wall and layout of MBD and ORF



## 2.4 Stage 2A: Power, communications, and water connections

Works required for power, communications, and water connections for Stage 2A are summarised in Table 2.3.

Table 2.3 Construction of utility connections for Stage 2A

| Component                | Works required                                                                                                                                                                                                                                                                               |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power and communications | <ul style="list-style-type: none"> <li>Construction and installation of a new 11kV power cable in a buried conduit and Substation.</li> <li>Energisation of the padmount substation and 415kV temporary building supply.</li> <li>Installation of communication conduit and pits.</li> </ul> |
| Potable water            | <ul style="list-style-type: none"> <li>Extension of existing potable waterline within MBD Site Compound.</li> </ul>                                                                                                                                                                          |

## 2.5 Stage 2A: Construction of ORF

The general layout of the ORF areas is shown in Figure 2.5. Works required for the three ORF areas during Stage 2A are summarised in Table 2.4.

Table 2.4 Structures to be constructed for ORF during Stage 2A

| Component                          | Works required                                                                                                                                                                                                                                                                                                                      |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Wharf Topside Area</b>          |                                                                                                                                                                                                                                                                                                                                     |
| MLAs                               | Installation of MLAs, including: <ul style="list-style-type: none"> <li>Civils and structures.</li> <li>Associated works such as piping, hydraulics, electrical, instrumentation, and auxiliary systems.</li> </ul>                                                                                                                 |
| Piping and valving                 | <ul style="list-style-type: none"> <li>All necessary piping and valving.</li> <li>Odorant injection facilities.</li> <li>Pig launcher, downstream of the MLAs to tie-in to the natural gas pipeline.</li> </ul>                                                                                                                     |
| Gangway                            | <ul style="list-style-type: none"> <li>Gangway access tower to provide connection between the wharf and FSRU.</li> </ul>                                                                                                                                                                                                            |
| Utility connections                | FSRU utilities connections for: <ul style="list-style-type: none"> <li>Communications.</li> <li>Marine Diesel Oil.</li> <li>Freshwater.</li> <li>Sewage, bilge, and grey water.</li> </ul>                                                                                                                                          |
| <b>Utility Area</b>                |                                                                                                                                                                                                                                                                                                                                     |
| Site utilities                     | Site utilities including: <ul style="list-style-type: none"> <li>Potable water and sewerage.</li> <li>Instrument air and bottled nitrogen.</li> <li>Diesel storage.</li> <li>Electrical distribution (including UPS and emergency diesel generators).</li> <li>Control and instrumentation.</li> <li>Telecommunications.</li> </ul> |
| <b>Common Areas</b>                |                                                                                                                                                                                                                                                                                                                                     |
| Firefighting systems and equipment | Firefighting equipment including: <ul style="list-style-type: none"> <li>Firewater storage.</li> <li>Pumps.</li> <li>Firewater monitors.</li> </ul>                                                                                                                                                                                 |
| Security systems and equipment     | <ul style="list-style-type: none"> <li>CCTV.</li> <li>Fencing and gates.</li> </ul>                                                                                                                                                                                                                                                 |

| Component                            | Works required                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                      | <ul style="list-style-type: none"> <li>– Security access and monitoring systems.</li> </ul>                                                                                                                                                                                                                                                                                |
| Equipment housing                    | Equipment shelters and buildings to house: <ul style="list-style-type: none"> <li>– Electrical, control, and operating equipment, critical spares, emergency response and site monitoring facilities.</li> <li>– Buildings will include appropriate building services e.g., heating, ventilation and air conditioning , potable water, amenities, sewerage etc.</li> </ul> |
| Site roadways, lighting and drainage | <ul style="list-style-type: none"> <li>– Roads and car parking areas.</li> <li>– General lighting, earthing, lightning system.</li> <li>– Drainage system to tie into the existing Port Kembla drainage system.</li> </ul>                                                                                                                                                 |
| Gas Pipeline                         | A section of gas pipeline will be installed within the MBD Compound site as part of the Stage 2A works. Final safety studies will be prepared prior to the construction of the gas pipeline and prior to commencement of operation as per Schedule 3, Condition 21 of Infrastructure Approval (SSI 9471).                                                                  |

## 2.6 Stage 2B: Excavation and dredging

An Emplacement Cell Report (ECR) has been developed by SMEC Australia Pty Ltd (SMEC) titled 'Port Kembla Gas Terminal Development – Emplacement Cell Report' in accordance with Infrastructure Approval (SSI 9471) Schedule 3, Condition 8 and 9. The ECR outlines the design and construction methodology of the Emplacement Cell.

Approximately 450,000 m<sup>3</sup> of materials will be excavated/dredged from the MBD Site Compound and placed within the boundaries of the Emplacement Cell. Further details, including detailed design drawings, can be found in the ECR (SMEC, 2022). A summary of the excavation and dredging works is provided in Section 2.6.2 and Section 2.6.3.

### 2.6.1 Silt curtains

Prior to the commencement of dredging activities, silt curtains will be installed within the Inner Harbour (MBD Site Compound) and Outer Harbour (Emplacement Cell). A fixed gate or bubble curtain gate will be installed to allow for the entrance and exit of barges whilst also controlling the dispersion of silt.

Silt curtains will be suitable for tidal and working harbour conditions.

Navigation and special markers will be installed to the satisfaction of the Harbour Master to alert marine vessels operating in the port harbours of the presence of silt curtains any other risks to navigation.

Further information regarding the use of silt curtains is provided in the Dredge and Excavation Management Plan (DEMP) for Stage 2A and Stage 2B.

### 2.6.2 Excavation and dredge staging

Construction activities undertaken during Stage 1 involved the excavation of fill materials at the MBD Site Compound. Excavation has continued through Stage 2A and will continue as part of Stage 2B. On completion of existing fill materials being excavated, dredging operations will commence at the MBD Site Compound as part of the Stage 2B works.

Dredging activities at the MBD Site Compound and Emplacement Cell will be staged to accommodate other construction works occurring at the MBD Site Compound.

Construction staging for excavation and dredging activities to be undertaken are summarised in the ECR (SMEC, 2022). Excavation and dredging at the MBD Site Compound is shown in Figure 2.6. An overview of the Emplacement Cell is shown in Figure 2.7.

### 2.6.3 Marine-based construction activities at MBD Site Compound

Marine based construction works required at the MBD Site Compound during Stage 2B are summarised in Table 2.5.

**Table 2.5**      *Marine based construction works during Stage 2B*

| Component                  | Works required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Navigational aids          | <ul style="list-style-type: none"> <li>– Construction of new navigation aid pile through the new southern revetment.</li> <li>– Installation of navigation platform, tower, and lights, including all access requirements such as ladders, platforms, and handrails.</li> <li>– Lights will be battery powered and charged via solar panels.</li> <li>– Existing navigation aid to be removed after the commission of the new navigation aid.</li> </ul>                                                                           |
| Revetment shore protection | <ul style="list-style-type: none"> <li>– Revetments will be constructed at the north and south embankments of the new MBD Site Compound wharf (refer to Figure 2.6) following completion of dredging works.</li> <li>– Works will comprise: <ul style="list-style-type: none"> <li>• Laydown of Texcel 1200R geotextile.</li> <li>• Placement of thick quarry run to a depth of 190mm.</li> <li>• Placement of underlay rock to a depth of 400mm.</li> <li>• Placement of armour rock to a depth of 900 mm.</li> </ul> </li> </ul> |
| Revetted Trench            | <ul style="list-style-type: none"> <li>– Dredging of an approximate 10x10m trench to -14.5 reduced level (RL) Port Kembla Height Datum (PKHD) for accommodating the under-keel requirements of the FSRU strainers. An approach channel may also be required.</li> <li>– The trench should have sufficient scour protection.</li> </ul>                                                                                                                                                                                             |
| Berthing box               | <ul style="list-style-type: none"> <li>– Dredging will be undertaken to facilitate berthing boxes to be constructed.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                    |

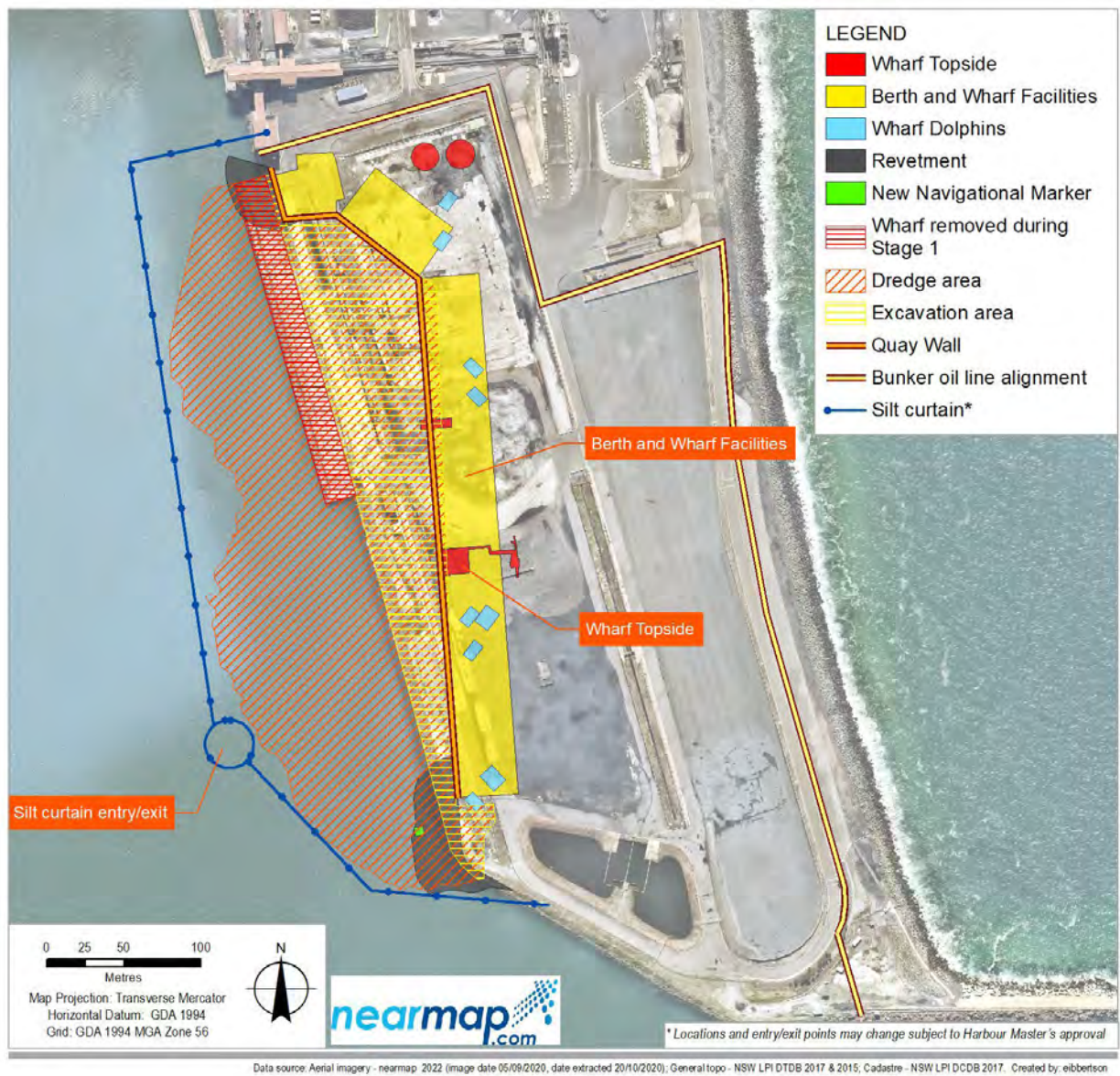


**Figure 2.6** Dredging and excavation works for MBD Site Compound (Stage 2B)



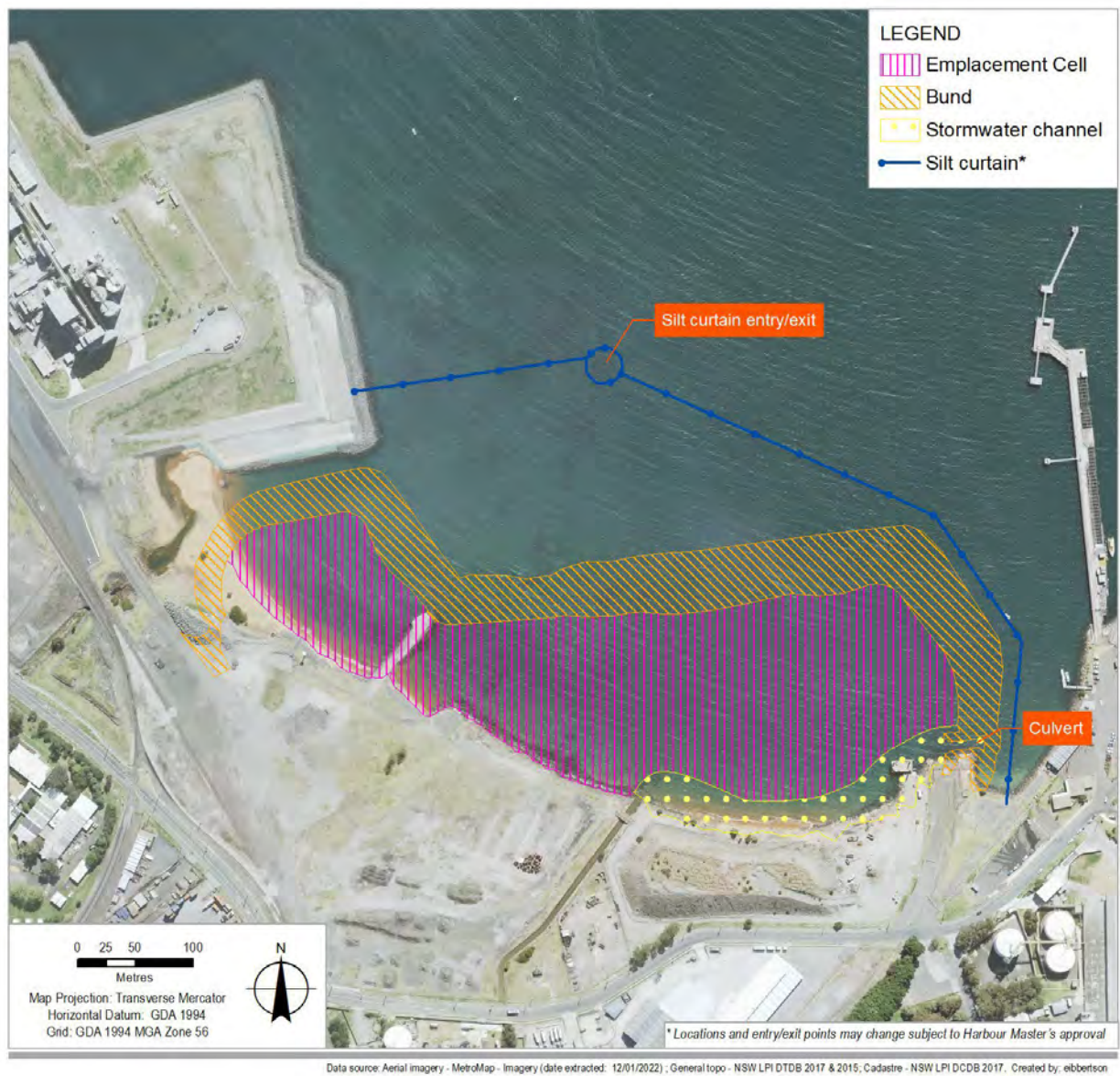


**Figure 2.7**      **Emplacement Cell overview (Stage 2B)**

## 2.7 Stage 2B: Construction of the Emplacement Cell

The Emplacement Cell will be located within the Outer Harbour, comprising of an approximate 800-metre perimeter bund. The Emplacement Cell has been designed and constructed to receive approximately 450,000 m<sup>3</sup> of dredged materials from the MBD Site Compound. Harbour Muds (HM)/Harbour Silts (HS) is to be placed below -1 m PKHD and at a maximum below LAT [below ~-0.02 m PKHD], and Potential Acid Sulfate Soils (PASS) will be placed below +0.9m PKHD within the Emplacement Cell.

The construction work components and key features of the Emplacement Cell are summarised in Table 2.6. An overview of the Emplacement Cell is shown in Figure 2.7. Further details are provided in the ECR (SMEC, 2022).

**Table 2.6**      *Emplacement Cell key features – Stage 2B*

| Component          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Emplacement Cell   | <ul style="list-style-type: none"> <li>– All contaminated soils, including HM/HS and PASS, will be placed within the Emplacement Cell generally below lower than -1.0m PKHD and in no instances above the LAT (~-0.02m PKHD).</li> <li>– The final Emplacement Cell levels will be graded towards the proposed stormwater channel.</li> <li>– Design life of 15 years.</li> </ul>                                                                                                                                                                                                                                 |
| Perimeter bund     | <ul style="list-style-type: none"> <li>– The design bund crest level was derived based on tide, storm surge, sea level rise and wave overtopping and assumed to be +3.55m PKHD. The adopted crest level also includes allowance for assessed post-construction settlement of up to 250mm.</li> <li>– Minimum crest width of 6m and 11m at passing bays.</li> <li>– Maximum permanent batter slopes of 1V:3H for seaward slopes and 1V:2H for landward/internal slopes.</li> <li>– The bund is to accommodate a 110t long reach excavator, fully loaded semi-trailer and temporary material stockpiles.</li> </ul> |
| Rock revetment     | <ul style="list-style-type: none"> <li>– Rock revetment structure will extend to the toe of the main bund to provide protection to the bund structure against coastal processes.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Stormwater channel | <ul style="list-style-type: none"> <li>– Stormwater channel to extend from the existing Darcy Road drain outlet to the eastern side of the Emplacement Cell.</li> <li>– Stormwater channel outlet is to comprise a box culvert structure on the eastern end of the Emplacement Cell, providing vehicular access onto the bund at the Jetty 3 abutment and within the NSW Ports property boundary.</li> </ul>                                                                                                                                                                                                      |

### 3. Roles and responsibilities

The Project Team is responsible for all activities associated with Stage 2A and Stage 2B, including the implementation and maintenance of the various mitigation/management measures outlined in this WQMP. Relevant roles and responsibilities of the Project Team are outlined in Table 3.1.

**Table 3.1** Roles and responsibilities of Project Team

| Project Role                                                                                              | Responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AIE Project Director                                                                                      | <ul style="list-style-type: none"> <li>– Responsible for the overall funding and direction of works associated with Stage 2A and Stage 2B.</li> <li>– Ensuring provision of adequate resources to achieve the environmental objectives for the Project including ensuring sufficient resourcing for the Environmental Team, Engineering and Construction Teams.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| AIE Construction Manager                                                                                  | <ul style="list-style-type: none"> <li>– Proactively stewards the effective implementation of Stage 2A and Stage 2B in accordance with requirements of the Infrastructure Approval (SSI 9471), this WQMP, Environmental Strategy, and all related Sub - plans.</li> <li>– Demonstrate proactive support for environmental requirements.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| AIE HSE Manager                                                                                           | <ul style="list-style-type: none"> <li>– Develop and update all Health, Safety and Environmental (HSE) Management Strategies and Sub - plans.</li> <li>– Ongoing liaison and engagement with government agencies and point of escalation for any environmental incidents.</li> <li>– Identifying environmental issues as they arise and proposing solutions.</li> <li>– Coordinate and facilitate periodic environmental inspections with the key contractors.</li> <li>– Environmental Reporting.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Emplacement Cell Auditor                                                                                  | <ul style="list-style-type: none"> <li>– Audit the construction of the Emplacement Cell and verify that works have been completed in accordance with the design intent (Emplacement Cell), The auditor role is to satisfy Condition 10 Schedule 3 of the Infrastructure Approval and any other relevant conditions therein.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager           | <ul style="list-style-type: none"> <li>– On-site Project management and control.</li> <li>– Decision-making authority relating to environmental performance of the construction program.</li> <li>– Authority over Project construction and site activities in accordance with the EMS.</li> <li>– Ensure relevant training is provided to all Project staff prior to commencing individual activities.</li> <li>– Reports to AIE Construction Manager on environmental matters.</li> <li>– Ensures appropriate Contractor resources are allocated to implement the environmental requirements.</li> <li>– Responsible for planning and scheduling of construction, and to ensure operations are conducted in accordance with statutory requirements and the EMS.</li> <li>– Monitors performance against environmental Key Performance Indicators (KPI's).</li> <li>– Ensures that all environmental objectives associated with the Project are achieved.</li> <li>– Day-to-day decision-making authority relating to environmental performance of construction activities and direct site activities and construction.</li> <li>– To provide resources to ensure environmental compliance and continuous improvement.</li> <li>– Ensure all personnel are aware of any changes to EMS, this WQMP and improved procedures.</li> <li>– Ensure this WQMP is implemented for the duration of Stage 2A and Stage 2B.</li> </ul> |
| Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman | <ul style="list-style-type: none"> <li>– Implement requirements contained in the EMS and Sub - plans, work procedures and standard drawings.</li> <li>– Maintaining open and transparent communication with other Project discipline managers and other areas of the Project.</li> <li>– Reporting of hazards and incidents and implementing any rectification measures.</li> <li>– Ensures appropriate contractor resources are allocated.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



| Project Role                                                                                                              | Responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                           | <ul style="list-style-type: none"> <li>– Orders STOP WORK for any environmental breaches and reports incidents to the Project Manager.</li> <li>– Ensure this WQMP is implemented for the duration of Stage 2A and Stage 2B.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Stage 2A Principal Contractor Environmental Representative and Stage 2B Principal Contractor Environmental Representative | <ul style="list-style-type: none"> <li>– Delivers environmentally focussed toolbox talks and provides applicable site inductions.</li> <li>– Provides environmental advice, assistance, and direction to Project Manager to ensure construction activities are conducted in accordance with regulatory legislation and this WQMP.</li> <li>– Participate and cooperate with AIE HSE Manager with regards to undertaking of joint environmental site inspections.</li> <li>– Coordinate / undertake wet-weather inspections as per EPL No. 21529 and report accordingly to the AIE HSE Manager.</li> <li>– Develop strong working relationships with the AIE team and Consultants.</li> <li>– Ensure environmental risks are appropriately identified, communicated, and effectively managed.</li> <li>– Ensure communication of relevant environmental information to Project personnel.</li> <li>– Provide specialist advice and input as required.</li> <li>– 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.</li> <li>– Orders STOP WORK for any environmental breaches and immediately reports incidents to Principal Contractor Project Manager and AIE HSE Manager.</li> </ul> |
| AIE Environmental Representative and AIE Environmental Contractor                                                         | <ul style="list-style-type: none"> <li>– Develop strong working relationships with the Principal Contractor Team and Consultants.</li> <li>– Ensure environmental risks are appropriately identified, communicated, and effectively managed.</li> <li>– Instruct and advise management team on compliance issues.</li> <li>– Provide specialist advice and input as required.</li> <li>– Co-ordinate internal audits of this WQMP.</li> <li>– Conduct audit review as required.</li> <li>– Reports on the performance of this WQMP and recommends changes or improvements to Project Manager.</li> <li>– Orders STOP WORK for any environmental breaches and immediately reports incidents to the AIE Construction Manager and AIE HSE Manager.</li> <li>– Conducts investigation and response to environmental complaints and inquiries, where required.</li> <li>– Undertake all required environmental monitoring for this phase of the Project.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Subcontractors and construction personnel                                                                                 | <ul style="list-style-type: none"> <li>– Undertake an environmental induction prior to accessing to site.</li> <li>– Comply with legislative requirements.</li> <li>– Participate in inspections and audits.</li> <li>– Follow environmental procedures.</li> <li>– Report all environmental incidents and hazards.</li> <li>– Introduce environmental topics to prestart meetings.</li> <li>– Ensure that all relevant permits and clearances are in place prior to commencing work.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## 4. Legislative requirements

The legislative requirements applicable to Stage 2A and Stage 2B are listed in Table 4.1.

**Table 4.1**      *Legislation and relevant policy applicable to this WQMP*

| Legislation and Regulation                                                                                  | Description                                                                                                                                                                                                                                                                                                                                                                            | Applicability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>State</b>                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>Protection of the Environment Operations Act 1997</i> (POEO Act)                                         | The objectives of the POEO Act are to protect and enhance the environment of NSW with regard to the need of ecologically sustainable development. The Act provides mechanisms to reduce risks to human health and the degradation of the environment. The POEO Act also outlines the Scheduled Activities that require an EPL in order to be carried out.                              | Section 120 of the Act states that 'any person who pollutes any waters is guilty of an offence'. AIE is committed to ensuring that the Stage 2A and Stage 2B works will not pollute any waters through the implementation of water quality controls and management.<br><br>Water quality monitoring/management measures will be implemented with reference to this plan throughout the Stage 2A and Stage 2B works to mitigate the impact of excavation activities and to maintain water quality and prevent pollution of Port Kembla Harbour waters.<br><br>All works will be undertaken in accordance with the issued EPL No 21529 conditions. |
| <i>Water Management Act 2000</i> (WM Act)                                                                   | The objectives of the WM Act are to provide for the sustainable and integrated management of NSW water sources for the benefit of both present and future generations.                                                                                                                                                                                                                 | The Stage 2A and Stage 2B works will involve excavation within 40 metres of the shoreline and has the potential to intercept water within an aquifer during excavation. The Stage 2A and Stage 2B works are not anticipated to require major dewatering 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 in accordance with Sections 89, 90 or 91. Accordingly, these approvals are not required for CSSI in accordance with Section 5.23 of the EP&A Act.                                                                                  |
| <b>Environmental Planning Instruments</b>                                                                   |                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| State Environmental Planning Policy (Transport and Infrastructure) 2021 (Transport and Infrastructure SEPP) | Chapter 5 of The Transport and Infrastructure SEPP provides a consistent planning regime for the development and delivery of infrastructure of land within Port Botany, Port Kembla and the Port of Newcastle for port purposes. Certain developments are identified as State Significant Development or State Significant Infrastructure under the Transport and Infrastructure SEPP. | Stage 2A and Stage 2B has been assessed and approved as part of the overall Infrastructure Approval. Additional development consent under the Transport and Infrastructure SEPP is not required.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## **5. Planning requirements**

### **5.1 Conditions of approval**

The planning requirements and the corresponding water quality management measures applicable to Stage 2A and Stage 2B are listed in Table 5.1 and Table 5.2. Management measures are detailed in Section 6 through Section 7.

The planning requirements include the conditions set out in the Infrastructure Approval (SSI 9471) dated 13 October 2021, the EPL No. 21529 conditions and the mitigation/management measures outlined in the PKGT EIS.

Table 5.1 Planning requirements

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Reference                       | Responsibility                                                                                                                                                                                                                                                                                                                                                                                                     | Evidence                     | Applicability to this WQMP |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|----------------------------|
| <b>Infrastructure Approval Requirements (SSI 9471)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                    |                              |                            |
| <p>Operation of plant and equipment</p> <p>The Proponent must ensure that all plant and equipment used on site, or to monitor the performance of the development is</p> <ol style="list-style-type: none"> <li>maintained in a proper and efficient condition; and</li> <li>operated in a proper and efficient manner.</li> </ol>                                                                                                                                                                                                                                                                                                                       | Schedule 2, Condition 13        | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul> | Section 6.2<br>Section 7.2.1 | Applicable                 |
| <p><b>Water Pollution</b></p> <p>Unless an environment protection licence authorises otherwise, the Proponent must comply with Section 120 of the POEO Act.</p> <p><i>Notes: Section 120 of the POEO Act makes it an offence to pollute any waters. The NSW 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 7° C below ambient water temperature for water discharges from the FSRU</i></p> | Schedule 3, Condition 1         | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> </ul>                                                                                                                                                                                                                                                                                                                                                | This Plan                    | Applicable                 |
| <p><b>Aquatic Habitat</b></p> <p>The Proponent must design and construct the water intake on the FSRU to minimise entrainment of aquatic organisms and plankton.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Schedule 3, Condition 2         |                                                                                                                                                                                                                                                                                                                                                                                                                    |                              | Not applicable             |
| <p><b>Discharge Limits</b></p> <p>The water discharge rate from the FSRU from the regasification process must not exceed 13,000 cubic metres per hour.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Schedule 3, Condition 2A and 2B |                                                                                                                                                                                                                                                                                                                                                                                                                    |                              | Not applicable             |

| Requirement                                                                                                                                                                                                                                                                                                                                                                  | Reference                 | Responsibility                                                                                                                                                                                                                                                                                    | Evidence                             | Applicability to this WQMP |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------------|
| The average annual water discharge rate from the FSRU from the regasification process must not exceed 8,125 cubic metres per hour.                                                                                                                                                                                                                                           |                           |                                                                                                                                                                                                                                                                                                   |                                      |                            |
| <b>Water Quality Verification and Monitoring Program</b><br>Prior to the commencement of operations, the Proponent must prepare a Water Quality Verification and Monitoring Program, in consultation with the EPA and DPI Fisheries and to the satisfaction of the Planning Secretary.                                                                                       | Schedule 3, Condition 3   |                                                                                                                                                                                                                                                                                                   |                                      | Not applicable             |
| The Proponent must implement the approved Water Quality Verification and Monitoring Program                                                                                                                                                                                                                                                                                  | Schedule 3, Condition 4   |                                                                                                                                                                                                                                                                                                   |                                      | Not applicable             |
| <b>Soil Erosion</b><br>The Proponent must minimise any soil erosion associated with the construction of the development in accordance with the relevant requirements in the Managing Urban Stormwater: Soils and Construction (Landcom, 2004) manual, or its latest version.                                                                                                 | Schedule 3, Condition 5   | <ul style="list-style-type: none"> <li>– AIE Environment Rep</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul> | Section 6.1<br>Refer to SMP and ESCP | Applicable                 |
| <b>Acid Sulfate Soils (ASS)</b><br>The Proponent must ensure that any construction activities in identified areas of ASS risk are undertaken in accordance with ASS Manual (Acid Sulfate Soil Management Advisory Committee (ASSMAC), 1998).                                                                                                                                 | Schedule 3, Condition 6   | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul>                                | Section 7.6.2<br>Refer to ASSMP      | Applicable                 |
| <b>Spoil Management Plan</b><br>Prior to the commencement of construction, the proponent must prepare a Spoil Management Plan to the satisfaction of the Planning Secretary and in consultation with the EPA, DP&E Water, NSW Ports, PANSW and, an EPA accredited contaminated site auditor. The plan must be consistent with the ECR (SMEC, 2022) and include:<br>(a) a CSP | Schedule 3, Condition 11A | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Stage 2A Principal Contractor Environmental Rep and</li> </ul>                                                                                | Refer to SMP and CSP                 | Applicable                 |

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Reference                                | Responsibility                                                                                                                                                                                                                                                                                    | Evidence      | Applicability to this WQMP         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                          | Stage 2B Principal Contractor Environmental Rep                                                                                                                                                                                                                                                   |               |                                    |
| (b) a DEMP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Schedule 3, Condition 11B                |                                                                                                                                                                                                                                                                                                   | Refer to DEMP | Applicable                         |
| (c) a WQMP that includes:<br>a description of the water quality monitoring that would be undertaken to monitor turbidity and pollutant concentrations surrounding dredging and disposal works, including: <ul style="list-style-type: none"> <li>– real-time turbidity monitoring</li> <li>– a broader program to monitor harbour-wide water quality trends and the ecological health of Port Kembla Harbour</li> <li>– 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</li> <li>– 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</li> <li>– reporting procedures for the results of the monitoring program.</li> </ul> | Schedule 3, Condition 11C                | <ul style="list-style-type: none"> <li>– AIE Environment Rep</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul> | This WQMP     | Applicable                         |
| The Proponent must implement the approved SMP for the development.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Schedule 3, Condition 12                 | <ul style="list-style-type: none"> <li>– AIE Environment Rep</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul> | Refer to SMP  | Applicable                         |
| At the completion of any dredging, excavation and disposal works, the Proponent must engage a site auditor accredited by the EPA to issue a Section A Site Audit Statement confirming the suitability of the site for its intended use.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Schedule 3, Condition 13                 | – AIE HSE Manager                                                                                                                                                                                                                                                                                 | Refer to CSP  | Applicable                         |
| <b>PKGT EIS Management Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                          |                                                                                                                                                                                                                                                                                                   |               |                                    |
| The location of the proposed terminal berth has been refined through navigation simulations to be located as close possible to the existing turning basin. This approach                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | EIS W1 – water quality and hydrodynamics |                                                                                                                                                                                                                                                                                                   |               | Applicable – addressed in PKGT EIS |

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Reference                                | Responsibility                                                                                                                                                                                                                                                                                    | Evidence                     | Applicability to this WQMP                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------------------------------------------|
| minimises hydrodynamic impacts and reduces dredging and disposal volumes as far as possible.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                          |                                                                                                                                                                                                                                                                                                   |                              |                                               |
| The footprint of the Outer Harbour placement area has been minimised by raising the proposed fill height to include emergent reclamation. This approach minimises the quantity of material to be bottom dumped and thereby reduces the potential for generation of turbid plumes and mobilisation of sediments.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | EIS W4 – water quality and hydrodynamics |                                                                                                                                                                                                                                                                                                   | Refer to ECR (SMEC, 2022)    | Applicable – addressed during detailed design |
| Preparation of an EMS 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | EIS W5 – water quality                   | – AIE HSE Manager                                                                                                                                                                                                                                                                                 | Refer to EMS and DEMP        | Applicable                                    |
| 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 EPLs for similar activities within Port Kembla such as the Berth 103 Stage 2 Dredging & Spoil Disposal EPL 20563).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | EIS W6 – water quality                   | <ul style="list-style-type: none"> <li>– AIE Environment Rep</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul> | Section 7                    | Applicable                                    |
| <p>Continuous turbidity monitoring would be undertaken using a series of monitoring buoys to provide impact and background data (turbidity (Nephelometric Turbidity Units (NTU)), pH, temperature)</p> <p>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 to the Environmental Representative and agreed procedures implemented.</p> <p>Such procedures 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>Collection of water samples and laboratory analysis for an agreed set of contaminants would be undertaken on a weekly basis during dredging operations</p> | EIS W6 – water quality                   | <ul style="list-style-type: none"> <li>– AIE Environment Rep</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul> | Section 7.6<br>Refer to DEMP | Applicable                                    |



| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Reference               | Responsibility                                                                                                                                                                                                                                                                                    | Evidence                           | Applicability to this WQMP |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|----------------------------|
| <p>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.</p> <p>Silt curtains are available in a range of designs and would be provided by the successful Contractor. It is envisaged that the silt curtain would comprise a geocomposite material consisting of a non-woven geotextile sewn to a woven geotextile, which would provide the required filtering capacity and rigidity respectively. Vessel access would be via gated or overlapped curtains or through installation of a bubble curtain. The top of the curtain would be supported by a floating boom, whilst the lower portion of the curtain would be weighted with appropriate ballasting (e.g. bars or chains) to ensure that the full length of the curtain is maintained at all times. The curtain would be anchored or fixed to existing structures as necessary.</p> | EIS W7 – water quality  | <ul style="list-style-type: none"> <li>– AIE Environment Rep</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul> | Refer to DEMP                      | Applicable                 |
| <p>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</p>                                                                                                                                                                                                                                                                                                                                                                                                                      | EIS W8 – water quality  | <ul style="list-style-type: none"> <li>– AIE Environment Rep</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul> | Refer to DEMP                      | Applicable                 |
| <p>A perimeter bund would be constructed within the Outer Harbour placement area to ensure long term stability of dredged materials and to minimise sediment migration during placement.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | EIS W9 – water quality  | <ul style="list-style-type: none"> <li>– AIE Environment Rep</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul> | Refer to ECR (SMEC, 2022) and DEMP | Applicable                 |
| <p>A site specific ESCP will be prepared as part of the EMS 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</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | EIS W10 – water quality | <ul style="list-style-type: none"> <li>– AIE Environment Rep</li> <li>– Stage 2A Principal Contractor Project</li> </ul>                                                                                                                                                                          | Section 7.4<br>Refer to ESCP       | Applicable                 |

| Requirement                                                                                                                                                                                                                                                                                                                                                                       | Reference                                                             | Responsibility                                                                                                                                                                                                                                                                                                                                 | Evidence                                     | Applicability to this WQMP |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------|
| 'Managing Urban Stormwater: Soil and Construction Volume 1' (Landcom 2004) ('the Blue Book').                                                                                                                                                                                                                                                                                     |                                                                       | Manager and Stage 2B Principal Contractor Project Manager<br>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep                                                                                                                                                                             |                                              |                            |
| 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 emergency services and relevant authorities (including Transport for NSW (TfNSW) and EPA officers) | EIS W11 – water quality, chemical and fuel impacts on flora and fauna | – AIE HSE Manager<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman<br>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager<br>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep | Refer to Emergency Spill Plan                | Applicable                 |
| 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.                                                                                                                                                                                                                                   | EIS W12– water quality, chemical and fuel impacts on flora and fauna  | – AIE HSE Manager<br>– AIE Environment Rep<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman<br>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager<br>– Stage 2A Principal Contractor                                              | Section 6.2<br>Refer to Emergency Spill Plan | Applicable                 |

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Reference                                                             | Responsibility                                                                                                                                                                                                                            | Evidence                                     | Applicability to this WQMP |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                       | Environmental Rep and Stage 2B Principal Contractor<br>Environmental Rep<br>– Subcontractors and construction personnel                                                                                                                   |                                              |                            |
| 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.                                                                                                                                                                                                                                                                           | EIS W13 – water quality, chemical and fuel impacts on flora and fauna | – AIE HSE Manager<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman<br>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep | Section 6.2                                  | Applicable                 |
| Prior to re-releasing the seawater back into the surrounding area, the operators of the vessel will aim to match the profile of the discharged water, as close as possible, to the pre-discharge profile and well below agreed thresholds for residual concentrations of sodium hypochlorite. Changing the profile of the discharge water will be done by modifying the frequency of production and the concentration of sodium hypochlorite produced on-board from the intake of sea water.                   | EIS W14 – water quality                                               |                                                                                                                                                                                                                                           |                                              | Not applicable             |
| A stormwater management system would be designed and constructed to control discharges from the import terminal site, including traps and filters where required. Design would be undertaken in accordance with emergency spill plans and the objectives and development criteria outlined in the Port Kembla Development Code (NSW Ports, 2016).                                                                                                                                                              | EIS W15 – water quality                                               |                                                                                                                                                                                                                                           |                                              | Not applicable             |
| 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 emergency services and relevant authorities (including TfNSW and EPA officers). 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. | EIS W16 – water quality                                               | – AIE HSE Manager<br>– AIE Environment Rep<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman<br>– Stage 2A Principal Contractor Project Manager and Stage 2B                 | Section 6.2<br>Refer to Emergency Spill Plan | Applicable                 |

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Reference                                              | Responsibility                                                                                                                                                                                                                                                                                | Evidence      | Applicability to this WQMP |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        | Principal Contractor Project Manager<br>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep<br>– Subcontractors and construction personnel                                                                                                  |               |                            |
| Works to remove the current quay wall and piles will commence after a visual inspection for protected mobile fauna (e.g., Syngnathids). If present, these will be relocated to adjacent habitats, outside the zone of influence by the proposed works, where feasible.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | EIS ME1- Biofouling and benthic community disturbance  |                                                                                                                                                                                                                                                                                               |               | Not applicable             |
| <p>The following controls should be implemented prior to dredge activities:</p> <ul style="list-style-type: none"> <li>– Physical controls such as installation of silt curtains prior to commencement of construction works would be adequate in minimising the spread of any sediments within the water column at the dredging and disposal locations.</li> <li>– Dredging techniques that minimise sediment resuspension during excavation and disposal (such as using mechanical methods over hydraulic methods) should be implemented throughout the Project. Barge loads will also be controlled such that overflow of barge loads is avoided.</li> <li>– Screening technologies will be implemented to ensure that any contaminated sediments are disposed of responsibly. Contaminated dredge material will be placed such that it will be capped by uncontaminated material in accordance with a dredge management plan.</li> <li>– Implementation of a water quality monitoring program to ensure construction works do not exceed the Project's agreed marine water quality criteria.</li> <li>– Daily visual observations of any potential toxic dinoflagellate blooms within the Inner Harbour.</li> </ul> | EIS ME 2- Biofouling and benthic community disturbance | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul> | Refer to DEMP | Applicable                 |

## 5.2 Environment Protection Licence

AIE have been issued an EPL under the POEO Act as of 2 June 2021. The conditions of EPL No. 21529 related to water quality and monitoring are provided in Table 5.2.

Table 5.2 EPL No. 21529 conditions

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Reference             | Evidence                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------|
| <b>Location of monitoring/discharge points and areas</b><br>The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point (refer to Figure 2.2).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Condition P1.2        | Section 7.1                                 |
| Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the POEO Act.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Condition L1.1        | Section 4<br>Refer to ESCP                  |
| <b>Concentration limits</b><br>For each monitoring/discharge point or utilisation area specified in the table below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table (refer to Table 7.2, Table 7.3 and Table 7.4).<br>Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.<br>To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table.                                                                                                                                                                                                                                                                                                         | Condition L3.1-3.5    | Section 7.6                                 |
| <b>Processes and management</b><br>Silt curtains must be installed and operated at the premises to minimise the pollution of waters beyond the boundary of the premises during any marine based works. Marine based works includes but is not limited to: pile removal; or any dredging; or construction of the Outer Harbour Emplacement Cell.<br>Note: Any reclamation of material to the Emplacement Cell is subject to a licence variation in accordance with Licence Condition A1.4.<br>Care must be taken with the installation and maintenance of silt curtains to ensure that there are no gaps at the ends, or in the fabric, or in the floating boom.<br>There must be no spillages of any materials from above the water surface into waters outside of the silt curtain/s.<br>The silt curtain/s may only be removed following the prior written approval of the EPA.                                                                 | Condition O4.6-O4.9   | Section 2.6.1<br>Section 6<br>Refer to DEMP |
| Vessels used for the transport of dredge spoil from the dredge site to the Outer Harbour stockpile area must not leak or release dredge spoil into waters en-route.<br>All dredgers and associated vessels must have their ballast & bilge water pumped out prior to arriving in Port Kembla Harbour.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Condition O4.10-O4.11 | Refer to DEMP                               |
| The licensee must continue to treat water from the southern ponds in Berth 101 prior to discharge from Licensed Discharge Point 20. The treatment method must be provided in writing to the EPA and cannot be changed without EPA approval                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Condition O4.12       | Section 7.4                                 |
| <b>Monitoring and Recording Conditions</b><br>The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.<br>All records required to be kept by this licence must be: <ol style="list-style-type: none"> <li>in a legible form, or in a form that can readily be reduced to a legible form</li> <li>kept for at least 4 years after the monitoring or event to which they relate took place; and</li> <li>produced in a legible form to any authorised officer of the EPA who asks to see them.</li> </ol> The following records must be kept in respect of any samples required to be collected for the purposes of this licence: <ol style="list-style-type: none"> <li>the date(s) on which the sample was taken</li> <li>the time(s) at which the sample was collected</li> <li>the point at which the sample was taken; and</li> </ol> | Condition M1.1-1.3    | Refer to SMP                                |

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Reference                | Evidence      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------|
| d. the name of the person who collected the sample.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |               |
| <b>Requirement to monitor concentration of pollutants discharged</b><br>For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns (refer to Table 7.2, Table 7.3 and Table 7.4).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Condition M2.1, 2.3, 2.4 | Section 7     |
| Water quality parameter probes on the Automated water quality buoys must be calibrated in accordance with manufacturer instructions, or relevant Australian Standards, whichever is more frequent                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Condition M2.5           | Section 7.2   |
| In the event that monitoring detects an exceedance of the total suspended solids/turbidity trigger level at monitoring point 24 of this licence, the licensee must: <ol style="list-style-type: none"> <li>Enact their Trigger Action Response Plan (TARP); and</li> <li>Continue monitoring until the results are within the limits; and</li> <li>Notify the EPA in accordance with the notification provisions of this licence, including condition R4.1.</li> </ol> Note: Enactment of the TARP requires ongoing checking and monitoring of water quality in addition to implementation of the following in sequential order: <ul style="list-style-type: none"> <li>Locate the source of the pollution.</li> <li>Check and correct environmental controls as required.</li> <li>Modification of current activities/practices attributing to elevated suspended solids.</li> <li>Where required, cease associated works to prevent more than a localised water quality impact, and to prevent an exceedance at licensed water quality monitoring locations.</li> </ul> | Condition M2.6           | Section 7.6.4 |
| Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Condition M3.2           | Section 7.6.3 |
| <b>Port Kembla Harbour Water Quality and Ecological Monitoring Program</b><br>The licensee must implement the Port Kembla Harbour Ecological Health Monitoring Program and associated reporting as per the GHD / AIE proposal dated September 2021, Rev G (EPA reference DOC21/864104-1).<br>Note: the initial monitoring frequency is specified in the above proposal, from a baseline event to the first year of operation. Following the first operational report, the ongoing monitoring frequency will then re-determined by the EPA in consultation with the licensee.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Condition M5.1           | Section 7.3   |
| <b>Recording of pollution complaints</b><br>The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.<br>The record must include details of the following: <ol style="list-style-type: none"> <li>the date and time of the complaint</li> <li>the method by which the complaint was made</li> <li>any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect</li> <li>the nature of the complaint</li> <li>the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and</li> <li>if no action was taken by the licensee, the reasons why no action was taken.</li> </ol> The record of a complaint must be kept for at least 4 years after the complaint was made.<br>The record must be produced to any authorised officer of the EPA who asks to see them.                  | Condition M7.1-7.4       | Section 7     |

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Reference            | Evidence                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------------------------|
| <p><b>Telephone complaints line</b></p> <p>The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.</p> <p>The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Condition M8.1-8.3   | Section 7                      |
| <p><b>Other monitoring and recording conditions</b></p> <p>The licensee must carry out, as a minimum, daily inspections of all water pollution control measures required by this licence. A record of each inspection must be made and produced to an EPA authorised officer if requested. The record must include:</p> <ol style="list-style-type: none"> <li>Date and time of inspection</li> <li>Details of the location of dredging operations</li> <li>Condition of silt curtains and other water pollution controls.</li> </ol> <p>Note: No movement of dredge spoil is permitted when a silt curtain required by this licence has not been maintained or is not achieving the requirements of this licence.</p>                                                                                                                                                                                                                                                                                                                                                               | Condition M10.1      | Section 7.6.1<br>Section 9.1.3 |
| <p><b>Notification of environmental harm</b></p> <p>Notifications must be made by telephoning the Environment Line service on 131 555.</p> <p>Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.</p> <p>The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Condition R2.1-2-2.2 | Section 8<br>Section 10.1      |
| <p><b>Other reporting conditions</b></p> <p><b>Water TARP Exceedance reporting requirements</b></p> <p>If there is an exceedance of the trigger level for Point 24 as described in Conditions L3.5 and L3.6, then the licensee must submit a Water Quality Impact Report to the EPA by 4pm the following working day.</p> <p>The Water Quality Impact Report described in Condition R4.1 must:</p> <ol style="list-style-type: none"> <li>include all water monitoring results (including background results from monitoring buoys Point 1, Point 16, Point 17, Point 18 and Point 19) obtained between 2 hours before and after the water quality trigger level in Condition L3.5 was exceeded; and</li> <li>provide an interpretation of those results; and</li> <li>detail the site management response.</li> </ol> <p>The Water Quality Impact Report described in Condition R4.2 must be submitted electronically to the Unit Head, EPA, Regulation Operations Metro South at RegOps.MetroRegulation@epa.nsw.gov.au.</p>                                                        | Condition R4.2       | Section 7.6.4                  |
| <p><b>Pollution Incident Response Management Plan (PIRMP)</b></p> <p>The Licensee must prepare a PIRMP that complies with Part 5.7A of the POEO Act (1997) in relation to the activity to which the licence relates. The PIRMP must be in the form required by the 'Regulations' and include the following:</p> <ul style="list-style-type: none"> <li>the procedures to be followed by the holder of the relevant environment protection licence, or the occupier of the relevant premises, in notifying a pollution incident to: <ul style="list-style-type: none"> <li>the owners or occupiers of premises in the vicinity of the premises to which the environment protection licence or the direction under section 153B relates, and</li> <li>the local authority for the area in which the premises to which the environment protection licence or the direction under section 153B relates are located and any area affected, or potentially affected, by the pollution, and</li> </ul> </li> <li>any persons or authorities required to be notified by Part 5.7,</li> </ul> | Condition E2.1       | Section 10.2<br>Section 11.3   |



| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Reference | Evidence |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------|
| <ul style="list-style-type: none"> <li>– a detailed description of the action to be taken, immediately after a pollution incident, by the holder of the relevant environment protection licence, or the occupier of the relevant premises, to reduce or control any pollution,</li> <li>– the procedures to be followed for co-ordinating, with the authorities or persons that have been notified, any action taken in combating the pollution caused by the incident and, in particular, the persons through whom all communications are to be made,</li> <li>– any other matter required by the regulations, including 'Keeping of Plan', 'Testing of Plan', 'Making Plan Readily Available' and 'Implementation of Plan'</li> </ul> |           |          |

## 6. Control measures

### 6.1 Excavation works

The Principal Contractors will manage the impacts of the Stage 2A and Stage 2B works on the marine environment of Port Kembla's Harbour in order to maintain compliance with monitoring limits and water quality monitoring obligations stipulated in the PKGT EIS, EPL No. 21529, Infrastructure Approval (SSI 9471), and Section 120 of the POEO Act.

Excavated works for the Stage 1 Early Enabling Works were completed in December 2021. Excavated materials will be temporarily stockpiled at the southern end of the East Stockyard of the MBD Site Compound and within the Emplacement Cell Construction Site. Completion of excavation works from the Stage 1 Early Enabling Works will be undertaken during Stage 2A (refer to Table 2.1).

The Principal Contractors will implement a number of control procedures during Stage 2A and Stage 2B, in line with the Project's Stage 2A and Stage 2B ESCP. These will include:

- Installing surface runoff control measures, such as diversion drains, silt fences, sumps and pumping systems to prevent runoff entering or leaving excavation areas, and to prevent runoff/suspended solids entering the Inner Harbour.
- Placing stockpiles away from drainage lines, the water's edge, gutters or stormwater pits and inlets. Covering stockpiles likely to generate dust or odours and ensuring stockpiles of contaminated soil are stored in a secure area.

### 6.2 Equipment

The Principal Contractors are responsible for supplying the necessary equipment for the Stage 2A and Stage 2B works.

An emergency spill kit will be kept on site at all times at both the MBD Site Compound and Emplacement Cell Construction Site. All staff will be made aware of the location of the spill kit and trained in its use. In the event of a spill, staff will follow the procedures outlined in the Stage 2A and Stage 2B Emergency Spill Plan.

Machinery and plant equipment will be checked daily for visible leaks and excessive exhaust fumes by the Principal Contractor Environmental Representatives to ensure no oil, fuel or other liquids are leaking from machinery that could potentially pollute Port Kembla Harbour. All plant and equipment used during the Stage 2A and Stage 2B works, including monitoring equipment, will be maintained in efficient condition, and operated by suitably qualified and trained construction personnel.

## 7. Water quality management

The objectives and performance criteria for water quality monitoring during Stage 2A and Stage 2B works are the following:

- To continue monitoring at relevant water quality monitoring locations based on the current EPL No. 21529 as described in Table 7.2;
- To ensure construction runoff does not cause pollution incident and discharge requirements of EPL No. 21529 are satisfied prior to any passive discharge into the harbour; and
- To implement ecological health monitoring as per the EHMP attached in Appendix C.

The monitoring parameters for Stage 2A and Stage 2B works are presented below in Table 7.1, with performance criteria based on 95% protection levels, or where baseline data collected to date indicates elevated background concentrations a more appropriate protection level has been adopted as indicated. The developed performance criteria is based on the Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Canberra ACT, Australia: and New Zealand Governments and Australian state and territory governments (ANZG, 2018b) primarily, or Australian and New Zealand Environment and Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) (ANZECC / ARMCANZ, 2000) if unsuitable thresholds nominated in ANZG 2018b.

Results of grab samples will be compared to the performance criteria using a rolling average of results. This will enable review of marine works and identification of any improvement opportunities to avoid exceedance of the performance criteria nominated below.

Given results of grab samples are not “real time” (ie laboratory analysis and associated turn around times), immediate reactive response or management of water quality issues will be through the implementation of the TARP outlined in Table 7.8.

**Table 7.1**      *Monitoring parameters*

| In-situ parameter                             | Unit        | Performance Criteria        | Note                              |
|-----------------------------------------------|-------------|-----------------------------|-----------------------------------|
| pH                                            | -           | 6.5-8.5                     | ANZECC/ ARMCANZ 2000              |
| Turbidity                                     | NTU         | TBD                         | Using NTU-TSS correlation         |
| Dissolved Oxygen (DO)                         | %           | 70 - 110                    | Baseline data                     |
| Electrical Conductivity (EC)                  | uS/cm       | -                           | Not listed                        |
| Temperature                                   | °C          | -                           | Not listed                        |
| <b>Dissolved Metals</b>                       | <b>Unit</b> | <b>Performance Criteria</b> | <b>Note</b>                       |
| Aluminium (dissolved)                         | ug/L        | 200                         | ANZECC/ ARMCANZ 2000              |
| Arsenic (dissolved)                           | ug/L        | 50                          | ANZECC/ ARMCANZ 2000              |
| Cadmium (dissolved)                           | ug/L        | 5.5                         | ANZG, 2018b, 95% protection level |
| Chromium (dissolved)                          | ug/L        | 4.4                         | ANZG, 2018b, 95% protection level |
| Cobalt (dissolved)                            | ug/L        | 1                           | ANZG, 2018b, 95% protection level |
| Copper (dissolved)                            | ug/L        | 8                           | ANZG, 2018b, 80% protection level |
| Lead (dissolved)                              | ug/L        | 12                          | ANZG, 2018b, 80% protection level |
| Mercury (dissolved)                           | ug/L        | 0.4                         | ANZG, 2018b, 95% protection level |
| Nickel (dissolved)                            | ug/L        | 70                          | ANZG, 2018b, 95% protection level |
| Zinc (dissolved)                              | ug/L        | 21                          | ANZG, 2018b, 80% protection level |
| <b>Polycyclic aromatic hydrocarbons (PAH)</b> | <b>Unit</b> | <b>Performance Criteria</b> | <b>Note</b>                       |
| Naphthalene                                   | ug/L        | 50                          | ANZG, 2018b, 99% protection level |
| <b>Other Toxicants</b>                        | <b>Unit</b> | <b>Performance Criteria</b> | <b>Note</b>                       |
| Tributyltin (as Sn)                           | ug/L        | 0.006                       | ANZG, 2018b, 95% protection level |
| Total Suspended Solids (TSS)                  | mg/L        | 50                          | as per EPL                        |
| Oil & Grease                                  | -           | visible                     | as per EPL                        |

## 7.1 Monitoring locations

Water quality monitoring (WQM) within the Port Kembla Harbour is to be undertaken at a total of six locations prior to, and during the Stage 2A and Stage 2B works, in accordance with the water quality monitoring requirements of EPL No. 21529. One additional monitoring points has also been included for wet weather discharge monitoring.

Each WQM point will be securely anchored/moored in its location. The location of each WQM point is outlined in Table 7.2 and shown in Figure 2.2.

Three locations have been selected to monitor at the zone of impact (WQM 2) and at nearby management zones upstream and downstream of the MBD Site Compound (WQM 1 and WQM 3) for the Stage 2A and Stage 2B works. Two locations have been selected to monitor background water quality (WQM4 and WQM5).

The sampling points will be at a depth of 1.6 metres.

**Table 7.2**      *Monitoring point descriptions*

| EPA ID No | WQM ID | Location description                                                                              | Type of monitoring                                 |
|-----------|--------|---------------------------------------------------------------------------------------------------|----------------------------------------------------|
| 1         | WQM 1  | North of Berth 101                                                                                | Primary/Impact Works Area Receiver - Water Quality |
| 16        | WQM 2  | North of the Emplacement Cell, Outer Harbour. No more than 20m from Emplacement Cell silt curtain | Primary/Impact Works Area Receiver - Water Quality |
| 17        | WQM 3  | South West of Berth 101                                                                           | Primary/Impact Works Area Receiver - Water Quality |
| 18        | WQM 4  | Near the Pacific Ocean entrance to Outer Harbour                                                  | Background Water Quality                           |
| 19        | WQM 5  | Near entrance to Allans Creek, near Bluescope Steel                                               | Background Water Quality                           |
| 20        |        | Berth 101 – Southern Pond                                                                         | Wet weather discharge quality monitoring           |
| 24        |        | Mobile monitoring point within 5 metres of the outermost silt curtain near Berth 101              | Ambient Monitoring                                 |

## 7.2 Automated WQM buoys

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

AMBs were deployed during the Stage 1 Early Enabling Works and baseline data was provided in accordance with the EPL. The AMBs will remain in place throughout Stage 2A and Stage 2B to meet ongoing EPL No. 21529 requirements. The AMBs will monitor:

- Temperature (Celsius).
- EC (salinity for harbour wide monitoring purposes).
- pH.
- Turbidity.
- DO (for harbour wide monitoring purposes).

Daily visual observations will also be undertaken for the duration of the Stage 2A and Stage 2B works to monitor for potential release of pollutants such as oil or grease. Indicative images of the AMBs are presented in Figure 7.1.

### 7.2.1 Calibration and maintenance of monitoring equipment

AMBs will be calibrated and maintained in accordance with manufacturer's specification or relevant Australian Standard, whichever is more frequent. The AIE Environmental Representative will inspect each AMB 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 (refer to Section 7.2).

Additional maintenance measures for the AMB to prevent pollution and deter formation of biofouling organisms include:

- Anti-fouling wipes: wipes to clean top surface of sensor to prevent biofouling organisms from colonising on probe edge and migrating towards the sensor.
- Sensor port plugs: plastic or copper alloy port plugs to prevent biofouling forming. Copper ports will deter organism settlement.
- Copper tape: anti-fouling protection for probe housing (if housing is plastic or metal).
- Protective plastic sleeves: biofouling will collect on sleeves covering probes and body of equipment and can be then easily removed.
- Sensor guards: metal (copper alloy) sensor guard fitted on the end of the sonde to deter bio-fouling formation.
- Copper alloy screens: placed over conductivity and temperature probes to deter bio-fouling formation. Screens allow water flow to ensure accurate measurements.
- C-spray solution: an environmentally safe, nano-polymer spray to keep surfaces slick and deter bio-fouling settlement.

- Plastic wrap: plastic wrap such as glad wrap or duct tape wrapped around the body of sonde have some anti-fouling properties when used in conjunction with C-spray solution.

In addition to calibration and maintenance of AMBs, hand held water quality monitoring equipment will also be calibrated and maintained in accordance with its manufacturer's specifications.

## 7.2.2 Real-time monitoring of AMBs

Data will be logged at 15-minute intervals, based on a moving 15-minute median, and transmitted to an onshore recording station where it will be processed to allow automated comparison of median turbidity/TSS levels to a series of green, amber, and red trigger levels (refer to Section 7.6.4). When exceeded, an alarm will be triggered, and an automated email and SMS alerts will be sent to the Principal Contractor Environmental Representative and AIE HSE Manager with appropriate procedures to be implemented.

The individual values of WQM 1, WQM 2 and/or WQM 3 will be compared against background levels at WQM 4. Real time data will be provided to the Principal Contractor Project Managers which will be incorporated into environmental reports and site inspection records (refer to Section 9.1 ).

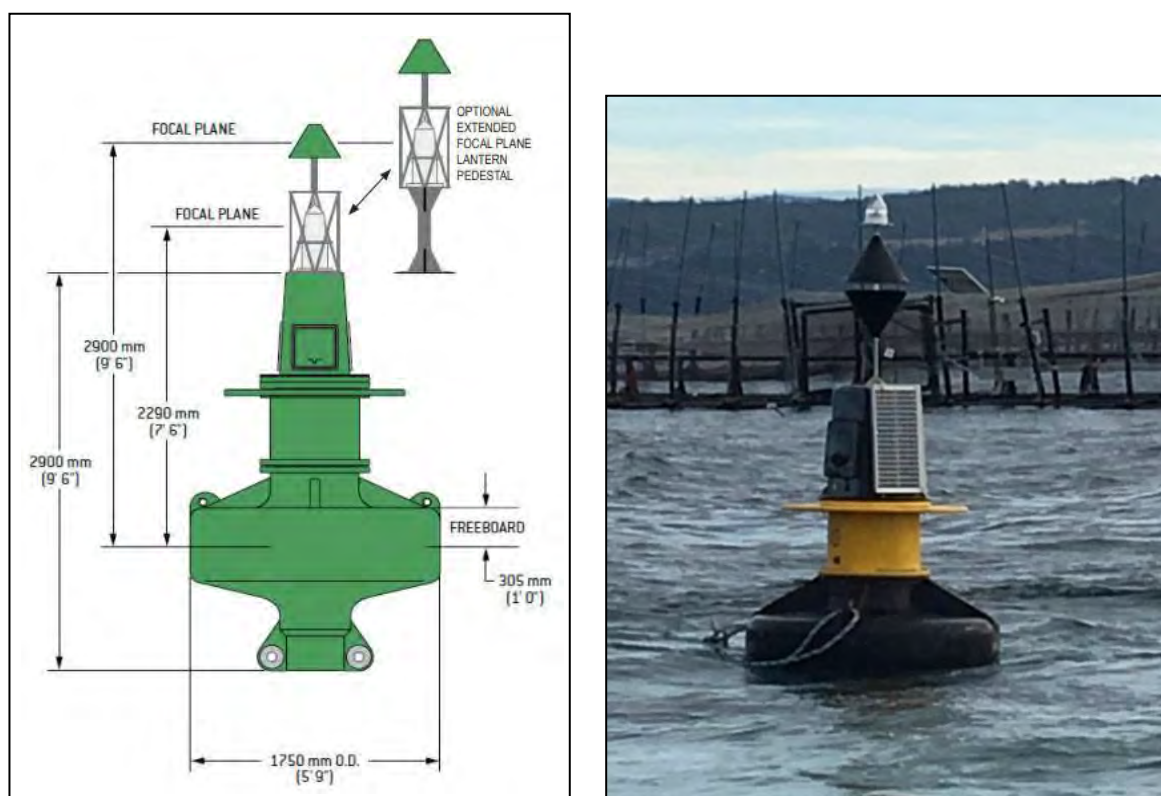


Figure 7.1 Automated Water Quality Monitoring Buoy dimensions

## 7.3 Harbour-wide Ecological Health Monitoring Program

AIE has developed an Ecological Health Monitoring Program (EHMP). Implementation of EHMP is imminent pending approvals; it is to be followed in the next stages of the Project including Stage 2A and Stage 2B. The purpose of the EHMP is to assess and monitor impacts of the PKGT construction and operational activities on the ecological health of Port Kembla Harbour. The monitoring program has been designed in accordance with the NSW EPA requirements as specified in EPL No. 21529, and Condition 11 and 3 of Schedule 3 of the Infrastructure Approval SSI 9471. The EHMP will complement this WQMP, which has been approved by DP&E and the EPA. A copy of the EHMP is provided in Appendix C.

Port Kembla Harbour has received industrial discharges from the Port Kembla Industrial precinct for over 100 years. At the same time, significant improvements in water quality and ecological health have been observed over the past several decades with reductions in pollutant loads and improvements in discharge water quality.

The construction and operation of the PKGT could potentially introduce:

- A short-term acute impact associated with the dredging and construction phase of the Project.

- A longer term and ongoing chronic impact associated with the discharge of cold water and biofouling compounds.

The overall aim of the EHMP is to undertake an ongoing water quality and health assessment of Port Kembla Harbour to monitor any change in water quality and ecology associated with the discharges from the PKGT.

The aims of the EHMP are to:

- Provide a quantitative assessment of the species diversity and abundance of aquatic hard-substrate sessile organisms in Port Kembla Harbour.
- Implement an ecological monitoring program to complement the licensee's existing WQMP.
- Assess the presence (if any) and extent of change to the diversity and abundance of aquatic hard-substrate sessile organisms and water quality in Port Kembla Harbour during the construction and operation of the PKGT.
- Build upon the existing scientific literature concerning the water quality and broader ecological health of Port Kembla Harbour.

WQM 4 and WQM 5 have been included in the EHMP for background water quality for the purpose of monitoring harbour-wide water quality trends and the ecological health of Port Kembla Harbour. The information obtained by WQM 4 and WQM 5 will be used to track water quality indicators in the Inner Harbour, remote of the Project. The trends will be reported monthly for information purposes only.

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

## 7.4 Construction site run-off

An ESCP has been developed for the MBD Site Compound to ensure that any stormwater runoff flows to an appropriately sized sediment basin. In addition, a water treatment system has been in place to ensure compliance with the EPL No. 21529 Condition O4.12 and EPL discharge limits.

A treatment plant will be in place during Stage 2A and Stage 2B to satisfy EPL No. 21529 Condition O4.12. The EPA has been provided details and description of the treatment system (treatment via filtration media).

The quality of water held in the sediment basin must be ensured to meet EPL No. 21529 discharge limit requirements, via water treatment plant, prior to release from the site. Water quality will be ensured via checking the treatment plant in place is operating correctly and providing its expected performance prior to discharge. Daily monitoring and sampling are to be undertaken during any times of discharge.

Whenever necessary, maintenance of the treatment system in place will be undertaken to ensure that the system is providing the required discharge quality.

Daily grab sampling during discharge of water from Point 20, will be undertaken in accordance with the sampling methodology described in Section 7.6.3 which includes testing for TSS and Oil & Grease. Visual inspection for Oil & Grease is also being undertaken prior to discharge event and during sampling.

Erosion control devices will be inspected within 24 hours after major rainfall events (>10mm in 24 hours). Where controls are deemed inadequate, additional controls will be installed e.g., sandbags additional sediment fences, channels. Sediment removed from devices will be assessed for suitability and combined with stockpiled Project spoil for reuse or disposal.

## 7.5 Monitoring data requirements

Water quality monitoring will be undertaken as per the monitoring requirements set out in EPL No. 21529. Details regarding sampling method, units of measure and sampling frequency of applicable pollutants of concern (POC) for WQMs are provided in Table 7.3.



**Table 7.3** Water quality monitoring requirements for WQMs 1-5

| Pollutant             | Unit of Measure | Frequency           | Sampling method  |
|-----------------------|-----------------|---------------------|------------------|
| Aluminium (dissolved) | µg/L            | Weekly              | Grab Sample      |
| Arsenic (dissolved)   | µg/L            | Weekly              | Grab Sample      |
| Cadmium (dissolved)   | µg/L            | Weekly              | Grab Sample      |
| Chromium (dissolved)  | µg/L            | Weekly              | Grab Sample      |
| Cobalt (dissolved)    | µg/L            | Weekly              | Grab Sample      |
| Copper (dissolved)    | µg/L            | Weekly              | Grab Sample      |
| DO                    | %               | Special Frequency 1 | Special Method 1 |
| EC                    | µS/cm           | Special Frequency 1 | Special Method 1 |
| Lead (dissolved)      | µg/L            | Weekly              | Grab Sample      |
| Mercury (dissolved)   | µg/L            | Weekly              | Grab Sample      |
| Nickel (dissolved)    | µg/L            | Weekly              | Grab Sample      |
| pH                    | pH units        | Special Frequency 1 | Special Method 1 |
| PAH                   | µg/L            | Weekly              | Grab Sample      |
| Temperature           | degrees Celsius | Special Frequency 1 | Special Method 1 |
| Tributyltin           | µg/L            | Weekly              | Grab Sample      |
| TSS                   | µg/L            | Weekly              | Grab Sample      |
| Turbidity             | NTU             | Special Frequency 1 | Special Method 1 |
| Zinc (dissolved)      | µg/L            | Weekly              | Grab Sample      |

1. Special Method 1 means parameters are recorded from automated monitoring buoys
2. Special Frequency 1 means parameters requiring monitoring at 15-minute median intervals.

Water quality monitoring requirements for wet weather discharge (Point 20) are provided in Table 7.4.

**Table 7.4** Water quality requirements for wet weather discharge (Point 20)

| Pollutant                        | Unit of Measure | Frequency                                            | Sampling method   |
|----------------------------------|-----------------|------------------------------------------------------|-------------------|
| Aluminium (dissolved)            | µg/L            | Every day a discharge occurs (prior to commencement) | Grab Sample       |
| Arsenic (dissolved)              | µg/L            | Every day a discharge occurs (prior to commencement) | Grab Sample       |
| Cadmium (dissolved)              | µg/L            | Every day a discharge occurs (prior to commencement) | Grab Sample       |
| Chromium (dissolved)             | µg/L            | Every day a discharge occurs (prior to commencement) | Grab Sample       |
| Cobalt (dissolved)               | µg/L            | Every day a discharge occurs (prior to commencement) | Grab Sample       |
| Copper (dissolved)               | µg/L            | Every day a discharge occurs (prior to commencement) | Grab Sample       |
| Lead (dissolved)                 | µg/L            | Every day a discharge occurs (prior to commencement) | Grab Sample       |
| Mercury (dissolved)              | µg/L            | Every day a discharge occurs (prior to commencement) | Grab Sample       |
| Nickel (dissolved)               | µg/L            | Every day a discharge occurs (prior to commencement) | Grab Sample       |
| Oil and Grease                   | visible         | Every day a discharge occurs (prior to commencement) | Visual Inspection |
| pH                               | pH units        | Every day a discharge occurs (prior to commencement) | Grab Sample       |
| Polycyclic Aromatic Hydrocarbons | µg/L            | Every day a discharge occurs (prior to commencement) | Grab Sample       |
| Tributyltin                      | µg/L            | Every day a discharge occurs (prior to commencement) | Grab Sample       |
| TSS                              | µg/L            | Every day a discharge occurs (prior to commencement) | Grab Sample       |
| Zinc (dissolved)                 | µg/L            | Every day a discharge occurs (prior to commencement) | Grab Sample       |

Water quality monitoring requirements for Point 24 are provided in Table 7.5.

**Table 7.5** Water quality requirements for Point 24 (Ambient Monitoring)

| Pollutant | Units of measure | Frequency           | Sampling Method |
|-----------|------------------|---------------------|-----------------|
| TSS       | mg/L             | Special Frequency 2 | Grab sample     |

Special Frequency 2 means at least once daily when dredging and/or support pile removal is being undertaken. The licensee may vary the monitoring frequency to suit their varying aspects of work, with the prior written consent of the EPA.

## 7.6 Monitoring of turbidity and physical parameters

### 7.6.1 Daily inspections

Environmental inspections will be completed daily at the MBD Site Compound and the Emplacement Cell Construction Site during the Stage 2A and Stage 2B works. The environmental inspections will be undertaken by the Principal Contractor Environmental Representatives who will be required to complete the Inspection Checklist.

With respect to water quality, the following observations will be recorded on the Inspection Checklist:

- Date and time of inspection.
- Condition of water pollution controls.
- Presence of sediment plumes.
- Presence of oil and grease.
- Potential toxic Dinoflagellate blooms within the Inner Harbour.

Other observations (aside from the above) are also to be recorded, as necessary.

### 7.6.2 ASS monitoring

Material classified as high risk of containing PASS and ASS has been identified during geotechnical investigations carried out as part of the PKGT EIS and additional baseline and targeted assessments (GHD, 2021). The Stage 2A and Stage 2B works may encounter unexpected PASS which occurs at a depth below the proposed level of excavation during this stage of the works. Additional management and monitoring for ASS are provided in the Stage 2A and Stage 2B ASSMP (Sub-plan to the SMP).

The AMBs have capacity to identify any decreasing trends in pH. These readings will be monitored by RARE Environmental and provided to the Principal Contractor Environmental Representatives. If a drop  $>0.5$  over two consecutive readings (15-minute intervals) is detected an investigation will ensue.

### 7.6.3 Sampling methodology

Grab sampling at each monitoring location indicated in Table 7.2 will be undertaken in accordance with the sampling frequency provided in Table 7.3, Table 7.4 and Table 7.5, at a depth of 1.5 metres for monitoring buoys. The same procedure is followed for Point 20; however, this would be taken at the outlet location.

Sampling will be undertaken by appropriately qualified and trained personnel and with reference to relevant statutory requirements, standards, and quality assurance (QA) and quality control (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 National Association of Testing Authorities (NATA) accredited laboratory on a standard turnaround time, and where necessary, on a fast turnaround time, to facilitate a timely response to elevated concentrations. The water sampling procedure is provided in Appendix B.

### 7.6.4 Trigger Action Response Plan

The TARP is a tool used for the monitoring and tracking of any trends associated with water quality and enables reactive management to be implemented in the event of an observed decrease / deterioration in the selected water quality parameters. Immediate response can only be practically undertaken for parameters with real time data including pH, temperature, turbidity, EC, DO, and TSS.

The 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. Table 7.8 provides the TARP that will be implemented during trigger level exceedance events.

Condition M2.6 of EPL No. 21529 states the following:

- In the event that monitoring detects an exceedance of the total suspended solids/turbidity trigger level at monitoring point 24 of this licence, the licensee must:

- Enact their TARP; and
- Continue monitoring until the results are within the limits; and
- Notify the EPA in accordance with the notification provision of this license, including Condition R4.1.

Table 7.6 and Table 7.7 below present the incremental monitoring trigger levels with regards to water quality impact (associated with the PKGT Project).

### EPL No. 21529 Trigger Level

The trigger level for ambient monitoring at Point 24 is provided in Condition L3.5 of EPL No. 21529, as presented below in Table 7.6 (inclusive of footnotes 1 - 4):

**Table 7.6** EPL No 21529 TSS Trigger Level

| Pollutant | Units of Measure | EPL No. 21529 Trigger Level |
|-----------|------------------|-----------------------------|
| TSS       | mg/L             | Background (BG)+ 50         |

**Note 1:** If the licensee uses Turbidity (NTU) in place of TSS, the licensee must develop a statistical correlation between NTU and TSS for water quality in order to determine the NTU equivalent of 50 milligrams per litre TSS. The licensee must develop and implement a method approved by the EPA to enable the ongoing verification of the relationship between NTU and TSS. In the absence of this correlation the turbidity value equivalent to 50 milligrams per litre TSS is 50 NTU.

**Note 2:** For the purposes of the table above, (BG Level + 50) is defined as the average of the two TSS samples obtained at EPL Points 1, 17 and 18 (collected in the time period of 30mins before and after the grab sampling event) plus 50 mg/L.

**Note 3:** The concentration limits specified for TSS do not apply when an exceedance can be directly attributed to rainfall run-off or re-suspension of bottom sediments caused by shipping movements. Ship movements do not include vessels associated with this licence.

The following internal trigger levels have been developed to assist AIE with the early identification of changes in water quality and corresponding implementation of appropriate construction response and process changes. This will ensure that all efforts are undertaken to ensure TSS / NTU water quality impacts remain under the trigger concentrations specified in EPL No. 21259 (Condition L3.5).

**Note 4:** The correlation to be used between TSS and turbidity is 1:1 ratio as stated on Note 1 above. This will be an interim correlation. A more robust correlation will be developed when dredging activities commence. Consultation and approval from the EPA will be sought prior to implementing the method for establishing this correlation and the on-going verification of the relationship between turbidity and TSS.

The internal trigger levels nominated by AIE for TSS / Turbidity are presented below in Table 7.7.

**Table 7.7** Internal TSS Trigger Level

| Pollutant       | Units of Measure | Internal Trigger Level 1 (TSS) | Internal Trigger Level 2 (TSS) |
|-----------------|------------------|--------------------------------|--------------------------------|
| TSS / Turbidity | mg/L / NTU       | BG + 30                        | BG + 40                        |

\*Background has the same definition as Note 2 above.

The following actions are to be undertaken at each trigger level as presented below in Table 7.8.

Table 7.8 Trigger Action Response Plan for TSS/ Turbidity monitoring

| Internal Level 1 Trigger                                                                                                                                                                                                                                                                                          | Internal Level 2 Trigger                                                                                                                                                                                                                                                                                                                                                                                                              | Internal Level 3 Trigger                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (BG + 30 mg/L)                                                                                                                                                                                                                                                                                                    | (BG + 40 mg/L)                                                                                                                                                                                                                                                                                                                                                                                                                        | (BG + 50 mg/L)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Review, check controls and work process                                                                                                                                                                                                                                                                           | Additional testing, and notify contractor                                                                                                                                                                                                                                                                                                                                                                                             | Respond, investigate, intervene, notify contractor and the EPA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <ul style="list-style-type: none"> <li>– Confirm shipping movements or rainfall run-off are not the cause.</li> <li>– Assess visual plume around the work area.</li> <li>– Check controls are in place and functional</li> <li>– Review works being done and note any deviation from standard process.</li> </ul> | <p>All level 1 controls plus:</p> <ul style="list-style-type: none"> <li>– Confirm measurement at least three times over next 3 hours.</li> <li>– Monitor any visual plume for significant migration from licensed premises.</li> <li>– If levels are persistently elevated (i.e., &gt; BG + 40mg/L), with migrating plume, discuss possible changes to work method with dredging contractor and implement where feasible.</li> </ul> | <p>All level 2 controls plus:</p> <ul style="list-style-type: none"> <li>– Obtain monitoring from WQMBs per the required frequency in the EPL Condition R4.2 as minimum (i.e. 2 hrs before and after exceedance at EPL24).</li> <li>– Undertake formal investigation of exceedance that will form part of Water Quality Impact Report that will be submitted to the EPA.</li> <li>– Check the TSS/ Turbidity levels at couple of distances between the impact area and the primary/ impact licensed water quality monitoring locations (i.e., EPL1, EPL16, EPL17, EPL18, and EPL19) where appropriate.</li> <li>– Modification of current activities/practices may be undertaken to achieve improvement in water quality – this may include but not limited to reduction in rate of excavation, change in methodology, movement of and/or additional sediment curtain.</li> <li>– In the event that sediment dispersion and subsequent water quality continue to exceed criteria (BG + 50) at the licensed water quality monitoring locations, the associated works would cease until water quality improves to levels within the required criteria.</li> <li>– Notify the EPA as per the EPL 21529 Conditions R4.1 and R4.2.</li> </ul> |

Any exceedance that is found to be caused solely by contractor activities will be recorded by the Principal Contractor Environmental Representatives (or delegate) and lodged as an official Environmental Incident Report to AIE. These details will include, but not be limited to:

- Location, time, and date.
- Tidal movements.
- Details of construction processes.
- Level of turbidity or TSS (from real time and/or grab samples taken prior to the event and following the event).

## 8. Communication and complaints

Effective communication between the Project Director, Project team, contractors and external stakeholders will be undertaken throughout the Project to ensure effective implementation of this WQMP.

Project communication can be categorised into internal and external communications, as well as communications specifically dealing with complaints. The specific communication methods for each category are discussed below.

### 8.1 Internal communications

Communication on environmental issues related to water management within the Project team will be maintained, as a minimum, through the following forums (organiser as noted):

- Weekly project construction team meetings (AIE Construction Manager or delegate).
- Periodic Environmental management team meetings with relevant contractors (AIE HSE Manager or Delegate).
- Toolbox talks and daily pre-start briefings (Principal Contractor Project Managers or delegate).
- Minutes of formal meetings will be taken and distributed to record issues raised and actions required, with action status established at subsequent meetings.
- Monthly review of the internal AIE Environmental Compliance Tracking register (AIE HSE Manager or delegate).

All internal meetings include appropriate documentation in the form of agenda and formal distribution via the Project's document system.

In addition to the above, the AIE Environment Team will also undertake informal planning sessions and resource review meetings to plan and forecast for upcoming key construction dates, critical issues and other relevant matters associated with environmental planning and approvals.

### 8.2 External communications

AIE is committed to keeping the local community and relevant agencies informed about the development of the Project. The principal external communication objectives are, therefore, to:

- Continue to maintain open communication with relevant stakeholders.
- Minimise environmental impacts.
- Be proactive in addressing any concerns that the community / external stakeholder may express.

AIE will build upon the stakeholder and community engagement phase undertaken during project development including multiple group or one on one briefings. A project website ([www.ausindenergy.com](http://www.ausindenergy.com)) has been developed and provides comprehensive, clear, and accessible information that is updated on a regular basis.

As well as the local Port Kembla and broader community of the Wollongong region, extensive engagement was also undertaken with a range of other interested key stakeholders, such as local commerce organisations, the PANSW and local and state government.

Consultation with key stakeholders and the wider community on the Project will continue throughout Stage 2A and Stage 2B and subsequent construction phases. These measures will ensure the stakeholders, including the wider community, remain informed of the Project's progress.

Key methods of engagement are provided in the Stage 2A and Stage 2B EMS.

### 8.3 Complaints management

All complaints where a third party has identified a construction activity as being unsatisfactory or unacceptable will be dealt with promptly and efficiently in accordance with the complaint and dispute response outlined in the Project's Stage 2A and Stage 2B EMS.

AIE will operate a free 24-hour Community Information Line (1800 789 177) where members of the community can leave details about an inquiry, they may have regarding construction activities related to water quality. This message will be passed on to site personnel and/or the Stakeholder Engagement Team, as appropriate. The phone number is listed on the AIE website (<https://ausindenergy.com/contact-us/>) and will be provided on all community newsletters. The AIE HSE Manager has notified the Port Kembla Harbour Environment Group of the Community Information Line.

Initial responses to complaints will be provided within 24 hours of the complaint being received. As part of the response, a review of the activity will be undertaken. If required and possible, immediate changes will be made to reduce any impact on the community. In some cases, the issues cannot be resolved immediately, and ongoing actions might be required to resolve the issue.

All complaints related to water quality will be recorded in a Complaints and Disputes Register. The following information will be recorded for each complaint:

1. The date and time of the complaint.
2. The method by which the complaint was made.
3. Any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect.
4. The nature of the complaint.
5. The action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant.
6. If no action was taken by the licensee, the reasons why no action was taken.

The Complaints and Disputes Register will be maintained by the Project's HSE Manager or delegate, and will detail what the issue was, initial response provided, how and when the issue was resolved, and by whom. Records will be kept for at least four years after the complaint was made and will be produced on request by any authorised officer of the EPA.

Where resolving a complaint with a third party is protracted or develops into a dispute, the AIE HSE Manager shall escalate proactively to Senior Project Leadership (e.g., AIE Project Manager and/or Project Director) to assist with resolution. AIE will work proactively with the complainant to resolve the dispute including having face to face meetings, site familiarisation sessions and agreeing on actions to resolve the dispute. All communications and agreed actions shall be documented.

For the management and reporting of corrective actions (which may be required in response to a complaint), refer to the Project's Stage 2A and Stage 2B EMS.

## 9. Inspections, monitoring and audits

Monitoring and auditing will be undertaken to determine the impact on the environment and identify opportunities for improvement. Monitoring to be implemented for specific actions or environmental issues (e.g., water quality monitoring, air quality monitoring) will be detailed in their relevant Sub - plan and will specifically address the monitoring requirements for those issues.

### 9.1 Environmental inspections

#### 9.1.1 AIE and Principal Contractors joint environmental inspection

As a minimum, the AIE HSE Manager (or nominated delegate) will undertake periodic inspection of the work sites with the relevant Principal Contractor's environmental personnel (Environmental Representative or similar) to evaluate the effectiveness of environmental controls (inclusive of erosion and sediment control measures) and general compliance with the implementation of the WQMP for site-based activities.

If any maintenance and / or deficiencies in environmental controls or in the standard of environmental performance are observed, they will be recorded on the checklist form. Records will also include details of any maintenance required, the nature of the deficiency, any actions required and an implementation priority.

Actions raised during inspections will be documented on the *Environmental Site Checklist* and will be issued formally through the Project's document management system to the relevant Contractor for action. If they represent an actual or potential significant environmental risk, these issues shall be reviewed at the Project Planning meetings and will have non-compliances raised if not closed out in the nominated timeframe (Non - compliances Report).

#### 9.1.2 Contractor environmental inspections

In addition to the joint periodic environmental site inspection with AIE, the Principal Contractors will be required to undertake daily site environmental inspections, targeting key environmental risks commensurate with the activity being undertaken. The environmental site inspection will be documented on a checklist, or similar, to be prepared and completed by the Principal Contractors.

Copies of the environmental site inspection records are to be provide to AIE on request.

The HSE Manager is responsible for the initial reporting of significant non-compliances with the WQMP or relevant legislation to the AIE Project Director and government authorities (refer to Section 9.4).

#### 9.1.3 EPL inspection requirements

In accordance with Condition O4.4 of the EPL No. 21529, the Contractors will undertake wet-weather inspections daily during periods of rainfall and within 24 hours of cessation of a rainfall event causing runoff to occur on or from the premises (based on site observation, this equates to 20 millimetres of rainfall in a 24-hour period).

Daily inspections of water pollution controls will be undertaken in accordance with Condition M.10.1 of the EPL No 21529 and recorded. Records will include the date and time of inspection, location of dredging operations and conditions of silt curtains and other water pollution controls. Records will be produced to an EPA authorised officer on request.

The Principal Contractors must record all such inspections including observations and works undertaken to repair and/or maintain erosion and sediment controls.



## 9.2 Monitoring

Monitoring will be undertaken to validate the impacts predicted for the work, to measure the effectiveness of management plans, environmental controls, and implementation of this WQMP, and to address approval requirements.

Monitoring requirements applicable to the WQMP include:

- Water quality monitoring results.
- Exceedances of POCs.

## 9.3 Auditing

AIE will conduct a program of internal audits for the purpose of verifying compliance with the following:

- The EMS and this WQMP.
- Compliance with the requirements of relevant components outlined within the EMS and WQMP, including but not limited to, site inspection compliance, document control / management, non - compliance, and incident management etc.
- Monitoring and reporting requirements as set out under EPL No. 21529.

Additional details regarding the auditing process are detailed in the Project's Stage 2A and Stage 2B EMS.

## 9.4 Environmental reporting

### 9.4.1 DP&E reporting

Regular reports on compliance and other matters will be provided during the construction phase of the Project. This will include reporting to the DP&E in accordance with Schedule 4, Conditions 7 and 8 of the Infrastructure Approval (SSI 9471), with specific reference to the *Compliance Reporting Post Approval Requirements* (DPIE, 2020).

In addition, DP&E will be notified in writing of the date of commencement of each of the relevant phases of the Project in accordance with Schedule 2, Condition 8 of the Infrastructure Approval (SSI 9471).

Reporting applicable to this WQMP will consist of:

- Water and air quality monitoring results.
- Requirements of EPL No. 21529.
- Construction works progress and appraisal of water, air and spoil management quality controls.
- Environmental Incident Report(s), as required.
- Annual returns, as required by EPL No. 21529.

### 9.4.2 Other reporting requirements

A monthly environmental monitoring report will be developed for each calendar month which will include details of the monitoring results and frequencies and inclusion of any exceedance of EPL No. 21529 monitoring limits / criteria. A copy of the monthly environmental monitoring report will be made available on the AIE Project website.

Further reporting requirements are provided in Section 9.6 and Section 10.1.

## 9.5 Compliance tracking register

A Compliance Tracking Register has been developed as a monitoring tool to assist with the compliance reporting requirement as set out under Condition 7, Schedule 4 of the Infrastructure Approval (SSI 9471).

The compliance tracking register includes a breakdown of the requirements from the following key approval and Project documents:

- Infrastructure Approval (SSI 9471).

- EPL No. 21529.
- Requirements of this WQMP.
- *Compliance Reporting Post Approval Requirements* (DPIE, 2020), or its most recent edition.

The Compliance Tracking Register includes tabulation of reference conditions, the requirements, responsibility, status (i.e., ongoing, close - out, not triggered, etc.) and supporting evidence where required.

A routine review of the Compliance Tracking Register is undertaken by the AIE HSE Manager (or delegate) with input sought from the relevant contractors as required. The Compliance Tracking is a live document which is kept up to date for each stage of the construction works.

## 9.6 Non - compliance, corrective, and preventative actions

Non - compliances or potential non - compliances are situations or events that do not comply with the safeguards and procedures stipulated in the EMS or this WQMP.

Non - compliances or potential non-compliances may be identified in any of the following situations:

- As part of site inspections, supervision or monitoring of construction activities.
- During internal audits.
- Following justified / supported verbal or written third party complaints.

All non - compliances related to water and air quality will be managed and reported using the non - compliance function of the Project's document management system. Each non-conformance event and follow-up action will be documented and traceable, including identification of key dates and responsible personnel.

Additional details regarding corrective and preventative actions are outlined in the Project's Stage 2A and Stage 2B EMS.

The Department must be notified in writing via the Department's Major Projects Website within seven days after the identification of any non - compliance issue. 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.

# 10. Incident management and emergency response

## 10.1 Incident management

### 10.1.1 Overview

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 non – compliance. The consequences of such incidents may result in material environmental harm, damage, or asset loss. ‘Near misses’ are extraordinary events that could have reasonably resulted in an incident.

All incidents related to water quality, including those of the Principal Contractors, its subcontractors, and visitors that occur during the undertaking of the construction works for the Project will be managed to satisfy the requirements of AIE’s Incident Reporting and Investigation System Requirements. Whilst it is noted that key Contractors will be implementing their own environmental management system procedures and processes, AIE will be responsible for ensuring that these systems and processes satisfy the requirements of the AIE EMS, including the incident management components. The Principal Contractors will be responsible for providing all necessary documentation with regards to the incident investigation and close - out actions where required. The timing of the provision of this documentation is to align with the AIE requirements.

The AIE HSE Manager must be notified immediately of any environmental incident or near miss related to water quality. These may include, but are not limited to the following:

- Exceedance of water and air monitoring criteria as required under the Project EPL (EPL No. 21529).
- Spill of any dangerous goods or hazardous substance to ground or water.
- Substantiated complaints received from members of the community or regulatory authorities.
- Regulatory breaches such as fines, prosecutions, improvement notices, breaches of licence conditions.
- All incidents of third-party property damage or loss.
- Incidents involving impact or potential damage to items or places of cultural heritage significance.
- Land-based off-site sediment loss to the environment, including sediment tracking onto the roadway.

The AIE HSE Manager will be responsible for regulatory notification of all notifiable environmental incidents (refer to Section 10.1.2 for notifiable incidents). All environmental incidents will be reported immediately to DP&E in writing via the Department’s Major Projects Website after AIE becomes aware of the incident, as per Schedule 4 Condition 5 of the Infrastructure Approval (SSI 9471). The notification must identify the development, including the application number, and set out the location and nature of the incident.

In the event of a notifiable non-compliance incident arising, the Principal Contractors will notify the AIE HSE Manager immediately to allow the AIE HSE Manager to notify DP&E in writing via the Department’s Major Projects Website within seven days of AIE becoming aware of the non - compliance, as per Schedule 4 Condition 6 of the Infrastructure Approval (SSI 9471). 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.

### 10.1.2 Notifiable incident under the POEO Act

In the event of a Notifiable Incident as defined under the POEO Act, AIE is responsible for immediately notifying the EPA, and any other relevant authority, of pollution incidents on or around the site via the EPA Environment Line (telephone 131 555) in accordance with Part 5.7 of the POEO Act. The circumstances where this will take place include:

- *If the actual or potential harm to the health or safety of human beings or ecosystems is not trivial.*

- If actual or potential loss or property damage (including clean-up costs) associated with an environmental incident exceeds \$10,000.

Follow-up written notification to the EPA and any other relevant authorities will be required in accordance with the POEO Act and requirements of the EPA. This includes the provision of written details of the notification to the EPA within seven days of the date on which the incident occurred.

All notifiable incidents will also be managed, documented, and reported in accordance with the AIE *Incident Reporting and Investigation System Requirement*.

In addition, an authorised officer of the EPA has the right to request a written report (in accordance with Condition R3 of the EPL No. 21529) if they suspect on reasonable grounds that an event has occurred at the licensed premises which has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies). The written report is to address all the requirements under Condition R3 of the EPL.

### 10.1.3 Notifiable incident under the Infrastructure Approval (SSI-9471)

In accordance with Condition 5 of Schedule 4, DP&E must be notified in writing via the Department's Major Projects Website immediately after AIE becomes aware of an incident on site.

Additional details regarding notifiable incidents and procedures are outlined in the Project's Stage 2A and Stage 2B EMS.

## 10.2 Emergency response

Actual or potential emergency situations will vary in type and severity. The required level of response and notification will be at the discretion of the AIE Construction Manager in consultation with the AIE HSE Manager.

Any emergency situation may require only isolated containment and control or may require the complete evacuation of the site and notification of relevant emergency services. Consideration should be made of the response requirements for different situations. If at any time there is uncertainty on how to proceed, response should be for the worst possible scenario. Ultimately, the AIE Construction Manager or representative has authority and responsibility to instigate an evacuation if he/she feels it is warranted.

In the event of an emergency, the following plans listed in Table 10.1 shall be consulted and implemented, as relevant.

**Table 10.1**      *Emergency plans*

| Plan                                               | Reference        | Application                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Principal Contractor Local Emergency Response Plan | -                | Principal Contractor's emergency response plan implemented in the event of any incident occurring during a Project activity as per the Contractor's policies and management framework.                                                                                                                                                                                                                           |
| AIE Port Kembla Gas Terminal Emergency Spill Plan  | PKGT-AIE-PRO-039 | Developed as a Sub - plan to the EMS to be implemented detailing: <ul style="list-style-type: none"> <li>– Response plans in the event of land or water-based spill events.</li> <li>– Inspections, notification, and incident management requirements in accordance with the Infrastructure Approval (SSI 9471) and EPL No 21529 in relation to spills.</li> </ul>                                              |
| PIRMP                                              | PKGT-AIE-PRO-007 | Implemented immediately in the event of a pollution incident occurring during a Project activity. The PIRMP: <ul style="list-style-type: none"> <li>– Outlines the actions to be taken during or immediately after a pollution incident.</li> <li>– Lists details of relevant authorities to be notified, as required.</li> <li>– Outlines community and neighbour notification details, as required.</li> </ul> |

| Plan                                | Reference        | Application                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AIE Emergency Management Procedures | PKGT-AIE-PRO-014 | <p>Implemented immediately in the event of any emergency incident occurring during the Project. Procedures include:</p> <ul style="list-style-type: none"> <li>– Types of emergencies and the detailed steps to be taken in response.</li> <li>– Notification details to relevant authorities and AIE Project team.</li> <li>– Incident response to follow up from incident and preventative actions to be implemented, if applicable.</li> </ul> |

# 11. Document management and review

## 11.1 Record management

Records and registers specified in this WQMP for Stage 2A and Stage 2B shall be maintained. Records to be kept may include but will not be limited to the following:

- Environmental Inspection Checklist.
- Environment Reporting.
- Environmental Monitoring Reports / Records.
- Fauna and Weed Register.
- Internal Audit Reports.
- Incident Reports and Register.
- Toolbox Talk Records.
- Induction Presentation and Register.
- Environmental Activities Safe Work Method Statement (SWMS).
- Corrective Actions Register.
- Waste and Resource Register.
- Material Tracking Register.
- Training Register / Matrix.
- Complaints Register.

## 11.2 Review and revision of WQMP

This WQMP will be reviewed and updated, as required under Condition 3 of Schedule 4 of Infrastructure Approval (SSI 9471) to ensure the objectives of the applicable approval conditions contained within are being met throughout Stage 2A and Stage 2B.

In addition, as required under Condition 4 of Schedule 4 of Infrastructure Approval (SSI 9471), the WQMP must be reviewed, and if necessary, revised within three months (unless otherwise agreed with DP&E) for any of the following:

- Following the submission of an incident report as per Condition 5, Schedule 4 of Infrastructure Approval (SSI 9471) (refer to Section 10).
- Following approval of any modification to the conditions of approval outlined in Infrastructure Approval (SSI 9471).
- At the direction of the Planning Secretary as per Condition 4, Schedule 2 of Infrastructure Approval (SSI 9471).

Where a review leads to revisions, 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

## 11.3 Access to information

AIE will make the following information publicly available on the PKGT website, as per Schedule 4, Condition 12 of the Infrastructure Approval (SSI 9471) and the requirements as set-out under the Project EPL No. 21529:

- The PKGT EIS.
- Current statutory approvals for the Project.
- Approved strategies, plans or programs required under the conditions of Infrastructure Approval (SSI 9471).

- A comprehensive summary of the monitoring results of the development, reported in accordance with the specification of any conditions, or any approved plans and programs relating to Infrastructure Approval (SSI 9471).
- A summary of complaints (updated monthly).
- Any independent environmental audit, and responses to the recommendations in any audit.
- The approved premises map (EPL No. 21259, Condition A2.4).
- PIRMP (EPL No. 21529, Condition E2).
- Any other matter required by the Planning Secretary.

This information will be kept up to date by AIE when required.

# References

Australian and New Zealand Environment and Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ), 2000.

DPIE 2020, *Compliance Reporting Post Approval Requirements*.

Environment Protection Licence No. 21529, dated 3 December 2021.

GHD 2018, Port Kembla Gas Terminal Environmental Impact Statement.

Infrastructure Approval SSI 9471 dated 13 October 2021.

Landcom 2004, Managing Urban Stormwater: Soils and Construction Volume 1 and Volume 2. - Volume 2A (the "Blue Book").

NSW Ports 2014, Berth 103 Stage 2 Extension - Dredging and Spoil Disposal Works.

NSW Ports 2016, Port Kembla Development Code.

SMEC February 2022, Port Kembla Gas Terminal Development – Emplacement Cell Report.



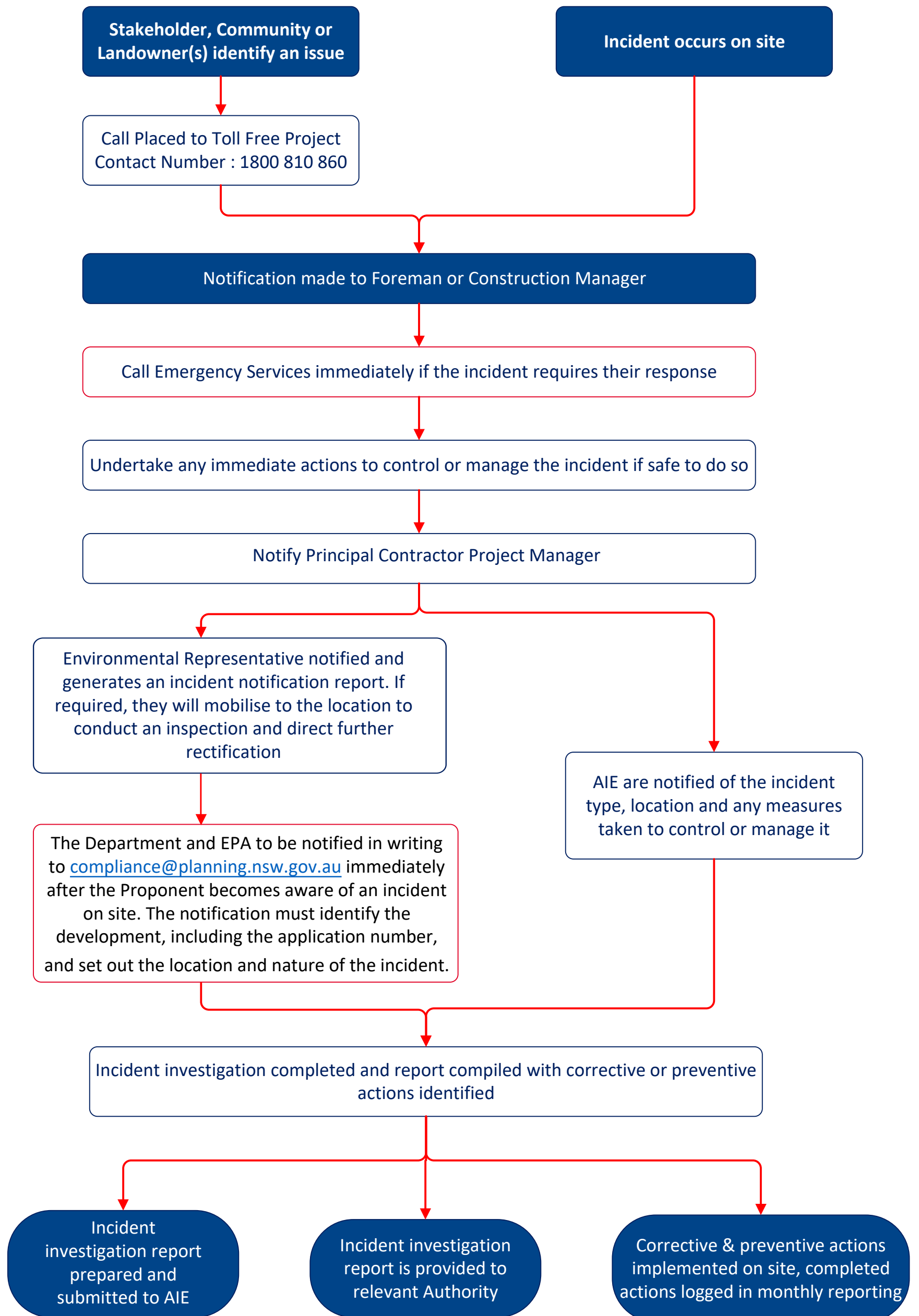
# Appendices

# **Appendix A**

**Incident Notification flow chart**

# Port Kembla Gas Terminal (PKGT) Project

## Incident Notification & Response Flow Chart



# **Appendix B**

## **Water sampling procedure**

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

## 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              |

|                             |                              |             |                           |          |
|-----------------------------|------------------------------|-------------|---------------------------|----------|
| <b>Metals (un-filtered)</b> | <b>Plastic or glass 50ml</b> |             | pH <2 (HNO <sub>3</sub> ) | 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.

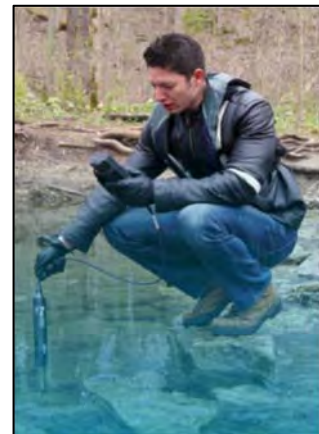


Photo 3 Water Quality Meter

## **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:**



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

# **Appendix C**

## **Ecological Health Monitoring Program**





# Port Kembla Harbour Ecological Health Monitoring Program

## Port Kembla Gas Terminal

Australian Industrial Energy

September 2021

→ The Power of Commitment



**GHD Pty Ltd**

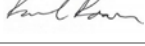
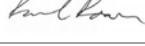
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|                         |                                                                                     |
|-------------------------|-------------------------------------------------------------------------------------|
| <b>File name</b>        | Ecological Health Monitoring Program                                                |
| <b>Author</b>           | Madelaine Hooper & Anna Boden                                                       |
| <b>Project manager</b>  | Karl Rosen                                                                          |
| <b>Client name</b>      | Australian Industrial Energy                                                        |
| <b>Project name</b>     | East Coast Gas Project                                                              |
| <b>Document title</b>   | Port Kembla Harbour Ecological Health Monitoring Program   Port Kembla Gas Terminal |
| <b>Revision version</b> | Rev G                                                                               |
| <b>Project number</b>   | 2127477                                                                             |

**Document status**

| Status Code | Revision | Author   | Reviewer           |                                                                                     | Approved for issue |                                                                                       |         |
|-------------|----------|----------|--------------------|-------------------------------------------------------------------------------------|--------------------|---------------------------------------------------------------------------------------|---------|
|             |          |          | Name               | Signature                                                                           | Name               | Signature                                                                             | Date    |
| S3          | A        | M Hooper | N House<br>A Boden |                                                                                     |                    |                                                                                       |         |
| S3          | B        | M Hooper | A Boden            |                                                                                     |                    |                                                                                       |         |
| S3          | C        | M Hooper | K Rosen            |                                                                                     |                    |                                                                                       |         |
| S4          | D        | A Boden  | K Rosen            |  | K Rosen            |  | 3/9/21  |
| S4          | E        | A Boden  | K Rosen            |  | K Rosen            |  | 17/9/21 |
| S4          | F        | A Boden  | K Rosen            |  | K Rosen            |  | 30/9/21 |
| S4          | G        | A Boden  | K Rosen            |  | K Rosen            |  | 30/9/21 |

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# 1. Introduction

## 1.1 Proposed Works

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

NSW currently imports more than 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 more than 100 petajoules of natural gas, equivalent to more than 70% of NSW gas needs and will 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) (NSW) and Schedule 5 of the State Environmental Planning Policy State and Regional Development (SRD SEPP). The Project received Infrastructure Approval from the Minister for Planning and Public Spaces on the 29th of April 2019.

The construction of the Project is primarily associated with the establishment of a new berth facility at Port Kembla to enable an LNG Carrier to berth alongside the Floating Storage and Re-gasification Unit (FSRU) and new infrastructure to connect the terminal to the existing gas network. The FSRU is a cape-class ocean-going vessel approximately 300 metres in length and about 50 metres in breadth. The vessels will be procured and operated under long-term charter by Höegh LNG. The vessel will be constructed and assembled offshore and then sailed to Port Kembla to be moored at the Berth 101 site throughout operations.

The development has progressed to the early works stage at Berth 101 (the site or MBD Site Compound), which includes the demolition and removal of all existing surface infrastructure, and disconnection and removal of all underground services. The Early Enabling Works phase is required to facilitate all future stages of development.

The construction phase is expected to last up to 18 months. Construction of the quay wall is scheduled to commence circa January 2022 with dredging and emplacement cell construction scheduled to commence circa March 2022.

Commissioning and operational phases of the Project will follow the completion of construction and are predicted to commence in January 2023. In its operational phase, the Project will operate 24 hours per day and 7 days per week and be capable of supplying in excess of 100 petajoules of gas each year.

## 1.2 Purpose of the Port Kembla Harbour Ecological Health Monitoring Program

The purpose of the Ecological Health Monitoring Program (EHMP) is to assess and monitor impacts of Port Kembla Gas Terminal (PKGT) construction and operational activities on harbour wide ecological health of Port Kembla Harbour. The monitoring program has been designed in accordance with the NSW Environmental Protection Authority (EPA) requirements as specified in Environment Protection Licence 21529 and Condition 11 and 3 of Schedule 3 of AIE's Infrastructure Approval (refer Table 1.1 below). The EHMP will complement the existing Water Quality Monitoring Plan which has been approved by the Department of Planning, Industry and Environment (DPIE) and the EPA.

To adequately identify and monitor impacts, the specific objectives of the EHMP are to:

- Provide quantitative assessment of the species diversity and abundance of aquatic hard-substrate sessile organisms in Port Kembla Harbour (PKH).

- Assess the presence and extent of change to the diversity and abundance of aquatic hard-substrate sessile organisms in Port Kembla Harbour during the study period.
- Complement AIE's existing Water Quality Monitoring Plan, and
- Build upon existing scientific literature concerning the water quality and broader ecological health of PKH.

*Table 1.1 Overview of relevant approval conditions and EHMP section references*

| Reference                               | Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | EHMP section reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EPL 21529<br>E3.3                       | By September 3 2021 the licensee must submit a draft monitoring program in writing to the EPA for approval. The draft program must be prepared by a person with suitable qualifications in aquatic ecology.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | This plan - qualifications of Author and Reviewer are provided in Attachment 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| EPL 21529<br>E3.4                       | The draft monitoring program must include, but may not be limited to: <ul style="list-style-type: none"> <li>a) A literature review – of previous similar and relates studies including the Bluescope Steel Report, Pollution Reduction Program 146: Assessment of the ecological condition of Port Kembla Inner Harbour and Allans Creek and a comparison with two references estuaries, June 2012.</li> <li>b) Sampling design and methodology – specifying the species to be monitored and the monitoring frequency and duration.</li> <li>c) Validation of predicted modelling impacts (e.g. verification sampling, bench testing).</li> <li>d) Monitoring point locations including reference, control and impacts site locations.</li> <li>e) Assessment of quantitative and qualitative ecological changes, including water quality monitoring from concurrent sampling undertaken by the licensee.</li> <li>f) Reporting – format and frequency.</li> </ul> <p>Note: Initially EPA requires a 2 year monitoring frequency for the program. That is, the program would be repeated every 2 years. Based on results and recommendations from a suitably qualified person, the EPA will review this frequency after 2 monitoring events in consultation with the licensee.</p>                                                                                                                       | <p>Section 3 – Literature Review</p> <p>Section 4 – Sampling Design and Methodology</p> <p>Section 4.2.5 – Validation modelling framework</p> <p>Section 4.1.3 – Monitoring Point Locations</p> <p>Section 4.2.3 – Data Analysis</p> <p>Section 5 - Reporting</p> <p>Section 4.1.4 – Duration and Frequency</p>                                                                                                                                                                                                                                  |
| SSI 9741<br>Schedule 3,<br>Condition 11 | <p><b>Spoil Management Plan</b></p> <p>11. Prior to the commencement of construction, the proponent must prepare a Spoil Management Plan to the satisfaction of the Planning Secretary and in consultation with the EPA, DPIE Water, NSW Ports, Port Authority of NSW and, an EPA accredited contaminated site auditor. The plan must be consistent with the Emplacement Cell Report and include:</p> <p>(a) – (b) <i>not relevant to EHMP.</i></p> <p>(c) a Water Quality Monitoring Plan that includes:</p> <ul style="list-style-type: none"> <li>• a description of the water quality monitoring that would be undertaken to monitor turbidity and pollutant concentrations surrounding dredging and disposal works, including real-time turbidity monitoring;</li> <li>• <b>a broader program to monitor harbour-wide water quality trends and the ecological health of Port Kembla Harbour;</b></li> <li>• 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;</li> <li>• 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</li> <li>• reporting procedures for the results of the monitoring program.</li> </ul> | <p>A Construction Water Quality Monitoring Plan has been developed to provide ongoing monitoring of potential impacts to water quality throughout construction.</p> <p>This EHMP is complementary to the Construction Water Quality Monitoring Plan and aims to address the requirement for a broader program to monitor harbour wide water quality trends and the ecological health of Port Kembla Harbour.</p> <p>The plan will be implemented to monitor trends during baseline, construction and operational phases of the development .</p> |

| Reference                              | Condition                                                                                                                                                                                                                                                                              | EHMP section reference                                                                                                                                                               |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SSI 9741<br>Schedule 3,<br>Condition 3 | <b>Water Quality Verification and Monitoring Program</b><br>Prior to the commencement of operations, the Proponent must prepare a Water Quality Verification and Monitoring Program, in consultation with the EPA and DPI Fisheries and to the satisfaction of the Planning Secretary. | To be completed prior to the commencement of operations in 2023 as a complementary program to this EHMP.<br><br>Framework provided in Section 4.2.5 – Validation modelling framework |

## 1.3 Scope and Limitations

*This report: has been prepared by GHD for Australian Industrial Energy and may only be used and relied on by Australian Industrial Energy for the purpose agreed between GHD and Australian Industrial Energy as set out in section 1.2 of this report.*

*GHD otherwise disclaims responsibility to any person other than Australian Industrial Energy arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.*

*The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.*

*The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.*

*The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.*

*GHD has prepared this report on the basis of information provided by Australian Industrial Energy and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.*

## 2. Local Marine Environment

### 2.1 Physical Environment

Port Kembla's Inner Harbour is considered a relatively low energy environment with low discharges from creeks and drains and little wave energy propagation into the Inner Harbour. In contrast, the Outer Harbour is known to be impacted by long wave events, with long waves from multiple directions occurring at the same time. The predominant directions are from the east, the north, and from the west, which is likely to be due to waves reflecting off the beach.

Land use in the immediate vicinity of Port Kembla contributes to the ambient marine water quality within the Port via terrigenous input during rain events. In addition, the ambient marine water quality within Port Kembla is also subject to tidal influences from the Port Kembla entrance.

Historically water quality within the Inner and Outer Harbours has been impacted by urban and industrial discharges as well as port activities. Water quality monitoring within the port has indicated concentrations of metals (aluminium, cadmium, copper, lead, zinc, tin and arsenic) exceeded the ANZECC (2000) (now ANZG 2018) 95% trigger values for protection of marine waters (GHD, 2018). These exceedances were generally highest in the vicinity of Allan's Creek, Gurungaty waterway and Darcy Road drain. Average total suspended solids were found to be higher within the Inner Harbour than the Outer Harbour. pH levels were generally lower in the Inner Harbour than the Outer Harbour, indicating freshwater discharge influences from the existing waterways within the Inner Harbour.

Water temperatures within the port are generally higher than those measured offshore due to slower tidal flushing patterns and existing industrial thermal discharges (hot water discharge within Allan's Creek) to the Inner Harbour. As a result, water temperatures within the Inner Harbour are generally one to two degrees warmer than temperatures beyond the entrance to the port. The Outer Harbour benefits from greater tidal flushing and is generally less than 0.25 degrees warmer than water temperatures beyond the entrance to the port (AECOM, 2010).

Marine sediments within the port are generally characterised as soft silty clays dominating the surface sediments with an underlying layer of stiff clay. Metals (arsenic, cadmium, chromium, copper, manganese, mercury, lead, vanadium and zinc), Polycyclic Aromatic hydrocarbons (PAH), dioxins and Tributyltin (TBT) have been recorded within these sediments across the Inner Harbour exceeding the screening levels for ocean and land disposal (National Assessment Guideline for Disposal – NAGD, and National Environment Protection Measures – NEPM) (WorleyParsons, 2012; Geochemical Assessments, 2013). Further, bioavailability investigations also found concentrations of cadmium, copper, lead and zinc exceeded NAGD screening level in some samples (Geochemical Assessments, 2013).

Recent investigations undertaken as part of the Environmental Impact Statement (EIS) have indicated the presence of contaminated sediments within the proposed dredging and disposal areas; these results were generally consistent with previous investigations. Concentrations of contaminants of concern were largely consistent across the dredging and disposal areas, with the primary contaminants of concern comprising heavy metals, PAH, dioxins and TBT at concentrations above the nominated screening levels.

### 2.2 Marine Habitat

PKH is a highly modified system, existing in an established industrial setting. PKH is a receiving environment of stormwater runoff and waste discharge from neighbouring industries. GHD (GHD, 2018b) has previously undertaken a marine assessment of PKH in 2018 and found marine habitat to be limited to hard substrate habitat and the soft sediment expanses.

Hard substrate habitat consists of infrastructure such as piles, quay walls and the breakwater around the perimeter of the port. Such hard substrate presents ideal habitat for biofouling communities within the sheltered environment. Assemblages around the Inner Harbour have been described as sparse with community structures reflective of the highly disturbed environment; species noted within these communities are polychaete worms, bryozoans,

barnacles and ascidians (Worley Parsons, 2012). Comparatively, a higher diversity and abundance of sessile invertebrates has previously been reported in the Outer Harbour (Worley Parsons, 2012). More recent surveys (GHD EIS, 2018) undertaken for the EIS found communities generally consistent with those previously described, with the addition of the macroalgae *Dictyota dichotoma* on the shallow subtidal zone of the surveyed piles.

The seabed within the Inner Harbour has previously been described as consisting of fine, unconsolidated silt expanses with large decapod burrows (Worley Parsons, 2012). Historically the seagrass species *Halophila ovalis* has been recorded within the Inner Harbour benthos (Pollard and Pethebridge, 2002; EcoLogical Australia, 2003), however seagrasses have not been detected on more recent surveys (2012, 2018). There are no known mapped seagrass communities adjacent to the PKH.

Macroalgae has been known to occur in sparse distributions across soft sediments habitats within the port. More recent investigations (2018) did not identify any macroalgae within the proposed dredge footprint, other than those observed along the berth piles. The different habitats within the Inner and Outer Harbour have been found to support varying diversities in fish assemblages and compositions. The higher diversity within the Outer Harbour may have reflected the use of area, including macroalgal habitat and breakwater, as nursery for juvenile species (AWT, 1999; AECOM, 2010). The eastern breakwater environments in the Outer Harbour also provided niche habitat for species including mado, yellowtail and moonwrasse, with the red morwong as the only species observed in deeper soft sediment habitat (AECOM, 2010). In contrast the highly utilised and developed Inner Harbour is not known to support as many species. Those that occur are typical of inshore habitats being Glass perchlet and Japanese striped goby (AWT, 1999; Pollard & Pethebridge, 2002; UNSW, 2009). Fish assemblages identified as part of these studies are common across the region and did not include any threatened species. The area also does not support any key fish habitat.

## 2.3 Marine Fauna

Schedule 4, 4A and 5 of the FM Act provides lists of critically endangered, endangered and vulnerable species, populations and ecological communities occurring in NSW. The following species were identified as potentially occurring in the Port Kembla area in the 2018 EIS and were assessed under the FM Act 1994 assessment criteria. The results of this assessment are summarised below:

- The grey nurse shark (*Carcharias taurus*) listed as **critically endangered**. The species may transit the region during local migrations between aggregation sites however, the port environment is not considered to be key habitat for this species.
- The Australian grayling (*Prototroctes marena*) listed as **endangered**. The closest known record of the species is in the estuary at Minnamurra, approximately 50 km south of Port Kembla (NSW DPI, 2016b). Due to the distance from this record, lack of suitable habitat and absence of records from previous port surveys, it is unlikely that the species will be present in the Port Kembla area.
- The black rockcod (*Epinephelus daemeli*) listed as **vulnerable**. Juveniles of the black rockcod are commonly found in inshore areas and estuaries where there is suitable sheltered habitat such as rock crevices, caves and gutters (NSW DPI, 2015). It is possible that the species could use the rock breakwalls, piles and quay walls within the port, however previous investigations within Port Kembla have not identified the black rockcod as present within the port (AECOM, 2010; Worley Parsons, 2012). The black rockcod is therefore identified as having a 'may occur' likelihood of occurrence.
- The great white shark (*Carcharodon carcharias*) listed as **vulnerable**. This species is known to be present near seal colonies and thus may visit the wider region as a transient visitor due to the nearby seal haul out site at the Five Islands Nature Reserve (DSEWPC, 2013). However, it is considered unlikely that the species will venture into the shallow waters of Port Kembla where there is frequent movement of vessels causes disturbance and a lack of food sources.

Schedule 1 of the BC Act 2016 provides lists of critically endangered, endangered, vulnerable species and populations occurring in NSW. The following species were identified as potentially occurring in the Port Kembla area and were assessed under the BC Act 2016 criteria. The results of this assessment are summarised below:

- The southern right whale (*Eubalaena australis*) listed as **endangered**. This species is likely to occur within the Outer Harbour having been previously recorded within the port (Worley Parsons, 2012).



- The blue whale (*Balaenoptera musculus*) listed as **endangered**. This species is unlikely to occur within Port Kembla due to lack of suitable habitat.
- Marine turtles – leatherback (**endangered**), loggerhead (**endangered**) and green (**vulnerable**) turtles could potentially visit the port as transient visitors however, it is unlikely that they use the port for nesting or foraging purposes and as such, these species are considered unlikely to occur within the Port Kembla area.
- The long-nosed fur seal (*Arctocephalus forsteri*) and the Australian fur seal (*Arctocephalus pusillus*) listed as **vulnerable**. These species are likely to occur, having been previously recorded within the Outer Harbour.

The EPBC Act Protected Matters Search Tool was used during the EIS to identify MNES and other matters protected under the EPBC Act that are predicted to occur in or relate to the project area. This search identified the following MNES of relevance to the PKGT:

- No Wetlands of International Significance
- No Commonwealth Marine Areas
- 69 Listed Threatened Species (marine species excluding marine birds)
- 56 Listed Migratory Species (marine species excluding marine birds)
- 83 Listed Marine Species
- 12 Whales and other Cetaceans
- 42 threatened and migratory bird species.

Of these, the following species/groups were identified as likely to occur in the port that were assessed as part of the EIS in accordance with the related Significant Impact Guidelines 1.1 (Commonwealth of Australia, 2013):

- Southern right whale (*Eubalaena australis*)
- Humpback whale (*Megaptera novaeangliae*)
- Long-nosed fur seal (*Arctocephalus forsteri*)
- Australian fur seal (*Arctocephalus pusillus*)
- Indian ocean bottlenose dolphin (*Tursiops aduncus*)
- Bottlenose dolphin (*Tursiops truncatus* s. str.)
- Syngnathids.

## 2.4 Introduced Species

Several introduced marine species surveys have identified an extensive list of species present in the port. Introduced marine species accounted for 50 % of the coverage of the hard substrate assemblages within Port Kembla with more pest species and higher abundances of pest species present in the Outer Harbour compared to the Inner Harbour (Johnston, 2006).

Of the species recorded within Port Kembla, *Alexandrium* spp. dinoflagellates are listed as High National Priority Pests while the ascidians *Ciona intestinalis* and *Styela clava* and bryozoan *Schizoporella errata* are classified as Medium National Priority Pests (Hayes *et al.*, 2005). Whilst the toxic dinoflagellate species *Alexandrium catenella* were recorded during surveys conducted in 2002 and 2009 within the port (Pollard & Pethebridge, 2002; AECOM, 2010), none were found during the 2011 survey (Worley Parsons, 2012). In addition, no toxic dinoflagellate blooms have been recorded within Port Kembla however historic events confirm a possibility of future outbreaks.

### 3. Literature Review

Following over 80 years of steelworks operations at Port Kembla, and associated anthropogenic influences on the marine environment, Bluescope Steel was directed by NSW EPA to implement Pollution Reduction Program (PRP) 146. From 2009 – 2011 PRP146 was implemented to assess the ecological condition of Port Kembla Inner Harbour, and Allans Creek. The results of this program were reported in Dafforn *et al.* (2012). Commensurate with the scale and duration of Bluescope Steel operations, a number of elements were monitored under the program including benthic larval fish, benthic and pelagic adult fish, planktonic larval fish, epibiota (sessile hard-substrate invertebrates), infauna (soft sediment invertebrates), phytoplankton and microphytobenthos (chlorophyll a), and physiochemical variables.

Of relevance to this EHMP is the epibiota component of the PRP146. The biofouling community was assessed over two events at sites of relevance to Bluescope Steel operations. This comprised seven sites at the Inner Harbour, and three sites in Allans Creek. Reference sites were also established in Botany Bay, and Port Jackson. Monitoring comprised of deployment of a settlement plate array, with n=2 replicates at each site. Following a three month deployment period in the 'growing season' (Nov/Dec – Feb/Mar), the settlement plates were retrieved, preserved and analysed using dissecting microscope for estimates of percentage cover. Taxa were identified to the lowest taxonomic level possible, noting that morphospecies were used in many instances.

Results of the assessment indicated that the epibiotic communities differed between the Port Kembla sites and the reference estuaries, and the communities were also different between sampling events. The epibiotic community at Port Kembla was therefore considered different to those at the reference locations, but there was no evidence of reduced ecological condition (Dafforn *et al.*, 2012). Whilst no formal review of the sampling design was included in Dafforn *et al.* (2012), the statistics presented, and firm conclusions reached indicate that n=2 replicates were sufficient for detecting change in ecological condition. Further, Dafforn *et al.* (2012) identified that "*Port Jackson appears most similar to Port Kembla and therefore is a useful reference estuary to determine if conditions worsen*".

To support design of this EHMP a review was also undertaken of the Aquatic Biological Monitoring Framework that was designed to assess impacts of dredging and spoil emplacement activities undertaken for the Port Kembla Outer Harbour Development (NSW Ports, 2015). Similar to PRP146, and earlier Inner Harbour dredge monitoring programs, the NSW Ports program included the assessment sessile invertebrates via the deployment of settlement plates. Whilst implementation of the framework was deferred, the framework was reviewed and approved by Department of Planning and Environment NSW, in consultation with NSW Department of Primary Industries and Fisheries.

The framework was designed for consistency with the PRP146, however sites were located in the Outer Harbour as relevant to the spatial footprint of the development. N=2 replicate settlement plates were proposed to be deployed at each of the four nominated sites in the Outer Harbour. Deployment periods, post-collection treatment and laboratory analysis, and statistical analysis were all proposed to be undertaken in a similar manner to that outlined for PRP146 above.

## 4. Sampling Design and Methodology

### 4.1 Approach

#### 4.1.1 Overview

As described in Section 2, one of the key marine fauna groups in PKH is the biofouling (or epibiota) community. Changes in this community structure is commonly used as an indicator for ecosystem health, and as outlined in Section 4 has previously been successful in Port Kembla monitoring programs. The larval recruitment of ascidians, barnacles, bivalves, bryozoa, sponges, amphipods and polychaetes is commonly targeted in ecological health programs. As a significant component of biological diversity, these filter feeders are generally sensitive to elevated contaminant loadings due to their immobility (NSW Ports, 2015) and larval recruitment is considered more sensitive than impacts to adults.

Methods proposed for this EHMP echoes those used in the PRP146 (Dafforn *et al.*, 2012), and the NSW Ports Outer Harbour Development Aquatic Biological Monitoring Program framework (NSW Ports, 2015). As was done for the NSW Ports framework, the monitoring approach developed and successfully implemented under PRP146 has been adapted for this EHMP to include sites of relevance to the proposed works and incorporate recommendations regarding reference locations from the PRP146.

This EHMP has also been designed to interface with the Construction Water Quality Monitoring Plan (CWQMP). There is intentional alignment with the Inner and Outer Harbour water quality monitoring locations and the proposed ecological health monitoring locations to allow for data synergies. This is further detailed in Section 4.2.3.

#### 4.1.2 Design Principles

The design principles that have been adopted for the EHMP during the construction and operational phases are summarised below:

- Adopt broad principles of the commonly accepted Before/After/Control/Impact (BACI) methodology and utilise robust analysis techniques to determine whether there are any significant ecological changes that may be attributed to the construction and operation of the PKGT.
- Ensure sufficient monitoring effort to detect ecological changes that may be attributed to the construction and operation of the PKGT, commensurate with the level of risk associated with the proposed works, whilst optimising the allocation of resources.
- Utilise a weight of evidence approach to determine impacts on the marine environment.

#### 4.1.3 Monitoring Point Locations

In order to represent the PKH wide environment, GHD will establish impact sites at two monitoring zones within PKH (Figure 4.1), comprising:

- Inner Harbour: Sites 1, 3, 5 and 8
- Outer Harbour: Sites 2, 4, 6 and 7.

The PRP146 assessment (Dafforn *et al.*, 2012) identified that Port Jackson is a “*useful reference estuary to determine if conditions worsen*”. Given the objective of this program is to monitor for potential impact, Port Jackson is therefore considered an appropriate reference location. Port Botany has also been included in the program as a reference estuary, with the expectation that this estuary will provide a “*suitable reference estuary to determine if conditions in Port Kembla improve*” (Dafforn *et al.*, 2012). Eight reference/control sites within Port Jackson (sites R1-R7) and within Port Botany (sites R8-R14) have been selected for monitoring under this program (Figure 4.2 and Figure 4.3), enabling a consistent level of effort across each of the estuaries.

Table 4.1 details the proposed sites. The sites within PKH have been selected to be co-located with water quality monitoring buoys to leverage water quality data when interpreting our results (sites I1-I5). Additional sites (I6-I7) were selected with reference to the outputs of the modelling of potential construction and operational impacts

undertaken during the EIS. The reference sites within Port Jackson and Port Botany are representative of habitats in the inner and outer harbour environs. Where appropriate these have also been selected to be consistent with reference sites monitored under PRP146 (Dafforn *et al.*, 2012).

Locations provided are approximate and will be ultimately decided in consultation with the NSW EPA and Port Authority NSW Harbour Master direction and approval.

**Table 4.1 Monitoring Locations and Designations**

| Site No. <sup>1</sup> | Monitoring Zone           | Site Description                      | Easting (approx.) | Northing (approx.) |
|-----------------------|---------------------------|---------------------------------------|-------------------|--------------------|
| I1                    | Port Kembla Inner Harbour | Inner Harbour North                   | 307674            | 6183760            |
| I3                    | Port Kembla Inner Harbour | Inner Harbour South                   | 307226            | 6184480            |
| I5                    | Port Kembla Inner Harbour | Inner Harbour West                    | 305960            | 6185090            |
| I8                    | Port Kembla Inner Harbour | Inner Harbour North East              | 306799            | 6185490            |
| I2                    | Port Kembla Outer Harbour | Mid Outer Harbour                     | 305711            | 6185110            |
| I4                    | Port Kembla Outer Harbour | Outer Harbour Breakwater East         | 306531            | 6185250            |
| I6                    | Port Kembla Outer Harbour | Outer Harbour Breakwater Middle       | 307497.1          | 6184396            |
| I7                    | Port Kembla Outer Harbour | Outer Harbour Breakwater West         | 307173.8          | 6184420            |
| R1                    | Port Jackson              | Port Jackson – Parsley Bay            | 340529            | 6253150            |
| R2                    | Port Jackson              | Port Jackson – Shark Bay              | 339549            | 6253070            |
| R3                    | Port Jackson              | Port Jackson – Chowder Bay            | 338335            | 6254100            |
| R4                    | Port Jackson              | Port Jackson – Whiting Beach          | 336969            | 6253520            |
| R5                    | Port Jackson              | Port Jackson – Cockatoo Island        | 332324            | 6254270            |
| R6                    | Port Jackson              | Port Jackson – Onion Point (Woolwich) | 331253            | 6254170            |
| R7                    | Port Jackson              | Port Jackson – Balls Head Bay         | 331083            | 6252940            |
| R8                    | Port Jackson              | Port Jackson – Balmain                | 333015            | 6252460            |
| R9                    | Port Botany               | Port Botany – Kurnell                 | 334488.1          | 6235548            |
| R10                   | Port Botany               | Port Botany – Yarra Bay               | 335703            | 6238963            |
| R11                   | Port Botany               | Port Botany – Foreshore Road          | 333835.9          | 6240957            |
| R12                   | Port Botany               | Port Botany – Runway West             | 331222.8          | 6242052            |
| R13                   | Port Botany               | Georges River – Taren Point           | 327410.3          | 6234843            |
| R14                   | Port Botany               | Georges River – Tom Uglys Point       | 326002            | 6236257            |
| R15                   | Port Botany               | Georges River – Shipwrights Point     | 325278            | 6235920            |
| R16                   | Port Botany               | Georges River – Kangaroo Point        | 324259            | 6235860            |

<sup>1</sup> Site numbers have been assigned to be consistent with co-located water quality monitoring sites where possible.

Figure 4.1 Monitoring Locations – Impact Sites

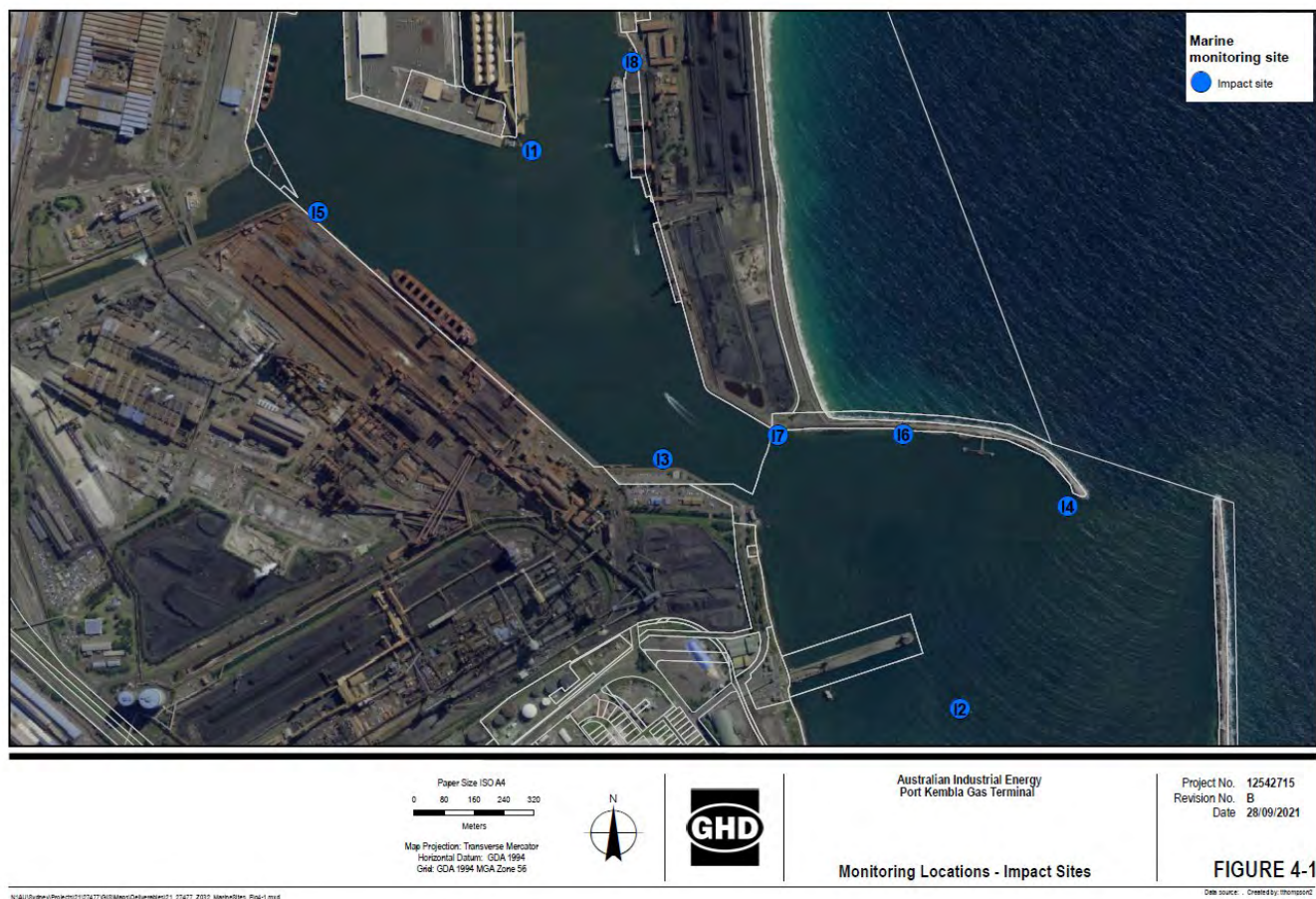
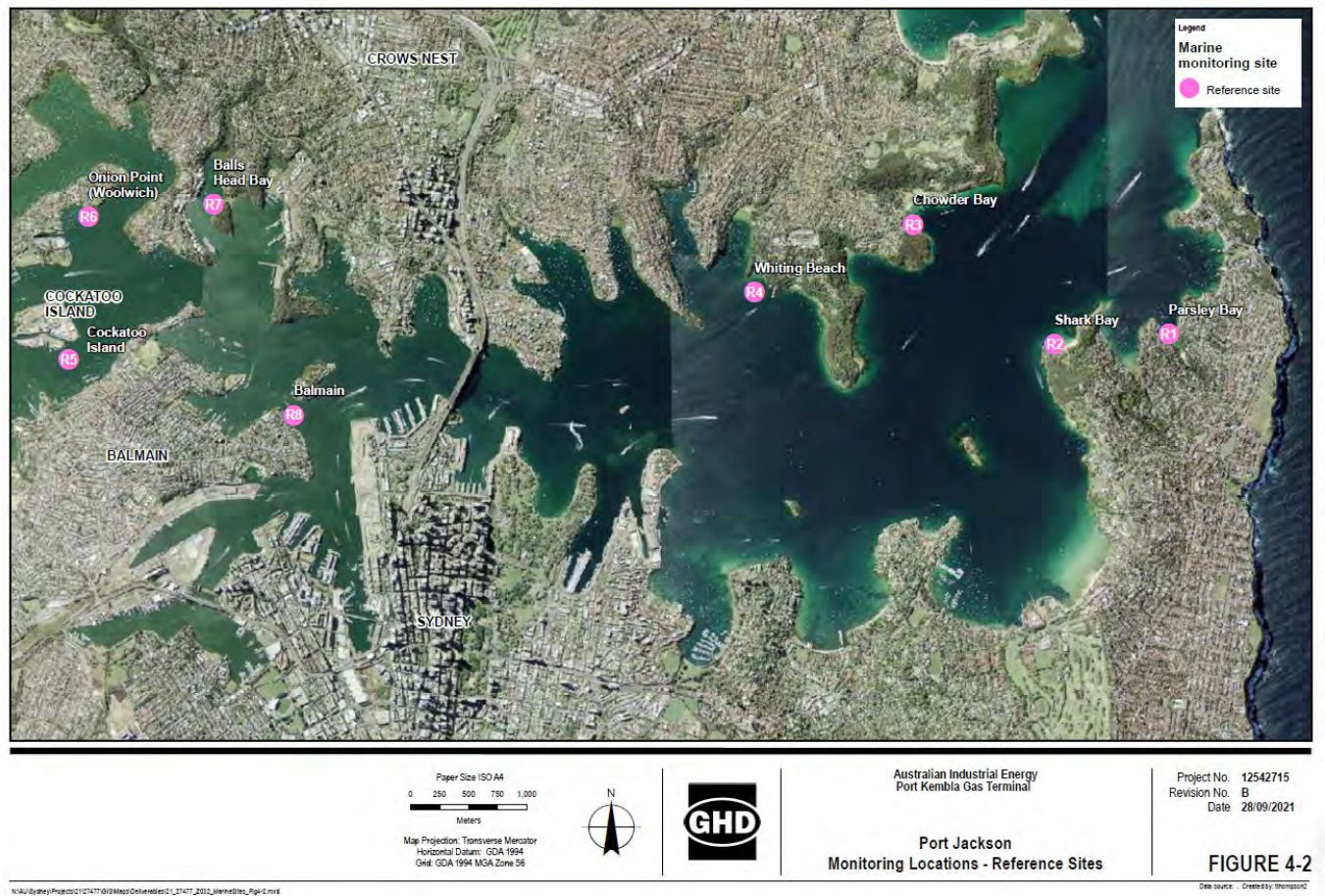




Figure 4.2 Monitoring Locations – Port Jackson Reference Sites



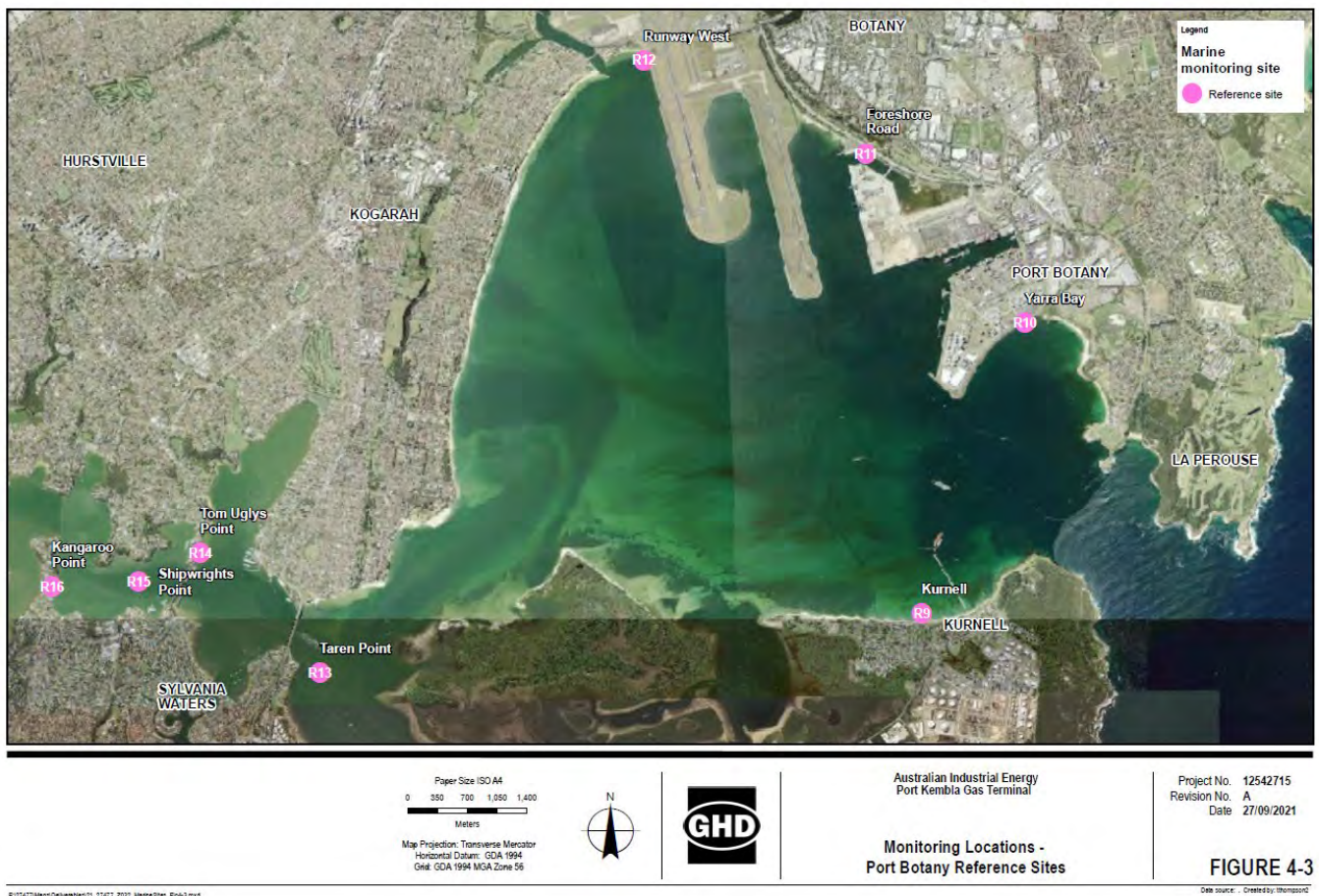


Figure 4.3 Monitoring Locations – Port Botany Reference Sites

## 4.1.4 Duration and Frequency

The EHMP will be implemented over three phases, comprising:

1. Baseline Construction Monitoring<sup>2</sup> Event 1, scheduled for Summer of 2021/22<sup>3</sup>
2. Construction Monitoring Event 2, scheduled for Summer of 2022/23
3. Operational Monitoring Event 1, scheduled for Summer of 2023/24

EPL 2159, condition E3 requires a two year monitoring frequency; after two monitoring events the program is to be reviewed in consultation with the EPA (refer section 6, and Table 1.1). The program shall therefore be reviewed after the Summer 2023/24 monitoring event to enable capture of the required two year frequency prior to program review.

For each monitoring event the monitoring arrays will be deployed for a period of 8 – 12 weeks, with arrays deployed in November/December and collected in February/March. Monitoring will be undertaken during the same season for each event. During the first event a visual check (via underwater drop camera) of deployed equipment will also be undertaken four to six weeks post deployment. This will enable confirmation that deployed plates are appropriately placed and have not been lost.

The program has been designed for scalability should construction phase be delayed, the EHMP can be adapted to facilitate additional monitoring if required.

## 4.2 Methods

### 4.2.1 Indicators

The indicators for the monitoring program are summarised in Table 4.2. The design approach is to employ a settlement plate array system, consistent with those previously deployed under PRP 146 (Dafforn *et al.*, 2012) and that proposed under NSW Ports (2015) Outer Harbour Monitoring Program framework.

An example settlement plate schematic is shown in Figure 4.4. Each array will consist of a backing plate upon which two 11 x 11 cm black Perspex plates will be fixed in a vertical position. The system will be anchored to the seabed at 5 m water depth, and the backing plate will be supported by a float to maintain a depth of 1 m from the seabed.

Limiting each array to two plates will lessen any risks associated with rope breakage due to excessive weight as recruitment accumulates. Vertical orientation of the array will be maintained by an appropriately weighted anchor system that allows for minimum slack necessary to account for movements in tide, wind and wave action. Each array will be orientated in line with the dominant current flow.

Redundancy has also been incorporated into the design, with an additional array to be deployed at each site. These redundancy plates will only be analysed in circumstances where the primary plate is missing.

**Table 4.2 Indicators of Ecological Health Monitoring Program**

| Monitoring Zone            | Design                                           | Total Units (per event)             | Indicator                                                                                                                      |
|----------------------------|--------------------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Inner Harbour<br>(3 sites) | 2 plates per array                               | 6 primary plates across<br>3 arrays | Sessile invertebrate<br>abundance, diversity, richness<br>Multivariate assemblage<br>analysis                                  |
|                            | Two arrays per site<br>(1 primary, 1 redundancy) | 6 back up plates                    |                                                                                                                                |
| Outer Harbour<br>(4 sites) | 2 plates per array                               | 8 primary plates across<br>4 arrays | Based on % cover of taxa<br>identified to lowest taxonomic<br>unit possible (likely family /<br>species / morphospecies level) |
|                            | Two arrays per site<br>(1 primary, 1 redundancy) | 8 back up plates                    |                                                                                                                                |

<sup>2</sup> Baseline monitoring will take place during construction Early-Works (prior to dredging). These activities pose low risk to impacts on water quality.

<sup>3</sup> Subject to approval from the Harbour Master and EPA



| Monitoring Zone           | Design                                           | Total Units (per event)              | Indicator |
|---------------------------|--------------------------------------------------|--------------------------------------|-----------|
| Port Jackson<br>(7 sites) | 2 plates per array                               | 14 primary plates across<br>7 arrays |           |
|                           | Two arrays per site<br>(1 primary, 1 redundancy) | 14 back up plates                    |           |
| Port Botany<br>(7 sites)  | 2 plates per array                               | 14 primary plates across<br>7 arrays |           |
|                           | Two arrays per site<br>(1 primary, 1 redundancy) | 14 back up plates                    |           |

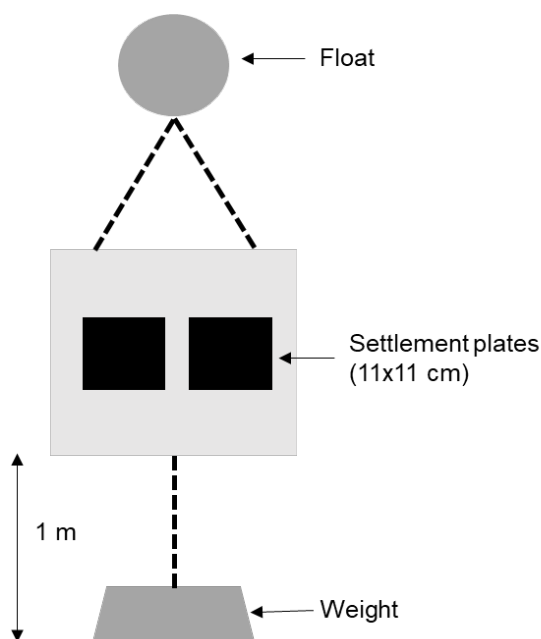


Figure 4.4 Example Settlement Plate Schematic

## 4.2.2 Collection and Preservation

At the end of the 8 to 12-week period, plates will be collected and photographed. Plates will be stored in-tact in a mesh bag submerged in formalin diluted to a 7 to 10% concentration with sea water for preservation until received by the nominated laboratory. Clear Site identification slates and rulers will be present in each field photo and each container will be clearly labelled. Once preserved in the mesh bag, the plates will be shipped in fully sealed plastic containers, kept in a cool and dark environment, and transported in sealed poly-drums.

Due to the formalin preservative, samples will be transported in accordance with Australian Dangerous Goods Code and carried as hazardous goods.

## 4.2.3 Data Analysis

Samples will be analysed by a laboratory experienced in taxonomic identification. Upon receipt the laboratory will visually inspect the samples for any damage and confirm samples received against the chain of custody. Prior to any examination, the laboratory will take a photograph of each aspect of the plate before visually inspecting presence/absence of all visible attached organisms, as certain small or translucent species may be missed in photo analysis, may not have been captured in the field and may have been damaged in transit. To minimize edge effects, the centre 8 x 8 cm of the plate will be analysed, with the remaining 3 cm boundary excluded from assessment.

## Image analysis

A custom overlay using GIMP software will outline the 8 x 8 cm marking. Following this percent cover analysis will be performed by identifying species beneath 100 randomly placed points using Coral Point Count with Excel extensions software. In the event of dense settlement, abundance will be obtained by sub sampling with total abundances extrapolated by counting individuals within 10 randomly selected 1 cm<sup>2</sup> areas.

The laboratory will identify to the lowest possible taxonomic classification, noting that use of morphospecies was appropriate for detection of change under PRP 146 (Dafforn *et al.*, 2012). Taxonomic identification will be supported using dissecting microscopes, with species codes input to the Coral Point Count software. A photographic reference collection will be collated for the project, and updated following each event.

## Statistical analysis

Univariate and multivariate statistical analysis will be used to explore the collected data and determine if impacts have occurred due to PKGT activities. In order to statistically inform potential impacts, the multivariate assemblage to the site, zone, and phase will be analysed using permutational multivariate analysis of variance (PERMANOVA) based on Bray-Curtis similarity of abundance data.

This approach allows no assumption of normality (i.e.  $p=0.05$  as in ANOVAs) allowing for comparison of unbalanced data sets. Post-hoc permutational pair wise tests using PERMANOVA will be performed to examine interactions of variables of a significant nature. In cases where the number of permutations is  $< 100$ , Monte Carlo P-values can be used to calculate the P value. To discriminate between variables (i.e. site, phase, etc), multivariate data will be graphically represented using non-metric multi-dimensional scaling (NMDS).

Univariate analysis will be carried out to investigate the differences in taxon richness and taxon abundance. As above, this will be undertaken using PERMANOVA+ to run permutational analyses of variance based on Euclidian distance of all possible pairs of samples of the variable of interest. Following this the underlying distribution of the data can be determined.

## Interfacing with other Monitoring Plans

GHD will use data collected as part of the Construction Water Quality Monitoring Plan (CWQMP) to contextualise the results of the ecological health monitoring plan. The CWQMP is proposing to use a combination of daily visual observations, weekly grab samples and Automated Monitoring Buoys (AMB) for harbour wide water quality monitoring at 5 locations (Figure 4.5). There is intentional alignment with the water quality monitoring locations and the proposed ecological health monitoring locations to allow for data synergies. The approach to water quality monitoring is outlined in Table 4.3.

GHD will obtain the raw data from the CWQMP, in addition to the monthly reports, to establish trends, and align results with construction activities or metocean events that may be influencing factors on the results.



Figure 4.5 Construction Water Quality Monitoring Plan Locations

Table 4.3 Construction Water Quality Monitoring Plan Design Outline

| Contaminant of Concern | Frequency   | Sampling method | Location                |
|------------------------|-------------|-----------------|-------------------------|
| Laboratory analysis    |             |                 |                         |
| 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 |

| Contaminant of Concern                    | Frequency                                  | Sampling method | Location                                                     |
|-------------------------------------------|--------------------------------------------|-----------------|--------------------------------------------------------------|
| 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 or from the shoreline during Stage 1 |
| Sediment plume                            | Daily                                      | Inspection      |                                                              |
| Marine mammals, Dinoflagellate Cyst Bloom | Daily                                      | Inspection      |                                                              |
| Physical parameters                       |                                            |                 |                                                              |
| Temperature                               | Continuous (15-minute recording intervals) | AMB             | Points WQMs 1,2,3 and 4                                      |
| pH                                        | Continuous (15-minute recording intervals) | AMB             | Points WQMs 1,2,3 and 4                                      |
| EC                                        | Continuous (15-minute recording intervals) | AMB             | Points WQMs 1,2,3 and 4                                      |
| DO                                        | Continuous (15-minute recording intervals) | AMB             | Points WQMs 1,2,3 and 4                                      |
| Turbidity                                 | Continuous (15-minute recording intervals) | AMB             | Points WQMs 1,2,3 and 4                                      |

## 4.2.4 Water sampling

During each deployment and retrieval of the settlement plate arrays a water sample will be collected and tested for the following:

- Physical parameters – Temperature, pH, EC, DO, Turbidity.
- Laboratory analysis – Total and dissolved metals (Aluminium, Arsenic, Cadmium, Chromium (total), Cobalt, Copper, Lead, Mercury, Nickel, Zinc), Anthracene, Benzo(a)pyrene, Fluoranthene, Naphthalene, Total PAHs, Tributyltin, TSS, Total Residual Chlorine.

Physical parameters will be measured using a calibrated, hand-held water quality meter. Sampling will be undertaken by appropriately qualified and trained personnel and with reference to relevant statutory requirements, standards and quality assurance and quality control protocols. Laboratory analysis will be undertaken by a National Association of Testing Authorities (NATA) accredited laboratory.

## 4.2.5 Validation modelling framework

Condition E3.4(c) of the EPL 21529 requires validation of the water quality modelling that was undertaken during the preparation of the EIS for FSRU operation. Namely, relating to the discharge of cool water and residual chlorine from the FSRU. Given the temporal disconnect between the writing of this EHMP, and the commencement of operations and resulting model validation exercise, it is proposed that a detailed model validation program be developed as a stand alone document. This will enable consultation with the FSRU operators and specialist subconsultants to ensure the program is designed appropriately to meet intended objectives. The model validation program design document will be submitted to relevant regulatory agencies, including the NSW EPA for agreement at least three months prior to the commencement of operations.

Presented following is a framework which will form the basis of the design document. Model validation will be undertaken in a staged approach:

- **Stage 1** will comprise field sampling which will be undertaken to understand the spatial and temporal extent of discharges during the operational phase. Field sampling will be undertaken across multiple events, enabling comparison with various modelled scenarios. Following sampling, results will be analysed and compared to modelling predictions. Should a disconnect between sampling and modelling predictions be identified (ie. a larger impact) and attributed to departures from the assessed FSRU operations or adopted modelling approach, then Stage 2 will be triggered.
- If required, **Stage 2** of the model validation will comprise a desktop assessment to understand level of impact associated with discrepancies between the modelling and field results. If further information is required to support this assessment Stage 3 will be triggered.
- If required, **Stage 3** of the model validation will be undertaken by specialist subconsultants experienced in toxicity bench testing. Tests will be designed for relevance to the species present within the Port Kembla region, and where possible will be undertaken in accordance with NATA accredited methodology.

Should the results of the model validation exercise identify impacts greater than those predicted, consideration will be given to practical measures to reduce the impacts of the discharge to the levels assessed in the EIS. The design of this EHMP will be revisited in conjunction with the implementation of any impact reduction measures to ensure monitoring objectives are still being met.

## 5. Reporting

Sessile invertebrate recruitment requires extensive field time, laboratory analysis and post processing effort and therefore is not appropriate to be relied upon for real time environmental management of dredging impacts. Adaptive management is best approached using real time, continuous data inputs such as electronic field instruments.

GHD will utilise the data collected from the CWQMP to compliment the results of the Ecological Health Monitoring Program and identify trends in water quality throughout the phases of the project and resultant impacts to sessile recruitment and surrounding water quality.

The findings from the EHMP, and associated findings from the CWQMP, will provide overall indication as to the impact of PKGT relative to the reference sites and baseline conditions observed at the impact sites pre-construction. Further, the results of the EHMP will determine, in part, the need for further monitoring to track the recovery and stabilisation of ecological health indicators if impacts are detected.

Each interim report will confirm that works have been carried out successfully and in accordance with the EHMP, identify any issues encountered, departures from the agreed EHMP and provide interim data and summary statistics. Should any impacts be identified by the interim reports, the program will be reviewed to identify appropriate management measures.

The end of operational event 1 report will provide an overarching summary of the interim reports and detailed data analysis at the end of the EHMP. This is summarised in Table 5.1.

GHD will provide one report within four months of each monitoring event to AIE with copies to NSW EPA, DPI Fisheries and the Department of Planning, Industry and Environment NSW.

*Table 5.1 Proposed Reporting Frequency*

| Phase                  | Interim progress report | End of Operational Event 1 report                              |
|------------------------|-------------------------|----------------------------------------------------------------|
| Phase 1 – Baseline     | Y                       |                                                                |
| Phase 2 – Construction | Y                       |                                                                |
| Phase 3 – Operation    |                         | Y – to be provided following one operational monitoring events |

## 6. Program Review

Condition E3.4 of the EPL 21529 notes that the EPA requires operational monitoring to be undertaken every 2 years. Based on the results and recommendations from a suitably qualified person, the EPA will review the frequency after two monitoring events in consultation with AIE.

Therefore, this document will be subject to review and revision following submission of the end of project report. Other triggers for review of the program include:

- Substantial changes to proposed works (scope/timeframes/footprint),
- Identification of broadscale impacts from dredging through complementary water quality monitoring programs,
- Identification of impacts beyond what was predicted during EIS modelling (via model validation exercise), or
- Identification of logistical issues beyond what has been accounted for with programmed redundancy.

Any revisions to this EHMP will be through approval by the EPA and a variation of licence condition E3. Consultation with other regulatory agencies will be undertaken as necessary. EHMP revisions will be documented for audit purposes.

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NSW Ports (2015). Draft Aquatic Biological Monitoring Program – Outer Harbour Development Port Kembla.



# Attachments

# **Attachment 1**

## **Author Qualifications**



**Anna Boden** MAppSc, BSc  
Technical Director – Ecology



**Location**

Brisbane, QLD, Australia

**Experience**

16 years

**Qualifications/Accreditations**

- Masters of Applied Science (Environmental Science), University of Sydney, 2002
- Bachelor of Science (Marine Science and Biology), University of Sydney, 2001

**Key technical skills**

- Marine impact assessment
- Project management
- Coastal development projects
- Environmental management
- Environmental reporting
- Experimental design and statistics

**Relevant experience summary**

Anna is one of GHD's leading ecologists with over 16 years' experience. She has a proven track record in technical leadership, collaboration and delivery. In her role as Technical Director she uses her leadership skills to guide delivery of work to meet client expectations. Anna has a proven track record in natural resources management, focussing on marine and estuarine ecology, water quality and sediment quality.

Anna has been responsible for the delivery of whole of life programs, from the initial establishment of baseline conditions, impact understanding, development of trigger values for management of sensitive receptors, and compliance monitoring in accordance with regulatory requirements. Anna has in-depth knowledge and understanding of approvals and permitting processes for natural resources projects, and has completed a number of assessments across NSW, Australia and Internationally.

Anna is highly familiar with the marine ecosystems of temperate Australia. Her post-graduate studies involved an assessment of heavy metals in marine sediments and mussels in Sydney Harbour. Subsequent to this she worked for four years as a research assistant at the University of Sydney's Centre of Research on Ecological Impacts of Coastal Cities.

Anna has also been approved by the Commonwealth Department of Agriculture, Water and the Environment to undertake compliance audits of EMPs conditioned under the EPBC Act, recognising her technical authority in environmental management.



## Madelaine Hooper

MEnvSc, BEnvSc(Bio)(EnvM), BIntBus, BCom(Economics)

Senior Marine Scientist / Economist



### Location

Sydney, Australia

### Experience

7+ years

### Qualifications/Accreditations

- MEnvSc(with Distinction), BEnvSc (Biology)(Environmental Monitoring), BIntBus, BCom(Economics)
- Coastal Hazard Management Course II: Advanced (Griffith University)
- Introduction to Reef Restoration – Great Barrier Reef Orpheus Island (Reef Ecologic/James Cook University)
- Registered consultant with Fiji Department of Environment (Specialist areas: Marine Flora and Fauna and Marine Pollution)
- PADI, OGUK/UKOOA, Boat License, MSIC, Survival at Sea, Fight and Extinguish Fires on Coastal Vessels, LROCP Marine Radio, First Aid and CPR/Basic Life Support, White Card, Operate and recover a 4WD, General Purpose Hand (Crew) Commercial Vessels (Search and Rescue) Certification.

### Key technical skills

- Lead scientist
- Sample design, planning and execution
- Environmental impact assessments
- Marine ecology, sediment and water quality
- Seagrass impact assessments

### Memberships

- Environment Institute of Australia and New Zealand (EIANZ)
- Professional Scientists Australia
- Australian Coastal Society (ACS)

### Relevant experience summary

Madelaine has over 7 years' experience in consulting and scientific research throughout Australia, the Pacific and the Middle East. Madelaine has experience in large scale environmental impact assessments and ecological monitoring programs, particularly in the resources sector, from project inception to establishing and operating ongoing monitoring phases of the project. Madelaine has led numerous projects both in Australia and internationally in country and has particular experience with designing and leading complex field programs to a high scientific standard. Madelaine's special interest areas include seagrass management, artificial reef design, coral reef restoration, emergency response and coastal hazard management.



# **Appendix C**

## **Contaminated Spoil Protocol**





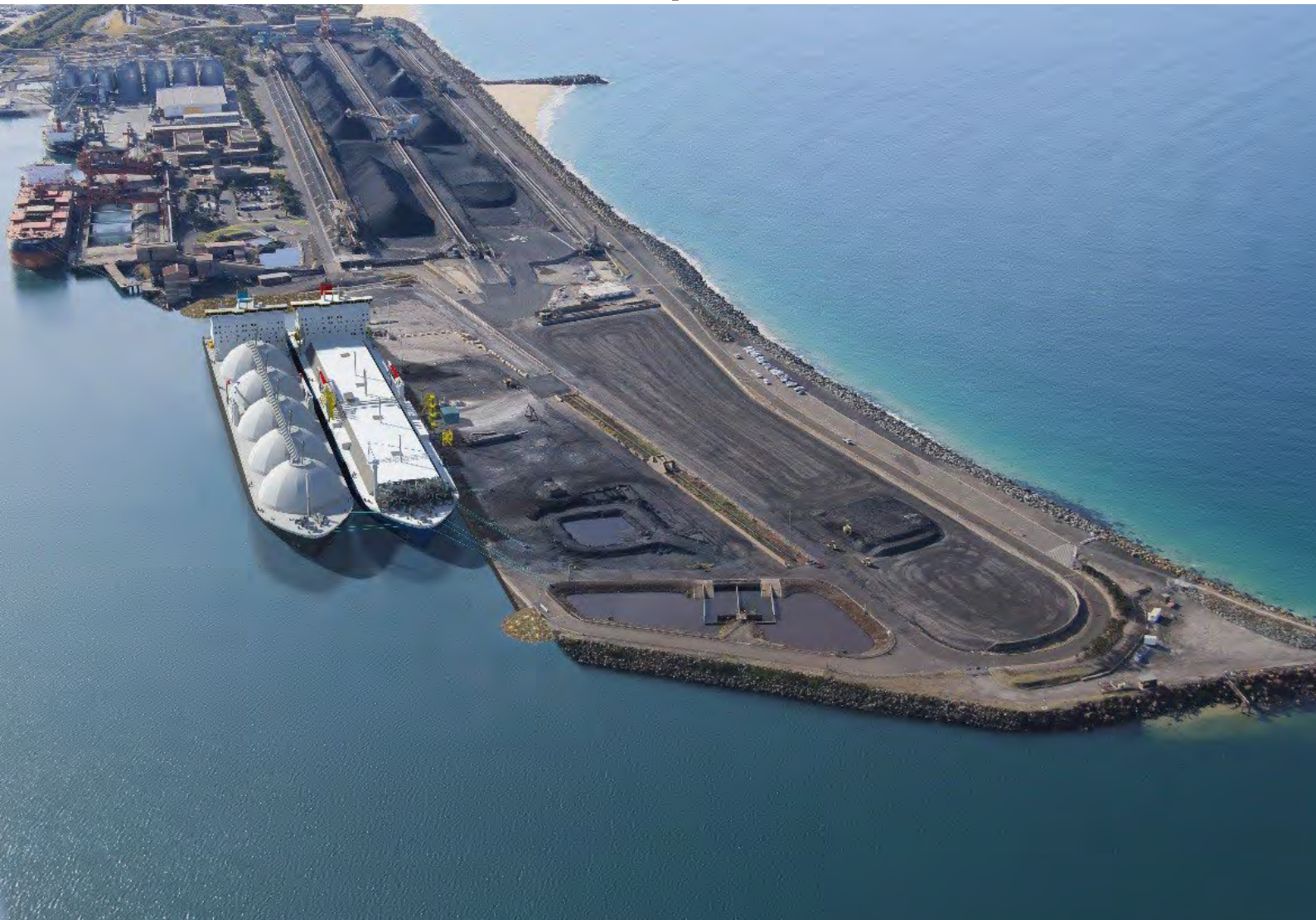
# Port Kembla Gas Terminal

**Contaminated Spoil Protocol  
Stage 2A and 2B Marine Berth  
Construction and Dredging – Land and  
Marine Based**

Australian Industrial Energy

30 May 2022

→ **The Power of Commitment**



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|                            |                                                                                                                                                     |
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| <b>Author</b>              | Nathan Alexander and Sarah Eccleshall                                                                                                               |
| <b>Project manager</b>     | Karl Rosen                                                                                                                                          |
| <b>Client name</b>         | Australian Industrial Energy                                                                                                                        |
| <b>Project name</b>        | East Coast Gas Project                                                                                                                              |
| <b>Document title</b>      | Port Kembla Gas Terminal   Contaminated Spoil Protocol                                                                                              |
| <b>Revision version</b>    | Rev E                                                                                                                                               |
| <b>Project number</b>      | 2127477                                                                                                                                             |
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|             |                              | Name                   | Signature                                                                           | Name               | Signature                                                                             | Date       |
| A           | N Alexander/<br>S Eccleshall | K Rosen /<br>I Gregson |  | K Rosen            |  | 04/02/2022 |
| B           | N Alexander                  | K Rosen                |  | K Rosen            |  | 18/02/2022 |
| C           | N Alexander                  | K Rosen                |  | K Rosen            |  | 02/03/2022 |
| D           | N Alexander                  | K Rosen                |  | K Rosen            |  | 23/03/2022 |
| E           | N Alexander                  | K Rosen                |  | K Rosen            |  | 30/05/2022 |

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# Acronyms

| Acronym   | Definition                                                   |
|-----------|--------------------------------------------------------------|
| ACM       | Asbestos containing materials                                |
| AF        | Asbestos fines                                               |
| AHD       | Australian Height Datum                                      |
| AIE       | Australian Industrial Energy                                 |
| AMP       | Asbestos Management Plan                                     |
| ANZG      | Australian and New Zealand Guideline                         |
| ASS       | Acid Sulfate Soils                                           |
| ASSMP     | Acid Sulfate Soil Management Plan                            |
| BaP       | Benzo(a)Pyrene                                               |
| Berth 101 | MBD Site Compound                                            |
| BTEXN     | Benzene, toluene, ethyl benzene and xylenes plus naphthalene |
| CD        | Chart Datum                                                  |
| CLM Act   | <i>Contaminated Land Management Act 1997</i>                 |
| COPC      | Contaminant of potential concern                             |
| CRS       | Certified Reference Standard                                 |
| CSM       | Conceptual Site Model                                        |
| CSP       | Contaminated Spoil Protocol                                  |
| CSSI      | Critical State Significant Infrastructure                    |
| CTMP      | Construction Traffic Management Plan                         |
| DEMP      | Dredge and Excavation Management Plan                        |
| DGV       | Default Guideline Values                                     |
| DP&E      | Department of Planning and Environment                       |
| DQI       | Data quality indicators                                      |
| DQO       | Data quality objectives                                      |
| EHMP      | Ecological Health Monitoring Program                         |
| EIL       | Ecological Investigation Level                               |
| EIS       | Environmental Impact Statement                               |
| EMP       | Environment Management Plan                                  |
| EMS       | Environmental Management Strategy                            |
| ENM       | Excavated Natural Material                                   |
| EPA       | NSW Environment Protection Authority                         |
| EP&A Act  | <i>Environmental Planning and Assessment Act 1979</i>        |
| EPL       | Environmental Protection Licence                             |
| FA        | Fibrous asbestos                                             |
| FSRU      | Floating Storage and Regasification Unit                     |
| GHD       | GHD Pty Ltd                                                  |
| GV-high   | Upper guideline value                                        |
| HIL       | Health Investigation Level                                   |

| Acronym               | Definition                                                  |
|-----------------------|-------------------------------------------------------------|
| HSE                   | Health, Safety and Environment                              |
| HSL                   | Health Screening Levels                                     |
| KPIs                  | Key Performance Indicators                                  |
| LAT                   | Lowest Astronomical Tide                                    |
| LNG                   | Liquified natural gas                                       |
| LOR                   | Limit of reporting                                          |
| LTEMP                 | Long Term Environment Management Plan                       |
| MBD                   | Marine Berth Construction and Dredging                      |
| mbgl                  | Metres below ground level                                   |
| mg/kg                 | Milligrams per kilogram                                     |
| NATA                  | National Association of Testing Authorities of Australia    |
| NEPC                  | National Environment Protection Council                     |
| NEPM                  | National Environment Protection Measure                     |
| ORF                   | Onshore Receiving Facilities                                |
| PAH                   | Polycyclic aromatic hydrocarbons                            |
| PASS                  | Potential Acid Sulfate Soils                                |
| PCB                   | Polychlorinated Biphenyl                                    |
| PFAS                  | Per- and polyfluoroalkyl substances                         |
| PIRMP                 | Pollution Incident Response Management Plan                 |
| PKCT                  | Port Kembla Coal Terminal                                   |
| PKGT                  | Port Kembla Gas Terminal                                    |
| PKGT EIS              | Port Kembla Gas Terminal Environmental Impact Statement     |
| PKHD                  | Port Kembla Height Datum                                    |
| Planning Systems SEPP | State Environmental Planning Policy (Planning Systems) 2021 |
| POEO Act              | <i>Protection of the Environment Operations Act 1997</i>    |
| QA/QC                 | Quality assurance/quality control                           |
| RPD                   | Relative percentage difference                              |
| RWP                   | Remediation Work Plan                                       |
| Senversa              | Senversa Pty Ltd                                            |
| SMP                   | Spoil Management Plan                                       |
| SPR                   | source-pathway-receptor                                     |
| SVR                   | Site Validation Report                                      |
| TEQ                   | Toxicity Equivalence Quotient                               |
| The Project           | Port Kembla Gas Terminal                                    |
| TOC                   | Total organic carbon                                        |
| TRH                   | Total recoverable hydrocarbons                              |
| µm                    | micrometres                                                 |
| UFP                   | Unexpected Finds Protocol                                   |
| VENM                  | Virgin Excavated Natural Material                           |
| WA DoH                | Western Australian Department of Health                     |
| WHS                   | Work Health and Safety                                      |
| WHS Act               | <i>Work Health and Safety Act 2011 (NSW)</i>                |

| Acronym               | Definition                                           |
|-----------------------|------------------------------------------------------|
| WHS Codes of Practice | <i>Work Health and Safety Codes of Practice 2011</i> |
| WHS Regulations       | <i>Work Health and Safety Regulations 2017 (NSW)</i> |
| WHSP                  | Work Health and Safety Plan                          |
| WQMP                  | Water Quality Monitoring Plan                        |

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# 1. Introduction

## 1.1 Overview

This Contaminated Spoil Protocol (CSP) has been developed as a Sub - plan to the Port Kembla Gas Terminal Project (the Project) Spoil Management Plan (SMP). The SMP is a Sub - plan to the Project's overarching Environmental Management Strategy (EMS). This CSP has been prepared by GHD Pty Ltd (GHD) on behalf of Australian Industrial Energy (AIE) to apply to construction activities associated with Stage 2A and Stage 2B of the Project. This Stage 2A and Stage 2B CSP supersedes the Stage 2A CSP.

This CSP interfaces with the other associated Sub - plans, which together describe the proposed structure for environmental management and monitoring requirements for the Project. This CSP addresses the requirements of the Port Kembla Gas Terminal Environmental Impact Statement (PKGT EIS) and associated Infrastructure Approval (SSI 9471) and Environment Protection Licence (EPL) No. 21529 and has been prepared in consultation with the NSW Environment Protection Authority (EPA), Department of Planning and Environment (DP&E) Water, NSW Ports, Port Authority of NSW (PANSW) and an EPA accredited contaminated site auditor.

## 1.2 Background

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

NSW currently imports more than 95 percent 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 more than 100 petajoules of natural gas, equivalent to more than 70 percent of NSW gas needs and will 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) (NSW) and Schedule 5 of the State Environmental Planning Policy ((Planning Systems) 2021 (Planning Systems SEPP). The Project received Infrastructure Approval from the Minister for Planning and Public Spaces on 29 April 2019.

The construction of the Project is primarily associated with the establishment of a new berth facility at Port Kembla to enable an LNG carrier to berth alongside the Floating Storage and Re-gasification Unit (FSRU) and new infrastructure to connect the terminal to the existing gas network. Excavation and dredging would be required to establish the new berth facility, with spoil deposited in a cell (referred to as the 'Emplacement Cell') in the Outer Harbour.

The development has progressed to Stage 2A and Stage 2B works located at Berth 101 (referred to as the 'Marine Berth Construction and Dredging (MBD) Site Compound') and the Outer Harbour Dredged Spoil Containment Area (referred to as 'OHDSCA' or the Emplacement Cell). Collectively, these two locations are referred to as "the site". The Stage 2A works include:

- Completion of excavation works undertaken during Stage 1 (including transport of spoil materials to the Emplacement Cell Construction Site).
- Construction of the quay wall at the MBD Site Compound.
- Construction of Onshore Receiving Facilities (ORF) at the MBD Site Compound (including construction of Wharf Topside Area, Utility Area, and Common Area).
- Installation and commissioning of power, communications, and potable water.
- Installation of gas pipeline within the MBD Site Compound as part of ORF.

The Stage 2B works include:

- Continuation of Stage 2A works.
- Excavation and dredging of the MBD Site Compound in the Inner Harbour and the Emplacement Cell in the Outer Harbour.
- Construction of the Emplacement Cell in the Outer Harbour.
- Marine based construction activities including installation of navigational aids and revetments at the MBD Site Compound.

A detailed description of the site and the Project construction scope of works is included in the Stage 2A and Stage 2B SMP.

## **1.3 Purpose of the CSP**

This CSP has been prepared in accordance with the PKGT EIS and associated Infrastructure Approval (SSI 9471) and EPL No. 21529. It describes how the management measures and commitments in the PKGT EIS, Infrastructure Approval (SSI 9471) and EPL No. 21529 relating to contaminated spoil are to be implemented by the Principal Contractors during Stage 2A and Stage 2B of the Project. AIE and its contractors acknowledge that appropriately managing spoil and waste in the vicinity of the Project site is paramount to the successful delivery of the construction phase of the Project. AIE is committed to ensuring this CSP is implemented, reviewed, and updated regularly to ensure its objectives are met and that the approval conditions outlined in the Infrastructure Approval (SSI 9471) and EPL No. 21529 are achieved.

This CSP is applicable to all staff, employees, subcontractors, and any statutory service authorities undertaking Stage 2A and Stage 2B works. The CSP implementation and on - going development will be managed by the Project Team (refer to Section 2).

## 2. Roles and responsibilities

The Project Team is responsible for all activities associated with Stage 2A and Stage 2B, including the implementation and maintenance of the various mitigation/management measures outlined in this CSP. Relevant roles and responsibilities of the Project Team are outlined in Table 2.1.

**Table 2.1** Roles and responsibilities of Project team

| Project Role                                                                                              | Responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AIE Project Director                                                                                      | <ul style="list-style-type: none"> <li>– Responsible for the overall funding and direction of works associated with Stage 2A and Stage 2B.</li> <li>– Ensuring provision of adequate resources to achieve the environmental objectives for the Project including ensuring sufficient resourcing for the Environmental Team, Engineering and Construction Teams.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| AIE Construction Manager                                                                                  | <ul style="list-style-type: none"> <li>– Proactively stewards the effective implementation of Stage 2A and Stage 2B in accordance with requirements of the Infrastructure Approval (SSI 9471), this CSP, Environmental Strategy, and all related Sub - plans.</li> <li>– Demonstrate proactive support for environmental requirements.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| AIE HSE Manager                                                                                           | <ul style="list-style-type: none"> <li>– Develop and update all Health, Safety and Environmental (HSE) Management Strategies and Sub - plans.</li> <li>– Ongoing liaison and engagement with government agencies and point of escalation for any environmental incidents.</li> <li>– Identifying environmental issues as they arise and proposing solutions.</li> <li>– Coordinate and facilitate periodic environmental inspections with the key contractors.</li> <li>– Environmental Reporting.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Emplacement Cell Auditor                                                                                  | Audit the construction of the Emplacement Cell and verify that works have been completed in accordance with the design intent (Emplacement Cell). The auditor role is to satisfy Condition 10 Schedule 3 of the Infrastructure Approval and any other relevant conditions therein.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager           | <ul style="list-style-type: none"> <li>– On-site Project management and control.</li> <li>– Decision-making authority relating to environmental performance of the construction program.</li> <li>– Authority over Project construction and site activities in accordance with the EMS.</li> <li>– Ensure relevant training is provided to all Project staff prior to commencing individual activities.</li> <li>– Reports to AIE Construction Manager on environmental matters.</li> <li>– Ensures appropriate Contractor resources are allocated to implement the environmental requirements.</li> <li>– Responsible for planning and scheduling of construction, and to ensure operations are conducted in accordance with statutory requirements and the EMS.</li> <li>– Monitors performance against environmental Key Performance Indicators (KPIs).</li> <li>– Ensures that all environmental objectives associated with the Project are achieved.</li> <li>– Day-to-day decision-making authority relating to environmental performance of construction activities and direct site activities and construction.</li> <li>– To provide resources to ensure environmental compliance and continuous improvement.</li> <li>– Ensure all personnel are aware of any changes to EMS, this CSP and improved procedures.</li> <li>– Ensure this CSP is implemented for the duration of Stage 2A and Stage 2B</li> </ul> |
| Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman | <ul style="list-style-type: none"> <li>– Implement requirements contained in the EMS and Sub - Plans, work procedures and standard drawings.</li> <li>– Maintaining open and transparent communication with other Project discipline managers and other areas of the Project.</li> <li>– Reporting of hazards and incidents and implementing any rectification measures.</li> <li>– Ensures appropriate contractor resources are allocated.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |



| Project Role                                                                                                              | Responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                           | <ul style="list-style-type: none"> <li>– Orders STOP WORK for any environmental breaches and reports incidents to the Project Manager.</li> <li>– Ensure this CSP is implemented for the duration of Stage 2A and Stage 2B.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Stage 2A Principal Contractor Environmental Representative and Stage 2B Principal Contractor Environmental Representative | <ul style="list-style-type: none"> <li>– Delivers environmentally focussed toolbox talks and provides applicable site inductions.</li> <li>– Provides environmental advice, assistance, and direction to Project Manager to ensure construction activities are conducted in accordance with regulatory legislation and this CSP.</li> <li>– Participate and cooperate with AIE HSE Manager with regards to undertaking of joint environmental site inspections.</li> <li>– Coordinate / undertake wet-weather inspections as per EPL No.21529 and report accordingly to the AIE HSE Manager.</li> <li>– Develop strong working relationships with the AIE team and Consultants.</li> <li>– Ensure environmental risks are appropriately identified, communicated, and effectively managed.</li> <li>– Ensure communication of relevant environmental information to Project personnel.</li> <li>– Provide specialist advice and input as required.</li> <li>– 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.</li> <li>– Orders STOP WORK for any environmental breaches and immediately reports incidents to Principal Contractor Project Manager and AIE HSE Manager.</li> </ul> |
| AIE Environmental Representative and AIE Environmental Contractor                                                         | <ul style="list-style-type: none"> <li>– Develop strong working relationships with the Principal Contractor Team and Consultants.</li> <li>– Ensure environmental risks are appropriately identified, communicated, and effectively managed.</li> <li>– Instruct and advise management team on compliance issues.</li> <li>– Provide specialist advice and input as required.</li> <li>– Co-ordinate internal audits of this CSP.</li> <li>– Conduct audit review as required.</li> <li>– Reports on the performance of this CSP and recommends changes or improvements to Project Manager.</li> <li>– Orders STOP WORK for any environmental breaches and immediately reports incidents to the AIE Construction Manager and AIE HSE Manager.</li> <li>– Conducts investigation and response to environmental complaints and inquiries, where required.</li> <li>– Undertake all required environmental monitoring for this phase of the Project.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Environmental Consultant (GHD)                                                                                            | <ul style="list-style-type: none"> <li>– Engaged by AIE. Responsible for providing technical guidance to the Contractor in appropriately implementing the requirements of the CSP, monitoring of work areas for environmental purposes, collection and analysis of validation and characterisation samples, and advising AIE of appropriate actions based on observations, sampling, and analysis. Responsible for preparing the Site Validation Report (SVR) at the completion of remediation.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Subcontractors and construction personnel                                                                                 | <ul style="list-style-type: none"> <li>– Undertake an environmental induction prior to accessing to site.</li> <li>– Comply with legislative requirements.</li> <li>– Participate in inspections and audits.</li> <li>– Follow environmental procedures.</li> <li>– Report all environmental incidents and hazards.</li> <li>– Introduce environmental topics to prestart meetings.</li> <li>– Ensure that all relevant permits and clearances are in place prior to commencing work.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

### 3. Legislative requirements

The legislative requirements applicable to Stage 2A and Stage 2B are listed in Table 3.1.

Table 3.1 Legislation and relevant policy applicable to this CSP

| Legislation and Regulation                                                                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Applicability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Federal</b>                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM)</i> | <p>The <i>National Environment Protection (Assessment of Site Contamination) Measure 1999</i> (referred to here as the NEPM) was produced by the federal National Environmental Protection Council (NEPC) in 1999 and was revised and updated in 2013 by way of the National Environmental Protection (Assessment of site Contamination) Amendment Measure 2013 (NEPC, 2013). The amended NEPM is still referred to as the NEPM 1999. The NEPM provides a national framework for conducting assessments of contaminated sites in Australia.</p> <p>The purpose of the NEPM is to “<i>establish a nationally consistent approach to the assessment of site contamination to ensure sound environmental management practices by the community which includes regulators, site assessors, environmental auditors, landowners, developers and industry.</i>”</p> <p>The desired environmental outcome for this NEPM is “<i>to provide adequate protection of human health and the environment, where site contamination has occurred, through the development of an efficient and effective national approach to the assessment of site contamination.</i>”</p> | <p>The NEPM addresses assessment of contamination and does not provide specific guidance for remediation or management of risk, although principles for remediation and management of contaminated sites are presented in Volume 1 of the NEPM.</p> <p>The NEPM includes two Schedules: Schedule A comprises a flowchart of the recommended general process for the assessment of site contamination and its relationship to the management of site contamination and Schedule B consists of technical guidelines about site assessment criteria, site investigation procedures, laboratory analyses, human health risk assessment, ecological risk assessment, derivation of investigation levels, groundwater risk assessment, community engagement and risk consultation and competencies and acceptance of environmental auditors and related professionals.</p> <p>In broad terms, the assessment process can be described as:</p> <ul style="list-style-type: none"> <li>– Tier 1 Preliminary investigation, laboratory analysis and interpretation, development of a conceptual site model (CSM) and assessment of results with reference to investigations or screening levels. The need for risk-based remediation assessment to derive response levels and/or the need for remediation is evaluated.</li> <li>– Where required, Tier 1, Tier 2 or 3 Detailed investigation/Site specific risk assessment, laboratory analysis and interpretation are completed, and the requirement for remediation is evaluated.</li> </ul> |
| <i>Work Health and Safety Act 2011</i>                                                        | <p>The <i>Federal Work Health and Safety Act 2011</i> provides a nationally consistent framework to ensure the health and safety of workers and workplaces. AIE has a duty under the Act to provide the highest level of protection possible against harm to health, safety and hazards and risks to all workers.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>As there is a potential for asbestos to be encountered within fill or as subsurface structures at the site, the primary legislative requirements detailing AIE’s obligations regarding the presence of asbestos (if it is encountered) on the site are listed as follows:</p> <ul style="list-style-type: none"> <li>– <i>Work Health and Safety Act 2011</i>(NSW) (WHS Act)</li> <li>– <i>Work Health and Safety Regulations 2017</i> (NSW) (WHS Regulations)</li> <li>– <i>How to Manage and Control Asbestos in the Workplace, 2019 SafeWork NSW</i> (SafeWork NSW, 2019a).</li> <li>– <i>How to Safely Remove Asbestos, 2019 SafeWork NSW</i> (SafeWork NSW, 2019b).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

| Legislation and Regulation                                                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Applicability                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Work Health and Safety Codes of Practice 2011</i> (WHS Codes of Practice) | The WHS Codes of Practice are instruments which provide detailed information on specific hazards and risks, such as management and control of asbestos, safe removal of asbestos and hazardous chemical management.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The WHS Codes of Practice are made under the Federal <i>Work Health and Safety Act 2011</i> and applies to all persons who have a duty under the Act. The Codes of Practice provide guidance on meeting obligations under the WHS Act and WHS Regulations. |
| <b>State</b>                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                            |
| <i>Contaminated Land Management Act 1997</i> (CLM Act)                       | <p>The CLM Act establishes a process for investigation and remediation of land that the EPA considers to be significantly contaminated. The Act sets out contamination management protocols, outlines the role of the EPA in the assessment and supervision of contaminated land and provides for accreditation of site auditors. The CLM Act has a comprehensive suite of guidelines related to assessment and management of contamination administered by the EPA, including:</p> <ul style="list-style-type: none"> <li>– NSW EPA (1995), <i>Contaminated Sites: Sampling Design Guidelines</i>. (NSW EPA, 1995).</li> <li>– NSW EPA (2020), <i>Consultants reporting on contaminated land – Contaminated land guidelines</i> (NSW EPA, 2020).</li> <li>– NSW EPA (2017), <i>Contaminated Sites: Guidelines for NSW Site Auditor Scheme (3<sup>rd</sup> ed.)</i> (NSW EPA, 2017).</li> <li>– NSW EPA (2014a). <i>Waste Classification Guidelines Part 1: Classification of Waste</i> (NSW EPA, 2014a).</li> <li>– NSW EPA (2014b). <i>Waste Classification Guidelines Part 4: Acid sulfate soils</i> (NSW EPA, 2014b).</li> </ul> <p>Guidelines approved under the CLM Act also include:</p> <ul style="list-style-type: none"> <li>– <i>National Environment Protection (Assessment of Site Contamination) Measure 1999 as amended 2013</i> (NEPC, 2013).</li> <li>– <i>Australian and New Zealand - Toxicant Default Guideline Values for Sediment Quality</i> (ANZG, 2018a).</li> <li>– <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Canberra ACT, Australia and New Zealand Governments and Australian state and territory governments</i> (ANZG, 2018b).</li> <li>– Friebe, E and Nadebaum, P (2011). <i>Health screening levels for petroleum hydrocarbons in soil and Groundwater</i>. CRC CARE Technical Report no. 10. CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia, 2011 (Friebe &amp; Nadebaum, 2011).</li> </ul> | Contamination assessment for the Project has been undertaken in accordance with the CLM Act and its guidelines. An EPA accredited site auditor, Melissa Porter from Senversa, has been appointed as the auditor for the Project.                           |
| <i>Protection of the Environment Operations Act 1997</i> (POEO Act)          | The objectives of the POEO Act are to protect, restore and enhance the quality of the environment, in recognition of the need                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Clause 9 of Schedule 1 applies to chemical storage facilities and includes developments with capacity to store more than 200 tonnes of liquefied gases. The FSRU will be permanently                                                                       |

| Legislation and Regulation | Description                                                                                                                                                                                                                                                                                 | Applicability                                                                                                                                                                                                                                                                                                                            |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                            | to maintain ecologically sustainable development.<br>The POEO Act provides for an integrated system of licensing and contains a core list of activities requiring an EPL from the NSW EPA. These activities are called 'Scheduled Activities' and are listed in Schedule 1 of the POEO Act. | moored at the MBD Site Compound and will therefore likely constitute a scheduled activity requiring an EPL.<br>Clause 15 of Schedule 1 applies to contaminated soils treatment which includes treatment or storage of more than 30,000 m <sup>3</sup> of contaminated soils.<br>EPL No 21529 has been issued for the Project by the EPA. |
| WHS Regulations            | The WHS Regulations set out the specific requirements for hazards and risks related to workplaces in NSW.                                                                                                                                                                                   | Division 6 of the WHS Regulations outlines the duties for health monitoring. Part 8.3 provides management of asbestos and associated risks.                                                                                                                                                                                              |

## 3.1 Guidelines

The framework for the management of spoil for the Project was developed with reference to guidelines listed below, with detailed assessment criteria included in Section 4.

### 3.1.1 National Environmental Protection (Assessment of site Contamination) Measure 1999 (as amended 2013) (NEPC, 2013)

The NEPM provides a national framework for conducting assessments of contaminated sites in Australia. The purpose of the NEPM is to *"establish a nationally consistent approach to the assessment of site contamination to ensure sound environmental management practices by the community which includes regulators, site assessors, environmental auditors, landowners, developers and industry."*

The desired environmental outcome for this NEPM is *"to provide adequate protection of human health and the environment, where site contamination has occurred, through the development of an efficient and effective national approach to the assessment of site contamination."*

The NEPM addresses assessment of contamination and does not provide specific guidance for remediation or management of risk, although principles for remediation and management of contaminated sites are presented in Volume 1 of the NEPM, as discussed in Section 6.

The NEPM includes two Schedules:

- Schedule A comprises a flowchart of the recommended general process for the assessment of site contamination and its relationship to the management of site contamination.
- Schedule B consists of technical guidelines about site assessment criteria, site investigation procedures, laboratory analyses, human health risk assessment, ecological risk assessment, derivation of investigation levels, groundwater risk assessment, community engagement and risk consultation and competencies and acceptance of environmental auditors and related professionals.

In broad terms, the assessment process can be described as:

- Tier 1 Preliminary investigation, laboratory analysis and interpretation, development of a CSM and assessment of results with reference to investigations or screening levels. The need for risk-based remediation assessment to derive response levels and/or the need for remediation is evaluated.
- Where required, Tier 1, Tier 2 or Tier 3 Detailed investigation/Site specific risk assessment, laboratory analysis and interpretation are completed, and the requirement for remediation is evaluated.

### 3.1.2 State guidelines

NSW has a comprehensive suite of guidelines relating to assessment and management of contamination, administered by the EPA under the CLM Act and the POEO Act. These include the following:

- NSW EPA (1995), *Contaminated Sites: Sampling Design Guidelines* (NSW EPA, 1995).

- NSW EPA (2020), *Consultants reporting on contaminated land – Contaminated land guidelines* (NSW EPA, 2020).
- NSW EPA (2017), *Contaminated Sites: Guidelines for NSW Site Auditor Scheme (3rd ed.)* (NSW EPA, 2017).
- NSW EPA (2014a). *Waste Classification Guidelines Part 1: Classification of Waste* (NSW EPA, 2014a).
- NSW EPA (2014b). *Waste Classification Guidelines Part 4: Acid Sulfate soils* (NSW EPA, 2014b).

Guidelines approved under the CLM Act also include:

- *National Environment Protection (Assessment of Site Contamination) Measure 1999* as amended 2013 (NEPC, 2013).
- Australian and New Zealand - *Toxicant Default Guideline Values for Sediment Quality* (ANZG, 2018a).
- Australian and New Zealand *Guidelines for Fresh and Marine Water Quality*. Canberra ACT, Australia and New Zealand Governments and Australian state and territory governments (ANZG, 2018b).
- Friebe, E and Nadebaum, P (2011). *Health screening levels for petroleum hydrocarbons in soil and Groundwater*. CRC CARE Technical Report no. 10. CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia, 2011. (Friebe & Nadebaum, 2011).

As there is a potential for asbestos to be encountered within fill or as subsurface structures at the site, the primary legislative requirements detailing AIE's obligations regarding the presence of asbestos (if it is encountered) on the site are listed as follows:

- *Work Health and Safety (National Uniform Legislation) Act 2011* (NSW).
- WHS Regulations.
- *How to Manage and Control Asbestos in the Workplace*, 2019 SafeWork NSW (SafeWork NSW, 2019a).
- *How to Safely Remove Asbestos*, 2019 SafeWork NSW (SafeWork NSW, 2019b).

## **3.2 Conditions of approval**

The planning requirements and the corresponding contaminated spoil management measures applicable to Stage 2A and Stage 2B are listed in Table 3.2. Management measures are detailed in Section 5 through Section 8.

The planning requirements include the conditions set out in the Infrastructure Approval (SSI 9471) dated 13 October 2021, EPL No. 21529 and the mitigation/management measures outlined in the PKGT EIS.

Table 3.2 Planning requirements

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Reference                | Responsibility                                                                                                                                                                                                                                                                                                                | Evidence                                                                                     | Applicability to this CSP |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------|
| <b>Infrastructure Approval Requirements (SSI 9471)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |                                                                                                                                                                                                                                                                                                                               |                                                                                              |                           |
| <b>Spoil Management Plan</b><br>Prior to the commencement of construction, the proponent must prepare a SMP to the satisfaction of the Planning Secretary and in consultation with the EPA, DP&E Water, NSW Ports, PANSW and an EPA accredited contaminated site auditor. The plan must be consistent with the ECR and include:<br>(a) CSP that includes: <ul style="list-style-type: none"> <li>– procedures for identifying and managing unexpected finds of contaminated or asbestos containing materials along the pipeline route and at Berth 101.</li> <li>– a strategy for addressing any contamination that has been encountered, if required (including the remediation and/or removal of contaminated soil or groundwater); and</li> <li>– details on how environmental and health risks will be mitigated and managed.</li> </ul> | Schedule 3, Condition 11 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Environmental Representative and Stage 2B Principal Contractor Environmental Representative</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Section 7.3.3<br>Section 6.3<br>Section 7.4.2<br>Section 6.2.1<br>Section 4.2.1<br>Section 8 | Applicable                |
| At the completion of any dredging, excavation and disposal works, the Proponent must engage a site auditor accredited by the EPA to issue a Section A Site Audit Statement confirming the suitability of the site for its intended use.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Schedule 3, Condition 13 | – AIE                                                                                                                                                                                                                                                                                                                         | Section 6.2.1<br>Section 7.4                                                                 | Applicable                |
| <b>PKGT EIS Management Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |                                                                                                                                                                                                                                                                                                                               |                                                                                              |                           |
| Inclusion of an Unexpected Finds Protocol (UFP) for contamination in the EMS for the work associated with construction activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | EIS Measure C03          | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> </ul>                                                                                                                                                | Section 6.5                                                                                  | Applicable                |

### 3.3 Environment Protection Licence

AIE have been issued an EPL under the POEO Act as of 2 June 2021. The conditions of EPL No. 21529 related to contaminated spoil management are provided in Table 3.3.

Table 3.3 EPL No. 21529 conditions applicable to contaminated spoil

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Reference             | Evidence               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------|
| <p><b>Processes and management</b></p> <p>Silt curtains must be installed and operated at the premises to minimise the pollution of waters beyond the boundary of the premises during any marine based works. Marine based works includes but is not limited to:</p> <p>pile removal; or any dredging; or construction of the Outer Harbour Emplacement Cell.</p> <p>Note: Any reclamation of material to the Emplacement Cell is subject to a licence variation in accordance with Licence Condition A1.4</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Condition O4.6 – O4.9 | Refer to WQMP and DEMP |
| <p><b>Waste management</b></p> <p>Excavated material and/or dredged spoil must not be stockpiled in Outer Harbour unless it will be re-used within the proposed Outer Harbour Emplacement Cell.</p> <p>Stockpiles of material stored at the premises must either be used as on-site backfill or Emplacement Cell construction or disposed offsite to a facility licensed to accept the material, within 12 months following stockpile creation.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Condition O5.1 – O5.2 | Section 6.4            |
| <p><b>Other operating conditions</b></p> <p>Any material that is proposed to be crushed or grinded or screened at the premises must not contain any asbestos.</p> <p>Excavated material will need an asbestos clearance certificate from a third party licensed asbestos assessor prior to being crushed or grinded or screened.</p> <p>For the purposes of the condition above, 'excavated material' excludes raw slag, concrete or basecourse.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Condition O6.1 – O6.2 | Section 6.3.3          |
| <p><b>Monitoring records</b></p> <p>The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.</p> <p>All records required to be kept by this licence must be:</p> <ol style="list-style-type: none"> <li>in a legible form, or in a form that can readily be reduced to a legible form.</li> <li>kept for at least 4 years after the monitoring or event to which they relate took place; and</li> <li>produced in a legible form to any authorised officer of the EPA who asks to see them.</li> </ol> <p>The following records must be kept in respect of any samples required to be collected for the purposes of this licence:</p> <ol style="list-style-type: none"> <li>the date(s) on which the sample was taken.</li> <li>the time(s) at which the sample was collected.</li> <li>the point at which the sample was taken; and</li> <li>the name of the person who collected the sample.</li> </ol> | Condition M1.1 – M1.3 | Refer to SMP           |
| <p><b>Recording of pollution complaints</b></p> <p>The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.</p> <p>The record must include details of the following:</p> <ol style="list-style-type: none"> <li>the date and time of the complaint.</li> <li>the method by which the complaint was made.</li> <li>any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect.</li> <li>the nature of the complaint.</li> </ol>                                                                                                                                                                                                                                                                                                                                                     | Condition M7.1 – M7.4 | Refer to SMP           |



| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Reference             | Evidence                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------------------------|
| <p>e. the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and</p> <p>f. if no action was taken by the licensee, the reasons why no action was taken.</p> <p>The record of a complaint must be kept for at least 4 years after the complaint was made.</p> <p>The record must be produced to any authorised officer of the EPA who asks to see them.</p>                                                                                                                                                                                                                                                                                                                                              |                       |                                            |
| <p><b>Telephone complaints line</b></p> <p>The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.</p> <p>The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.</p> <p>The preceding two conditions do not apply until 1 month after the date of the issue of this licence.</p>                                                                                                                       | Condition M8.1 – M8.3 | Refer to SMP                               |
| <p><b>Requirement to monitor volume or mass</b></p> <p>The licensee must record the volume of material that is crushed or grinded at the premises.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Condition M9.1        | Section 6.3<br>Section 6.4<br>Refer to SMP |
| <p><b>Other monitoring and recording conditions</b></p> <p>The licensee must carry out, as a minimum, daily inspections of all water pollution control measures required by this licence. A record of each inspection must be made and produced to an EPA authorised officer if requested. The record must include:</p> <ol style="list-style-type: none"> <li>Date and time of inspection.</li> <li>Details of the location of dredging operations.</li> <li>Condition of silt curtains and other water pollution controls.</li> </ol> <p>Note: No movement of dredge spoil is permitted when a silt curtain required by this licence has not been maintained or is not achieving the requirements of this licence.</p>                                              | Condition M10.1       | Refer to SMP                               |
| <p><b>Notification of environmental harm</b></p> <p>Notifications must be made by telephoning the Environment Line service on 131 555.</p> <p>Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.</p> <p>The licensee must provide written details of the notification to the EPA within 7 days of the date on which they became aware of the incident.</p>                                                                                                                                                                                          | Condition R2.1 – R2.2 | Refer to SMP                               |
| <p><b>Emplacement Cell Report</b></p> <p>Condition of consent No. 8 for the project (SSI 9471) requires that an ECR is prepared to the satisfaction of the Planning Secretary prior to the commencement of dredging, disposal, and emplacement activities.</p> <p>The licensee must provide a ECR to the EPA for comment. The report must be provided to the EPA at least four weeks prior to commencement of dredging disposal and emplacement activities.</p>                                                                                                                                                                                                                                                                                                       | Condition E1.1        | Section 7.4<br>Refer to ECR (SMEC, 2022)   |
| <p><b>Pollution Incident Response Management Plan (PIRMP)</b></p> <p>The Licensee must prepare a PIRMP that complies with Part 5.7A of the POEO Act (1997) in relation to the activity to which the licence relates. The PIRMP must be in the form required by the 'Regulations' and include the following:</p> <ul style="list-style-type: none"> <li>- the procedures to be followed by the holder of the relevant environment protection licence, or the occupier of the relevant premises, in notifying a pollution incident to: <ul style="list-style-type: none"> <li>• the owners or occupiers of premises in the vicinity of the premises to which the environment protection licence or the direction under section 153B relates, and</li> </ul> </li> </ul> | Condition E2.1        | Refer to SMP                               |

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Reference | Evidence |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------|
| <ul style="list-style-type: none"> <li>the local authority for the area in which the premises to which the environment protection licence or the direction under section 153B relates are located and any area affected, or potentially affected, by the pollution, and</li> <li>any persons or authorities required to be notified by Part 5.7,</li> </ul> <ul style="list-style-type: none"> <li>– a detailed description of the action to be taken, immediately after a pollution incident, by the holder of the relevant environment protection licence, or the occupier of the relevant premises, to reduce or control any pollution,</li> <li>– the procedures to be followed for co-ordinating, with the authorities or persons that have been notified, any action taken in combating the pollution caused by the incident and the persons through whom all communications are to be made,</li> <li>– any other matter required by the regulations, including 'Keeping of Plan', 'Testing of Plan', 'Making Plan Readily Available' and 'Implementation of Plan'.</li> </ul> |           |          |

## 4. Assessment criteria

### 4.1 Relevant guidelines

The framework for the contamination assessment was developed with reference to relevant guidelines relating to assessment and management of contamination, as detailed in Section 3.

In the first instance, the most sensitive assessment criteria will be compared with the concentrations of any contamination identified at the site. If these are exceeded, the specific land use and exposure scenarios relevant to the area and depth at which the subject material is located will be examined, and the concentrations compared with the appropriate criteria for those circumstances. If the relevant criteria are exceeded, the material will be managed or remediated in accordance with this CSP.

### 4.2 Assessment/validation criteria - soil

#### 4.2.1 Health investigation and screening levels

The assessment criteria proposed for the CSP were sourced from the following references:

- NEPM (NEPC, 2013).
- CRC CARE Technical Report No. 10 – Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater (Friebel & Nadebaum, 2011).

The NEPM (NEPC, 2013) presents health-based investigation levels for different land uses (e.g., industrial / commercial, residential, recreational, etc.) as well as ecological investigation levels.

The MBD Site Compound is situated within a heavy industrial area of Port Kembla. The site land use has been and will continue to be industrial. If any material is transported off-site for reuse as capping material in the Emplacement Cell, the land use would be similar.

The potential secondary receptors are site workers in a commercial/industrial land use setting. It is expected during remediation, site workers may be in direct contact with soil for short periods.

Based on the likely receptors identified for this site, the following assessment criteria will be adopted for soil assessment purposes:

- Health investigation level (HIL) for remaining Contaminants of Potential Concern (COPC) (Table 1A (1) HIL D (NEPC, 2013).
- Direct contact screening values for petroleum hydrocarbons listed in Tables B3 and B4 (Friebel & Nadebaum, 2011).

The assessment criteria selected for the key COPC are listed in Table 4.1.

Table 4.1 Human Health assessment criteria

| COPC                           | HIL (mg/kg) | Direct contact screening values (HSL-D) (mg/kg) |
|--------------------------------|-------------|-------------------------------------------------|
| <b>Heavy Metals</b>            |             |                                                 |
| Arsenic                        | 3,000       |                                                 |
| Cadmium                        | 900         |                                                 |
| Chromium (III+VI)              | 3,600       |                                                 |
| Copper                         | 240,000     |                                                 |
| Lead                           | 1,500       |                                                 |
| Mercury                        | 730         |                                                 |
| Nickel                         | 6,000       |                                                 |
| Zinc                           | 400,000     |                                                 |
| <b>TRH</b>                     |             |                                                 |
| F1 (C6-C10)                    |             |                                                 |
| F1 (C6-C10 less BTEX)          |             | 26,000                                          |
| F2 (>C10-C16)                  |             |                                                 |
| F2 (>C10-C16 less naphthalene) |             | 20,000                                          |
| F3 (>C16-C34)                  |             | 27,000                                          |
| F4 (>C34-C40)                  |             | 38,000                                          |
| <b>PAH</b>                     |             |                                                 |
| Carcinogenic PAHs (as BaP) TEQ | 40          |                                                 |
| Total PAH                      | 4,000       |                                                 |
| <b>PCB</b>                     |             |                                                 |
|                                | 7           |                                                 |

In addition to human health risks, ecological risks also need consideration for the above land uses. The ecological risks consider contaminant impacts to vegetation and transitory wildlife. The risk to those receptors is dependent on the exposure pathway and site activities, which may degrade ecological values. The site and surrounding areas have been used for heavy industrial activities for over 50 years, which has significantly reduced the potential habitat value for ecological receptors. Therefore, terrestrial ecological values are significantly degraded and are not considered to be required for further site assessment or validation in relation to land-based use of materials. Aquatic ecological risks are discussed in Section 4.3 below.

## 4.2.2 Asbestos

The NEPM provides guidance relating to the assessment of known and suspected asbestos contamination in soil and addresses both friable and non-friable forms of asbestos. The health screening levels for asbestos in soil have been adopted from the Western Australian Department of Health (WA DoH) *Guidelines for Remediation and Management of Asbestos Contaminated Sites in Western Australia* (WA DoH, 2009). It is noted that an updated version of the Western Australian guidelines was issued in 2021 (WA DoH, 2021), but the health screening levels have not changed.

The NEPM guidance emphasises that the assessment and management of asbestos contamination should consider the condition of the asbestos materials and the potential for damage and resulting release of asbestos fibres. Therefore, for the purposes of assessing the significance of asbestos in soil contamination, three terms are used as summarised below:

- Bonded asbestos containing material (ACM) – sound condition although possibly broken or fragments and the asbestos is bound in a matrix.
- Fibrous asbestos (FA) – friable asbestos materials such as severely weathered ACM and asbestos in the form of loose fibrous materials such as insulation.

- Asbestos fines (AF) – including free fibres of asbestos, small fibre bundles and fragmented ACM that passes through a 7 millimetres x 7 millimetres sieve.

From a risk to human health perspective, FA and AF are considered by the NEPM to be equivalent to “friable” asbestos in SafeWork NSW Codes of Practice (SafeWork, 2019a). Bonded ACM in sound condition represents a low human health risk. However, both FA and AF materials have the potential to generate, or be associated with, free asbestos fibres and may represent a significant human health risk if disturbed and fibres are made airborne.

As per Section 4.2.1, the commercial / industrial (D) Health Screening Levels (HSLs) were adopted as the most appropriate to the site, as presented in Table 4.2.

**Table 4.2 Asbestos assessment criteria**

| Form of Asbestos                          | HSL (%w/w)                           |
|-------------------------------------------|--------------------------------------|
|                                           | Commercial/industrial D              |
| Bonded ACM                                | 0.05%                                |
| FA and AF <sup>a</sup> (friable asbestos) | 0.001%                               |
| All forms of asbestos                     | No visible asbestos for surface soil |

<sup>a</sup>The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF can be quantified by gravimetric procedures. This screening level is not applicable to free fibres.

A tiered approach to risk assessment of asbestos contamination is recommended, including the development of an appropriate CSM. A weight of evidence approach is recommended with consideration given to factors such as the distribution of different fill types, the heterogeneity of the contamination and the uncertainty associated with the sampling methodology.

The NEPM states that if the Tier 1 screening levels are not exceeded, and an appropriate level of investigation has been carried out, then no contamination management actions are required except for ensuring the surface soil is free of visual asbestos. Final visual inspection of the assessment and remediated areas should not detect any visible asbestos.

GHD notes that these HSLs do not necessarily equate to requirements under the WHS Regulation or WHS Codes of Practice, which may impose requirements regardless of the concentration or proportion of asbestos in soil.

### 4.2.3 Dioxin

The NEPM does not provide human health guidelines for dioxin in soil, and therefore a toxicity assessment was completed as part of a human health risk assessment (GHDA, 2021) to identify a set of toxicity criteria that have then been used to derive site-specific screening criteria for soil.

The *Human health risk assessment of dioxins in Australia* (Office of Chemical Safety, Australian Government Department of Health and Ageing, 2005) represents the most recent toxicity assessment undertaken by Australia regulators. This document recommends a toxicity reference value (TRV) of 2.3 pg/kg/day and this value has been adopted in this assessment for the incidental ingestion and dermal exposure pathways.

The NHMRC (2005) does not present TRV for the inhalation exposure pathway and therefore a route-to-route extrapolation method has been adopted based on US EPA (2009) *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual*, as recommended in the NEPM. The route-to-route extrapolation methodology can be summarised as follows:

$$\text{Extrapolated inhalation unit risk} = \text{Oral TRV} \times \frac{\text{Adult body weight (70 kg)}}{\text{Adult inhalation rate (20 m}^3/\text{day)}}$$

The inhalation TRV calculated using this method is  $8.1 \times 10^{-9}$  mg/m<sup>3</sup>. The toxicity data adopted in this assessment is summarised in Table 4.3.

**Table 4.3** Summary of adopted human health toxicity data for dioxin

| Exposure pathway     | TRV                                    | Source                                                                                                  |
|----------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------|
| Incidental ingestion | 2.3 pg/kg/day                          | NHMRC (2005) oral TRV                                                                                   |
| Inhalation           | $8.1 \times 10^{-9}$ mg/m <sup>3</sup> | Extrapolated from the NHMRC (2005) oral TRV using the approach recommended by the NEPM                  |
| Dermal contact       | 2.3 pg/kg/day                          | NHMRC (2005) oral TRV using a gastrointestinal absorption factor (GAF) of 1, sourced from US EPA (2004) |

An exposure assessment was completed using a series of 18 parameters which consider the duration and rate of exposure, potential pathways and the physical and chemical properties of the receptor and dioxins, generally assuming a commercial/industrial land use of defined in the NEPM. This model was used to calculate site-specific screening criteria for Berth 101 material, as summarised in Table 4.4.

**Table 4.4** Site specific assessment criteria for Berth 101 materials

| Exposure scenario                                                                | Site-specific screening criteria (ng/kg) | Dioxin concentration measures in Berth 101 material (ng/kg) |
|----------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------------------------|
| OHDSCA construction worker                                                       | 490                                      | Maximum: 118 ng/kg (Total WHO Mammalian TEQ (0.5 LoR))      |
| Future onsite worker (exposed to dioxin in capping material) *                   | 2320                                     |                                                             |
| * Also protective of occasional dioxin exposure to revetment maintenance workers |                                          |                                                             |

The site-specific screening criteria of 490 ng/kg and >2000 pg/g for construction workers and future onsite commercial/industrial workers respectively are substantially higher than the dioxin TEQ concentrations measured in Berth 101 soils.

Notably, the “risk driving” exposure pathways in these calculations (i.e., the pathways associated with the greatest exposure) are dermal absorption and the incidental ingestion of soil. The NEPM commercial/industrial scenario assumes that 19% of the skin surface area is exposed, which relates to the head, hands, and forearms. The use of safety clothing (i.e., long sleeves and gloves) would be an effective way to minimise dermal exposure for Emplacement Cell construction workers. Protocols to reduce the potential for incidental ingestion (e.g., providing washing facilities at the work site) will also reduce the potential for exposure.

## 4.2.4 Acid Sulfate Soils (ASS)/ Potential ASS (PASS)

There are no human health guidelines for ASS/PASS in soil. The Stage 2A and Stage 2B ASSMP provides an overview of the applicable ASS guidelines and their application to the works.

## 4.3 Assessment criteria – sediment

### 4.3.1 ANZG guideline values

For soils that may be re-used in an aquatic environment, the assessment criteria selected for this assessment were sourced from the following reference: Australian and New Zealand - Toxicant Default Guideline Values for Sediment Quality (ANZG, 2018a).

ANZG (2018a) provides criteria that allow for the assessment of toxicant effects on sediment biota. Toxicant concentrations reported below the Default Guideline Values (DGVs) are considered to present a low risk of unacceptable effects to aquatic ecosystems. However, toxicant concentrations exceeding the upper guideline value (GV-high) are an indicator of potential high-level toxicity problems, and therefore not a guideline value that will ensure protection of ecosystems without further lines of evidence with respect to toxicity affects. Based on the aquatic receptors identified in Section 5.2 of this CSP, these guidelines are considered appropriate for the purposes of this assessment.

In addition to the assessment criteria, the guideline also recommends that “the <2-millimetre sediment particle size fraction should be used for chemical analyses for comparison with sediment quality guideline values so that the

potential risk posed by contaminants is not diluted by a large mass of larger materials (gravel and other debris). The <63 µm sediment particle size fraction (clay and silt) is considered a suitable representation of the sediment materials that are mostly readily resuspended or potentially ingested by organisms” (ANZG, 2018a).

Because the bioavailability and toxicity of contaminants is influenced by sediment grain size and organic carbon content, particle size distribution and total organic carbon (TOC) testing has also been carried out on selected samples representing a particular sediment unit. Total recoverable hydrocarbons (TRH), Polycyclic aromatic hydrocarbons (PAH) and Polychlorinated Biphenyl (PCB) concentrations will be normalised to 1% OC based on the TOC result.

The sediment assessment criteria selected for the COPC identified on site in GHD (2021b) and (2021c) are listed in Table 4.5.

**Table 4.5** Sediment assessment criteria

| COPC                                  | DGV (mg/kg) | GV-high (mg/kg) |
|---------------------------------------|-------------|-----------------|
| Chromium (III+VI)                     | 80          | 370             |
| Copper                                | 65          | 270             |
| Lead                                  | 50          | 220             |
| Nickel                                | 21          | 52              |
| Zinc                                  | 200         | 410             |
| Total TRH                             | 280         | 550             |
| Total PAH                             | 10          | 50              |
| PCB                                   | 0.034       | 0.28            |
| TBT (as Sn, µg/kg dry weight, 1% OC)) | 9           | 70              |

## 4.3.2 Dioxins

There are currently no environmental quality guidelines published by Australian regulators for dioxins in soil or sediment. An ecological risk assessment (ERA) (GHD, 2021a) was conducted to ascertain appropriateness of material to be used in the bund wall of the Emplacement Cell. This approach was in general accordance with that recommended in the National Assessment Guidelines for Dredging (NAGD) (DAWE, 2009). The Lines of Evidence (LoE) relevant to assessing the risks posed by the reuse of Berth 101 Unit 1A and Unit 1B material within the Emplacement Cell bund included the following:

- Chemistry
- Bioavailability and toxicity; and
- Bioaccumulation

No site-specific criteria for dioxin were derived, however using the LoE approach it is considered unlikely that an unacceptable ecological risk would be posed to the marine environment by Berth 101 Unit 1A and Unit 1B materials being used in the Emplacement Cell bund. Therefore, dioxin characteristics as established for Unit 1A or Unit 1B material will be used as initial criteria for assessing the suitability of material to be used in the Emplacement Cell bund.

## 4.4 Application of selected criteria

The methodology used when assessing contamination levels in soils during remediation/characterisation and validation at the site will be to use the relevant HSLs, HILs, sediment (DGV and GV-high) where required as cut off points to classify materials either as:

- Not contaminated, which pose no risk to the environment or human health and warrant no further action, i.e., concentrations less than or equal to the selected criteria.
- Containing elevated concentrations of contaminants, which may pose a risk to the environment (aquatic ecosystems) but pose no risk to human health under the proposed land use scenario i.e., concentrations greater than the DGVs and less than the adopted HILs or HSLs. A qualitative risk assessment may be sufficient to evaluate the potential impact for the proposed land use.

- Significantly contaminated which pose a risk to both human health and aquatic ecosystems, i.e., concentrations significantly greater than relevant health investigation or DGVs. Soils or sediment in this category would likely require management or disposal off site (including potential containment within the Emplacement Cell), or further assessment by way of site-specific health and/or ERA (Tier 2 or 3) carried out as appropriate for the proposed land use. This may require the collection of additional site data.

## 4.5 Waste classification criteria

Materials that may require offsite disposal as part of site remediation will be classified using the six-step process and criteria detailed in *Waste Classification Guidelines – Part 1: Classification of Waste* (NSW EPA, 2014a).

In accordance with the Waste Classification Guidelines (NSW EPA, 2014a), the applicable classification principles include (but are not limited to) the following:

- “If asbestos waste is mixed with any other class of waste, all the waste must be classified as asbestos waste. For example, asbestos waste mixed with building waste, must be managed as asbestos waste.”
- ‘Special waste’ is a class of waste that has unique regulatory requirements. The potential environmental impacts of special waste need to be managed to minimise the risk of harm to the environment and human health.
- Special wastes are:
  - Clinical and related waste.
  - Asbestos waste.
  - Waste tyres.

Producers of special waste do not need to make any further assessment of their waste if it falls within the definitions of special wastes, except for asbestos waste. Asbestos waste means any waste that contains asbestos. Chemical classification of soil contaminated with asbestos is still required.

Materials that may comprise Acid Sulfate Soils (ASS) will be classified and handled as per the *Waste Classification Guidelines – Part 4: Acid Sulfate Soils* (NSW EPA, 2014b). Additional information is provided in the Stage 2A and Stage 2B ASSMP.



## 5. Site contamination status

The following review of the site contamination status is based on the results from GHD (2018a), (2021a), (2021b), GHD (2021d) and Fox Environmental Consulting (2022).

### 5.1 Contaminated materials

Based on the review of all previous investigations at the site, the following areas were identified as potentially posing a risk to human health and/or the environment for redevelopment of the site and were remediated and/or managed during Stage 1 works.

The current contamination status is summarised in Table 5.1 below.

**Table 5.1** Summary of identified and potential contamination currently on site

| Item                                                                                                                   | Location of impact | Outcome                                                                                                                                                                                                                                                                                                                               | Current status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Exceedance of human health criteria and management levels for BaP TEQ and TRH (NEPC, 2013). Identified in GHD (2018).  | MBD Site Compound  | Further delineation samples were taken, no further exceedances were identified.                                                                                                                                                                                                                                                       | Following additional investigations, delineated vertically and in all directions and deemed to be localised.<br><br>Located at 4.2-4.4 metres below ground level (mbgl), this equates to 1.74 – 1.54 m Port Kembla Height Datum (PKHD). As this material is below +2.5 mPKHD (the depth of the current excavation) this material is still in situ and should be appropriately managed if excavation is to occur in this area.                                                                                                                                        |
| Exceedance of human health criteria and management levels for BaP TEQ and TRH F3 (NEPC, 2013) Identified in GHD (2018) | MBD Site Compound  | Further delineation samples were taken, no further exceedances were identified.                                                                                                                                                                                                                                                       | Following additional investigations, the lateral extent for GBH26 is unknown to the west, as underground services and limited space prevented a borehole from being advanced in this direction.<br><br>Located in a sample at 4.75 – 4.90 mbgl, this equates to 0.13 – -0.02 mPKHD. As this material is below +2.5 mPKHD (the depth of the current excavation) this material is still in situ and should be appropriately managed if excavation is to occur in this area. Risks can be managed by implementing standard contaminated site hygiene and OH&S measures. |
| Exceedance of human health criteria and DGV for BaP TEQ and TRH (NEPC, 2013) Identified in GHD (2021a)                 | MBD Site Compound  | N/A                                                                                                                                                                                                                                                                                                                                   | The lateral extent has not been delineated however the impact is considered localised.<br><br>Located in a sample at 3.4-3.5 m (HIL-D exceedance), this equates to 1.49-1.39 mPKHD. As this material is below +2.5 mPKHD (the depth of the current excavation) this material is still in situ and should be appropriately managed if excavation is to occur in this area.                                                                                                                                                                                            |
| Dioxins                                                                                                                | MBD Site Compound  | Dioxins were identified in fill and natural soils across the site. The congener profile associated with the Berth 101 materials is like that reported by Horri <i>et al.</i> for kaolin clays, with OCDD being predominant and no furan compounds detected. This suggests a possibly natural rather than anthropogenic dioxin source. | Dioxins are ubiquitous within the fill and natural soils present on the site; however, concentrations are below those which would present an unacceptable risk to human health for workers who may come into contact with materials during works on the site. The risk can be further appropriately managed by implementing standard contaminated site hygiene and OH&S measures.                                                                                                                                                                                    |

| Item                                                         | Location of impact                 | Outcome                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Current status                                                                                                                                               |
|--------------------------------------------------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Asbestos impacted soil                                       | Site wide                          | All asbestos has been removed from the excavation zone and validation complete. Impacted material has been disposed of offsite, contained onsite in T5 cell or segregated and stockpiled.                                                                                                                                                                                                                                                                                                                                                                                                                                            | Asbestos impacted soil relocated to former Conveyor C6 Stockpile and/or T5 containment cell.                                                                 |
| ASS/PASS                                                     | MBD Site Compound                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Refer to Stage 2A and Stage 2B ASSMP.                                                                                                                        |
| Contaminated sediments (HM/HS) (GHD, 2018b)                  | Inner and Outer Harbour            | The presence of contaminated sediments, being heavy metals above screening criteria, were found within the proposed dredging and disposal areas. Sampling indicated PASS conditions present within the dredging footprint.<br><br>Dioxins were present in both the dredging and disposal areas within the range of Australian background levels.                                                                                                                                                                                                                                                                                     | Refer to Stage 2A and Stage 2B DEMP and ASSMP.                                                                                                               |
| Contaminated soil in Outer Harbour (GHD, 2021e) (GHD, 2021f) | Emplacement Cell Construction Site | Eastern portion of the Emplacement Cell Construction Site "Site 1": lead exceedances of the human health criterion in boreholes to 1 mbgl at eastern and western ends of the site. Only identified at surface (0.0 – 0.2 m) in north-eastern corner of the site.<br><br>Western portion of the Emplacement Cell Construction Site "Site 2": BaP TEQ, PAH and TRH above the human health guideline criterion were detected to 1 mbgl in the eastern end of the site. Detections at surface levels (0.0 – 0.2 m) were restricted to two locations for BaP TEQ and one location for TRH. Surface asbestos materials were also detected. | Site 1: contamination identified still present at site.<br><br>Site 2: asbestos clearance has been undertaken. Other contaminants identified remain in situ. |

BaP: Benzo(a)Pyrene

TEQ: Toxicity Equivalence Quotient

HM/HS: Harbour Muds/Harbour Silts

### Other contaminants

Per- and polyfluoroalkyl substances (PFAS) are not considered to be a potential contaminant of concern for the site. GHD understands that no storage of PFAS chemicals or firefighting activities have occurred at the site. There has been no evidence of disposal of other wastes or products that may contain PFAS chemicals (e.g., household waste) identified. Based on this, PFAS has not been included in the sampling program.

## 5.2 Updated conceptual site model

A CSM is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The development of a CSM is an essential part of all site assessments and provides the framework for identifying contamination sources and how potential receptors may be exposed to contamination.

## 5.2.1 Potential sources

Potential sources of contamination are as outlined in Section 5.1 and include:

- Fill used in the construction of Berth 101 and adjoining areas including identified hot spots of contamination. Contaminants of concern include TRH, Benzene, toluene, ethyl benzene and xylenes plus naphthalene (BTEXN), PAH and heavy metals.
- Material across the site was excavated and stockpiled on site during the Stage 1 works. No gross contamination was identified in the material during previous assessments (as summarised in Section 6.3.1).
- Dioxins in fill and natural materials across the site.

## 5.2.2 Potential exposure pathways

The primary exposure pathways by which potential receptors could be exposed to the COPC are considered to be:

- Direct contact with contaminated soil or groundwater
- Inhalation of dust from contaminated soils.
- Inhalation of vapours/gases generated by contaminated soil.

## 5.2.3 Potential receptors

Fill material from the berth is proposed to be excavated, stockpiled and then either re-used on site or relocated to the Emplacement Cell. Accordingly, the key receptors of interest include:

- Future site workers and users:
- Site workers involved in the Project works at the site in which the impacted material is disturbed.
- Individuals involved in potential future construction and maintenance of the site. Intrusive maintenance workers: carrying out repairs or installation on subsurface utilities. It is expected that minor excavation activity could occur in the future (e.g., for installation of additional services).
- Marine ecological receptors: The primary receptor of any identified contamination is considered to be marine aquatic ecosystems of the Inner and Outer Harbour following placement of excavated materials in the Emplacement Cell, particularly for the construction of the bund. The Inner and Outer Harbours are highly modified industrial settings, receiving stormwater runoff and waste discharge from neighbouring industries. Further information regarding the marine ecological receptors for the project site can be found in the Ecological Health Monitoring Program (EHMP, Appendix C of WQMP).

## 5.2.4 Source-pathway-receptor (SPR) linkages

Initial receptors are considered to be site workers involved with earth works associated with excavation activities, that is, those coming into direct contact with soil or potentially hazardous materials. Earthworks are to involve shallow to deep excavations across the site to achieve required construction levels or to remove identified contamination, stockpile management, including stockpiled materials which have been identified as unsuitable for placement in the Emplacement Cell Construction Site. This exposure scenario provides an increase likelihood that workers will be in direct contact with soil and exposed to dust via inhalation generated during excavation and stockpiling.

Based on results of the previous investigation, vapours and gases have not been identified as exposure pathways. Therefore, the SPR linkages are assessed incomplete for vapour inhalation as this form of contamination has not been identified. Based on review of the potential SPR linkages, the proposed development may provide direct contact/ingestion exposure pathways to contamination, if present, to workers involved in remediation of impacted soils and to aquatic ecosystems.

Remediation works for identified contamination have been completed during Stage 1 Early Enabling Works construction, so potential SPR linkages are significantly reduced for ongoing construction activities at the site.

## 6. Remediation works plan

A remediation options review was conducted prior to Stage 1 Early Enabling Works of the Project and is included in the Remediation Works Plan (RWP) for that stage (GHD, 2021g). The adopted remediation approach for Stage 1 Early Enabling Works is considered to still be applicable in Stage 2A and Stage 2B and can be summarised as follows:

- Re-use (including at the new berth or in construction of the Emplacement Cell) of suitable materials.
- Recycling of waste materials that are capable of being readily reused, reprocessed, recycled, or otherwise recovered.
- Containment of fill and other suitable materials within the Emplacement Cell.
- Disposal off site for bulky wastes not suitable for recycling and unexpected finds of contamination (if any are encountered) that are not considered suitable to be placed within the Emplacement Cell.

This section provides a description of the remediation works steps and procedures required to protect health, safety, and the environment for Stage 2A and Stage 2B works.

The roles and responsibilities of the AIE Project Manager and Stage 2A and Stage 2B Principal Contractors are outlined in Section 2.

### 6.1 Site mobilisation for Stage 2A and Stage 2B

Management of the site mobilisation process is to be included in the Stage 2A and Stage 2B Principal Contractor's work plans including the following:

- **Site access and security** – Principal Contractors will be responsible for ensuring the security of all work areas and all plant and equipment maintained on-site during the works. This includes signage, control of site access (authorised personnel and vehicles only) and safety inductions and documentation.
- **Plant re-fuelling/maintenance/cleaning** – Principal Contractors will be responsible for designating locations/areas for equipment refuelling, maintenance, and cleaning activities undertaken during the site works (as required) and to ensure all vehicles leaving the site are free of any contaminated material. Some equipment, such as static generators, drill rigs and cranes, may require re-fuelling in situ and not within designated areas. The refuelling procedure will be followed with spill controls outlined in the Emergency Spill Plan.
- **Traffic control** – Principal Contractors will be responsible for ensuring adequate traffic control measures are in place to ensure site safety and take into consideration the entry and egress of vehicles from the main site entrance in accordance with the Stage 2A and Stage 2B Construction Traffic Management Plan (CTMP).
- **Environmental controls** – Principal Contractors will be responsible for installing and maintaining environmental controls consistent with relevant management plans.

### 6.2 MBD Site Compound

#### 6.2.1 Asbestos-containing materials

AIE is required to appropriately manage the occurrence of unexpected finds to satisfy condition S5.7 *Discovered Contamination* under the *Deed of Surrender and Grant of New Lease between Port Kembla Operations Pty Ltd as trustee of Port Kembla Unit Trust and Port Kembla Coal Terminal Limited and Australian Industrial Energy Pty Ltd* (Surrender Deed), and also from a land contamination aspect, as the lease area (southern part of Part Lot 22 DP 1128396) requires a Section A Site Audit Statement at the completion of construction, confirming the suitability of the site for its intended use.

A RWP addendum (GHD, 2021h) has been prepared to provide remediation and validation methodologies for ACM, specifically addressing asbestos impacts associated with the discovered contamination. The addendum was approved by the independent site auditor, and the methodologies within it and the RWP it supports, will be applied going forward if ACM is encountered during Stage 2A and Stage 2B works. The Auditor has provided feedback on both the RWP and RWP Addendum (refer to IAA14) with response pending. These are summarised in Section 7.3.3.

## 6.3 Excavation

### 6.3.1 Overview

Excavation and backfilling from the Stage 1 Early Enabling Works has been completed as of January 2022 to allow for construction of structures within the MBD Site Compound. A nominal 15-metre-wide section on the northern end and a circa 60-metre 'wedge' at the south-west corner of the excavation zone was left to facilitate contractor access which has been completed. Excavation during Stage 2A and Stage 2B does not relate to remediation but to construction of the new wharf and land-based facilities. However, any unexpected finds that will require removal of contamination and excavation will follow the unexpected finds protocol detailed in Section 6.5. Excavated materials from the Stage 1 Early Enabling Works to have been stockpiled within the Eastern and Western Stockyards of the MBD Site Compound and within Emplacement Cell Construction Site.

The excavated materials stockpiled at the MBD Site Compound include:

- Approximately 9,700 m<sup>3</sup> of demolished concrete crushed to nominal 70mm minus.
- Approximately 12,500 m<sup>3</sup> of heavily bound base course crushed to nominal -150mm minus.
- Approximately 33,900 m<sup>3</sup> of mixed slag, general fill, and coal nominally < 150mm in size.
- Approximately 10,700 m<sup>3</sup> of predominantly sand material.
- Approximately 8,600 m<sup>3</sup> of asbestos impacted soils.

The excavated materials stockpiled at the Emplacement Cell Construction Site include:

- Approximately 44,000 m<sup>3</sup> of sand material.

### 6.3.2 Validation sampling

Where material has not been adequately characterised by existing investigations, characterisation sampling of stockpiles will involve sample collection and analysis in accordance with the Vic EPA IWRG 702 as referenced in the NEPM Schedule B2. The assessment criteria are outlined in detail in Section 4.

### 6.3.3 Backfill or reinstatement requirements

On completion of excavation and subsequent validation approval, backfilling of excavations may be required (i.e., for site levelling or safety reasons). Significant backfilling at the site is not anticipated during the Stage 2A and Stage 2B works. If required, backfilling procedures will be as follows:

- Excavations should be backfilled with either:
  - Materials excavated during Stage 1 Early Enabling Works which includes crushed concrete, heavily bound base course, mixed slag, general fill, and coal (refer to Section 6.3.1). Reused crushed concrete and fill has been validated to be free from contamination prior to stockpiling for reuse, and thus is deemed to be free from asbestos. Excavated material will need an asbestos clearance certificate from a third party licensed asbestos assessor prior to being crushed or grinded or screened. For the purposes of Condition O6.1-6.2, 'excavated material' excludes raw slag, concrete or basecourse.
  - Asbestos impacted material will be placed in designated containment areas / cells at the MBD Site and shall not be mixed with other clean backfill material. Containment of these asbestos impacted materials will follow the relevant guidelines and legislation for managing asbestos impacted material on site.
  - If required, Virgin Excavated Natural Material (VENM) or Excavated Natural Material (ENM) can be sourced externally. Material considered to be VENM or ENM should be assessed by an appropriately qualified environmental consultant/advisor to confirm that the material meets the relevant regulatory requirements. Analytical results must report non-detects for all contaminants with exception of heavy metals, which would be representative of background concentrations, or by review of any associated waste classification documentation obtained.
  - Materials sourced from commercial/ licensed premises that are deemed clean, uncontaminated, and suitable for purpose. Materials may include but are not limited to, quarry aggregates, sand materials, and landscaping materials.
- Backfill material must be of suitable composition and must meet geotechnical and other material property requirements for the area of use and not present hazards to future development. It must be validated to

confirm suitability for use from a contamination perspective with the sampling density and suite of analysis commensurate with import source/material type, supported by appropriate source documentation and visual inspection to confirm free from contamination.

- VENM or ENM materials are not to be stockpiled in areas still undergoing remediation or encounter contaminated soils either through storage or from equipment/plant handling contaminated materials.
- Validation samples should be collected from on-site or imported material (if required) to confirm its suitability for use.
- Fill material and concrete suitable for reuse will be used for the wharf construction. Materials will be crushed on site and stockpiled at the MBD Site Compound or Emplacement Cell Construction Site. This material will be segregated and validated for use.

Reinstatement, compaction, and further redevelopment works will be undertaken in accordance with the requirements of AIE.

## 6.4 Waste management

The Principal Contractors shall establish appropriate waste disposal containers as part of site mobilisation, which shall be maintained on site for the duration of the works. All waste materials (e.g., garbage) must be disposed of using safe waste disposal practises. No waste shall be disposed of on-site. The waste disposal containers shall be emptied as necessary to avoid overflowing, and the contents disposed of to a licensed waste disposal facility approved for the relevant waste type.

A Waste Management Plan (Section 9 of the SMP) has been prepared that identifies materials that can be re-used or recycled, and how these will be managed during the remediation works.

All potential pollutant materials will be stored away from any poorly drained areas, flood-prone areas, and stormwater drainage areas. Such materials will be stored in an appropriately designated area. Containment bunds will be constructed with provision for collection and storage of any spilt material.

Excavated material and/or dredged spoil will not be stockpiled in Outer Harbour unless it will be re-used within the proposed Outer Harbour Emplacement Cell.

Stockpiles of material stored at the premises will either be used as on-site backfill or Emplacement Cell construction or disposed offsite to a facility licensed to accept the material, within 12 months following stockpile creation.

## 6.5 Unexpected finds protocol

The site has been investigated for contamination as detailed in previous investigation reports. However, a degree of uncertainty is inherent in any site contamination investigation and a potential exists for undetected contaminated soils or wastes to be identified during the proposed remediation works. There is a potential for previously unidentified contamination to be present beneath the remaining above and below ground structures and services and with the extensive fill units across the site. Indications of potential contamination may include:

- Stained or discoloured fill, soils, or seepage water.
- Odorous fill, soils, or seepage waters.
- Construction wastes such as concrete, bricks, timber, tiles, asbestos sheeting, fragments, and pipes.
- General rubbish such as plastic, glass, packaging.
- Imported materials.
- Additional high-risk PASS within Unit 1A and Unit 1B (i.e., Unit 1C)

An UFP has been developed and is illustrated below in Figure 6.1, which outlines the suggested procedures that should be followed in the event of an unexpected find.

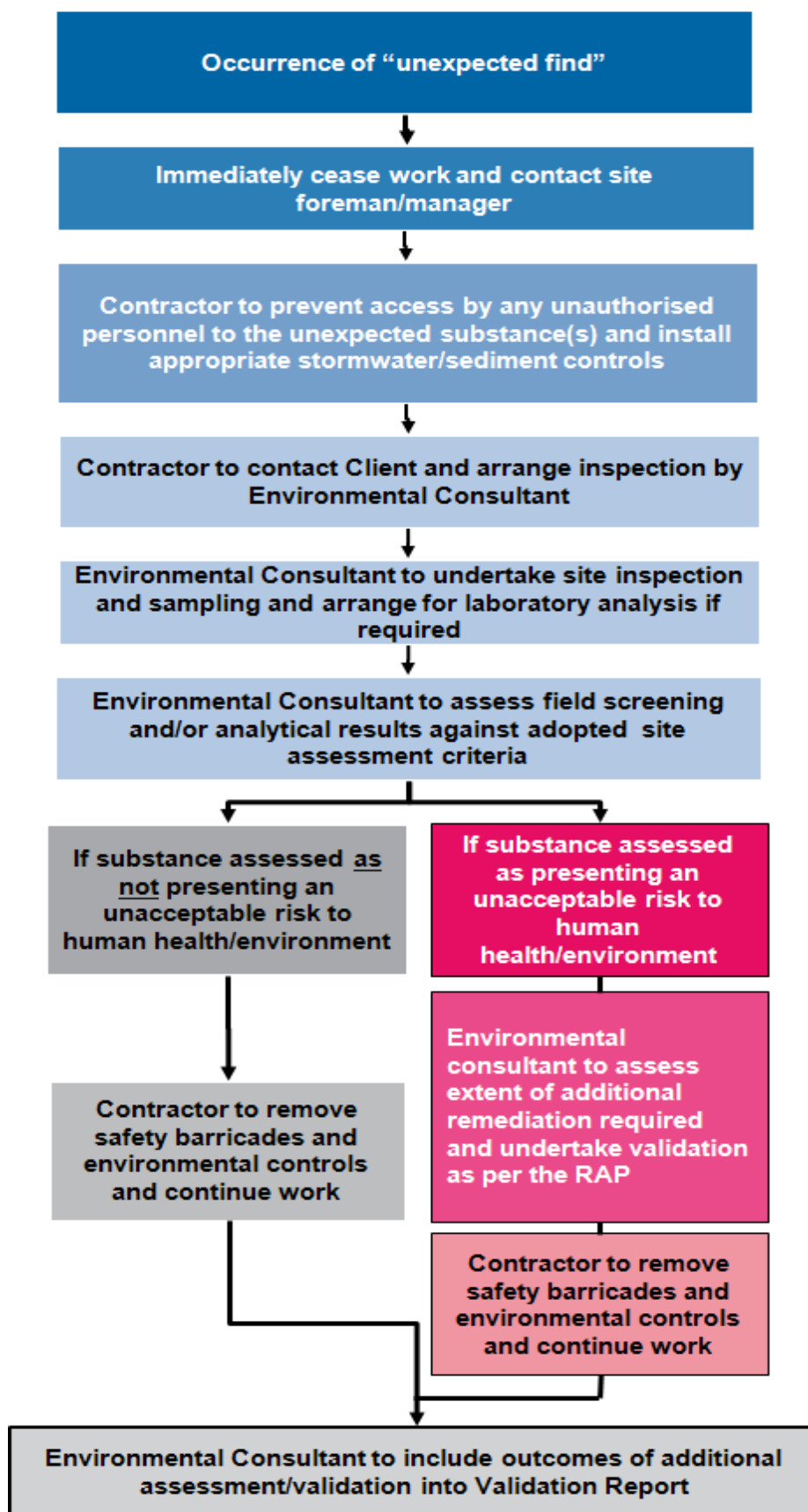


Figure 6.1 Unexpected finds decision process

## 6.6 Material tracking control

A critical aspect of Stage 2A and Stage 2B is how materials are controlled throughout all stages of the works. The following tracking control requirements for each stage shall be implemented by the Principal Contractors to ensure all materials are accounted for:

- Excavation:
  - The area to be excavated shall be clearly delineated.
  - Qualified supervision shall be used during excavation to ensure that all contaminated materials are removed but disturbance of uncontaminated soils is minimised.
  - Materials shall be segregated to the extent practical during excavation to minimise mixing of materials with different degrees or types of contamination.
  - The final extent of excavation and location of validation sampling points shall be measured and recorded by GPS or survey, as required by AIE. Excavation records also indicate ASS/PASS status so that the material is managed appropriately (including timeframes for placement in the emplacement cell) as well as depth placement.
- Stockpiling/backfilling:
  - Stockpiles shall be kept separate, to minimise mixing of materials (as above).
  - All stockpiling and backfilling operations will only move material from one location to another when approved by the Stage 2A and Stage 2B Principal Contractor Environmental Representatives. All such movements shall be clearly documented by the Principal Contractor in a material tracking register equivalent to that used during Stage 1 works. The materials tracking register shall document (at a minimum) the following information:
    - Stockpile identification.
    - Source of material.
    - Volume of material.
    - Destination (including on-site locations for intermediate movement).
    - Date of movement.
    - Authorisation.
    - Material description.

Segregation of material will also be undertaken in accordance with the ASSMP, to allow for segregation of low risk and high-risk ASS material.

## 6.7 Dredging

Additional land-based works will be undertaken prior to the commencement of marine-based dredging. Once the new quay wall at the MBD Site Compound has progressed to a stage that the dredging can proceed continuously, the Machiavelli dredge and Materials Handling Barge will be mobilised to site as the primary equipment for dredging.

A brief outline of the sequencing is described in the sections below for the following activities:

- Silt curtain installation at both the MBD Site Compound and surrounding the Emplacement Cell.
- Excavation of the toe trench for the Emplacement Cell bunds (split program).
- Removal of the existing armour rock from RL2.5m down, loading into barges and unloading at the Emplacement Cell.
- Dredging of remaining fill, Unit 1 materials and placing in the Emplacement Cell bunds.
- Progressively dredging wedges of material within the exclusion zone to within 0.5 metres of the pile face (subject to mobilisation timing review).
- Potentially washing of material trapped within the pile line to provide clearance.
- Clean up cut and possible sweeping of the dredge area.
- Dredging of Outer Harbour site toe trench
- Dredging of HS / HM, Unit 2, and Unit 3 materials and placing in the Emplacement Cell



## 6.8 Remediation contingency plan

The site has been investigated for contamination as detailed in previous investigation reports. However, a degree of uncertainty is inherent in any site contamination investigation. Due to the size of the site and nature of the fill material, there is a potential for unidentified areas of contamination across the site.

A contingency response plan for unexpected situations shall be prepared by the Contractor and the Contractor will be required to follow the contingency response plan if unexpected situations are encountered. Table 6.1 outlines some of the unexpected situations that may arise.

**Table 6.1** Contingency procedures

| Issue                                                                                                                                      | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A greater volume of soil contamination may be encountered than is presently estimated, or other types of contamination may be encountered. | <p>If significant additional volumes of contamination or previously unidentified types of contaminants are identified, work would cease in the area of concern. An assessment of the impact of the additional contaminated materials would be undertaken by the Environmental Consultant. Updated or new documentation is to be prepared to support management/validation of any previously unidentified contamination if encountered.</p> <p>The presence of previously unidentified types of contaminants may be identified during remedial works. If previously unidentified types of contaminants are detected, then the validation criteria may have to be revised to incorporate those contaminants.</p> <p>Any potential contaminated material in addition to the type already identified will be treated in a method considered suitable for the type of contaminant. Additional testing would be undertaken to determine requirements in this respect.</p> |
| Identification of friable ACM                                                                                                              | Bonded asbestos is expected at this site and removal will be undertaken in accordance with the Asbestos Management Plan (AMP). However, if friable asbestos is encountered, the contingency procedures in the AMP are to be implemented. An assessment of the impact of the ACM would be undertaken by the Environmental Consultant and the appropriate remediation measures implemented (usually removal).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Wastes, previously unidentified, buried in the work area may be encountered                                                                | If buried wastes are encountered during remediation works, the extent of the impact from the buried wastes will be assessed. Following assessment, if required, the waste will be removed, stored, classified, and disposed of in accordance with NSW EPA 2014a and/or 2014b.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Dewatering of excavations may be required.                                                                                                 | <p>If dewatering of excavations is required, the water will be pumped into suitable storage and either used for dust suppression or compaction (following appropriate testing), treated, and tested prior to discharge (once discharge criteria are met) or disposed of at a licenced facility approved to accept potentially contaminated groundwater.</p> <p>If excavations are unstable, demolition and excavation works will be reassessed in consultation with the AIE Project Manager.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Unacceptable Environmental Impacts because of remediation activities                                                                       | <p>The Stage 2A and Stage 2B SMP has considered the potential environmental impacts of side effects of the works remediation such as noise, odour, dust, and surface runoff. These shall be further considered in relevant management plans prepared by the Principal Contractors. However, if unacceptable levels of such side effects are detected at the site boundaries during remedial works, the Principal Contractors shall cease work and the Environmental Consultant will assess the situation and direct corrective action in accordance with the following:</p> <ul style="list-style-type: none"> <li>– Existing management plans</li> <li>– Current EPA regulations and requirements</li> <li>– In consultation with the AIE Project Manager.</li> </ul>                                                                                                                                                                                              |

## 6.9 Site management

### 6.9.1 Interim site management

As the Project site is secure with limited potential for unauthorised access and based on the current site usage (former port operations), occupation of the site for current land uses is considered acceptable to continue until remediation commences. However, the proposed remediation works may generate exposure hazards to sensitive

receptors. Mitigation measures shall be included as part of the Work Health and Safety Plan (WHSP) as prepared by the Stage 2A and Stage 2B Principal Contractors.

## 6.9.2 Long term site management

Implementation of a long-term site management plan for any contamination that remains on site, including potential contamination remaining at depths not disturbed by the redevelopment and the Emplacement Cell, will likely be required, and a long-term management plan for the MBD Site Compound will be developed as part addressing relevant approval conditions.

## 7. Validation

The process as outlined in the following sections applies to all areas of the site proposed for remediation and/or validation and will be based on aesthetic issues/visual observations combined with collection of soil samples from the walls and base of excavation and trenches with analysis for the contaminants of concern as discussed in Section 5.1. It is noted that the validation process was developed for Stage 1 of the construction process and remediation works are largely complete. The validation process will continue to apply for any unexpected finds of contamination identified within the remaining areas of excavation for Stage 2A and Stage 2B. It should be noted that the Auditor has provided feedback on the dioxin assessment works in IAA15, with response and updated report pending.

### 7.1 Data quality objectives

Data Quality Objectives (DQOs) have been established for this CSP to assist the design and implementation of data collection activities, to ensure the type, quantity and quality of data obtained are appropriate and address the project objectives. The DQO process as described in Schedule B2, Appendix B, of the NEPM (NEPC, 2013) was adopted for this project. The DQO process involves seven steps as described below.

The DQO steps defined above have been addressed as follows.

#### Step 1 - State the problem

AIE intend to redevelop Berth 101 of the Port Kembla Coal Terminal (PKCT) with the construction of facilities for an LNG import facility. The development will involve the excavation of hardstand and fill materials to RL 2.5 m PKHD (this equates to approximately 1.6 metres to 4.2 mbgl) (completed in January 2022 as Stage 1), the excavation of piles and footings that extend into bedrock and dredging to accommodate the Marine Berth.

Uncontaminated materials previously identified as fill ("Fill"), reclaimed sands and alluvium ("Unit 1") will be used to develop the Emplacement Cell perimeter bund wall which will then contain remaining excavated materials (i.e., estuarine sands, residual soils, harbour sediments and muds).

Contamination has been identified at the site that may adversely impact the suitability of the fill to be used in the Emplacement Cell and/or may have adverse impacts upon environmental receptors.

GHD carried out an evaluation of existing data to assess the suitability of Fill and Unit 1 to be reused in the perimeter bund wall. It was concluded that *"the majority of Fill and Unit 1 are considered to pose a low risk to the marine aquatic environment based on the characterisation carried out, however some limited supplementary assessment would be beneficial to confirm this."* (GHD, 2020). The majority of Fill and Unit 1 are still considered unlikely to pose an unacceptable risk to the marine aquatic environment. The Unit 1 materials have been assessed for dioxins and the ERA concluded that there is unlikely to be an unacceptable risk posed from dioxin in the material used in the bund wall. With regards to ASS, it is concluded that "placement of high-risk ASS below mean sea level 0.9m Chart Datum (CD) (0.0m Australian Height Datum (AHD)) will not lead to oxidation of sulphides that would cause long term environmental harm" based on the current Emplacement Cell configuration (Fox Environmental Consulting, 2022). Asbestos contaminated materials are present at the site in two areas: a stockpile at the former C6 conveyor area, and the T5 containment cell.

Construction of the Emplacement Cell and redevelopment of the site as an LNG facility (continued commercial/industrial land use) requires appropriate management of contaminated soils.

#### Step 2 – Identify the decisions

The decisions are those required to ensure the successful management or remediation of contamination at the site and consequently the protection of the environment and human health. Key decisions include:

- Have the identified data gaps been adequately addressed?
- Have the surface and subsurface structures and services been removed, and appropriate assessment of previously inaccessible soils been undertaken?
- Have known areas of contamination been remediated and validated to achieve residual concentrations of contamination less than the adopted criteria?

- Has excavated materials (hardstand, fill, sands etc) been adequately segregated and validated suitable for reuse on site, in the Emplacement Cell perimeter bund or capping or for placement with the Emplacement Cell?
- Have any unexpected finds encountered during site works been appropriately managed or remediated?

### **Step 3 – Identify inputs to the decision**

Data to be input to the decision-making process includes:

- Information from previous investigations and prior validation works.
- Information from additional investigations (if required).
- Current assessment criteria as discussed in Section 4.
- Consideration of future land use / material placement.
- Monitoring the Principal Contractor's work and site conditions.
- Review of relevant documentation to be provided by the remediation contractor.
- Observations and analyses to be undertaken during the site remediation and validation works.

### **Step 4 - Define the study boundaries**

The lateral boundaries of the study area are defined by the extent of the excavation area which extends from Road No. 7 at the northern end of the West Stockyard to the South Ponds and across to Road No. 9 and includes the MBD Site Compound area as shown in Appendix A.

The vertical boundaries of the study are the vertical extent of proposed earthworks generally noted between the surface and approximately 25 mbgl (depth of dredging).

### **Step 5 – Develop a decision rule**

Review of previous site investigations has been used to identify the main contaminants of concern and areas requiring remediation or management prior to site redevelopment.

Concentrations of contaminants for validation (where required) will be compared with the criteria discussed in Section 4, considering the proposed use or placement of material, to assess the success of the remediation and/or screening processes and/or to assess waste disposal requirements.

To decide whether the data obtained is precise, accurate, reliable, and reproducible for the site at the time of the investigation, field and laboratory quality control and quality assurance (QA/QC) procedures will be utilised throughout the sampling programs. All sampling work will be carried out in accordance with Standard Operating Procedures for field activities, based on standard industry practices. QA/QC results will be compared to nominal acceptance limits (as outlined in in Section 7.2).

### **Step 6 - Specify limits on decision errors**

The guidelines as listed in Section 4 will be used to assess the contamination status of the soils within the subject site. Data quality indicators (DQIs) as described in Section 7.2 will be used to evaluate the acceptability of the data.

Where quantitative data is used as a basis for decisions, data will be evaluated on a statistical basis as described in the NEPM (NEPC, 2013), to a 95% confidence level.

### **Step 7 - Optimise the design for obtaining data**

A sampling and analytical program has been prepared as included in Section 7.3 below.

## **7.2 Data quality indicators**

The DQIs for sampling techniques and laboratory analysis of collected samples defines the acceptable level of error required for this investigation. The data quality objectives will be assessed by reference to data quality indicators as follows:

- **Data Representativeness** - expresses the degree which sample data accurately and precisely represents a characteristic of a population or an environmental condition. Representativeness is achieved by collecting

samples in an appropriate pattern across the site, and by using an adequate number of sample locations to characterise the site. Consistent and repeatable sampling techniques and methods are utilised throughout the sampling.

- **Completeness** - defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study. If there is insufficient valid data, then additional data are required to be collected.
- **Comparability** - is a qualitative parameter expressing the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples and ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- **Precision** - measures the reproducibility of measurements under a given set of conditions. The precision of the data is assessed by calculating the Relative Percent Difference (RPD) between duplicate sample pairs.

$$RPD(\%) = \frac{|C_o - C_d|}{C_o + C_d} \times 200$$

Where    Co =    Analyte concentration of the original sample  
             Cd =    Analyte concentration of the duplicate sample

GHD adopts a nominal acceptance criterion of  $\pm 30\%$  RPD for field duplicates and splits for inorganics and a nominal acceptance criterion of  $\pm 50\%$  RPD for field duplicates and splits for organics, however it is noted that this will not always be achieved, particularly in heterogeneous soil or fill materials, or at low analyte concentrations.

- **Accuracy**: measures the bias in a measurement system. Accuracy can be undermined by such factors as field contamination of samples, poor preservation of samples, poor sample preparation techniques and poor selection of analysis techniques by the analysing laboratory. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes, laboratory blanks and analyses against reference standards. The nominal “acceptance limits” on laboratory control samples are defined as follows:
  - Laboratory spikes – 70-130% for metals/inorganics 60-140% for organics.
  - Laboratory duplicates - <30% for metals/inorganics, <50% for organics.
  - Laboratory blanks - <practical quantitation limit.

Accuracy of field works is assessed by examining the level of contamination detected in equipment blanks. Equipment blanks should return concentrations of all organic analytes as being less than the practical quantitation limit of the testing laboratory.

The individual testing laboratories will conduct an assessment of the laboratory QC program, internally; however, the results will also be independently reviewed and assessed by the Environmental Consultant.

## 7.3 Validation methodology

The validation methodology outlined in the subsequent sections will be implemented in excavations where the removal of material identified as contaminated has to be undertaken. No items have been identified as requiring remediation in this CSP, however there is potential for unexpected finds to be encountered during excavations.

ASS/PASS is not considered contamination for the purpose of validation. Processes and procedures for ASS/PASS management is included in the Stage 2A and Stage 2B ASSMP.

### 7.3.1 Validation for dredged materials

Placement of materials excavated or dredged from the site in accordance with the ECR (SMEC, 2022), Stage 2A and Stage 2B DEMP and ASSMP will be documented in accordance with material tracking requirements as described in Section 6.4, based on the results of previous investigations. No further validation sampling or analysis is required unless materials are encountered which are not consistent with currently identified site characteristics.

### 7.3.2 Validation of excavations resulting from unexpected finds

Where required, validation of the remediation excavations will be undertaken in accordance with the NSW EPA (1995) *Contaminated Sites: Sampling Design Guidelines*.

The Environmental Consultant will record and document the excavation and removal activities of contaminated soils, encountered as unexpected finds, from the excavations and trenches. Systematic sampling will be undertaken on the base and walls of the excavations. The validation sampling procedure will comprise:

- Documentation of the excavation activities.
- Visual confirmation that the extent of excavation has removed all contaminated fill material (stained and odorous).
- Validation will be required following excavation of impacted soils. The resultant excavations will be validated to confirm the removal of the contaminated material with collection of at least five samples (four wall samples, one base sample) from any excavation and analysis for contaminants of concern (based on the results of previous investigations and observations during the remediation). Base samples will be collected at a minimum rate of one per 25 metres<sup>2</sup>, and wall samples at a minimum rate of one per five linear metres, with samples collected from each distinct strata of soil.
- Ensuring detailed material tracking by maintaining and reviewing a material tracking register (including on-site soil movement) and waste disposal dockets, to be provided by the Principal Contractors.

Validation sampling locations will be systematic, or biased towards areas of apparent contamination, if present (to provide a conservative approach). Photographs of the excavation will be taken as part of the validation works. The extent and depth of the completed excavation shall be measured by the environmental consultant, with reference to site boundaries or physical features.

### 7.3.3 Validation resulting from unexpected finds – asbestos

If the unexpected find encountered is asbestos contamination and lies within the excavation zone, the Environmental Consultant will undertake a visual assessment of the remedial excavation, providing an accurate log/description of its condition and a photographic record of the soils within the resulting excavation. These observations along with copies of documentation (including details of source, quality, and records of material movement) for the excavated material will be required to support the Environmental Consultant's assessment and will be included in the Validation Report. Visual validation of contaminated material transport routes will also be required. Validation of the remedial excavation will be carried out by a competent person and in general accordance with the WA DoH: *Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia* (WA DoH, 2021).

Validation for asbestos is primarily concerned with asbestos remediation works related to removal of the ACM building materials and conduit in the substation and removal of the ACM water pipeline (estimated to be 418 m in length) which has now been completed as a part of Stage 1 works.

Handling, transporting, storing and disposing of ACM or any contaminated material in general are described in Section 8 of the SMP. Any identified ACM fragments will be managed in accordance with the AIE Unexpected Finds Protocol, including the removal of any visible fragments by a licenced removalist in accordance with relevant SafeWork NSW codes of practice. Following removal, a licenced asbestos assessor should inspect the site and provide a clearance certificate confirming removal of asbestos.

Within the excavation zone the following will be applied:

- Visual validation procedure:
  - Visually checking the walls and base of the remedial excavation to confirm absence of ACM.
  - Test pitting the base of the excavation to confirm the vertical extent of impact and test pitting 2 m beyond the excavation wall to assess condition of fill with respect to ACM if terminated within the excavation zone. If the impact can be observed to be restricted to a specific area i.e., in the case of asbestos pipes or conduit, test pitting would not be required. Visual inspection for ACM on exposed surfaces and within test pits will be the primary method of validation, with verification as described below a second line of evidence.
  - The location, description (including size and condition) and number of any fragments encountered, and during which pass/test pit they were encountered, will be documented. One complete pass without encountering any additional fragments is necessary for validation, or further assessment of any remaining ACM is required.

- Any ACM fragments observed will, in the interim, be placed into labelled asbestos waste bags or suitable containers, then transferred to the designated asbestos stockpile area.
- Validation soil sampling procedure:
  - Once the visual assessment confirms no residual ACM fragments are present in the excavation, validation soil sampling will be undertaken.
  - Sampling will be carried out every 5 m along the excavation walls at one or two depth intervals down the soil profile (or per 1 m depth). If the remedial excavation terminates at the extent of the excavation zone, no validation samples will be undertaken, the walls will be assumed to contain ACM and documented in the Environment Management Plan (EMP).
  - Collection of one sample per every 100 m<sup>2</sup> of the base (i.e., 10 m x 10 m grid). Samples will be collected over a depth interval of approximately 0.1 m and an area of approximately 0.3 m x 0.3 m. Where base of the excavation is a trench less than 10 m wide, one sample per every 10 linear metres along the base will be collected.
  - Per sample location, 10 litres of material will be spread out for inspection on a contrasting colour material or sieved through a 7 mm sieve. Any fragments of suspected asbestos greater than 7 mm will be placed in a zip lock bag then submitted to the laboratory for weighing and confirmatory testing. Alternatively, fragments may be weighed on-site with an appropriately accurate scale and assumed to contain asbestos.
  - One wetted 500 ml sub sample will be collected for laboratory analysis for asbestos identification (AS4964-2004) or for quantification, as indicated below.
  - Where asbestos is detected in any sample, the concentration of asbestos as fragments (ACM) and as AF or FA will be compared with the validation assessment criteria listed in Table 4.2 in Section 4.2.2.
  - Asbestos analysis will be carried out by a National Association of Testing Authorities of Australia (NATA) accredited laboratory.
  - Samples used to validate excavations resulting from the removal of redundant infrastructure will be initially analysed using non-quantitative methods (i.e., absence/presence). This approach is commensurate with the known source of ACM and its general embedment in the redundant infrastructure. Should asbestos be identified in these samples, quantitative analysis will be required.

At this stage, residual asbestos impacts in areas of outside the dredging or excavation zone will not be removed. Where the impacts are encountered, surface ACM will be removed by the licenced asbestos removalist and surface clearance performed by the Hygienist. The nature, condition and abundance of any ACM removed should be documented. The spatial position and the surface Reduced Level (RL) of impact or assumed impact will be recorded by a registered surveyor. As an interim control measure, the area will be cordoned off, and sign posted identifying the presence of asbestos below the ground surface. The asbestos impacted area will be documented in the EMP.

The impacted area will require ongoing monitoring/management by either the Hygienist or the Environmental Monitoring Consultant until the area is capped, which is anticipated to occur at the completion of the construction phase. The construction phase is scheduled for completion in 2022/2023.

### 7.3.4 Validation of imported material

Significant importation of materials at the site is not anticipated during this phase of the redevelopment. However, if materials will be imported to site, options include VENM (as defined by NSW EPA (2014a)), ENM or other materials subject to a Resource Recovery Order and Exemption.

Materials may only be classified as VENM if they have been excavated from an area that is not contaminated with other waste materials or by manufactured chemicals. Imported materials should be validated as VENM, ENM or otherwise suitable for importation to site by an appropriately qualified environmental professional. Classification of all imported materials involves the following steps:

- The history of the site of origin of the material should be understood and documented to identify whether any potentially contaminating activities have been undertaken at that location.

- An inspection of the source site or materials should be undertaken by an appropriately qualified environmental professional, including a visual inspection of the stockpiled materials. Findings of the inspection should be fully documented.
- Validated as suitable for use with reference to NEPM Schedule B2 / EPA Victoria Industrial Waste Resource Guidelines 702 (Vic EPA, 2009) which may involve collection of samples at a prescribed rate depending on the volume of material, with at least three samples from any source.
  - VENM samples would be analysed for a general contamination suite including heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn), TRH, BTEXN, PAH and OCPs. Results would be compared to the relevant HILs and Ecological Investigation Levels (EILs) for the proposed land use.
  - ENM samples would be analysed for the suite of contaminants as listed in Column 1 of Table 4 of the NSW EPA Excavated natural material order 2014, which includes asbestos. Results would be compared to the concentrations listed in Columns 2 and 3 of the same Table 4.
- A visual inspection of the VENM, ENM or any other imported materials should be undertaken as it is imported onto site to ensure that the material is consistent with documented observations.
- Materials tracking of any imported materials to confirm imported material source, volume imported and final location on site.

### 7.3.5 Validation of excavated material stockpiles

Following the conclusion of Stage 1 works in January 2022, all stockpiled materials (refer to Section 6.3.1) have been appropriately characterised and validated. Thus the remediation and validation testing described in this Plan relates only to unexpected finds, following steps in the UFP detailed in Section 6.5.

Where additional materials have not been adequately characterised by existing investigations, characterisation sampling of stockpiles including those to be disposed off-site will involve sample collection and analysis in accordance with the Vic EPA IWRG 702 (Vic EPA, 2009) as referenced in the NEPM Schedule B2 (NEPC, 2013). Characterisation sampling of stockpiles will involve sample collection and analysis at a minimum rate of 1 sample per 25 metres<sup>3</sup>, or at least three samples from each distinct area of excavation or “batch” of material.

Material exhibiting visual evidence of heterogeneity may require sampling at a higher rate to ensure all characteristic elements of the material are sampled. “Procedure B” from the *Sampling Design Guidelines* (NSW EPA, 1995) will be used to assess if the number of samples is adequate to show that the average concentrations of contaminants are below the relevant criteria.

Analysis will be undertaken for contaminants of potential concern to include heavy metals, TRH, BTEXN, PAHs, PCBs, and asbestos for the “batch” of material being tested and results compared to the following:

- Re-use on site – Results compared to relevant health and ecological criteria and use of the segregating materials decision tree (refer to Figure 8-1 in the Stage 2A and Stage 2B SMP).
- Disposal off site – Results compared to the NSW EPA Waste Classification Guidelines (2014a and/or 2014b). If necessary for additional waste classification purposes or for assessment of potential environmental impacts, a Toxicity Characteristics Leaching Procedure test for selected parameters will be undertaken in conjunction with total concentration analysis.

### 7.3.6 Quality assurance

All fieldwork will be conducted in general accordance with Standard Operating Procedures for field activities, which are aimed at collecting environmental samples using uniform and systematic methods. Key requirements of these procedures are as follows:

- Decontamination procedures - including the use of new disposable gloves for the collection of each sample, decontamination of the sampling equipment between each sampling location and the use of dedicated sampling containers provided by the laboratory.
- Sample identification procedures - collected samples will immediately be transferred to sample containers of appropriate composition and preservation for the required laboratory analysis. All sample containers will be clearly labelled with a sample number, sample location, sample depth and sample date. The sample containers will then be transferred to a chilled cooler for sample preservation prior to and during shipment to the testing laboratory.



- Chain of custody information requirements - a chain-of-custody form, for each batch of samples, will be completed and forwarded to the testing laboratory.
- Sample duplicate frequency approximately 10% (5% each for intra and inter laboratory duplicates) – for chemical analysis only.

Field quality control procedures to be used during the project include the collection and analysis of the following (for chemical analysis only):

- **Intra Laboratory (Blind) duplicates/replicates:** Comprise a single sample that is divided into two separate sampling containers. Both samples are sent anonymously to the project laboratory. Blind duplicates/replicates provide an indication of the analytical precision of the laboratory but are inherently influenced by other factors such as sampling techniques and sample media heterogeneity. It is proposed to collect and analyse blind duplicate samples at a rate of at least 5%.
- **Inter Laboratory duplicates/replicates:** Individual samples are split in two in the field by the sampling crew and are placed in two separate containers. One sample is sent to the project laboratory and one sample is sent to an independent check laboratory. Field split duplicate samples provide an indication of the analytical accuracy of the project laboratory but may be affected by other factors such as sampling methodology and the inherent heterogeneity of the sample medium. It is proposed to collect and analyse blind duplicate samples at a rate of at least 5%.

Rinse blanks will be collected where sampling equipment is used but may not be analysed daily unless cross contamination is considered an issue.

It is noted that based on the contaminants of concern for the site (i.e., no volatile contaminants have been identified), the use of trip blank and trip spike samples is not required.

### 7.3.7 Laboratory program

The NATA accredited project laboratory will use their internal procedures and NATA accredited methods in accordance with their quality assurance system. The environmental consultant is to ensure that the laboratory analytical methods and limits of reporting are acceptable for analysis required.

Laboratory quality control procedures used during the project should include (where relevant):

- **Laboratory duplicate samples:** Duplicate sub samples collected by the laboratory from one sample submitted for analytical testing at a rate equivalent to one in twenty samples per analytical batch, or one sample per batch if less than twenty samples are analysed in a batch. A laboratory duplicate provides data on the analytical precision and reproducibility of the test result.
- **Spiked Samples:** An authentic field sample is spiked by adding an aliquot of known concentration of the target analyte(s) prior to sample extraction and analysis. A spike documents the effect of the sample matrix on the extraction and analytical techniques. Spiked samples will be analysed for each batch where samples are analysed for organic chemicals of concern.
- **Certified Reference Standards:** A reference standard of known (certified) concentration is analysed along with a batch of samples. The Certified Reference Standard (CRS) or Laboratory Control Spike provides an indication of the analytical accuracy and the precision of the test method and is used for inorganic analyses.
- **Surrogate Standard/Spikes:** These are organic compounds which are like the analyte of interest in terms of chemical composition, extractability, and chromatographic conditions (retention time), but which are not normally found in environmental samples. These surrogate compounds are spiked into blanks, standards and samples submitted for organic analyses by gas-chromatographic techniques prior to sample extraction. Surrogate Standard/Spikes provide a means of checking that no gross errors have occurred during any stage of the test method leading to significant analyte loss.
- **Laboratory Blank:** Usually an organic or aqueous solution that is as free as possible of analytes of interest to which is added all the reagents, in the same volume, as used in the preparation and subsequent analysis of the samples. The reagent blank is carried through the complete sample preparation procedure and contains the same reagent concentrations in the final solution as in the sample solution used for analysis. The reagent blank is used to correct for possible contamination resulting from the preparation or processing of the sample.

The individual testing laboratories will assess the laboratory QC program, internally; however, the results will also be independently reviewed and assessed by the Environmental Consultant.

Laboratory duplicate samples should return RPDs within the NEPM acceptance criteria of  $\pm 30\%$ . Per cent recovery is used to assess spiked samples and surrogate standards. Per cent recovery, although dependent on the type of analyte tested, concentrations of analytes and sample matrix; should normally range from about 70-130%. Method (laboratory) blanks should return analyte concentrations as 'not detected'.

## 7.3.8 Dispatch and transport of samples

All samples will be dispatched and transported in accordance with laboratory procedures and requirements. The Environmental Consultant will conduct a review of these procedures and requirements to ensure that all statutory requirements are complied with.

The Environmental Consultant will seek to ensure that the specified holding times for analytes are not exceeded due to delays between sample dispatch and laboratory receipt.

## 7.4 Reporting

### 7.4.1 Site Validation Report

Where remediation has been carried out, the site must be 'validated' to ensure that the objectives stated in the CSP have been achieved. Verification of material movements in accordance with the ECR (SMEC, 2022), Stage 2A and Stage 2B DEMP and ASSMP will also be required. A SVR is required to be prepared in accordance with the relevant requirements of NSW EPA (2020) detailing extent of remediation and validation results. Because the site works have been broken down into stages with respective remediation and validation goals guided by the CSP for each stage the SVRs will be prepared at the culmination of each stage by the Environmental Consultant (GHD). The Stage 1 validation report is currently in preparation. The SVRs will be submitted to the Site Auditor, Melissa Porter of Senversa, for review and approval.

The Stage 2A and Stage 2B SVR will be completed in accordance with NSW EPA (2020) and will document the implementation of the remediation work plan as outlined in this CSP and assess any results of the validation observations and sampling against the assessment criteria stated in the CSP and approved addenda. Where validation has not been achieved, reasons must be stated, and additional site work proposed to achieve the CSP objectives. The SVR will also include information confirming that all NSW EPA and other regulatory conditions and approvals have been met. The focus of the Stage 2B works is dredging, therefore the SVR will document evidence of material movements, reconciling the volumes of soil removed and disposed of off-site and reused on-site, confirm that any disposal of waste materials off-site has been completed in accordance with the CSP and relevant regulatory requirements, and that re-use of materials has been conducted as per its contamination status (i.e. only permitted materials have been used in the bund wall), in accordance with the ECR (SMEC, 2022), Stage 2A and Stage 2B DEMP and ASSMP.

The SVR will reference the CSP and any addenda, the ECR (SMEC, 2022), Stage 2A and Stage 2B DEMP and ASSMP and verify that remediation and validation activities undertaken were in substantial compliance with these documents. Any unexpected finds that will require removal of contamination and excavation will follow the unexpected finds protocol detailed in Section 6.5. The report will provide a concluding statement on the MBD Site Compound site suitability with respect to ongoing industrial / commercial land use, make recommendations for further work (if required) and state any ongoing management/monitoring requirements.

Construction of the Emplacement Cell will be documented by a separate verification process, to be completed by the Emplacement Cell Auditor in accordance with Schedule 3, Condition 10 of Infrastructure Approval (SSI 9471).

### 7.4.2 Long Term Environment Management Plan

Once the installation of any capping layers required are complete, including containment of any contaminated materials, a Long Term Environmental Management Plan (LTEMP) will be prepared. The LTEMP will be expanded to include:

- A drawing clearly identifying the locations of remaining impacted materials and the capping details (works as executed drawings).
- Advice on how to recognise if the cap has been breached.
- A long-term maintenance and monitoring/inspection program for the cap.

- Provision of additional control measures and their application for any future works that may penetrate through the cap including road repair/maintenance.

Information to be provided by the Contractor during the preparation of the LTEMP shall include the details of any standard protocols relevant to the LTEMP.

The LTEMP will require review and approval by the Site Auditor, Melissa Porter.

## 8. Health and safety

### 8.1 Work health and safety

Work Health and Safety (WHS) is a necessity to ensure the health and safety of all personnel working/visiting the site. Therefore, work shall be carried out in accordance with a site-specific WHSP. The Stage 2A and Stage 2B Principal Contractors shall prepare a site specific WHSP (or combined HSE Plan) for the works, addressing as a minimum the requirements of this CSP, and shall appoint a Site Safety Officer for the duration of the works.

The purpose of the plan is to provide all relevant health and safety information for all personnel undertaking work at the site and to provide and maintain safety standards and practices which offer the highest practical degree of personal protection to the on-site workers, based on current knowledge.

The plan will recognise the legislative obligations of the Stage 2A and Stage 2B Principal Contractors and of AIE and will in particular:

- Recognise that the work to be undertaken as part of the CSP may involve a “construction project” (as defined in the relevant legislation) in respect of which AIE and/or the Contractors have obligations as Principal Contractors. These obligations will be expressly dealt with in the plan.
- Recognise that the work to be undertaken as part of the CSP includes “high risk construction work” (as defined in the relevant legislation) in respect of which both the Stage 2A and Stage 2B Principal Contractors and AIE have obligations. These obligations will be expressly dealt with in the plan.

It is the responsibility of the Stage 2A and Stage 2B Principal Contractors and the AIE Project Manager to take all necessary practicable actions to safeguard the safety and health of all employees and subcontractors while they are on the site.

All work undertaken shall be performed in accordance with the provisions of the WHS Act, the WHS Regulations and any other relevant regulations or directions issued by regulatory authorities.

### 8.2 Community health and safety

To ensure the protection of the local community, the Stage 2A and Stage 2B Principal Contractors shall control the exposure pathways identified in this section.

Control mechanisms will include the following:

- Site security measures to control direct contact with the contamination.
- Dust suppression measures to control inhalation exposure.
- Cleaning and tarping trucks to control direct contact from migration of contaminated soils.

These measures shall be documented in detail in relevant management plans prepared by the Stage 2A and Stage 2B Principal Contractors.

## 9. CSP conclusions

The purpose of this CSP is to manage contamination issues during Stage 2A and Stage 2B works.

Stage 2A and Stage 2B works covered by the CSP will comprise:

- Stage 2A
  - Construction of the quay wall at MBD Site Compound incorporating finalisation of excavation works undertaken during Stage 1 (including transport of spoil materials to Emplacement Cell Construction Site).
  - Installation of and commissioning of power, communications, and potable water line.
  - Construction of ORF at MBD Site Compound (including construction of Wharf Topside Area, Utility Area, and Common Area).
  - Installation of gas pipeline within MBD Compound site.
- Stage 2B
  - Continuation of Stage 2A works.
  - Installation of site facilities and preparatory earthworks at Emplacement Cell Construction Site.
  - Marine-based construction activities including installation of silt curtains, navigational aids, and revetment shore protection at the MBD Site Compound.
  - Construction of the Emplacement Cell in the Outer Harbour.
  - Excavation and dredging of the MBD Site Compound in the Inner Harbour.

The CSP sets management requirements for the removal and on-site or off-site placement of excavated or dredged soils, ensuring it will pose no unacceptable risk to human health or the environment. The CSP also outlines the remediation techniques, procedures and validation sampling requirements (should the need occur), and the procedures for appropriate material management and movement. In addition, the safeguards to ensure works relating to contamination are handled in a safe and environmentally acceptable manner are documented, and the necessary approvals and licences required by regulatory authorities in order to enable Stage 2A and Stage 2B works to proceed (in relation to contamination issues only) are detailed.

The investigations that have been undertaken to date are considered sufficient to develop this CSP. Additional areas may require remediation should unexpected finds pertaining to contamination be encountered. Provided the measures detailed in this CSP are appropriately implemented, contamination will be unlikely to be present on the site at concentrations which would be considered a risk to human health or the environment under ongoing commercial/industrial land use, subject to an accompanying environmental management plan.

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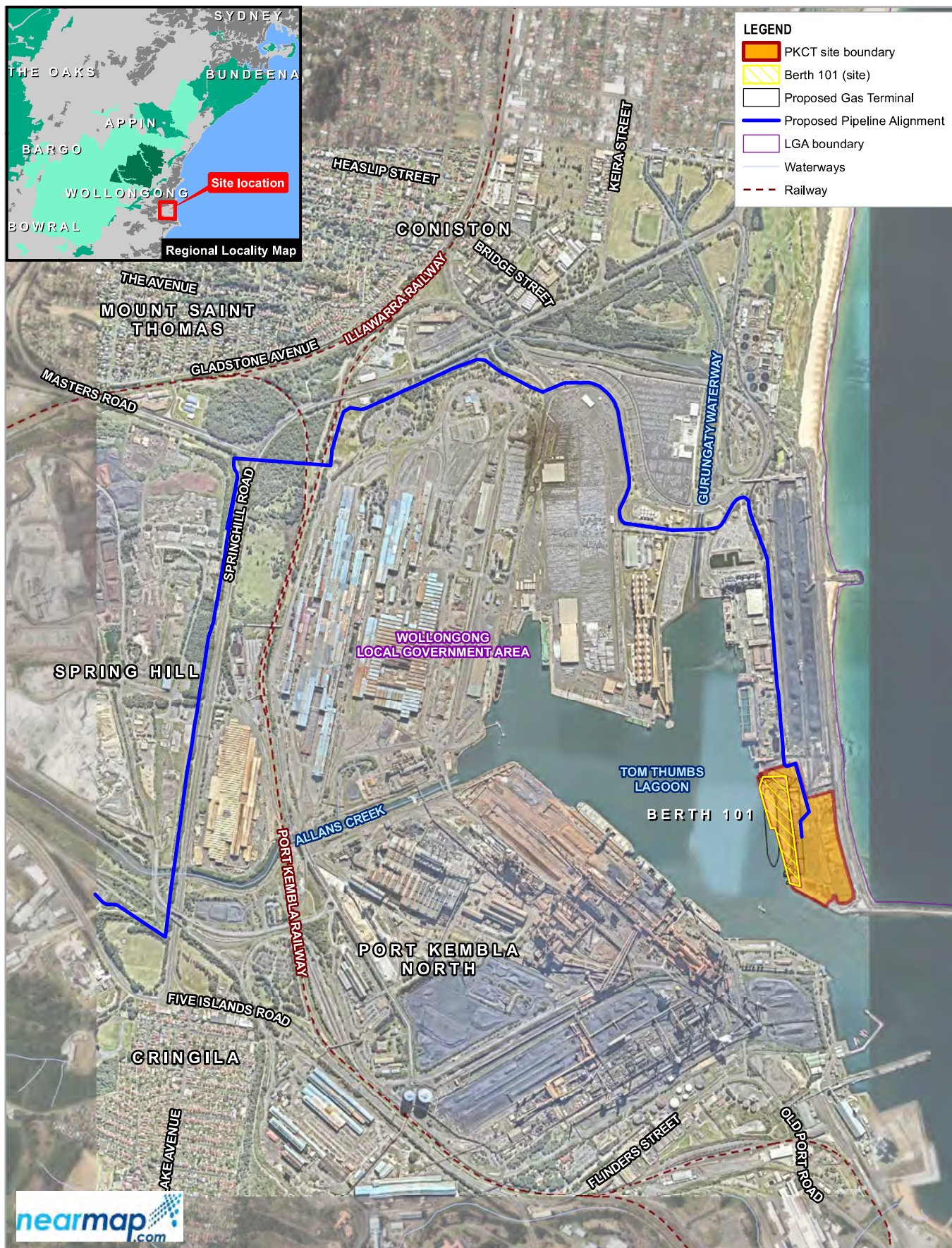
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# Appendices

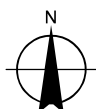
# Appendix A

## Figures





Paper Size ISO A4  
1:20,000  
0 400 800  
Metres  
Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 56



Australian Industrial Energy  
Berth 101 LNG Facility, Port Kembla, NSW  
Remediation Works Plan

Project No. 21-27477  
Revision No. -  
Date 25/02/2021

Remediation Works Plan – Berth 101

FIGURE 1





# **Appendix D**

## **Erosion and Sediment Control Plan**





# Port Kembla Gas Terminal

**Erosion and Sediment Control Plan  
Stage 2A and 2B Marine Berth  
Construction and Dredging – Land and  
Marine Based**

Australian Industrial Energy

30 May 2022

→ The Power of Commitment



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| <b>File name</b>           | \\ghdnet\ghd\AU\Sydney\Projects\21\27477\Tech\MP update\Stage 2B\Spoil Management Plan\App D - Erosion and Sediment Control Plan\PKGT-AIE-ESCP-Stage-2A&2B_RevD (TC).docx |
| <b>Author</b>              | Nathan Alexander                                                                                                                                                          |
| <b>Project manager</b>     | Karl Rosen                                                                                                                                                                |
| <b>Client name</b>         | Australian Industrial Energy                                                                                                                                              |
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| <b>Document title</b>      | Port Kembla Gas Terminal   Erosion and Sediment Control Plan Stage 2A and 2B Marine Berth Construction and Dredging – Land and Marine Based                               |
| <b>Revision version</b>    | Rev D                                                                                                                                                                     |
| <b>Project number</b>      | 2127477                                                                                                                                                                   |
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|             |             | Name     | Signature                                                                           | Name               | Signature                                                                             | Date     |
| A           | N Alexander | K Rosen  |  | K Rosen            |  | 28/01/22 |
| B           | N Alexander | K Rosen  |  | K Rosen            |  | 22/02/22 |
| C           | N Alexander | K Rosen  |  | K Rosen            |  | 23/03/22 |
| D           | N Alexander | K Rosen  |  | K Rosen            |  | 30/05/22 |

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# Acronyms

| Acronym        | Definition                                                                   |
|----------------|------------------------------------------------------------------------------|
| AHD            | Australian Height Datum                                                      |
| AIE            | Australian Industrial Energy                                                 |
| ARI            | Average Recurrence Interval                                                  |
| ASRIS          | Australian Soil Resource Information System                                  |
| ASS            | Acid Sulfate Soils                                                           |
| ASSMP          | Acid Sulfate Soils Management Plan                                           |
| Berth 101      | Marine Berth Construction and Dredging                                       |
| Blue Book      | Managing Urban Stormwater: Soils and Construction – Volume 1 “the Blue Book” |
| BOM            | Bureau of Meteorology                                                        |
| CPESC          | Certified Professional in Erosion and Sediment Control                       |
| CSP            | Contaminated Spoil Protocol                                                  |
| CSSI           | Critical State-Significant Infrastructure                                    |
| CTMP           | Construction Traffic Management Plan                                         |
| DEMP           | Dredge and Excavation Management Plan                                        |
| DP&E           | Department of Planning and Environment                                       |
| ECR            | Emplacement Cell Report                                                      |
| EIS            | Environmental Impact Statement                                               |
| EMS            | Environmental Management Strategy                                            |
| EP&A Act       | <i>Environmental Planning and Assessment Act 1979</i>                        |
| EPL            | Environment Protection Licence                                               |
| ESCP           | Erosion and Sediment Control Plan                                            |
| FSRU           | Floating Storage and Re-gasification Unit                                    |
| GHD            | GHD Pty Ltd                                                                  |
| GML            | General Mass Limits                                                          |
| HM             | Harbour Muds                                                                 |
| HS             | Harbour Silts                                                                |
| HSE            | Health, Safety and Environment                                               |
| IECA           | International Erosion Control Association                                    |
| KPIs           | Key Performance Indicators                                                   |
| LNG            | Liquefied Natural Gas                                                        |
| m <sup>3</sup> | Cubic metres                                                                 |
| MBD            | Marine Berth Construction and Dredging                                       |
| mbgl           | metres below ground level                                                    |
| MLA            | Marine Loading Arms                                                          |
| OHDSOA         | Outer Harbour Dredged Spoil Containment Area                                 |
| ORF            | Onshore Receiving Facilities                                                 |
| PANSW          | Port Authority of NSW                                                        |
| PASS           | Potential Acid Sulfate Soils                                                 |

| Acronym               | Definition                                                  |
|-----------------------|-------------------------------------------------------------|
| PESCP                 | Progressive Erosion and Sediment Control Plan               |
| PKGT                  | Port Kembla Gas Terminal                                    |
| PKGT EIS              | Port Kembla Gas Terminal Environmental Impact Statement     |
| PKHD                  | Port Kembla Height Datum                                    |
| Planning Systems SEPP | State Environmental Planning Policy (Planning Systems) 2021 |
| POEO Act              | <i>Protection of the Environment Operations Act 1997</i>    |
| POMP                  | Port Operations Management Plan                             |
| RL                    | Reduced level                                               |
| RoW                   | Right of Way                                                |
| RUSLE                 | Revised Universal Soil Loss Equation                        |
| SEPP                  | State Environmental Planning Policy                         |
| SMEC                  | SMEC Australia Pty Ltd                                      |
| SMP                   | Spoil Management Plan                                       |
| SLC                   | Soil Loss Class                                             |
| The Project           | Port Kembla Gas Terminal Project                            |
| Wollongong DCP        | Wollongong Development Control Plan 2009                    |
| Wollongong LEP        | Wollongong Local Environmental Plan 2009                    |
| WQMP                  | Water Quality Monitoring Plan                               |

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# 1. Introduction

## 1.1 Overview

This Erosion and Sediment Control Plan (ESCP) has been developed as a Sub - plan to the Port Kembla Gas Terminal Project (the Project) Spoil Management Plan (SMP). The SMP is Sub - plan to the Project's overarching Environmental Management Strategy (EMS). This ESCP has been prepared by GHD Pty Ltd (GHD) on behalf of Australian Industrial Energy (AIE) to apply to construction activities associated with Stage 2A and Stage 2B of the Project. This Stage 2A and Stage 2B ESCP supersedes the Stage 2A ESCP.

This ESCP interfaces with the other associated Sub - plans, which together describe the proposed structure for environmental management and monitoring requirements for the Project. This ESCP addresses the requirements of the Port Kembla Gas Terminal Environmental Impact Statement (PKGT EIS) and associated Infrastructure Approval (SSI 9471) and Environment Protection Licence (EPL) No. 21529.

## 1.2 Background

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

NSW currently imports more than 95 percent 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 more than 100 petajoules of natural gas, equivalent to more than 70 percent of NSW gas needs and will 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) (NSW) and Schedule 5 of the State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP). The Project received Infrastructure Approval from the Minister for Planning and Public Spaces on 29 April 2019.

The construction of the Project is primarily associated with the establishment of a new berth facility at Port Kembla to enable an LNG carrier to berth alongside the Floating Storage and Re-gasification Unit (FSRU) and new infrastructure to connect the terminal to the existing gas network. Excavation and dredging would be required to establish the new berth facility, with spoil deposited in a cell (referred to as the 'Emplacement Cell') in the Outer Harbour.

The development has progressed to Stage 2A and Stage 2B works located at Berth 101 (referred to as the 'Marine Berth Construction and Dredging (MBD) Site Compound') and the Outer Harbour Dredged Spoil Containment Area (referred to as 'OHDSOA' or the Emplacement Cell). Collectively, these two locations are referred to as "the site". The Stage 2A works include:

- Completion of excavation works undertaken during Stage 1 (including transport of spoil materials to the Emplacement Cell Construction Site).
- Construction of the quay wall at the MBD Site Compound.
- Construction of Onshore Receiving Facilities (ORF) at the MBD Site Compound (including construction of Wharf Topside Area, Utility Area, and Common Area).
- Installation and commissioning of power, communications, and potable water.
- Installation of gas pipeline within the MBD Site Compound as part of ORF.

The Stage 2B works include:

- Continuation of Stage 2A works.

- Excavation and dredging of the MBD Site Compound in the Inner Harbour and the Emplacement Cell in the Outer Harbour.
- Construction of the Emplacement Cell in the Outer Harbour.
- Marine based construction activities including installation of navigational aids and revetments at the MBD Site Compound.

## 1.3 Purpose

This ESCP has been prepared in accordance with the PKGT EIS and associated Infrastructure Approval (SSI 9471) and EPL No. 21529. It describes how the management measures and commitments in the PKGT EIS, Infrastructure Approval (SSI 9471) and EPL No. 21529, relating to erosion and sediment controls are to be implemented by the Principal Contractor's during Stage 2A and Stage 2B construction of the Project. Specifically, this plan addresses the following requirements:

- Minimise the impacts of erosion and sedimentation during construction to surrounding environments.
- Ensure appropriate erosion and sediment control measures are implemented across the Project to meet regulatory, statutory and community expectations and requirements.
- Ensure that best practice erosion and sediment controls are appropriately adopted and designed, following the Managing Urban Stormwater: Soils and Construction (Landcom, 2004) also known as the "Blue Book".
- Provide a measurable set of commitments for site inspections and audits with regards to management of soils and water.
- Promote a focus on erosion control and the prevention of sediment generation.

This plan addresses the above requirements and includes, but is not limited to:

- Performance criteria for erosion and sediment control mitigation.
- Mitigation strategies to minimise impacts related to erosion and sediment control.

AIE and its contractors acknowledge that maintaining erosion and sediments in the vicinity of the Project site is paramount to the successful delivery of the construction phase of the Project. AIE is committed to ensuring this ESCP is implemented, reviewed and updated regularly to ensure its objectives are met and that the conditions outlined in the Infrastructure Approval (SSI 9471) and EPL No. 21529 are achieved.

This ESCP is applicable to all staff, employees, subcontractors, and any statutory service authorities undertaking the Stage 2A and Stage 2B works described in Section 2 of this ESCP.

This ESCP is an overarching plan that provides guidance to the development of Progressive Erosion and Sediment Control Plans (PESCPs), which are specific to various sites (e.g., MBD Site Compound and Emplacement Cell Construction Site). The PESCP for the MBD Site Compound has been developed and is progressively updated by the Stage 2A Principal Contractor as required. The PESCP for the Emplacement Cell Construction Site (Drawings ESCP01 and ESCP02, Revision 5, dated 30 August 2021) will not require updating and will remain applicable for the current condition of the Emplacement Cell Construction Site. The ESCP implementation and on-going development will be managed by the Project Team (refer to Section 3).

## 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 an 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 includes 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. Berth and wharf facilities, as well as 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. The Emplacement Cell will be located in the Outer Harbour. A site overview is provided as Figure 2.1.

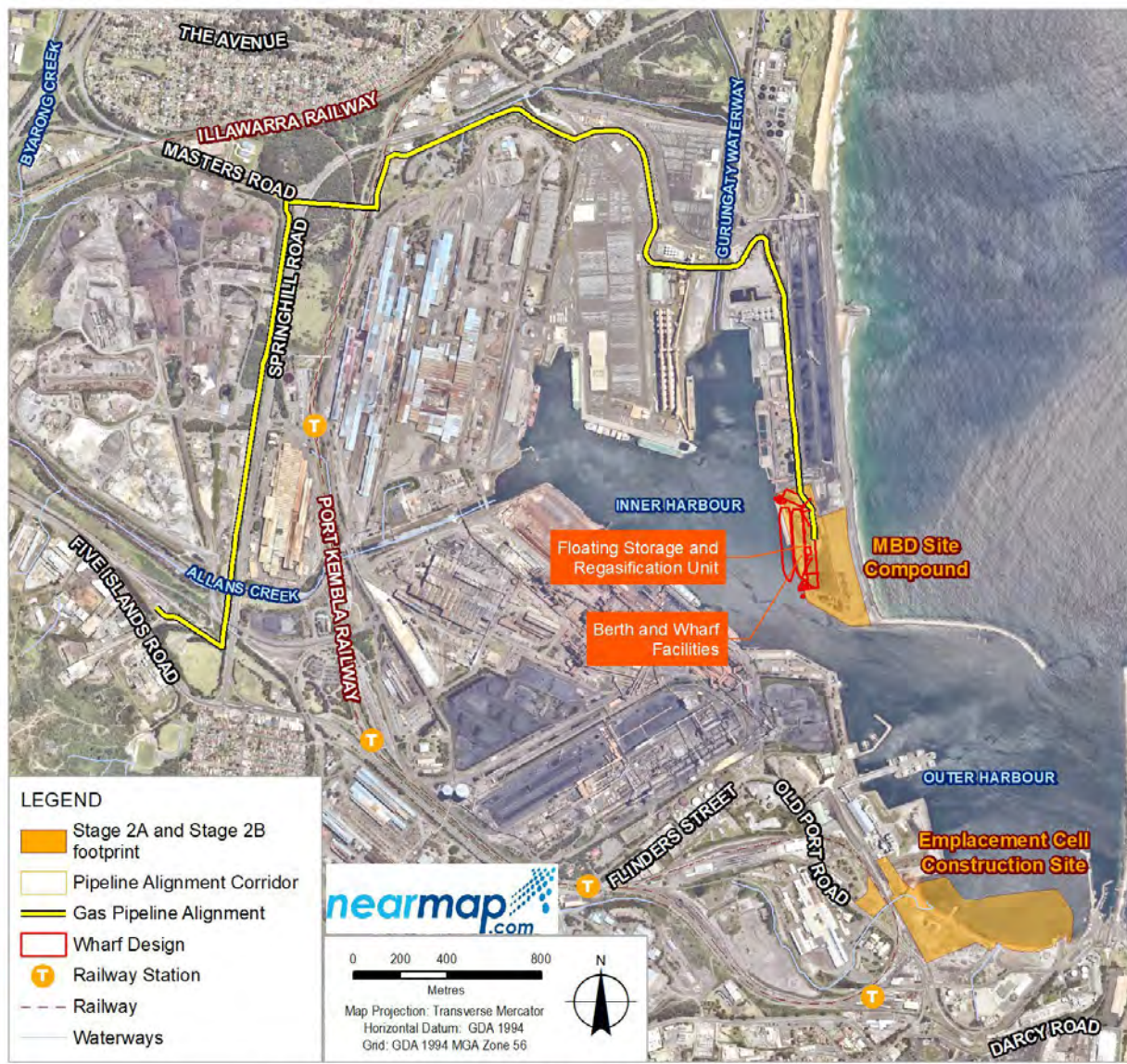


Figure 2.1 Site overview

## 2.2 Project construction scope of works

The Project construction scope of work has been divided into three main packages (with associated activities), as outlined in Table 2.1. Construction staging of the Project has been approved in accordance with Condition 3 of Schedule 4 of Infrastructure Approval (SSI-9471) as per correspondence from the Department of Planning and Environment (DP&E) dated 27 October 2021. This ESCP applies only to the works associated with Stage 2A and Stage 2B.

**Table 2.1** Construction stages/work packages

| Stage | Package                                                        | Proposed commencement | Activities                                                                                                                                                                                                                                                                                            |
|-------|----------------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | Early Enabling Works                                           | May 2021              | Demolition of Berth 101, removal of structures and land based excavation works, and Cone Penetration Testing in the Outer Harbour to inform Emplacement Cell design and relocation of Bunker Oil Pipeline.                                                                                            |
| 2A    | Marine Berth Construction – Land Based                         | January 2022          | Completion of excavation works undertaken during Stage 1.<br>Transport of spoil materials to Emplacement Cell Construction Site.<br>Quay wall construction.                                                                                                                                           |
|       |                                                                | February 2022         | Installation of communications conduit, potable water line, 11kV power cable, and padmount substation within the MBD Site Compound.                                                                                                                                                                   |
|       |                                                                | April 2022            | Construction of the ORF, which comprises three areas: Wharf Topside Area; Utility Area; and Common Area.                                                                                                                                                                                              |
|       |                                                                | June 2022             | Pipeline construction and associated ancillary infrastructure within MBD Site Compound                                                                                                                                                                                                                |
| 2B    | Marine Berth Construction and Dredging – Land and Marine Based | March 2022            | Continuation of Stage 2A with addition of the following activities:                                                                                                                                                                                                                                   |
|       |                                                                |                       | Excavation/dredging of the MBD Site Compound in the Inner Harbour and construction of the Emplacement Cell in the Outer Harbour                                                                                                                                                                       |
|       |                                                                |                       | Marine based construction activities including installation of navigational aids and revetment shore protection.                                                                                                                                                                                      |
| 3     | Pipeline Installation including tie-ins (NGP)                  | June 2022             | Construction of an 18" onshore natural gas pipeline approximately 6.3km in length from the Berth 101 site boundary to tie-in facility at Cringila for connection to the Eastern Gas Pipeline<br>Pipeline construction to occur concurrently with Jemena, subject to separate set of management plans. |

\*Proposed dates and may be subject to change.

The following will be undertaken as part of the Stage 2A works:

- Construction of the quay wall at MBD Site Compound incorporating finalisation of excavation works undertaken during Stage 1 (including transport of spoil materials to Emplacement Cell Construction Site).
- Installation of and commissioning of power, communications, and potable water line.
- Construction of ORF at MBD Site Compound (including construction of Wharf Topside Area, Utility Area, and Common Area).
- Installation of gas pipeline within MBD Compound site.

The following will be undertaken as part of the Stage 2B land and marine-based works:

- Continuation of Stage 2A works.
- Installation of site facilities and preparatory earthworks at Emplacement Cell Construction Site.
- Marine-based construction activities including installation of silt curtains, navigational aids, and revetment shore protection at the MBD Site Compound.
- Construction of the Emplacement Cell in the Outer Harbour.
- Excavation and dredging of the MBD Site Compound in the Inner Harbour.



An outline of the tasks associated with Stage 2A and Stage 2B is provided in Section 2.3 through Section 2.7. The site includes the MBD Site Compound, the Emplacement Cell Construction Site, and the Emplacement Cell located in the Outer Harbour. The location of the Stage 2A and Stage 2B works is shown in Figure 2.2.

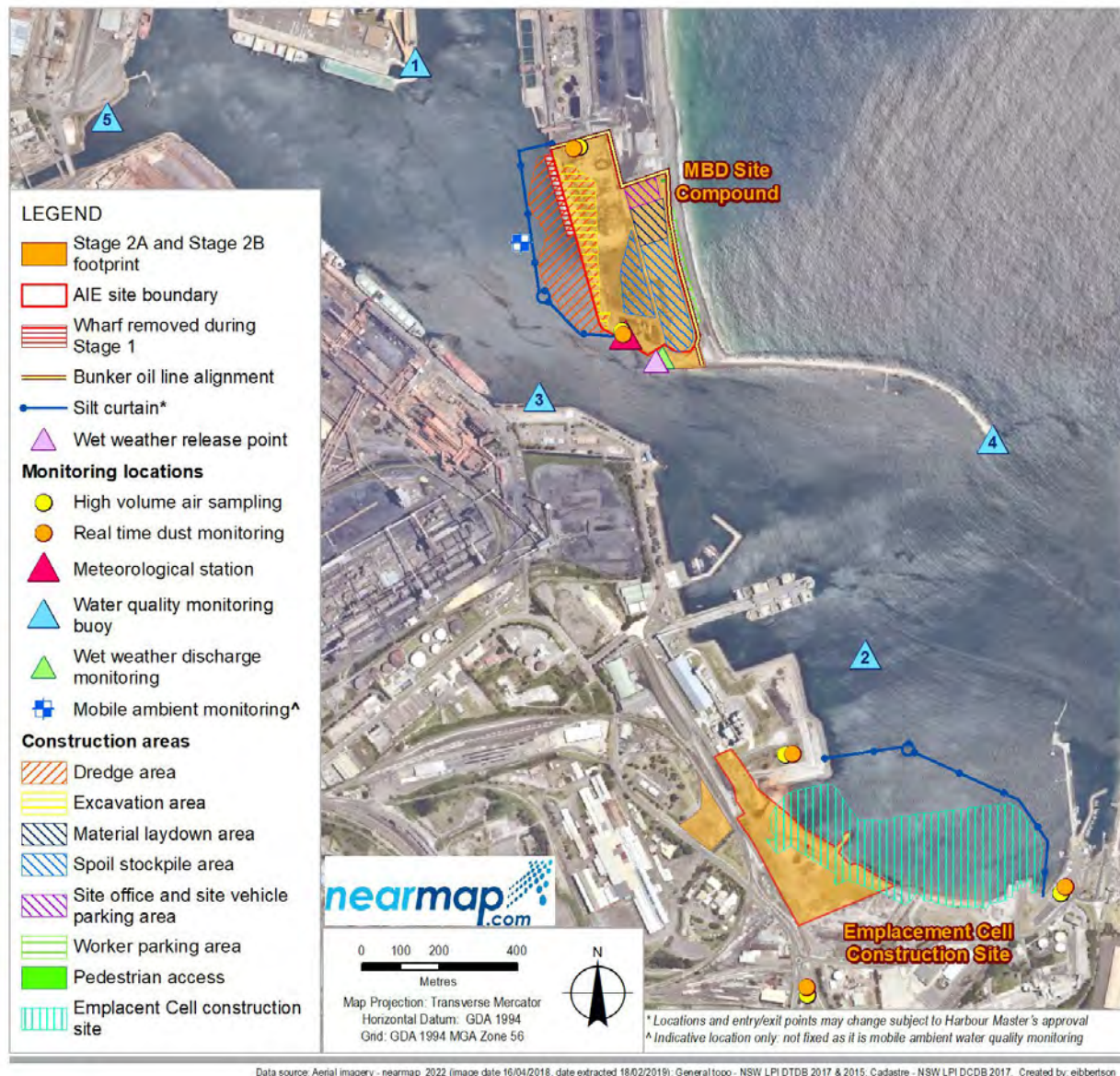


Figure 2.2 Stage 2A and Stage 2B works and location of MBD Site Compound, Emplacement Cell and Emplacement Cell Construction Site

## 2.2.1 Traffic

Road traffic generated by Stage 2A and Stage 2B will be controlled through the gate on Sea Wall Road. Heavy vehicle movements will be generated by the delivery of materials, equipment, and plant to the MBD Site Compound and transport of stockpiled material to the Emplacement Cell Construction Site.

In addition to the material that has already been transported to Emplacement Cell Construction Site (Outer Harbour Laydown Area) during Stage 2A, up to 30,000 cubic metres (m<sup>3</sup>) of material from the MBD Site Compound is anticipated to be transported via road to the Emplacement Cell Construction Site during Stage 2B. The activities associated with this task will involve loading, road transportation via truck and trailer (approximately 30-tonne capacity), unloading, stockpiling, and management of the stockpiles.

Light vehicle movements will be generated from construction workers accessing the MBD Site Compound and Emplacement Cell Construction Site. Parking will be provided for up to approximately 100 workers on the MBD Site Compound and approximately 37 workers at the Emplacement Cell Construction Site (refer to Figure 2.3 and Figure 2.4).



Road traffic movements will be undertaken in accordance with the Stage 2A and Stage 2B Construction Traffic Management Plan (CTMP).

The road traffic generated by Stage 2B will mainly be associated with the delivery of the quarry materials from quarries located in the surrounding area. It is anticipated that about 40-50 daily truck movements will be required, consisting of three - five axle semi-trailers or rigid truck and five axle dog-trailers of less than 40 tonnes (GML). The activities will take place during the standard daytime construction working hours, averaging approximately eight heavy truck movements per hour (four vehicles in and out of site). The total number of vehicles required for the operation will be 12-16.

The majority of traffic generated during Stage 2B activities will be marine traffic movements during dredging operations. Marine traffic navigation and management will be undertaken in accordance with a Port Navigation Plan, herein referred to as the Port Operations Management Plan (POMP). The POMP has been produced by the Stage 2B Principal Contractor in consultation with the Port Authority of NSW (PANSW) and is consistent with the principles in the CTMP for Stage 2A.

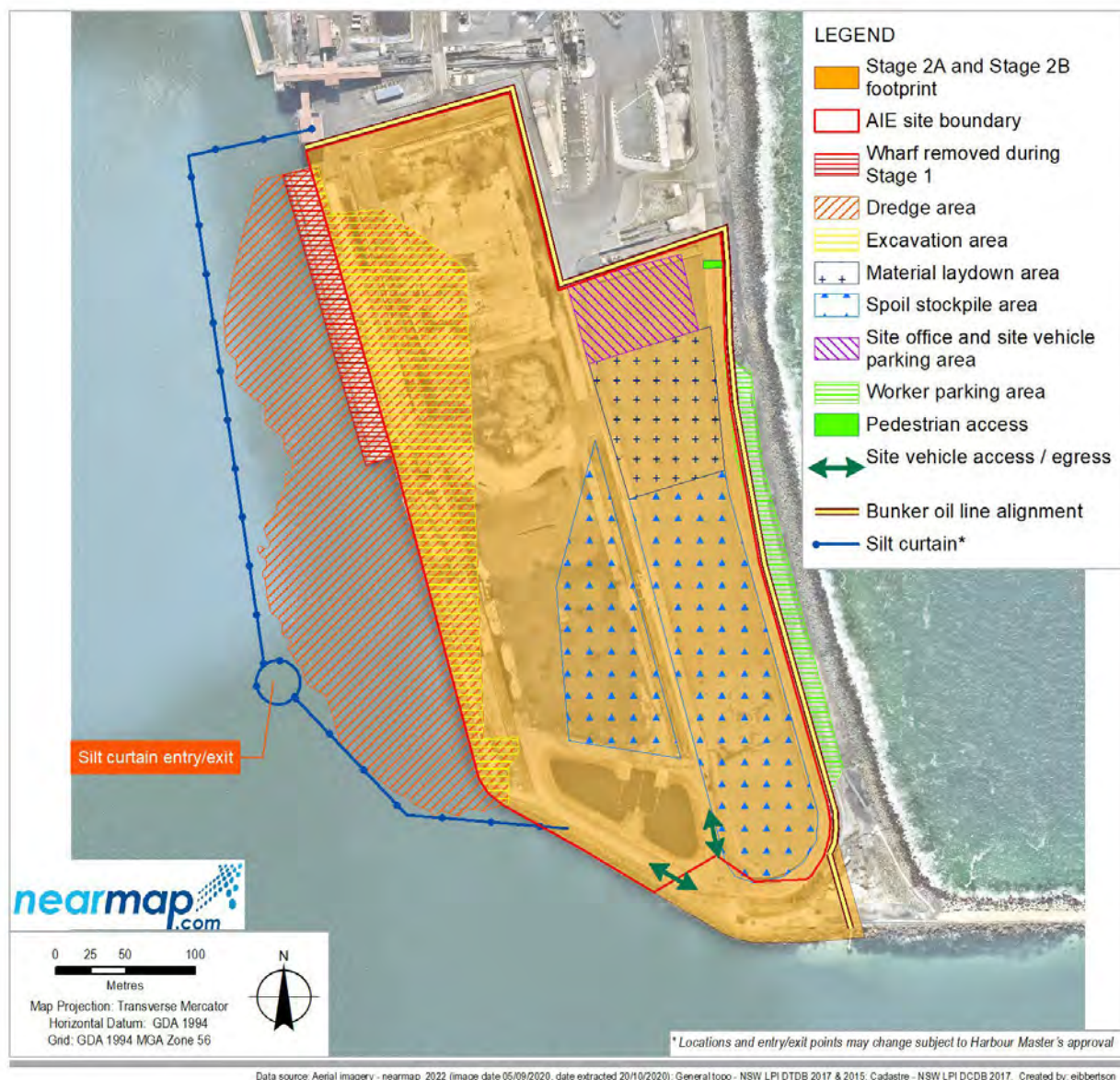


Figure 2.3 Layout of MBD Site Compound



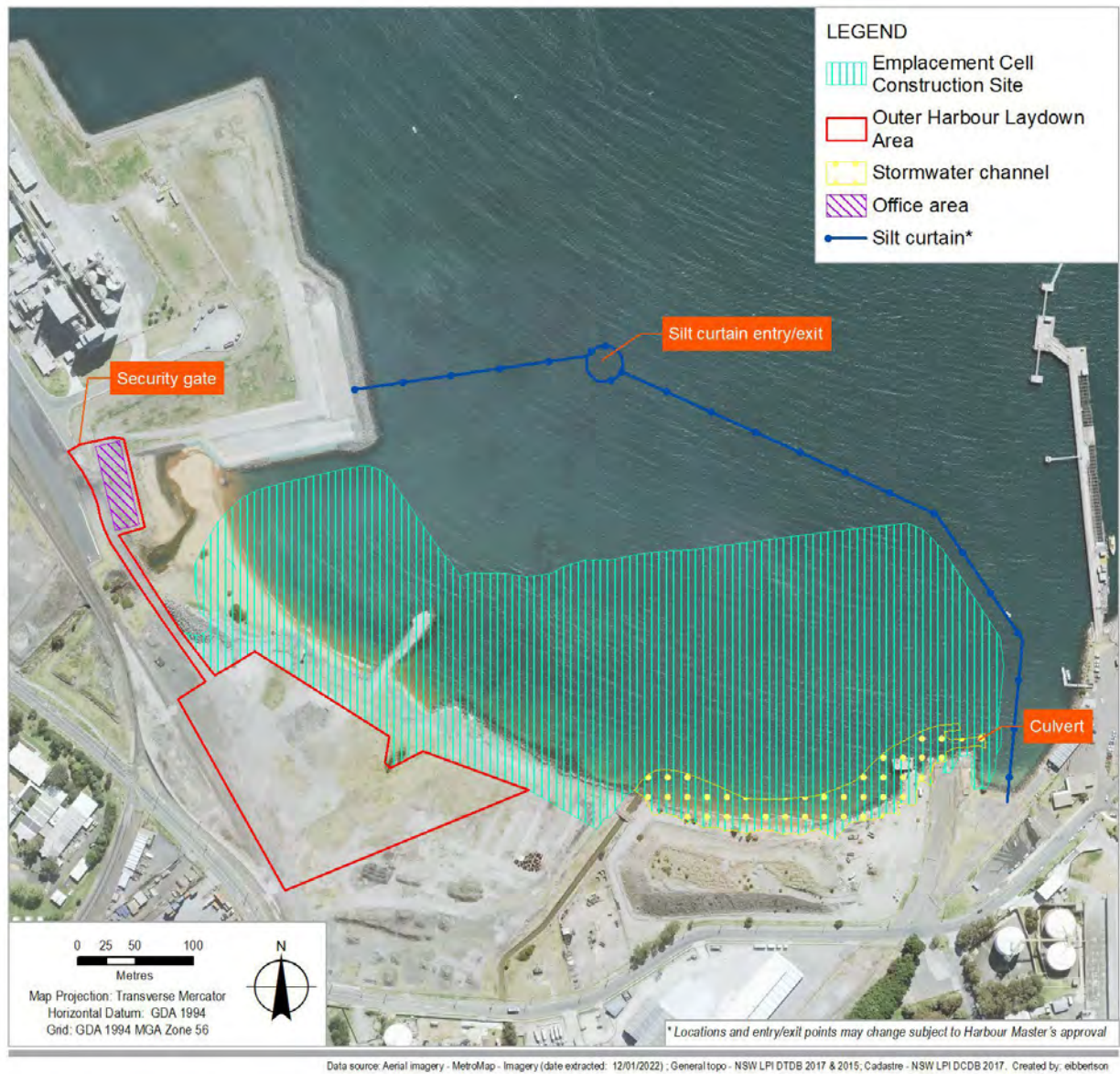


**Figure 2.4**      *Layout of Emplacement Cell Construction Site*

## 2.2.2 Program

The Stage 2A works commenced in January 2022. Stage 2B, which includes the continuation of land-based construction and marine-based works, are then anticipated to commence in March 2022 (refer to Table 2.1 for construction staging). As noted in Section 2.2, these dates are only proposed and may be subject to change.

## 2.3 Stage 2A: Construction of quay wall (MBD – Land Based)

A number of structures will be constructed within the MBD Site Compound to accommodate the FSRU and LNG carrier for the Project. Excavation and stockpiling activities from the Stage 1 Early Enabling Works will continue on-site during Stage 2A to lay the platform for ongoing construction activities at the MBD Site Compound.

The new structures that will commence construction during Stage 2A are summarised in Table 2.2. The location of the quay wall and layout of the marine berth and wharf facilities is shown in Figure 2.5.

**Table 2.2** Marine berth and wharf structures to be constructed during Stage 2A

| Component                            | Works required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Earthworks and stockpiles            | <ul style="list-style-type: none"> <li>Completion of excavation and backfilling works from Stage 1 Early Enabling Works.</li> <li>Excavated materials from the Early Enabling Works have been stockpiled within the Eastern and Western Stockyards of the MBD Site Compound and the Emplacement Cell Construction Site.</li> <li>The excavated materials stockpiled at the MBD Site Compound include: <ul style="list-style-type: none"> <li>Approximately 9,700m<sup>3</sup> of demolished concrete crushed to nominal 70mm minus.</li> <li>Approximately 12,500m<sup>3</sup> of heavily bound base course crushed to nominal -150mm minus.</li> <li>Approximately 33,900m<sup>3</sup> of mixed slag, general fill, and coal nominally &lt; 150mm in size.</li> <li>Approximately 10,700m<sup>3</sup> of predominantly sand material.</li> <li>Approximately 8,600 m<sup>3</sup> of asbestos impacted soils.</li> </ul> </li> <li>The excavated materials stockpiled at the Emplacement Cell Construction Site include: <ul style="list-style-type: none"> <li>Approximately 44,000 m<sup>3</sup> of sand material.*</li> </ul> </li> <li>The excavated materials will be used/reused for quay wall construction and to backfill the landside area of the quay wall or transported to the Emplacement Cell Construction Site for storage and use in construction of the Emplacement Cell.</li> </ul> |
| Quay wall                            | <ul style="list-style-type: none"> <li>Construction of a new piled quay wall keyed into bedrock where necessary complete with sheet pile anchor wall, capping beam and tie rods to the south of the existing coal terminal.</li> <li>Excavated and processed materials from the Stage 1 Early Enabling Works are stockpiled within the MBD Site Compound and will be used during construction of the quay wall and to backfill on landside area of the wall.</li> <li>Installation of a marine fender system attached to the capping beam along the quay wall to protect the quay wall from berthing and mooring loads.</li> <li>Installation of a cathodic protection system to the quay wall and associated elements, including assessment of the potential impacts the FSRU and pipeline cathodic protection will have on quay wall.</li> <li>Backfilling and compaction on landside area of wall utilising the site stockpiled materials.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Mooring dolphins                     | <ul style="list-style-type: none"> <li>Installation of landside mooring dolphin structures on reinforced concrete platforms supported by steel piles.</li> <li>Mooring equipment will be installed and comprise the following: <ul style="list-style-type: none"> <li>20 load sensing quick release hooks.</li> <li>Up to four land-based mooring winches on mooring dolphins may be required.</li> <li>Up to four swivel fairleads may be required to enable each mooring line to land-based winches to be fed in a horizontal alignment.</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Marine Loading Arm (MLA) foundations | Construction of a new reinforced concrete foundation supported on steel piles, located behind the new quay wall.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Gangway tower foundation             | Construction of foundation for Gangway tower.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Fire monitor foundation              | Fire monitor foundations, subject to risk studies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

\*The volumes provided are approximate and may vary.

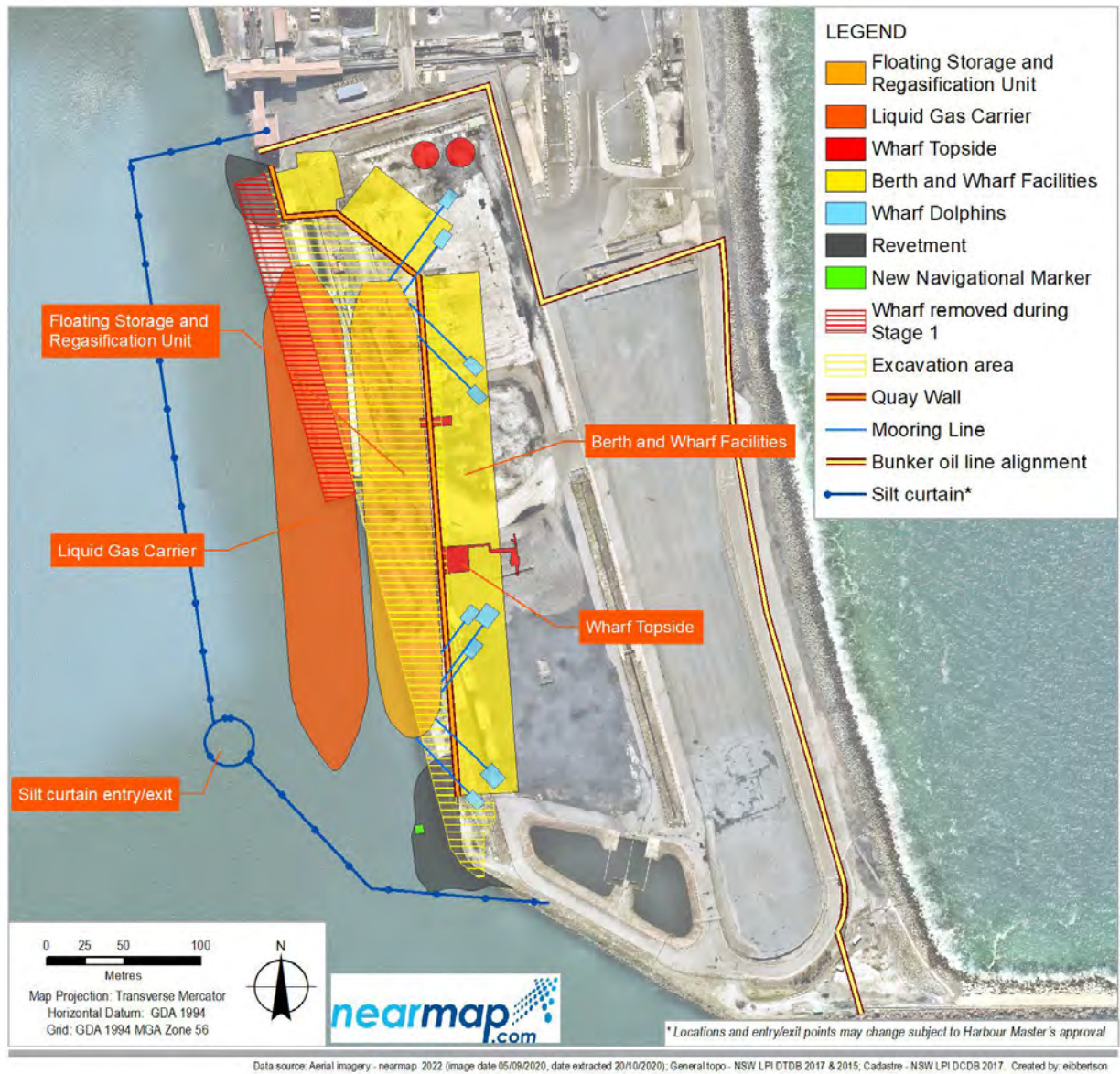


Figure 2.5 Location of quay wall and layout of MBD and ORF



## 2.4 Stage 2A: Power, communications, and water connections

Works required for power, communications, and water connections for Stage 2A are summarised in Table 2.3.

Table 2.3 Construction of power connections for Stage 2A

| Component                | Works required                                                                                                                                                                                                                                                                               |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power and communications | <ul style="list-style-type: none"> <li>Construction and installation of a new 11kV power cable in a buried conduit and Substation.</li> <li>Energisation of the padmount substation and 415kV temporary building supply.</li> <li>Installation of communication conduit and pits.</li> </ul> |
| Potable water            | <ul style="list-style-type: none"> <li>Extension of existing potable waterline within MBD Site Compound.</li> </ul>                                                                                                                                                                          |

## 2.5 Stage 2A: Construction of ORF

The general layout of the ORF areas is shown in Figure 2.5. Works required for the three ORF areas during Stage 2A are summarised in Table 2.4.

Table 2.4 Structures to be constructed for ORF during Stage 2A

| Component                          | Works required                                                                                                                                                                                                                                                                                                                      |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Wharf Topside Area</b>          |                                                                                                                                                                                                                                                                                                                                     |
| Marine Loading Arms (MLAs)         | Installation of MLAs, including: <ul style="list-style-type: none"> <li>Civils and structures.</li> <li>Associated works such as piping, hydraulics, electrical, instrumentation, and auxiliary systems.</li> </ul>                                                                                                                 |
| Piping and valving                 | <ul style="list-style-type: none"> <li>All necessary piping and valving.</li> <li>Odorant injection facilities.</li> <li>Pig launcher, downstream of the MLAs to tie-in to the natural gas pipeline.</li> </ul>                                                                                                                     |
| Gangway                            | <ul style="list-style-type: none"> <li>Gangway access tower to provide connection between the wharf and FSRU.</li> </ul>                                                                                                                                                                                                            |
| Utility connections                | FSRU utilities connections for: <ul style="list-style-type: none"> <li>Communications.</li> <li>Marine Diesel Oil.</li> <li>Freshwater.</li> <li>Sewage, bilge, and grey water.</li> </ul>                                                                                                                                          |
| <b>Utility Area</b>                |                                                                                                                                                                                                                                                                                                                                     |
| Site utilities                     | Site utilities including: <ul style="list-style-type: none"> <li>Potable water and sewerage.</li> <li>Instrument air and bottled nitrogen.</li> <li>Diesel storage.</li> <li>Electrical distribution (including UPS and emergency diesel generators).</li> <li>Control and instrumentation.</li> <li>Telecommunications.</li> </ul> |
| <b>Common Areas</b>                |                                                                                                                                                                                                                                                                                                                                     |
| Firefighting systems and equipment | Firefighting equipment including: <ul style="list-style-type: none"> <li>Firewater storage.</li> <li>Pumps.</li> <li>Firewater monitors.</li> </ul>                                                                                                                                                                                 |
| Security systems and equipment     | <ul style="list-style-type: none"> <li>CCTV.</li> <li>Fencing and gates.</li> </ul>                                                                                                                                                                                                                                                 |

| Component                            | Works required                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                      | <ul style="list-style-type: none"> <li>– Security access and monitoring systems.</li> </ul>                                                                                                                                                                                                                                                                               |
| Equipment housing                    | Equipment shelters and buildings to house: <ul style="list-style-type: none"> <li>– Electrical, control, and operating equipment, critical spares, emergency response and site monitoring facilities.</li> <li>– Buildings will include appropriate building services e.g., heating, ventilation and air conditioning, potable water, amenities, sewerage etc.</li> </ul> |
| Site roadways, lighting and drainage | <ul style="list-style-type: none"> <li>– Roads and car parking areas.</li> <li>– General lighting, earthing, lightning system.</li> <li>– Drainage system to tie into the existing Port Kembla drainage system.</li> </ul>                                                                                                                                                |
| Gas Pipeline                         | A section of gas pipeline will be installed within the MBD Compound site as part of the Stage 2A works. Final safety studies will be prepared prior to the construction of the gas pipeline and prior to commencement of operation as per Schedule 3, Condition 21 of Infrastructure Approval (SSI 9471).                                                                 |

## 2.6 Stage 2B: Excavation and dredging

An Emplacement Cell Report (ECR) has been developed by SMEC Australia Pty Ltd (SMEC) titled 'Port Kembla Gas Terminal Development – Emplacement Cell Report' in accordance with Infrastructure Approval (SSI 9471) Schedule 3, Condition 8 and 9. The ECR outlines the design and construction methodology of the Emplacement Cell.

Approximately 450,000 m<sup>3</sup> of materials will be excavated/dredged from the MBD Site Compound and placed within the boundaries of the Emplacement Cell. Further details, including detailed design drawings, can be found in the ECR (SMEC, 2022). A summary of the excavation and dredging works is provided in Section 2.6.2 and Section 2.6.3.

### 2.6.1 Silt curtains

Prior to the commencement of dredging activities, silt curtains will be installed within the Inner Harbour (MBD Site Compound) and Outer Harbour (Emplacement Cell). A fixed gate or bubble curtain gate will be installed to allow for the entrance and exit of barges whilst also controlling the dispersion of silt.

Silt curtains will be suitable for tidal and working harbour conditions.

Navigation and special markers will be installed to the satisfaction of the Harbour Master to alert marine vessels operating in the port harbours of the presence of silt curtains any other risks to navigation.

Further information regarding the use of silt curtains is provided in the Dredge and Excavation Management Plan (DEMP) for Stage 2A and Stage 2B.

### 2.6.2 Excavation and dredge staging

Construction activities undertaken during Stage 1 involved the excavation of fill materials at the MBD Site Compound. Excavation has continued through Stage 2A and will continue as part of Stage 2B. On completion of existing fill materials being excavated, dredging operations will commence at the MBD Site Compound as part of the Stage 2B works.

Dredging activities at the MBD Site Compound and Emplacement Cell will be staged to accommodate other construction works occurring at the MBD Site Compound.

Construction staging for excavation and dredging activities to be undertaken are summarised in the ECR (SMEC, 2022). Excavation and dredging at the MBD Site Compound is shown in Figure 2.6. An overview of the Emplacement Cell is shown in Figure 2.7.

### 2.6.3 Marine-based construction activities at MBD Site Compound

Marine based construction works required at the MBD Site Compound during Stage 2B are summarised in Table 2.5.

**Table 2.5**      *Marine based construction works during Stage 2B*

| Component                  | Works required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Navigational aids          | <ul style="list-style-type: none"> <li>– Construction of new navigation aid pile through the new southern revetment.</li> <li>– Installation of navigation platform, tower, and lights, including all access requirements such as ladders, platforms, and handrails.</li> <li>– Lights will be battery powered and charged via solar panels.</li> <li>– Existing navigation aid to be removed after the commission of the new navigation aid.</li> </ul>                                                                           |
| Revetment shore protection | <ul style="list-style-type: none"> <li>– Revetments will be constructed at the north and south embankments of the new MBD Site Compound wharf (refer to Figure 2.6) following completion of dredging works.</li> <li>– Works will comprise: <ul style="list-style-type: none"> <li>• Laydown of Texcel 1200R geotextile.</li> <li>• Placement of thick quarry run to a depth of 190mm.</li> <li>• Placement of underlay rock to a depth of 400mm.</li> <li>• Placement of armour rock to a depth of 900 mm.</li> </ul> </li> </ul> |
| Revetted Trench            | <ul style="list-style-type: none"> <li>– Dredging of an approximate 10x10m trench to -14.5 reduced level (RL) Port Kembla Height Datum (PKHD) for accommodating the under-keel requirements of the FSRU strainers. An approach channel may also be required.</li> <li>– The trench should have sufficient scour protection.</li> </ul>                                                                                                                                                                                             |
| Berthing box               | <ul style="list-style-type: none"> <li>– Dredging will be undertaken to facilitate berthing boxes to be constructed.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                    |

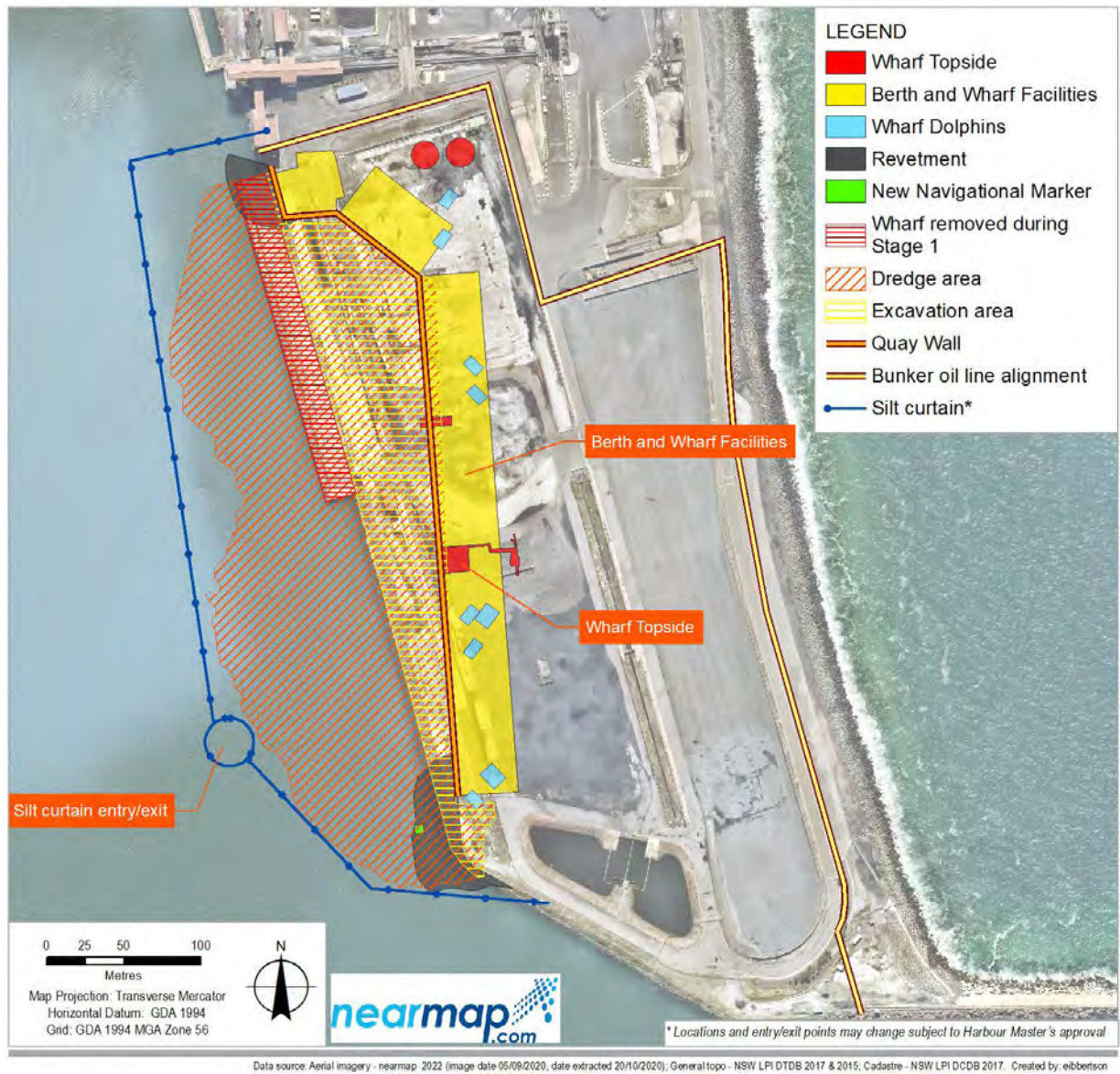


**Figure 2.6** Dredging and excavation works for MBD Site Compound (Stage 2B)



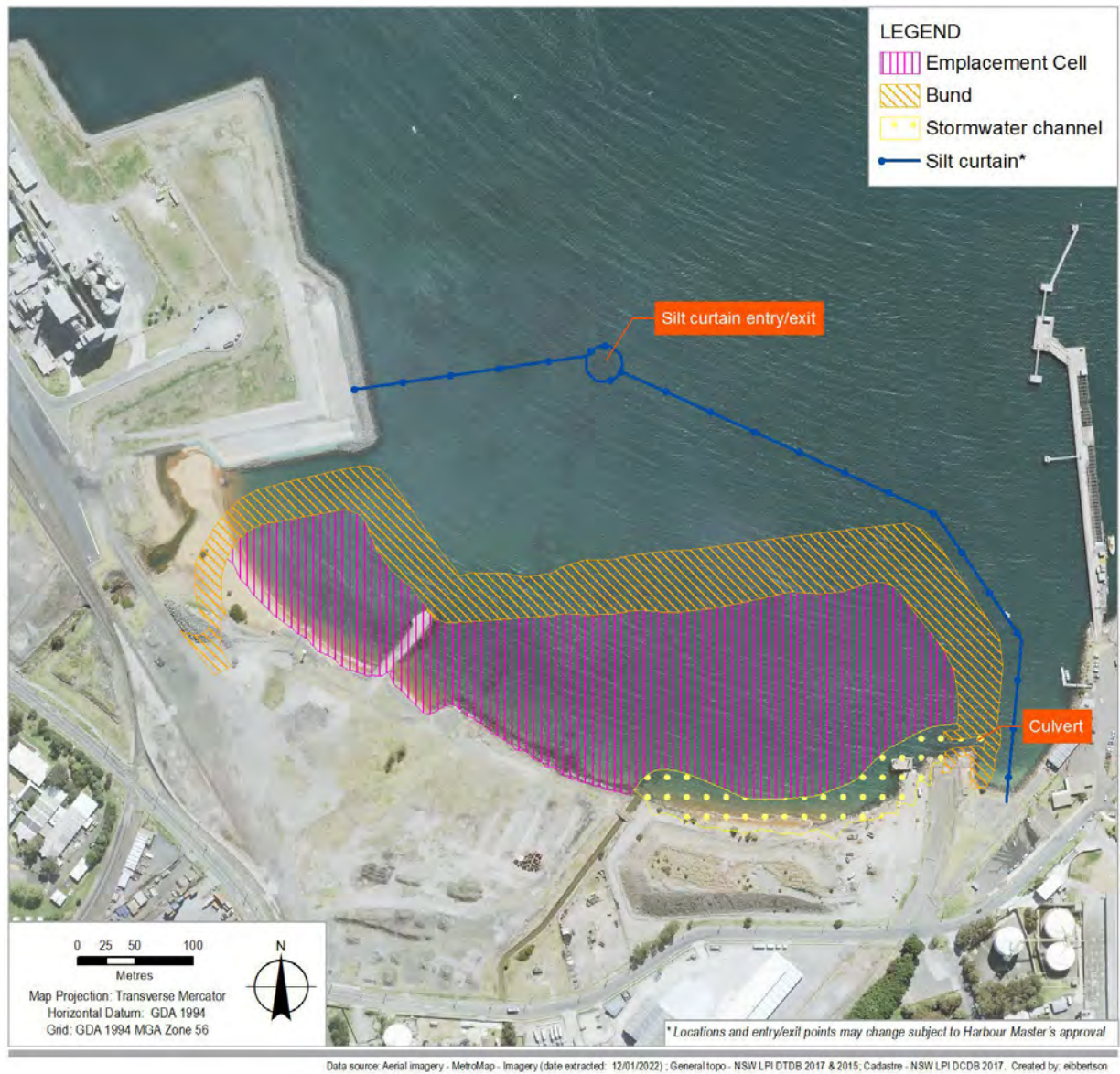


**Figure 2.7**      **Emplacement Cell overview (Stage 2B)**



## 2.7 Stage 2B: Construction of the Emplacement Cell

The Emplacement Cell will be located within the Outer Harbour, comprising of an approximate 800-metre perimeter bund. The Emplacement Cell has been designed and constructed to receive approximately 450,000 m<sup>3</sup> of dredged materials from the MBD Site Compound. Contaminated materials including Harbour Muds (HM)/Harbour Silts (HS) will be placed below -1 m PKHD and at a maximum below LAT (below ~-0.02 m PKHD), and Potential Acid Sulfate Soils (PASS) will be placed below +0.9m PKHD within the Emplacement Cell.

The construction work components and key features of the Emplacement Cell are summarised in Table 2.6. An overview of the Emplacement Cell is shown in Figure 2.7. Further details are provided in the ECR (SMEC, 2022).

**Table 2.6**      *Emplacement Cell key features – Stage 2B*

| Component          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Emplacement Cell   | <ul style="list-style-type: none"> <li>– All contaminated soils, including HM/HS and PASS, will be placed within the Emplacement Cell generally below lower than -1.0m PKHD and in no instances above the LAT (~-0.02m PKHD).</li> <li>– The final Emplacement Cell levels will be graded towards the proposed stormwater channel.</li> <li>– Design life of 15 years.</li> </ul>                                                                                                                                                                                                                                 |
| Perimeter bund     | <ul style="list-style-type: none"> <li>– The design bund crest level was derived based on tide, storm surge, sea level rise and wave overtopping and assumed to be +3.55m PKHD. The adopted crest level also includes allowance for assessed post-construction settlement of up to 250mm.</li> <li>– Minimum crest width of 6m and 11m at passing bays.</li> <li>– Maximum permanent batter slopes of 1V:3H for seaward slopes and 1V:2H for landward/internal slopes.</li> <li>– The bund is to accommodate a 110t long reach excavator, fully loaded semi-trailer and temporary material stockpiles.</li> </ul> |
| Rock revetment     | <ul style="list-style-type: none"> <li>– Rock revetment structure will extend to the toe of the main bund to provide protection to the bund structure against coastal processes.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Stormwater channel | <ul style="list-style-type: none"> <li>– Stormwater channel to extend from the existing Darcy Road drain outlet to the eastern side of the Emplacement Cell.</li> <li>– Stormwater channel outlet is to comprise a box culvert structure on the eastern end of the Emplacement Cell, providing vehicular access onto the bund at the Jetty 3 abutment and within the NSW Ports property boundary.</li> </ul>                                                                                                                                                                                                      |

### 3. Roles and responsibilities

The Project Team is responsible for all activities associated with Stage 2A and Stage 2B, including the implementation and maintenance of the various mitigation/management measures outlined in this ESCP. Relevant roles and responsibilities of the Project Team are outlined in Table 3.1.

**Table 3.1** Roles and responsibilities of Project Team

| Project Role                                                                                              | Responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AIE Project Director                                                                                      | <ul style="list-style-type: none"> <li>– Responsible for the overall funding and direction of works associated with Stage 2A and Stage 2B.</li> <li>– Ensuring provision of adequate resources to achieve the environmental objectives for the Project including ensuring sufficient resourcing for the Environmental Team, Engineering and Construction Teams.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| AIE Construction Manager                                                                                  | <ul style="list-style-type: none"> <li>– Proactively stewards the effective implementation of Stage 2A and Stage 2B in accordance with requirements of the Infrastructure Approval (SSI 9471), this ESCP, Environmental Strategy, and all related Sub - plans.</li> <li>– Demonstrate proactive support for environmental requirements.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| AIE HSE Manager                                                                                           | <ul style="list-style-type: none"> <li>– Develop and update all Health, Safety and Environmental (HSE) Management Strategies and Sub - plans.</li> <li>– Ongoing liaison and engagement with government agencies and point of escalation for any environmental incidents.</li> <li>– Identifying environmental issues as they arise and proposing solutions.</li> <li>– Coordinate and facilitate periodic environmental inspections with the key contractors.</li> <li>– Environmental Reporting.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Emplacement Cell Auditor                                                                                  | <ul style="list-style-type: none"> <li>– Audit the construction of the Emplacement Cell and verify that works have been completed in accordance with the design intent (Emplacement Cell), The auditor role is to satisfy Condition 10 Schedule 3 of the Infrastructure Approval and any other relevant conditions therein.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager           | <ul style="list-style-type: none"> <li>– On-site Project management and control.</li> <li>– Decision-making authority relating to environmental performance of the construction program.</li> <li>– Authority over Project construction and site activities in accordance with the EMS.</li> <li>– Ensure relevant training is provided to all Project staff prior to commencing individual activities.</li> <li>– Reports to AIE Construction Manager on environmental matters.</li> <li>– Ensures appropriate Contractor resources are allocated to implement the environmental requirements.</li> <li>– Responsible for planning and scheduling of construction, and to ensure operations are conducted in accordance with statutory requirements and the EMS.</li> <li>– Monitors performance against environmental Key Performance Indicators (KPI's).</li> <li>– Ensures that all environmental objectives associated with the Project are achieved.</li> <li>– Day-to-day decision-making authority relating to environmental performance of construction activities and direct site activities and construction.</li> <li>– To provide resources to ensure environmental compliance and continuous improvement.</li> <li>– Ensure all personnel are aware of any changes to EMS, this ESCP and improved procedures.</li> <li>– Ensure this ESCP is implemented for the duration of Stage 2A and Stage 2B.</li> </ul> |
| Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman | <ul style="list-style-type: none"> <li>– Implement requirements contained in the EMS and Sub - plans, work procedures and standard drawings.</li> <li>– Maintaining open and transparent communication with other Project discipline managers and other areas of the Project.</li> <li>– Reporting of hazards and incidents and implementing any rectification measures.</li> <li>– Ensures appropriate contractor resources are allocated.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| Project Role                                                                                                              | Responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                           | <ul style="list-style-type: none"> <li>– Orders STOP WORK for any environmental breaches and reports incidents to the Project Manager.</li> <li>– Ensure this ESCP is implemented for the duration of Stage 2A and Stage 2B.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Stage 2A Principal Contractor Environmental Representative and Stage 2B Principal Contractor Environmental Representative | <ul style="list-style-type: none"> <li>– Delivers environmentally focussed toolbox talks and provides applicable site inductions.</li> <li>– Provides environmental advice, assistance, and direction to Project Manager to ensure construction activities are conducted in accordance with regulatory legislation and this ESCP.</li> <li>– Participate and cooperate with AIE HSE Manager with regards to undertaking of joint environmental site inspections.</li> <li>– Coordinate / undertake wet-weather inspections as per EPL No. 21529 and report accordingly to the AIE HSE Manager.</li> <li>– Develop strong working relationships with the AIE team and Consultants.</li> <li>– Ensure environmental risks are appropriately identified, communicated, and effectively managed.</li> <li>– Ensure communication of relevant environmental information to Project personnel.</li> <li>– Provide specialist advice and input as required.</li> <li>– 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.</li> <li>– Orders STOP WORK for any environmental breaches and immediately reports incidents to Principal Contractor Project Manager and AIE HSE Manager.</li> </ul> |
| AIE Environmental Representative and AIE Environmental Contractor                                                         | <ul style="list-style-type: none"> <li>– Develop strong working relationships with the Principal Contractor Team and Consultants.</li> <li>– Ensure environmental risks are appropriately identified, communicated, and effectively managed.</li> <li>– Instruct and advise management team on compliance issues.</li> <li>– Provide specialist advice and input as required.</li> <li>– Co-ordinate internal audits of this ESCP.</li> <li>– Conduct audit review as required.</li> <li>– Reports on the performance of this ESCP and recommends changes or improvements to Project Manager.</li> <li>– Orders STOP WORK for any environmental breaches and immediately reports incidents to the AIE Construction Manager and AIE HSE Manager.</li> <li>– Conducts investigation and response to environmental complaints and inquiries, where required.</li> <li>– Undertake all required environmental monitoring for this phase of the Project.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Subcontractors and construction personnel                                                                                 | <ul style="list-style-type: none"> <li>– Undertake an environmental induction prior to accessing to site.</li> <li>– Comply with legislative requirements.</li> <li>– Participate in inspections and audits.</li> <li>– Follow environmental procedures.</li> <li>– Report all environmental incidents and hazards.</li> <li>– Introduce environmental topics to prestart meetings.</li> <li>– Ensure that all relevant permits and clearances are in place prior to commencing work.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## 4. Legislative requirements

The legislative requirements applicable to Stage 2A and Stage 2B are listed in Table 4.1.

**Table 4.1**      *Legislation and relevant policy applicable to this ESCP*

| Legislation and Regulation                                                                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                        | Applicability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Legislation</b>                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>Protection of the Environment Operations Act 1997 (POEO Act)</i>                           | The objectives of the POEO Act are to protect and enhance the environment of NSW with regard to the need for ecologically sustainable development. The Act provides the statutory framework for managing pollution in NSW, including the procedures for issuing licences for environmental protection on aspects such as waste, air, water, and noise pollution control. It is an offence under Section 120 to pollute any waters. | AIE is committed to ensuring that the Stage 2A and Stage 2B works will not pollute any waters through the implementation of erosion and sediment controls and management. All works will be undertaken in accordance with the issued EPL No. 21529 conditions (refer to Table 5.2).                                                                                                                                                                                                                                                                   |
| <b>Planning Instrument</b>                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Wollongong Development Control Plan 2009 (Wollongong DCP)                                     | The Wollongong DCP are a set of policies from Wollongong City Council that detail how developments must be undertaken in order to meet the conditions of the Wollongong Local Environmental Plan 2009 (Wollongong LEP) and State Environmental Planning Policies (SEPPs). The Wollongong LEP does not apply to State significant sites, which includes the Port of Port Kembla.                                                    | Chapter 15 of the DCP outlines the objectives for Water Sensitive Urban Design, including controls related to minimisation of stormwater run-off and protect the quality of water run-off from development.<br><br>Chapter 22 outlines soil erosion and sediment controls. The objectives are to minimise amount of sediment and contaminated water leaving the site, minimisation of site disturbance and rehabilitation strategies post completion of the works. Control measures outlined in these chapters have been incorporated into this ESCP. |
| <b>Guidelines</b>                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Managing Urban Stormwater: Soils and Construction – Volume 1 “the Blue Book” (Landcom, 2004). | The Blue Book is a resource guideline which provides management strategies for stormwater and erosion and sediment control during construction of developments.                                                                                                                                                                                                                                                                    | Management strategies and control measures outlined in the Blue Book have been incorporated into this ESCP.                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## **5. Planning requirements**

### **5.1 Conditions of approval**

The planning requirements and the corresponding erosion and sediment control management measures applicable to Stage 2A and Stage 2B are listed in Table 5.1 and Table 5.2. Management measures are detailed in Section 7 and Section 8.

The planning requirements include the conditions set out in the Infrastructure Approval (SSI 9471) dated 13 October 2021, EPL No. 21529 and the mitigation/management measures outlined in the PKGT EIS.

Table 5.1 Planning requirements

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Reference               | Responsibility                                                                                                                                                                                                               | Evidence                                                            | Applicability to this ESCP |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------|
| <b>Infrastructure Approval Requirements (SSI 9471)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                         |                                                                                                                                                                                                                              |                                                                     |                            |
| <b>Soil Erosion</b><br>The Proponent must minimise any soil erosion associated with the construction of the development in accordance with the relevant requirements in the Managing Urban Stormwater: Soils and Construction (Landcom, 2004) manual, or its latest version.                                                                                                                                                                                                                                                                                                                                                                                                                     | Schedule 3, Condition 5 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– AIE Construction Manager</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Section 7.2<br>Section 8                                            | Applicable                 |
| <b>Water Pollution</b><br>Unless an environment protection licence authorises otherwise, the Proponent must comply with Section 120 of the POEO Act.<br><i>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:</i> <ul style="list-style-type: none"> <li>– an equivalent suspended sediment of no more than 50 mg/L above background turbidity levels during the construction stage;</li> </ul> <i>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.</i> | Schedule 3, Condition 1 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– AIE Construction Manager</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Section 7.2.3<br>Also refer to Water Quality Monitoring Plan (WQMP) | Applicable                 |
| <b>PKGT EIS Management Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                         |                                                                                                                                                                                                                              |                                                                     |                            |
| A site specific ESCP will be prepared as part of the EMS 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').                                                                                                                                                                                                                                                                                                                                                  | EIS Measure W10         | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– AIE Construction Manager</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | This ESCP                                                           | Applicable                 |
| A site specific ESCP will be prepared as part of the EMS. All erosion and sediment control measures shall be designed, implemented and maintained in accordance with relevant sections of 'Managing Urban Stormwater: Soil and Construction Volume 1' (Landcom 2004) ('the Blue Book') (particularly section 2.2) and 'Managing Urban Stormwater: Soil and Construction Volume 2A – Installation of Services' (DECC 2008b). The erosion and sediment control plan will include stockpiles, stormwater runoff, trees, site boundaries, site access and storage areas.                                                                                                                             | EIS Measure TB6         | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– AIE Construction Manager</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | This ESCP                                                           | Applicable                 |
| Areas disturbed during the works will be rehabilitated, including stabilising disturbed soils to resist erosion and weed invasion via establishment of with                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | EIS Measure TB7         | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> </ul>                                                                                                                                                          | Section 7.2                                                         | Applicable                 |

| Requirement                                                                                                                                                                                                                                                                                                                                                                          | Reference | Responsibility                                                                                                                                                                                    | Evidence                                                              | Applicability to this ESCP |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------|
| <p>a suitable turf species such as a native Couch or repaving roads and sealed surfaces.</p> <p>Stabilisation activities will be carried out progressively to limit the time disturbed areas are exposed to erosion processes</p> <p>Activities with a risk of soil erosion such as earthworks will not be undertaken immediately before or during high rainfall or wind events.</p> |           | <ul style="list-style-type: none"> <li>– AIE Construction Manager</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | <p>Section 8</p> <p>Also refer to Flora and Fauna Management Plan</p> |                            |

## 5.2 Environment Protection Licence

AIE have been issued an EPL under the POEO Act as of 2 June 2021. Conditions applicable to erosion and sediment control management are outlined in Table 5.2.

Table 5.2 EPL No. 21529 conditions

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Reference      | Evidence               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------|
| <b>Pollution of waters</b><br>Except as may be expressly provided in any other condition of this licence, the licensee must comply with Section 120 of the POEO Act.                                                                                                                                                                                                                                                                                                                                                                                       | Condition L1.1 | Section 7.2.3          |
| <b>Processes and management</b><br>The licensee must implement all feasible and reasonable erosion and sediment controls as may be necessary throughout the life of construction works and activities to minimise sediment leaving the premises.                                                                                                                                                                                                                                                                                                           | Condition O4.1 | Section 7<br>Section 8 |
| The licensee must ensure erosion and sediment controls are designed (stability, location, type and size), constructed, operated and maintained in accordance with Managing Urban Stormwater – Soils and Construction, Volume 1, 4th Edition (Landcom, 2004).<br><br>Note: the licensee may consider guidance from other industry best practice documents if it can demonstrate the guidance will provide improved outcomes for the environment and meet the requirements of condition L1.1 of this licence.                                                | Condition O4.2 | Section 7              |
| All erosion and sediment control measures on the premises must be inspected and works undertaken to repair and/or maintain these controls: <ul style="list-style-type: none"> <li>a. weekly during normal construction hours</li> <li>b. daily during periods of rainfall; and</li> <li>c. within 24 hours of cessation of a rainfall event causing runoff to occur on or from the premises.</li> </ul> The Licensee must record all such inspections including observations and works undertaken to repair and/or maintain erosion and sediment controls. | Condition O4.4 | Section 9              |
| The southern pond in Berth 101 must be maintained to ensure that sedimentation does not reduce their capacity by more than 20% of the design capacity.                                                                                                                                                                                                                                                                                                                                                                                                     | Condition O4.5 | Section 8              |



## 6. Existing environment

### 6.1 Topography

The MBD Site Compound is situated between three metres Australian Height Datum (AHD) and five metres AHD. The MBD Site Compound gently slopes from south to west with a large, constructed settlement pond present within the southern portion of the site (the Southern Pond). The Project will be situated on largely reclaimed land that has historically been highly disturbed and subject to industrial land uses.

The Emplacement Cell Construction site is located in a highly modified and industrial setting. The site is generally flat and sits at elevations between three metres and ten metres AHD. The Emplacement Cell Construction site is adjacent to the Outer Harbour and bounded by a rail corridor, roads and industrial sites. The site has been largely cleared of all vegetation and is currently used for stockpiling.

### 6.2 Soils and geology

A desktop review of the Australian Soil Resource Information System (ASRIS) (ASRIS, 2011) shows that dermosols are mapped as the predominant soil type within the MBD Site Compound. The original soil within the MBD Site Compound has been removed, greatly disturbed or buried. Site investigations undertaken by Worley Parsons (2012) and summarised by GHD (2018) showed that fill materials encountered generally contained coal, coal wash and slag with trace fragments of asbestos containing materials and other anthropogenic materials.

The Wollongong-Port Hacking 1:100 000 Soil Landscape Series Sheet 9029-9129 (Soil Conservation Service of NSW, 1990) indicates the Emplacement Cell Construction Site is located within a disturbed terrain soil landscape which has been disturbed by human activity with the original soils being removed, greatly disturbed or buried. Geological mapping indicates the site comprises of Quaternary sediments described as quartz and lithic fluvial sand, silt, and clay (Geological Survey of NSW, 1985).

### 6.3 Acid Sulfate Soils (ASS)

GHD (2018a) have identified the presence of ASS at the MBD Site Compound. ASS was found to occur in natural sediments below the fill (variable and to depths between 2.5 and 5.5 metres below ground level (mbgl) to at least 14 metres depth and likely beyond, particularly where dark grey and green clays exist. Estuarine sediments exist within the harbour and are mapped as high probability of ASS.

The Emplacement Cell Construction Site is not located in an area mapped as being at ASS risk on the ASS risk map (DLWC, 1997).

The design of the Emplacement Cell indicates that all ASS and contaminated materials can be placed below +0.9m PKHD (SMEC, 2022). In the event that there are excess materials of ASS that cannot be placed in the Emplacement Cell, offshore and onshore disposal may be required. This is currently being investigated by AIE and would be subject to approval by relevant authorities such as DP&E. Neutralisation/treatment options have been disregarded due to the difficulty of applying these measures to stiff clays. Additional information on ASS is provided in the Stage 2A and Stage 2B Acid Sulfate Soils Management Plan (ASSMP).

### 6.4 Contaminated soils

A high-level assessment for contamination was undertaken for the Project and included within the PKGT Submissions Report (GHD, 2019). Whilst no widespread or gross contamination was found, there is considered to be a moderate potential for contamination based upon the nature of the fill material and potentially contaminating activities from surrounding industry at the MBD Site Compound (GHD, 2019). Further detail regarding potential/known contamination that may be encountered during Stage 2A and Stage 2B, and associated controls, is contained within the SMP, ASSMP and Contaminated Spoil Protocol (CSP).

## 6.5 Climate

Climate statistics were obtained from the Bureau of Meteorology (BOM) for Port Kembla Signal Station (068053). Average rainfall (millimetres) data for Port Kembla Signal Station (068053) (BOM, 2019) is shown in Table 6.1 and Figure 6.1. The figures show an increased average rainfall during the spring months; however, significant rainfall can occur at any time during the year.

**Table 6.1** Average rainfall (mm) data for Port Kembla Signal Station (068053) (BOM, 2019)

|                    | Jan   | Feb   | Mar   | Apr  | May | Jun   | Jul  | Aug  | Sep | Oct | Nov  | Dec  | Total  |
|--------------------|-------|-------|-------|------|-----|-------|------|------|-----|-----|------|------|--------|
| Mean Rainfall (mm) | 116.1 | 157.5 | 183.7 | 92.9 | 89  | 140.3 | 62.6 | 87.7 | 55  | 108 | 94.3 | 90.4 | 1260.6 |

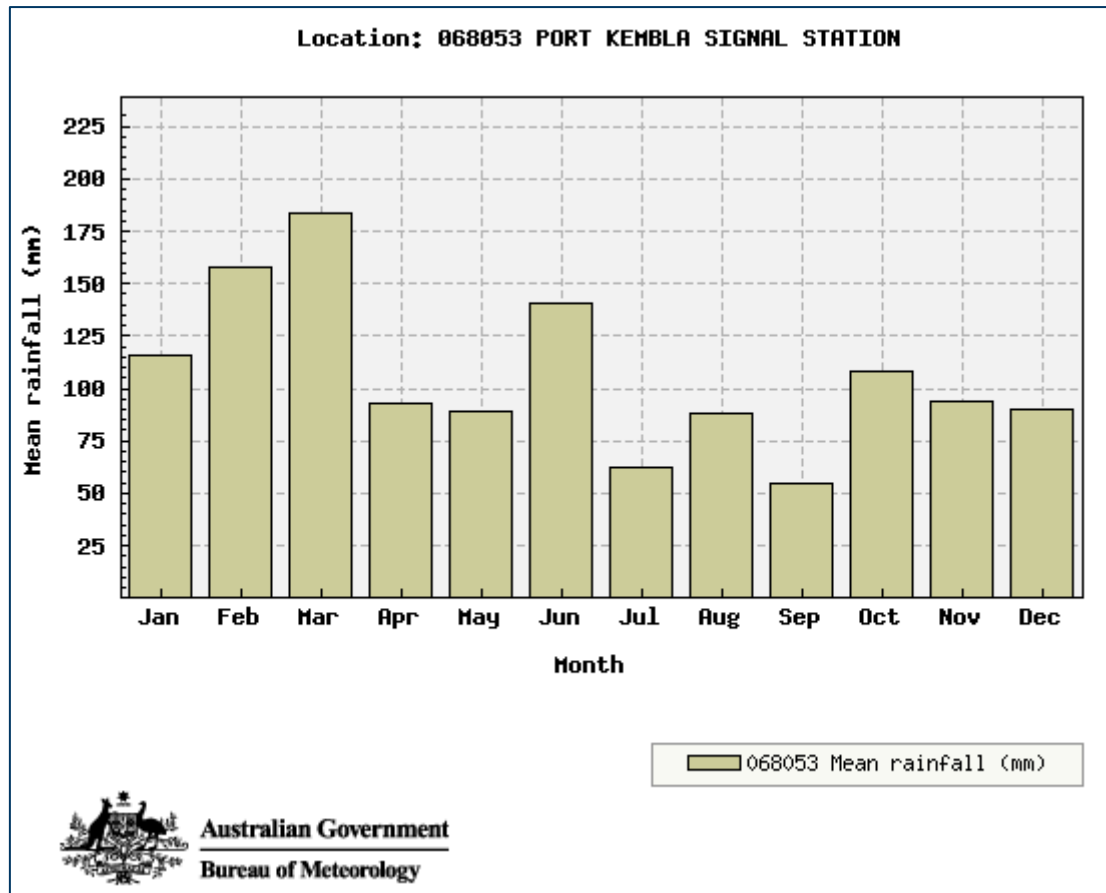


**Figure 6.1** Average rainfall (mm) graph for Port Kembla Signal Station (068053) (BOM, 2019)

## 7. Progressive Erosion and Sediment Control Plans

### 7.1 Development of PESCPs

PESCPs will be developed for high-risk areas prior to commencing work. PESCPs are site-specific plans that sit under this overarching ESCP. PESCPs will include, at a minimum:

- A drawing or marked up map showing the layout and details of erosion and sediment control measures including runoff, stockpiles, site access and storage areas.
- Supporting site specific commentary or construction notes containing explanatory text, calculations, and diagrams, as necessary.
- Calculations and sizing of controls, as required.

The preparation of PESCPs will utilise the design criteria and standards stipulated in Section 7.2. The Principal Contractors will be responsible for developing the plans with sign-off by a Certified Professional in Erosion and Sediment Control (CPESC). All erosion and sediment control devices will be designed to minimise any soil erosion associated with the construction of Stage 2A and Stage 2B works, in accordance with the relevant requirements in the *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004) manual, or its latest version.

PESCPs are to be maintained to ensure they accurately reflect the construction works occurring on site. All feasible and reasonable erosion and sediment controls as may be necessary will be implemented throughout the life of construction works and activities to minimise sediment leaving the premises.

### 7.2 Design criteria

#### 7.2.1 Erosion hazard (RUSLE)

An indicative erosion hazard assessment using the Revised Universal Soil Loss Equation (RUSLE) equation has been undertaken for the Project area and should be updated using site-specific soils data for the PESCPs.

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

Table 7.1 details the factors and adopted values for the assessment.

Table 7.1 RUSLE factors

| RUSLE Parameter | Description                       | Adopted Value                                                                                  |
|-----------------|-----------------------------------|------------------------------------------------------------------------------------------------|
| R-Factor        | Rainfall erosivity                | 4,421 based on $R = 164.74 (1.1177)^S S^{0.6444}$ where $S$ equals the 2yr-6hr storm (14.2 mm) |
| K-Factor        | Soil erodibility factor           | 0.04 based on a conservative silty clay loam estimate                                          |
| LS-Factor       | Topographic factor                | Variable based on site specific conditions                                                     |
| P-Factor        | Soil conservation practice factor | Default of 1.3 to be used (smooth and compacted)                                               |
| C-factor        | Ground cover factor               | Default of 1.0 to be used (no ground cover)                                                    |

Table 7.2 details the estimated Soil Loss Class (SLC) and equivalent soil loss rate (tonnes / hectares / year) for a range of slopes and lengths across the MBD Site Compound. The estimated SLC for the Project is SLC 1 with a soil loss rate of approximately 149 tonnes / hectares / year. Type 2 and 3 controls will typically be installed across the MBD Site Compound including diversion banks, sediment traps and filter tubes, as discussed in the following sections and in Appendix A.

Monthly erosion risk and hazards will be taken into consideration during the development of PESCPs.

Table 7.2 Erosion risk and annual soil loss for the Project

| % Grade | Slope Lengths |     |     |     |     |     |     |     |     |     |    | Soil Loss Class |
|---------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----------------|
|         | 100           | 90  | 80  | 70  | 60  | 50  | 40  | 30  | 20  | 10  | 5  |                 |
| 10      | 752           | 699 | 646 | 589 | 531 | 469 | 402 | 331 | 251 | 156 | 97 | 1 0 to 150      |
| 9       | 631           | 589 | 544 | 497 | 449 | 397 | 343 | 283 | 216 | 136 | 86 | 2 151 to        |
| 8       | 545           | 508 | 471 | 432 | 391 | 347 | 301 | 248 | 191 | 122 | 78 | 3/4 226 to      |
| 7       | 465           | 435 | 404 | 372 | 337 | 301 | 261 | 218 | 169 | 109 | 71 | 5/6 501 to      |
| 6       | 386           | 363 | 338 | 313 | 285 | 255 | 223 | 186 | 147 | 97  | 64 | 7 > 1,500       |
| 5       | 310           | 292 | 274 | 253 | 232 | 209 | 184 | 156 | 124 | 83  | 55 |                 |
| 4       | 237           | 223 | 209 | 195 | 179 | 163 | 145 | 124 | 101 | 69  | 48 |                 |
| 3       | 166           | 159 | 149 | 140 | 131 | 120 | 108 | 94  | 78  | 55  | 39 |                 |
| 2       | 101           | 99  | 94  | 90  | 83  | 78  | 71  | 64  | 55  | 41  | 32 |                 |
| 1       | 46            | 46  | 44  | 44  | 41  | 39  | 37  | 34  | 30  | 25  | 21 |                 |

## 7.2.2 Minimum design standards

The minimum design storm standard for temporary sediment and erosion controls with a design life up to six months are summarised in Table 7.3.

Table 7.3 Minimum design standards (DECC, 2008)

| Control Measure                                                                                                                                                                                             | Minimum Design Storm Event – average recurrence interval (ARI) |                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-----------------------|
|                                                                                                                                                                                                             | Standard Design                                                | Sensitive Environment |
| <b>Temporary Drainage (Erosion) Controls</b>                                                                                                                                                                |                                                                |                       |
| (e.g., diversion banks, catch drains, level spreaders, check dams) should be designed to have a non-erosive hydraulic capacity (excluding freeboard) sufficient to convey the nominated design storm event. | 2-year ARI                                                     | 5-year ARI            |
| <b>Temporary Sediment Controls</b>                                                                                                                                                                          |                                                                |                       |
| (e.g., sediment fences, stacked rock sediment traps) in small catchments, where used as a 'last line of defence', should be constructed to remain structurally sound in the nominated design storm event.   | 2-year ARI                                                     | 5-year ARI            |
| <b>Type D/F Sediment Retention Basins (if required)</b>                                                                                                                                                     |                                                                |                       |
| Basin volume based on nominated percentile rainfall depth for 5-day duration storm.                                                                                                                         | 75th percentile                                                | 80th percentile       |
| Embankment and spillway.                                                                                                                                                                                    | 10-year ARI                                                    | 20-year ARI           |

## 7.2.3 Standard PKGT controls

A PESCP will be developed for the PKGT prior to commencing works. The PESCP is to prioritise the installation of final design stormwater structures and utilise the existing PKGT settling pond located on the southern boundary of the works, if possible. The PESCP will be reviewed and approved by a CPESC. The Project will comply with Section 120 of the POEO Act by not polluting the harbour, which includes ensuring Total Suspended Solids level of construction discharge is no more than 50mg/L using a water treatment system. Mitigation measures to ensure the Project complies with Section 120 of the POEO Act can be found in the Stage 2A and Stage 2B WQMP.

## 7.2.4 Standard pipeline controls

Appendix P of the International Erosion Control Association (IECA) provides detail on pipeline alignment controls. Table 7.4, taken from (IECA, 2008), details the typical controls and considerations associated with management erosion and sediment control on pipeline projects.

Table 7.4 Typical ESC practices for pipelines (IECA, 2008)

| Category         | Key tasks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Drainage control | <ul style="list-style-type: none"> <li>• Diversion of 'clean' up-slope run-on water either around or through the construction site.</li> <li>• Collection of 'dirty' runoff generated within the RoW and the delivery of this water to an appropriate sediment trap.</li> <li>• Minimising the risk of soil erosion caused by site-generated flows passing along the RoW through the use of 'intermediate' flow treatment and release points.</li> <li>• Control of the flow velocity of water passing through the RoW at drainage line and waterway crossings.</li> </ul>                                                                                               |
| Erosion control  | <ul style="list-style-type: none"> <li>• Appropriate management of work programming and the scheduling of forward works with the aim of minimising the erosion risk.</li> <li>• Control soil erosion at drainage line and waterway crossings caused by run-on water passing through (across) the RoW (this task is closely linked to the 'drainage control' task listed above).</li> <li>• Control of soil erosion at vehicle crossings of drainage line and waterway crossings</li> <li>• Minimising the extent of vegetation and soil disturbance at drainage line and waterway crossings.</li> <li>• Erosion control practices during site rehabilitation.</li> </ul> |
| Sediment control | <ul style="list-style-type: none"> <li>• Treatment of 'dirty' water runoff generated within the RoW.</li> <li>• Sediment control at vehicle exit points from the pipeline RoW.</li> <li>• Integration of sediment control attributes into the drainage/erosion control practices installed at drainage line and waterway crossings.</li> </ul>                                                                                                                                                                                                                                                                                                                           |

Figure 7.1, Figure 7.2 and Figure 7.3 provide guidance, but not exhaustive, on right of way (RoW) erosion and sediment control set up to be directed by the Principal Contractors on site on low to moderate risk erosion areas.

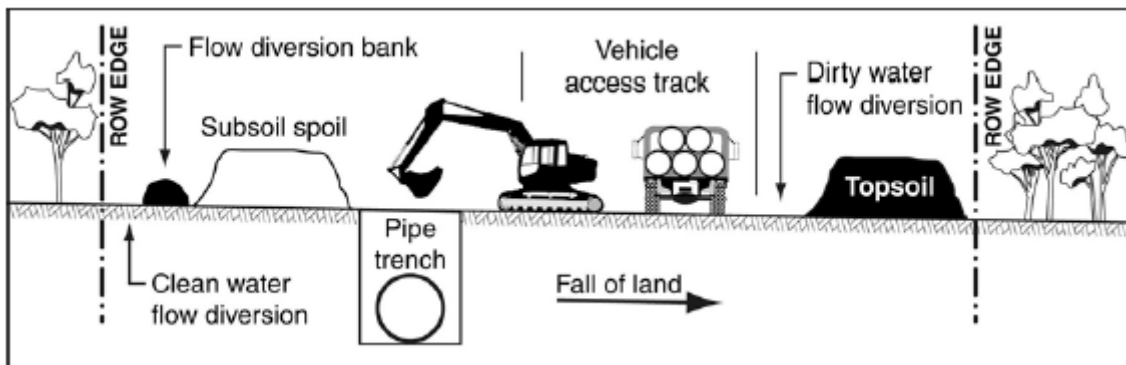


Figure 7.1 Typical ROW trench up slope of vehicle access track (IECA, 2008)

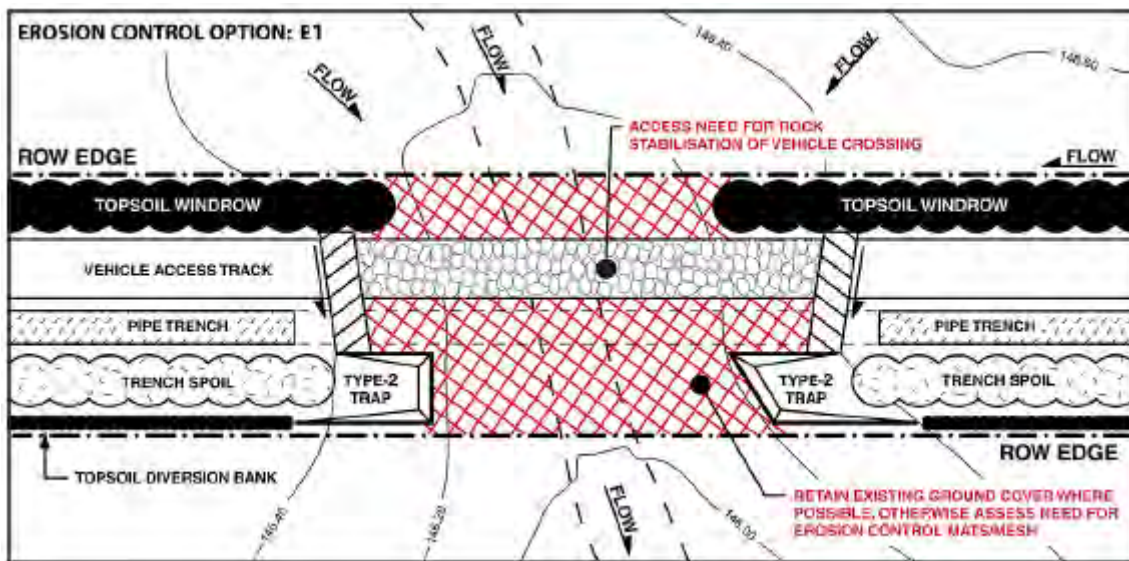


Figure 7.2 Typical layout of erosion controls Option E1 (IECA, 2008)

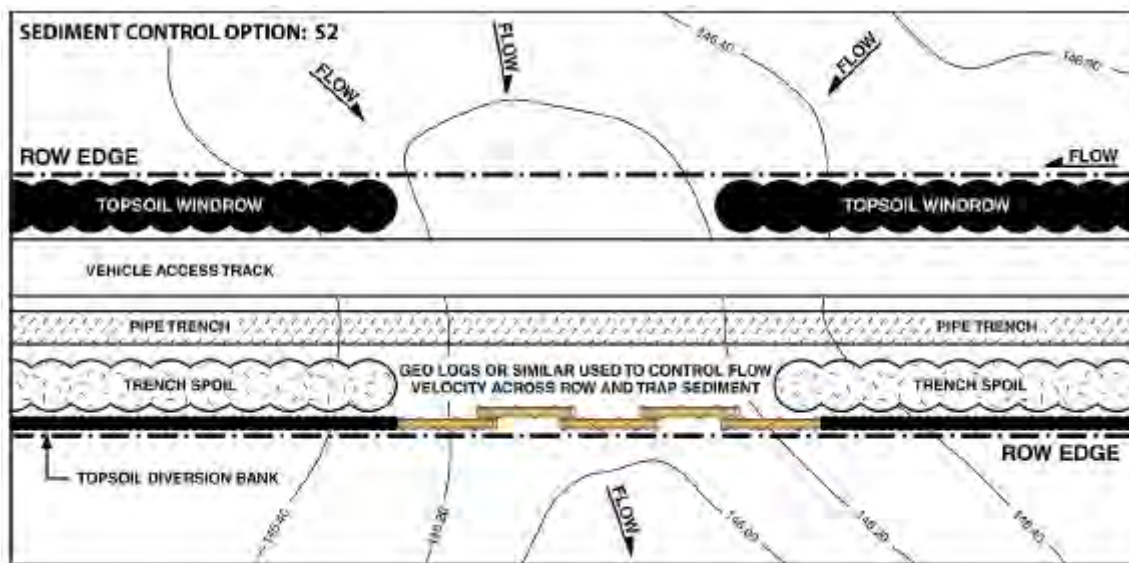


Figure 7.3 Sediment control option S2 (IECA, 2008)



## 8. Management and mitigation measures

Mitigation and management measures to eliminate or otherwise reduce the risk of erosion and sedimentation during Stage 2A and Stage 2B construction works are outlined in Table 8.1.

**Table 8.1** Mitigation/management measures for erosion and sedimentation during Stage 2A and Stage 2B

| Measure/ Requirement                                                                                                                                                                                                                                                                | Timing              | Responsibility                                                                                                                                                                                                                                                                                                | Evidence                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>General</b>                                                                                                                                                                                                                                                                      |                     |                                                                                                                                                                                                                                                                                                               |                                                                                                                 |
| PESCPs will be developed for high-risk areas prior to commencing works.                                                                                                                                                                                                             | Preconstruction     | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul>                                                                                                                      | PESCPs                                                                                                          |
| A register of PESCPs will be maintained in the Project office along with copies of PESCPs.                                                                                                                                                                                          | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul>                                                                                                                      | Register                                                                                                        |
| PESCPs will be prepared using the design criteria detailed in Section 7.2 of this plan unless site specific conditions justify alternative values.                                                                                                                                  | Preconstruction     | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul>                                                                                                                      | PESCPs                                                                                                          |
| The Stage 2A and Stage 2B Principal Contractor Environmental Representatives and Construction Foremen will monitor weather conditions and forecasts daily and plan works activities in accordance with risk including stabilisation of site as required.                            | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Daily prestart                                                                                                  |
| Relevant documentation and systems for recording environmental activities will be implemented including: <ul style="list-style-type: none"> <li>– Inspection checklist</li> <li>– Water quality monitoring (as per the WQMP)</li> <li>– Contaminated Land/ASS registers.</li> </ul> | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Site Engineers</li> </ul>                                                                                            | <ul style="list-style-type: none"> <li>– Checklist</li> <li>– Monitoring records</li> <li>– Register</li> </ul> |
| Key erosion and sediment control measures such as sediment traps and clean water diversions will be installed as early works, where practicable.                                                                                                                                    | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist                                                                                            |
| Adequate supplies of erosion and sediment control materials will be available on site at all times.                                                                                                                                                                                 | During construction | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B</li> </ul>                                                  | Inspection checklist                                                                                            |

| Measure/ Requirement                                                                                                                                                                                | Timing              | Responsibility                                                                                                                                                                                                                                                                                                                                                                                                           | Evidence             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
|                                                                                                                                                                                                     |                     | Principal Contractor Environmental Rep                                                                                                                                                                                                                                                                                                                                                                                   |                      |
| High risk works such as earthworks, will not be undertaken immediately before or during high rainfall or wind events.                                                                               | During construction | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul>                                                                                                                      | Inspection checklist |
| Environmental incidents will be reported in accordance with Section 9 of the EMS.                                                                                                                   | During construction | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul>                                                                                                                      | Incident report      |
| <b>Training</b>                                                                                                                                                                                     |                     |                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |
| Erosion and sediment control aspects will be included in the site induction for the Project.                                                                                                        | Preconstruction     | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul>                                                                                                                      | Induction records    |
| Erosion and sediment control training will be regularly provided to Project staff as required including de-watering and correct installation of controls.                                           | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> </ul>                                                                                                                                                                                                                                 | Toolbox records      |
| <b>Erosion control</b>                                                                                                                                                                              |                     |                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |
| Disturbance will be staged and limited to the least amount practicable to undertake the upcoming works safely.                                                                                      | During construction | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist |
| Temporary ground covers (i.e., geofabric, soil binder) will be utilised to provide temporary cover prior to rainfall as appropriate or in areas where sediment controls are unable to be installed. | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul>                                                                                                            | PESCPs               |
| Construction works will be planned and staged to allow for timely and progressive stabilisation and rehabilitation of completed areas. Interim surface stabilisation                                | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B</li> </ul>                                                                                                                                                                                                                                                                        | PESCPs               |



| Measure/ Requirement                                                                                                                                                       | Timing              | Responsibility                                                                                                                                                                                                                                  | Evidence                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| measures, e.g. bucket compaction and polymer/binder, will be utilised progressively throughout the Project, prior to final project surface specification (e.g. hardstand). |                     | Principal Contractor Environmental Rep<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman                                                                                           |                                    |
| <b>Sediment control</b>                                                                                                                                                    |                     |                                                                                                                                                                                                                                                 |                                    |
| Sediment controls are to be installed to capture or treat dirty water prior to discharge off site.                                                                         | During construction | – AIE Environmental Rep<br>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman | – PESCPs<br>– Inspection checklist |
| Sediment controls requiring excavations will be avoided in known areas of ASS/ PASS. Erosion controls will be utilised.                                                    | During construction | – AIE Environmental Rep<br>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman | PESCPs                             |
| Sediment controls are to remain in place until appropriate stabilisation of the catchment is undertaken or are no longer required.                                         | During construction | – AIE Environmental Rep<br>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman | Inspection checklist               |
| Coagulants or flocculants will be used, where appropriate, to control turbidity levels and to improve the effectiveness of Type 2 and 3 controls.                          | During construction | – AIE Environmental Rep<br>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman | Permit to Discharge                |
| <b>Access and maintenance</b>                                                                                                                                              |                     |                                                                                                                                                                                                                                                 |                                    |
| All vehicles leaving site are to ensure vehicle is free of excess sediment.                                                                                                | During construction | – AIE Environmental Rep<br>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman | Inspection checklist               |
| Stabilised access points will be installed, where required, typically from unsealed work areas to public roads.                                                            | During construction | – AIE Environmental Rep<br>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep                                                                                                                | Inspection checklist               |

| Measure/ Requirement                                                                                                                                                     | Timing              | Responsibility                                                                                                                                                                                                                                                                                                | Evidence                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
|                                                                                                                                                                          |                     | <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul>                                                                                                                                                 |                          |
| Street sweepers and other methods are to be deployed to clean up excess sediment tracked onto roads.                                                                     | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist     |
| Material deliveries are to have covered loads.                                                                                                                           | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist     |
| Access to site is to be restricted during and post rainfall if required to prevent excess sediment tracking.                                                             | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist     |
| <b>Drainage control</b>                                                                                                                                                  |                     |                                                                                                                                                                                                                                                                                                               |                          |
| 'Clean' water runoff is to be diverted around or through site and 'dirty' water is to be captured or treated prior to exiting works areas.                               | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | PESCPs                   |
| Areas subject to concentrated flow (i.e., diversion drains, batter chutes) are to be lined with geofabric, seed, erosion control matting or similar to minimise erosion. | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | PESCPs                   |
| Outlets of pipes or culverts are to have energy dissipaters installed (i.e., scour rock).                                                                                | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | PESCPs / design drawings |

| Measure/ Requirement                                                                                                                                                   | Timing              | Responsibility                                                                                                                                                                                                                                                                                                | Evidence             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Check dams may be installed in drainage as velocity checks. Placement of rock on dispersive soils should be avoided.                                                   | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | PESCPs               |
| Slope lengths in areas of exposed soils will be limited to a maximum of 80 m whenever inclement weather is forecast.                                                   | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist |
| The southern pond within the MBD Site Compound must be maintained to ensure that sedimentation does not reduce their capacity by more than 20% of the design capacity. | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist |
| <b>Stockpile management</b>                                                                                                                                            |                     |                                                                                                                                                                                                                                                                                                               |                      |
| Stockpiles of materials will be positioned in appropriate locations as far away from the marine environment and drainage lines as reasonably practicable.              | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist |
| Materials are to be stockpiled separately wherever practicable.                                                                                                        | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist |
| ASS and contaminated land are to be managed and stockpiled in accordance with the Projects ASSMP and CSP.                                                              | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist |
| Inactive stockpiles will be stabilised to a C-factor of 0.15 (equivalent ground cover of about 50%) within 20 working days of inactivity.                              | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B</li> </ul>                                                                                                                                                             | Inspection checklist |

| Measure/ Requirement                                                          | Timing              | Responsibility                                                                                                                                                                                                                                  | Evidence             |
|-------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
|                                                                               |                     | Principal Contractor Environmental Rep<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman                                                                                           |                      |
| Stockpiles should be maintained at heights less than 10 m, where practicable. | During construction | – AIE Environmental Rep<br>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman | Inspection checklist |
| Stockpiles are to be battered to no steeper than 2:1 (H:V).                   | During construction | – AIE Environmental Rep<br>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman | Inspection checklist |
| Dust suppression will be undertaken, as required, on stockpiles.              | During construction | – AIE Environmental Rep<br>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman | Inspection checklist |
| <b>Dust suppression</b>                                                       |                     |                                                                                                                                                                                                                                                 |                      |
| Dust suppression will be undertaken when necessary to minimise airborne dust. | During construction | – AIE Environmental Rep<br>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman | Inspection checklist |
| Where possible, utilise retained water on site as priority.                   | During construction | – AIE Environmental Rep<br>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman | Inspection checklist |
| Cover dust-creating loads while in transit on public roads.                   | During construction | – AIE Environmental Rep<br>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B                                           | Inspection checklist |

| Measure/ Requirement                                                                                                                | Timing              | Responsibility                                                                                                                                                                                                                                                                                                | Evidence             |
|-------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
|                                                                                                                                     |                     | Principal Contractor Construction Foreman                                                                                                                                                                                                                                                                     |                      |
| Monitor weather forecasts for conditions that will cause excessive dust generation and plan works accordingly.                      | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Daily prestart       |
| Apply soil binder to haul roads and exposed areas such as laydowns if required.                                                     | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist |
| <b>Clear and grade</b>                                                                                                              |                     |                                                                                                                                                                                                                                                                                                               |                      |
| Disturbance areas will be clearly delineated and established prior to commencing clear and grade activities.                        | Pre-construction    | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Daily prestart       |
| Erosion and sediment control measures are to be installed prior to stripping or immediately following for each discrete works area. | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist |
| All vegetation that is to be maintained is to be clearly marked.                                                                    | Pre-construction    | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Pre-clearance Survey |
| Land clearing is to be undertaken progressively and limited to only that which is necessary for upcoming works.                     | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist |
| <b>Trenching</b>                                                                                                                    |                     |                                                                                                                                                                                                                                                                                                               |                      |

| Measure/ Requirement                                                                                                                                                                   | Timing              | Responsibility                                                                                                                                                                                                                                                                                                | Evidence                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| Avoid trenching in areas where water flow is likely to concentrate or schedule works for dry periods, where feasible.                                                                  | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Daily prestart                             |
| Ensure trench widths and depths are the minimum necessary.                                                                                                                             | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Design                                     |
| Ensure trench spoil and topsoils are stockpiled separately and avoid mixing.                                                                                                           | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist                       |
| Divert surface water away from trench openings, where feasible.                                                                                                                        | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist                       |
| Installation of diversion banks is to consider the erodibility of the soils, slope gradients and lengths and are to be installed on a 1% grade to minimise erosion, where appropriate. | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist                       |
| <b>De-watering</b>                                                                                                                                                                     |                     |                                                                                                                                                                                                                                                                                                               |                                            |
| Wherever possible, water detained on site will be utilised for dust control and other non-potable uses.                                                                                | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist / Permit to Discharge |
| <b>Wet weather management</b>                                                                                                                                                          |                     |                                                                                                                                                                                                                                                                                                               |                                            |
| Prior to forecast rainfall events of 80% chance, 10mm in 24 hours or more, end of day controls will be                                                                                 | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B</li> </ul>                                                                                                                                                             | Inspection checklist                       |

| Measure/ Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Timing              | Responsibility                                                                                                                                                                                                                                                                                                | Evidence             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| considered to help reduce erosion and control sediment. These may include the following: <ul style="list-style-type: none"> <li>– Diversion banks.</li> <li>– Temporary ground cover (i.e., matting, soil binder).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     | Principal Contractor Environmental Rep <ul style="list-style-type: none"> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul>                                                                                                          |                      |
| Prior to forecast heavy rainfall (80% chance, 15mm in 24 hours) the Stage 2A and Stage 2B Principal Contractor Environmental Representatives and Construction Foremen will inspect the site and note any areas requiring additional measures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist |
| <b>Inspections and audits</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |                                                                                                                                                                                                                                                                                                               |                      |
| <p>The Stage 2A and Stage 2B Principal Contractor Environmental Representatives will inspect all environmental controls measures across active works sites at least:</p> <ul style="list-style-type: none"> <li>– Weekly.</li> <li>– Prior to forecast rainfall of 80% chance, 10mm in 24 hours.</li> <li>– Daily during rain event*.</li> <li>– Post rainfall with runoff (&gt;10mm in 24 hours).</li> </ul> <p>Inspections will include checks of drainage, erosion and sediment controls to determine effectiveness and maintenance requirements. Inspections will consider issues such as:</p> <ul style="list-style-type: none"> <li>– Sediment transport and or deposition either on or off site.</li> <li>– Evidence of excessive erosion.</li> <li>– Maintenance, treatment and or de-watering requirements.</li> <li>– Stability of reinstatement, rehabilitation and revegetation works.</li> </ul> | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist |
| Corrective maintenance to address any damage to erosion and sediment controls is to be scheduled and completed as soon as practicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist |
| Sediment controls will be cleaned out as required, no more than 5 days after rainfall. Sediment will be stockpiled or added to backfill.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist |

| Measure/ Requirement                                                                                                                                                                                                                                            | Timing              | Responsibility                                                                                                                                                                                                                                                                                                | Evidence                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Within 5 days of the cessation of rainfall, ensure that sediment basins are in capacity to receive the amount of rain indicated on the progressive ESCP. If discharging is required, ensure that EPL No. 21529 discharge limit and relevant conditions are met. | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | <ul style="list-style-type: none"> <li>– Inspection checklist</li> <li>– Discharge Permit</li> </ul> |
| <b>Stabilisation and rehabilitation</b>                                                                                                                                                                                                                         |                     |                                                                                                                                                                                                                                                                                                               |                                                                                                      |
| Undertake progressive stabilisation and rehabilitation of ground surfaces as they are completed.                                                                                                                                                                | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist                                                                                 |
| Sediment controls are to remain in place until their upslope catchment is stabilised.                                                                                                                                                                           | During construction | <ul style="list-style-type: none"> <li>– AIE Environmental Rep</li> <li>– Stage 2A Principal Contractor Environmental Rep and Stage 2B Principal Contractor Environmental Rep</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Inspection checklist                                                                                 |

\*Inspections will be dependent on safety issues present as conditions may be dangerous for site personnel during heavy rainfall. Inspections will not be undertaken during site shutdowns (Sundays and public holidays).



## 9. Monitoring and inspections

Monitoring and inspection activities will be undertaken with Section 8 of the Stage 2A and Stage 2B EMS.

Inspections will be undertaken of all active work fronts during construction activities and noted on the inspection checklist. Erosion and sediment control items will be part of the inspections.

Pre rainfall inspections will be undertaken prior to days when there is forecast to be an 80 per cent (or greater) chance of 20 millimetres of rain within the following 24-hour period, or at times when it is reasonably expected that runoff producing rainfall is to occur. Post rainfall inspections are to be undertaken in accordance with the EPL, and generally when the site received rain that caused runoff (approx. 20mm within 24 hours).

# References

ASRIS 2011, ASRIS - Australian Soil Resource Information System

BOM 2019, Climate statistics: Port Kembla Signal Station (068053)

DECC 2008, Managing Urban Stormwater: Soils and construction Volume 2A, Sydney: Department of Environment and Climate Change NSW.

Environment Protection Licence No. 21529, dated 3 December 2021.

GHD 2018, Contamination Assessment Report for Berth 101, s.l.: Australian Industrial Energy.

GHD 2018, Port Kembla Gas Terminal: Preliminary site investigation - pipeline alignment , s.l.: Australian Industrial Energy.

GHD 2019, Port Kembla Gas Terminal: Submissions Report, s.l.: AIE.

IECA 2008, Best Practice Erosion and Sediment Control, Picton, NSW: International Erosion Control Association (Australasia)

Infrastructure Approval SSI 9471 dated 13 October 2021.

Landcom 2004, Managing Urban Stormwater: Soils and Construction, Parramatta: Landcom.

SMEC March 2022, Port Kembla Gas Terminal Development – Emplacement Cell Report.

# Appendices

# **Appendix A**

**Standard design drawings**

## MATERIALS

**ROCK:** 150 TO 300mm EQUIVALENT DIAMETER, HARD, EROSION RESISTANT ROCK.

**SANDBAGS:** GEOTEXTILE BAGS (WOVEN SYNTHETIC, OR NON-WOVEN BIODEGRADABLE) FILLED WITH CLEAN COARSE SAND, CLEAN AGGREGATE, OR COMPOST.

## INSTALLATION (ROCK CHECK DAM)

1. REFER TO APPROVED PLANS FOR LOCATION AND INSTALLATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.
2. PRIOR TO PLACEMENT OF THE SEDIMENT TRAP, ENSURE THE DRAINAGE CHANNEL IS DEEP ENOUGH TO PREVENT WATER BEING UNSAFELY DIVERTED OUT OF THE DRAIN ONCE THE CHECK DAMS ARE INSTALLED.
3. LOCATE EACH CHECK DAM SEDIMENT TRAP AS DIRECTED WITHIN THE APPROVED PLANS, OR OTHERWISE AT SUCH A SPACING TO ACHIEVE THE REQUIRED SEDIMENT TRAPPING OUTCOMES.
4. IF THE CHECK DAMS ARE ALSO BEING USED TO CONTROL EROSION WITHIN THE DRAINAGE CHANNEL, THEN LOCATE EACH SUCCESSIVE CHECK DAM SUCH THAT THE CREST OF THE IMMEDIATE DOWNSTREAM DAM IS LEVEL WITH THE CHANNEL INVERT AT THE IMMEDIATE UPSTREAM CHECK DAM.
5. CONSTRUCT EACH CHECK DAM TO THE DIMENSIONS AND PROFILE SHOWN WITHIN THE APPROVED PLAN.
6. WHERE SPECIFIED, THE CHECK DAMS MUST BE CONSTRUCTED ON A SHEET OF GEOTEXTILE FABRIC USED AS A DOWNSTREAM SPLASH PAD.
7. EACH CHECK DAM MUST BE EXTENDED UP THE CHANNEL BANK (WHERE PRACTICABLE) TO AN ELEVATION AT LEAST 150mm ABOVE THE CREST LEVEL OF THE DAM.

## INSTALLATION (COMPOST-FILLED SOCKS)

1. REFER TO APPROVED PLANS FOR LOCATION AND INSTALLATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.
2. PRIOR TO PLACEMENT OF THE SEDIMENT TRAP, ENSURE THE DRAINAGE CHANNEL IS DEEP ENOUGH TO PREVENT WATER BEING UNSAFELY DIVERTED OUT OF THE DRAIN ONCE THE CHECK DAMS ARE INSTALLED.
3. LOCATE EACH SOCK AS DIRECTED WITHIN THE APPROVED PLANS, OR OTHERWISE AT SUCH A SPACING TO ACHIEVE THE REQUIRED SEDIMENT TRAPPING OUTCOMES.
4. PLACE EACH SOCK TO THE LINES AND PROFILE SHOWN IN THE APPROVED PLAN OR AS DIRECTED BY THE SITE SUPERVISOR.
5. ENSURE EACH SOCK EXTENDS UP THE CHANNEL BANKS (WHERE PRACTICAL) TO A LEVEL AT LEAST 100mm ABOVE THE CREST LEVEL OF THE CHECK DAM.

## MAINTENANCE

1. INSPECT EACH CHECK DAM AND THE DRAINAGE CHANNEL AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING RAINFALL.
2. CORRECT ALL DAMAGE IMMEDIATELY. IF SIGNIFICANT EROSION OCCURS BETWEEN ANY OF THE CHECK DAMS, THEN CHECK THE SPACING OF THE DAMS AND WHERE NECESSARY INSTALL INTERMEDIATE CHECK DAMS OR A SUITABLE CHANNEL LINER.
3. CHECK FOR DISPLACEMENT OF THE CHECK DAMS.
4. CHECK FOR SOIL SCOUR AROUND THE ENDS OF EACH CHECK DAM. IF SUCH EROSION IS OCCURRING, CONSIDER EXTENDING THE WIDTH OF THE CHECK DAM TO AVOID SUCH PROBLEMS.

5. IF SEVERE SOIL EROSION OCCURS EITHER UNDER OR AROUND THE CHECK DAMS, THEN SEEK EXPERT ADVICE ON AN ALTERNATIVE TREATMENT MEASURE.
6. DE-SILT SEDIMENT TRAP IF THE SEDIMENT LEVEL EXCEEDS 1/3 THE CREST HEIGHT.
7. DISPOSE OF COLLECTED SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

## REMOVAL

1. WHEN CONSTRUCTION WORK WITHIN THE DRAINAGE AREA ABOVE THE CHECK DAMS HAS BEEN COMPLETED AND DISTURBED AREAS SUFFICIENTLY STABILISED TO RESTRAIN EROSION, THE DAMS MUST BE REMOVED, UNLESS THE SEDIMENT TRAPS ARE TO REMAIN AS A PERMANENT FEATURE.
2. REMOVE COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.
3. REMOVE AND APPROPRIATELY DISPOSE OF ALL MATERIALS INCLUDING ANY GEOTEXTILE FABRIC.
4. STABILISE THE DISTURBED CHANNEL WITH A LINING OF FABRIC AND ROCK, OR ESTABLISH VEGETATION AS APPROPRIATE.

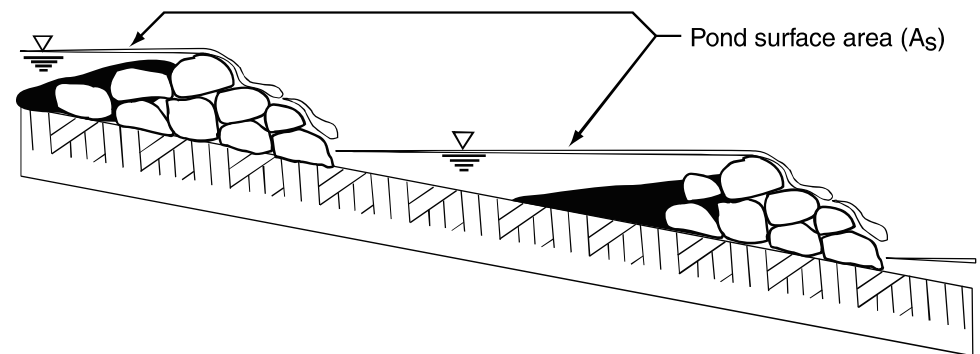


**Figure 1 - Placement of check dam sediment traps**

|        |        |                         |        |
|--------|--------|-------------------------|--------|
| Drawn: | Date:  |                         |        |
| GMW    | Apr-10 | Check Dam Sediment Trap | CDT-01 |

## MATERIALS

UNLESS OTHERWISE SPECIFIED, THE FOLLOWING MATERIAL SPECIFICATIONS SHOULD APPLY.

### GEOTEXTILE BLANKETS:

- (i) WOVEN POLYPROPYLENE FABRIC.
- (ii) MINIMUM THICKNESS OF 1.5mm.
- (iii) MINIMUM WIDTH OF 3.6m.

### STAPLES:

- (i) MINIMUM 11 GAUGE STEEL WIRE.
- (ii) U-SHAPED WITH 200mm LEG LENGTH AND 50mm CROWN.

### EXCELSIOR BLANKETS:

- (i) CURLED WOOD FIBRE BLANKET WITH 80% OF FIBRES LONGER THAN 150mm.
- (ii) MINIMUM ROLL WIDTH OF 1200mm.
- (iii) AVERAGE WEIGHT OF 0.43kg/m<sup>2</sup> +/-10%.

### STRAW BLANKETS:

- (i) MINIMUM ROLL WIDTH OF 2m.
- (ii) MINIMUM WEIGHT OF 0.27kg/m<sup>2</sup>.

### COCONUT FIBRE BLANKETS:

- (i) MINIMUM ROLL WIDTH OF 2m.
- (ii) MINIMUM WEIGHT OF 0.27kg/m<sup>2</sup>.

## INSTALLATION

THE METHOD OF INSTALLATION VARIES WITH THE TYPE OF MATERIAL USED AND THE TASK BEING PERFORMED BY THE BLANKET. INSTALLATION PROCEDURES SHOULD BE SUPPLIED BY THE MANUFACTURER OR DISTRIBUTOR OF THE PRODUCT. A TYPICAL INSTALLATION PROCEDURE FOR ROLLED EROSION CONTROL PRODUCTS IS DESCRIBED BELOW.

### APPLICATION OF ROLLED BLANKETS ON SLOPES NOT SUBJECTED TO CONCENTRATED FLOW:

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND INSTALLATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.
2. CLEAR AWAY TRASH AND LARGE STONES, AND GRADE SMOOTHLY TO ELIMINATE FOOTPRINTS, TRACKS AND RUTS.
3. PREPARE A SMOOTH SEEDBED OF APPROXIMATELY 75mm OF TOPSOIL.
4. APPLY SEED, SOIL AMELIORANTS AND WATER AS SPECIFIED, THEN RAKE TO REMOVE ANY REMAINING SURFACE IRREGULARITIES.
5. COMMENCE PLACEMENT OF THE BLANKETS AT THE TOP OF THE SLOPE. BURY THE UPPER EDGE OF THE BLANKET WITHIN A 300mm DEEP TRENCH AND STAPLE AT 200 TO 250mm CENTRES.
6. THE BLANKETS CAN BE PLACED LENGTHWISE EITHER ALONG THE SLOPE (PARALLEL TO THE CONTOURS) OR DOWN THE SLOPE (TRANSVERSE TO THE CONTOURS), BUT NOT DIAGONALLY ACROSS THE SLOPE.
7. OVERLAP THE SIDES OF EACH BLANKET BY AT LEAST 100mm.
8. BURY THE EDGE OF THE BLANKET LOCATED ALONG THE OUTER MOST EDGE OF THE TREATED AREA WITHIN A 300mm DEEP TRENCH AND STAPLE THE BLANKET WITHIN THE TRENCH AT 200 TO 250mm CENTRES.

9. WHERE MORE THAN ONE BLANKET IS USED DOWN THE SLOPE, OVERLAP EACH BLANKET BY AT LEAST 300mm WITH THE UPPER BLANKET PLACED OVER THE LOWER BLANKET (SHINGLE STYLE).

10. WHEN SPREADING THE BLANKETS, AVOID STRETCHING THE FABRIC. THE BLANKETS SHOULD REMAIN IN GOOD CONTACT WITH THE SOIL.

11. STAPLE THE EXPOSED FABRIC SURFACE AT 1m CENTRES.

12. BLANKETS, ONCE FIXED, MAY BE ROLLED WITH A ROLLER WEIGHING 60 TO 90kg/m LENGTH, THEN WATERED.

13. THE INSTALLATION PROCEDURE MUST ENSURE THAT THE BLANKET ACHIEVES AND RETAINS INTIMATE CONTACT WITH THE SOIL.

14. DAMAGED FABRIC SHALL BE REPAIRED OR REPLACED.

15. WHERE DIRECTED, AN ADDITIONAL MESH (JUTE OR COIR) ANCHOR MAY NEED TO BE PLACED OVER THE BLANKETS TO MINIMISE DISPLACEMENT BY STRONG WINDS.

### ADDITIONAL REQUIREMENTS ASSOCIATED WITH USE NEAR AIRPORT PAVEMENTS:

1. ONLY BLANKETS THAT ARE DOUBLE NETTED SHALL BE ALLOWED WITHIN 3m OF ANY AIRPORT PAVEMENT USED BY AIRCRAFT WITH THE EXCEPTION OF AIRPORTS CLASSIFIED AS AIR CARRIER OR CORPORATE/TRANSPORT. IF THE AIRPORT IS CLASSIFIED AS AN AIR

CARRIER OR CORPORATE/TRANSPORT, THERE WILL BE NO BLANKETS ALLOWED WITHIN 9m OF PAVEMENT USED BY AIRCRAFT.

2. ONLY BIODEGRADABLE ANCHORING DEVICES SHALL BE ALLOWED IN THE INSTALLATION OF ANY BLANKET FOR AIRPORT APPLICATIONS. NO METAL STAPLES WILL BE ALLOWED.

## MAINTENANCE

1. DURING THE ACTIVE CONSTRUCTION PERIOD, INSPECT THE TREATED AREA FORTNIGHTLY AND AFTER RUNOFF-PRODUCING STORM EVENTS AND MAKE REPAIRS AS NEEDED.

2. THE TREATED AREA SHOULD BE INSPECTED AT LEAST FORTNIGHTLY FOR THE FIRST 3 MONTHS.

3. INSPECT THE TREATED AREA TO SEE IF:

- (i) CONSTRUCTION ACTIVITY OR FALLING DEBRIS HAVE DAMAGED THE BLANKETS;
- (ii) RUNOFF IS UNDERMINING THE FABRIC;
- (iii) THE BLANKETS ARE IN GOOD CONTACT WITH THE SOIL; AND
- (iv) THE BLANKETS MAINTAIN ADEQUATE OVERLAP.

4. IF DAMAGED, REPAIR OR REPLACE THE DAMAGED SECTION. IF WATER IS UNDERMINING THE FABRIC, REPAIR ANY HOLES OR JOINTS OR RE-BURY THE UPPER ENDS OF THE DAMAGED SECTIONS.

Drawn:

GMW

Date:

May-10

Erosion Control Blankets

ECB-01

## MATERIALS

**FIBRE ROLLS:** TYPICALLY 200 TO 250mm JUTE, COIR OR STRAW ROLL TIED WITH SYNTHETIC OR BIODEGRADABLE MESH.

**STAKES:** MINIMUM 25 x 25mm TIMBER STAKES.

## INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND INSTALLATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, DIMENSIONS OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. WHEN PLACED ACROSS NON-VEGETATED OR NEWLY SEEDED SLOPES, THE ROLLS MUST BE PLACED ALONG THE CONTOUR.

3. IF PLACED ON OPEN OR LOOSE SOIL, ENSURE THE FIBRE ROLLS ARE TRENCHED 75 TO 125mm IN SANDY SOILS AND 50 TO 75mm IN CLAYEY SOILS.

4. ENSURE THE OUTER MOST ENDS OF THE FIBRE ROLL ARE TURNED UP THE SLOPE TO ALLOW WATER TO ADEQUATELY POND UP-SLOPE OF THE ROLL, AND TO MINIMISE FLOW BYPASSING.

5. WHEN PLACED ACROSS THE INVERT OF MINOR DRAINS, ENSURE THE SOCKS ARE PLACED SUCH THAT:

- (i) THE CREST OF THE DOWNSTREAM ROLL IS LEVEL WITH THE CHANNEL INVERT AT THE IMMEDIATE UPSTREAM SOCK (IF ANY);
- (ii) EACH ROLL EXTENDS UP THE CHANNEL BANKS SUCH THAT THE CREST

OF THE FIBRE ROLL AT ITS LOWEST POINT IS LOWER THAN THE GROUND LEVEL AT EITHER END OF THE ROLL.

6. ENSURE THE ANCHORING STAKES ARE DRIVEN INTO THE END OF EACH ROLL AND ALONG THE LENGTH OF EACH ROLL AT A SPACING NOT EXCEEDING 1.2m OR SIX TIMES THE ROLL DIAMETER, WHICHEVER IS THE LESSER. A MAXIMUM STAKE SPACING OF 0.3m APPLIES WHEN USED TO FORM CHECK DAMS.

7. ADJOINING ROLL MUST BE OVERLAP AT LEAST 450mm, NOT ABUTTED.

## MAINTENANCE

1. INSPECT ALL FIBRE ROLLS PRIOR TO FORECAST RAIN, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER SIGNIFICANT RUNOFF PRODUCING STORMS OR OTHERWISE AT WEEKLY INTERVALS.

2. REPAIR OR REPLACE DAMAGED FIBRE ROLLS.

3. REMOVE COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

## REMOVAL

1. ALL EXCESSIVE SEDIMENT TRAPPED BY THE ROLLS MUST BE REMOVED FROM THE DRAIN OR SLOPE IF SUCH SEDIMENT IS LIKELY TO BE WASHED AWAY BY EXPECTED FLOWS.

2. DISPOSE OF COLLECTED SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

3. THE BIODEGRADABLE CONTENT OF THE STRAW ROLLS MAY NOT NECESSARILY NEED TO BE REMOVED FROM THE SITE.

4. ALL SYNTHETIC (PLASTIC) MESH OR OTHER NON READILY BIODEGRADABLE MATERIAL MUST BE REMOVED FROM THE SITE ONCE THE SLOPE OR DRAIN IS STABILISED, OR THE ROLLS HAVE DETERIORATED TO A POINT WHERE THEY ARE NO LONGER PROVIDING THEIR INTENDED DRAINAGE OR SEDIMENT CONTROL FUNCTION.

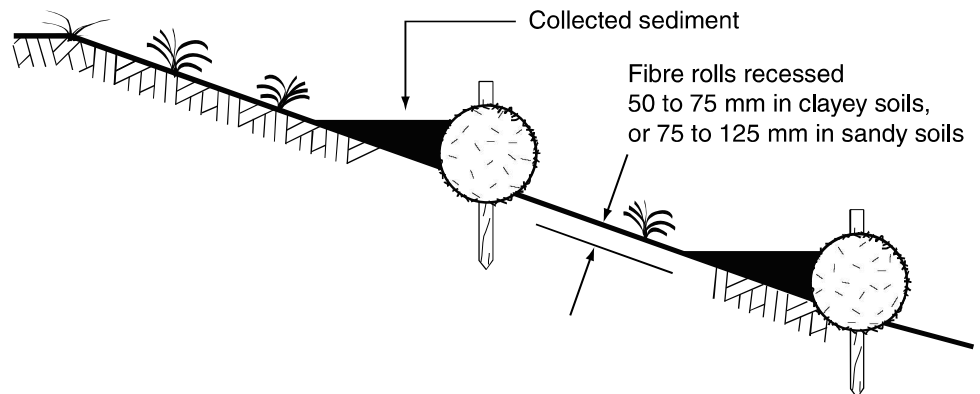


**Figure 1 - Typical installation of fibre rolls**

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| Drawn: | Date:  |             |       |
| GMW    | Apr-10 | Fibre Rolls | FR-01 |

## MATERIALS

**FILTER TUBE:** MANUFACTURED FROM A NON-WOVEN GEOTEXTILE REINFORCED WITH A UV-STABILISED, WOVEN FABRIC OR POLY-PROPYLENE MESH. THE GEOTEXTILE FABRIC SHOULD BE EITHER POLYESTER OR POLYPROPYLENE. PROPERTIES (AS3706) MINIMUM WIDE STRIP TENSILE STRENGTH OF 20kN/m IN BOTH DIRECTIONS; PORE SIZE EOS LESS THAN 160MICRONS, O95 LESS THAN 90MICRONS; MINIMUM MASS OF 300GSM (MINIMUM 'BIDIM' A44 OR EQUIVALENT).

**RIBBED PIPE (USED WITH EARTH BANKS):** RIBBED, PVC OR SIMILAR PIPE.

**EARTH EMBANKMENT:** NON-DISPERSIVE (EMERSON'S AGGREGATE CLASS 6, 7 OR 8) CLEAN EARTH FILL, FREE OF ORGANIC DEBRIS AND WITH SUFFICIENT CLAY CONTENT TO PREVENT THE THROUGH-FLOW OF WATER.

## INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. CONSTRUCT A SUITABLE WATER-RETAINING BARRIER/EMBANKMENT OUT OF THE MATERIAL SPECIFIED WITHIN THE APPROVED PLANS.

3. WHILE CONSTRUCTING THE DAM OR EMBANKMENT, INSTALL AND ANCHOR THE SPECIFIED NUMBER OF RIBBED PIPE SECTIONS THROUGH THE DAM/ EMBANKMENT.

4. ENSURE THE INLETS TO EACH FILTER TUBE ARE APPROPRIATELY ELEVATED ABOVE THE ADJACENT GROUND LEVEL TO MINIMISE THE RISK OF SEDIMENT BLOCKAGE OF THE PIPE ENTRANCE.

5. FOR EARTH EMBANKMENT, FIRMLY HAND-TAMP THE EARTH UNDER AND AROUND THE RIPPED PIPE/S IN LIFTS NOT EXCEEDING 100mm. ENSURE THAT ALL FILL MATERIAL IS WELL-COMPACTED.

6. FOR EARTH EMBANKMENTS, ENSURE THAT THE EMBANKMENT HAS MINIMUM DIMENSIONS OF 500mm HEIGHT, WITH 200mm CLEARANCE OVER THE PIPE OBVERT, AND MAXIMUM 2:1(H:V) SIDE SLOPES.

7. SUITABLY CONNECT THE FILTER TUBES TO THE DOWNS-SLOPE END OF THE PROTRUDING CONNECTOR PIPES. ENSURE ALL CONNECTIONS ARE WATERTIGHT.

## MAINTENANCE

1. INSPECT THE BARRIER/EMBANKMENT AND FILTER TUBES REGULARLY AND AT LEAST DAILY DURING DE-WATERING OPERATIONS. MAKE REPAIRS AS NEEDED TO THE FABRIC.

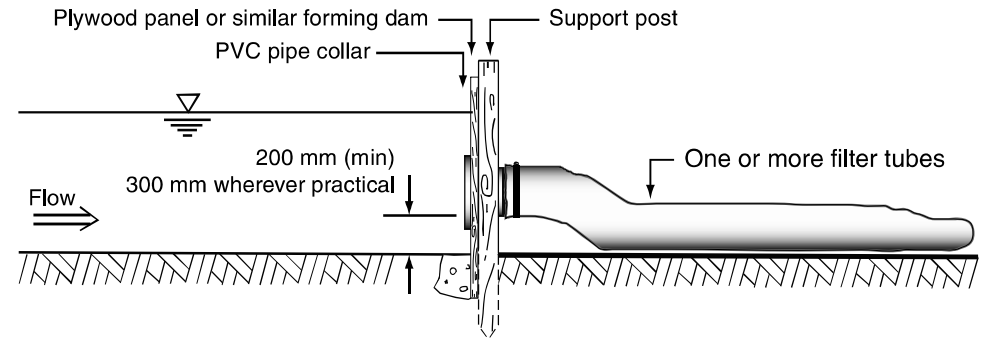
2. INSPECT THE FILTER TUBES FOR OBVIOUS LEAKS RESULTING FROM HOLES, TEARS OR JOINT FAILURE IN THE FABRIC.

3. REPAIR OR REPLACE ANY FILTER TUBE AS NECESSARY TO MAINTAIN THE DESIRED OPERATIONAL PERFORMANCE. IN SOME CIRCUMSTANCES FLOW RATE THROUGH THE FILTER TUBES CAN BE TEMPORARILY IMPROVED BY BRUSHING THE BAG WITH A STIFF-BRISTLED BROOM.

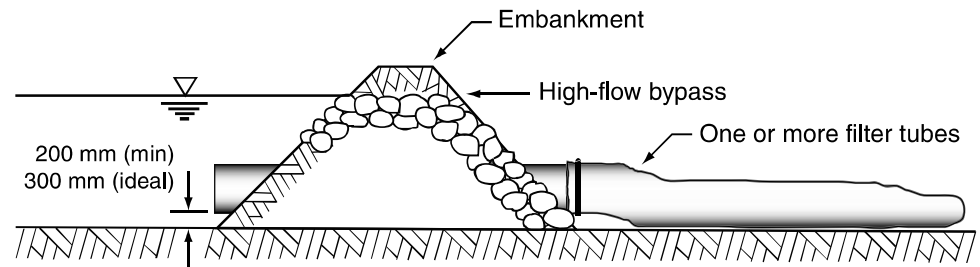
4. REPLACE ANY FILTER TUBE IF SEDIMENT BLOCKAGE OF THE FABRIC DECREASES THE FLOW RATE TO AN UNACCEPTABLE LEVEL, OR THE FILTER TUBE CONTAINS EXCESSIVE SEDIMENT.

## REMOVAL

1. REMOVE OF ALL MATERIALS AND DISPOSE OF THEM IN A SUITABLE MANNER THAT WILL NOT CAUSE AN ONGOING EROSION OR POLLUTION HAZARD.



(a) Filter tubes incorporated a solid, impervious dam



(b) Filter tubes incorporated into an earth embankment

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| GMW    | Apr-10 | Filter Tube Dam | FTD-01 |



**CAUTION; SPECIFICATIONS FOR SITE REVEGETATION VARY CONSIDERABLY FROM SITE TO SITE. SITE SUPERVISORS SHOULD OBTAIN SITE SPECIFIC PLANTING SPECIFICATIONS.**

#### **INSTALLATION**

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND APPLICATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF APPLICATION CONTACT THE ENGINEER, LANDSCAPE ARCHITECT OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.
2. ENSURE ALL NECESSARY SOIL TESTING (e.g. SOIL pH, NUTRIENT LEVELS) AND ANALYSIS HAS BEEN COMPLETED, AND REQUIRED SOIL ADJUSTMENTS PERFORMED PRIOR TO PLANTING.
3. APPLY SOIL CONDITIONERS AND FERTILISER AS SPECIFIED ON THE APPROVED PLANS. RIP THE SOIL 100 TO 150mm TO MIX THE COMPONENTS INTO THE SOIL AND TO LOOSEN AND ROUGHEN THE SOIL SURFACE BEFORE SEEDING.
4. WHERE POSSIBLE, THERE SHOULD BE SUFFICIENT SOIL DEPTH TO PROVIDE AN ADEQUATE ROOT ZONE. THE DEPTH TO ROCK OR IMPERMEABLE LAYERS SUCH AS HARDPANS SHOULD BE 300mm OR MORE, EXCEPT ON SLOPES STEEPER THAN 2:1(H:V) WHERE SUCH SOIL DEPTH MAY NOT BE FEASIBLE.
5. ENSURE THE SOIL pH IS WITHIN THE SPECIFIED RANGE.
6. APPLY SEED UNIFORMLY BY HAND OR WITH A CYCLONE SEEDER, DROP-TYPE SPREADER, DRILL, HYDROSEEDER, HYDROMULCHER, OR OTHER SUITABLE EQUIPMENT AS SPECIFIED.
7. WHEN USING BROADCAST-SEEDING METHODS, SUBDIVIDE THE AREA INTO WORKABLE SECTIONS AND APPLY ONE-HALF THE SPECIFIED QUANTITY OF SEED WHILE MOVING BACK AND FORTH ACROSS THE AREA, MAKING A UNIFORM PATTERN. THEN APPLY THE SECOND HALF IN THE SAME WAY, BUT MOVING AT RIGHT ANGLES TO THE FIRST PASS. COVER BROADCAST SEED BY RAKING

OR CHAIN DRAGGING; THEN FIRM THE SURFACE WITH A ROLLER TO PROVIDE GOOD SEED CONTACT.

8. APPLY SEED AT THE RECOMMENDED RATE, AND DISC OR OTHERWISE MECHANICALLY TREAT THE SURFACE TO BRING THE SEED INTO CONTACT WITH THE SOIL.
9. THE SEEDED AREA SHOULD BE MULCHED AS SPECIFIED IN THE APPROVED PLAN.

#### **MAINTENANCE**

1. DURING THE CONSTRUCTION PHASE, INSPECT THE TREATED AREA FORTNIGHTLY AND AFTER RUNOFF-PRODUCING RAINFALL. MAKE REPAIRS AS NEEDED.
2. WATERING THE VEGETATION PERIODICALLY IS ESSENTIAL, ESPECIALLY IN THE FIRST 7 DAYS AFTER ESTABLISHMENT. USE LOW-PRESSURE SPRAYS BECAUSE HIGH-PRESSURE JETS CAN WASH AWAY THE SEED AND MULCH COVER.
3. WATERING SHOULD START IMMEDIATELY AFTER PLANTING. WATERING SHOULD COMPLY WITH SPECIFICATIONS PROVIDED WITH THE APPROVED PLANS. GENERALLY WATERING SHOULD VARY ACCORDING TO WEATHER AND SOIL CONDITIONS. A TYPICAL WATERING SCHEDULE MAY CONSIST OF THE FOLLOWING:
  - (i) 25mm EVERY SECOND DAY FOR THE FIRST THREE WATERINGS;
  - (ii) 25mm TWICE A WEEK FOR THE NEXT THREE WEEKS; AND
  - (iii) 25mm ONCE WEEKLY FOR A FURTHER TWO WEEKS.
4. MONITOR SITE REVEGETATION, PARTICULARLY AFTER RAINFALL, AND APPROPRIATE MAINTENANCE AND/OR AMENDMENT TO ENSURE THAT THE REVEGETATION IS CONTROLLING EROSION AND STABILISING SOIL SLOPES AS REQUIRED.
5. WHERE PRACTICABLE, FILL IN, OR LEVEL OUT, ANY RILL EROSION BETWEEN PLANTS. IF EXCESSIVE EROSION OCCURS, THEN CONSIDER INCREASING THE PLANTING DENSITY, APPLYING APPROPRIATE EROSION CONTROL MEASURES, OR INTRODUCING ALTERNATIVE, NON-CLUMPING PLANT SPECIES.

6. AREAS MUST BE RE-SEEDED AND MULCHED IF THE VEGETATION FAILS TO ESTABLISH OR IS DAMAGED BY RUNOFF OR CONSTRUCTION ACTIVITIES.

7. IF THE TEMPORARY VEGETATION COVER OR EROSION CONTROL MEASURE (e.g. MULCH COVER) SHOULD FAIL FOR ANY REASON BEFORE ESTABLISHMENT OF THE PERMANENT VEGETATION COVER, THEN IT MUST BE REPLACED WITH AN APPROPRIATE TYPE OF COVER SUFFICIENT TO CONTROL SOIL EROSION.

8. IF THE PERMANENT VEGETATION SHOULD FAIL TO ESTABLISH OR TO ADEQUATELY RESTRAIN EROSION FOR ANY REASON DURING THE CONSTRUCTION OR MAINTENANCE PERIOD, THE AREA SHOULD BE REVEGETATED OR PROTECTED WITH OTHER EROSION CONTROL MEASURES AS APPROPRIATE.

9. IN AREAS WHERE THE OBTAINED VEGETATION COVER IS CONSIDERED INADEQUATE FOR EROSION CONTROL, THE AFFECTED AREA SHOULD BE OVER-SEEDED AND FERTILISED USING HALF THE ORIGINALLY SPECIFIED RATES, OR AS DIRECTED.

10. MAINTAIN GRASS BLADE LENGTH AT A MINIMUM 50mm HEIGHT WITHIN MEDIUM TO HIGH VELOCITY DRAINAGE AREAS, AND 20 TO 50mm WITHIN LOW VELOCITY FLOW PATHS.

11. WHERE NECESSARY, OR AS DIRECTED BY THE SITE SUPERVISOR, SLASH THE TEMPORARY CROP/GRASS COVER TO ALLOW THE SUCCESSFUL GROWTH OF THE UNDERLYING PERMANENT VEGETATION COVER.

12. CONTROL WEED GROWTH WITHIN 1m OF IMMATURE TREES FOR 6 TO 12 MONTHS FOR FAST GROWING SPECIES, AND 18 TO 20 MONTHS FOR SLOWER GROWING SPECIES, OR UNTIL THE END OF THE SPECIFIED MAINTENANCE PERIOD.

13. WHERE MULCH IS USED TO CONTROL WEED GROWTH, INSPECT AND WHERE NECESSARY, RENEW AT MAINTENANCE PERIODS NOT EXCEEDING 4 TO 6 MONTHS.

14. APPLY ADDITIONAL SEED, MULCH AND/OR SOIL CONDITIONING AS REQUIRED. MULCHES USUALLY NEED TO BE MAINTAINED OR RENEWED (AS NECESSARY) 2 TO 3 TIMES A YEAR.

15. INSPECT AND WHERE NECESSARY REPAIR PROTECTIVE FENCING AT MAINTENANCE PERIODS NOT EXCEEDING 1 MONTH.

16. RE-FIRM PLANTS LOOSENED BY WIND-ROCK, LIVESTOCK OR WILDLIFE.

17. REPLACE DEAD OR SEVERELY RETARDED PLANTS.

18. PRUNE ANY PLANTS OF DEAD OR DISEASED PARTS. CUT OFF ALL DAMAGED TREE LIMBS ABOVE THE TREE COLLAR AT THE TRUNK OR MAIN BRANCH. USE SEVERAL CUTS INCLUDING UNDERCUTTING TO AVOID PEELING BARK FROM THE HEALTHY AREAS OF THE TREE.

19. DISPOSE OF CLEARED VEGETATION IN AN APPROPRIATE MANNER SUCH AS CHIPPING OR MULCHING, ON-SITE BURIAL, OR OFF-SITE DISPOSAL. CLEARED VEGETATION SHOULD NOT BE DUMPED NEAR A WATERCOURSE OR ON A FLOODPLAIN WHERE IT COULD BE REMOVED BY FLOODWATERS. VEGETATION SHOULD NOT BE BURNT ON-SITE WITHOUT SPECIFIC APPROVAL FROM THE LOCAL AUTHORITY.

20. REPAIR DAMAGED TREE ROOTS BY CUTTING OFF THE DAMAGED AREAS AND SEALING THEM WITH AN APPROVED PRODUCT. SPREAD MOIST TOPSOIL OVER EXPOSED ROOTS.

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## MATERIALS

**ROCK:** 150 TO 300mm NOMINAL DIAMETER, HARD, EROSION RESISTANT ROCK. SMALLER ROCK MAY BE USED IF SUITABLE LARGE ROCK IS NOT AVAILABLE.

**SANDBAGS:** GEOTEXTILE BAGS (WOVEN SYNTHETIC, OR NON-WOVEN BIODEGRADABLE) FILLED WITH CLEAN COARSE SAND, CLEAN AGGREGATE, STRAW OR COMPOST.

## INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND INSTALLATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. PRIOR TO PLACEMENT OF THE CHECK DAMS, ENSURE THE TYPE AND SIZE OF EACH CHECK DAMS WILL NOT CAUSE A SAFETY HAZARD OR CAUSE WATER TO SPILL OUT OF THE DRAIN.

3. LOCATE THE FIRST CHECK DAM AT THE DOWNSTREAM END OF THE SECTION OF CHANNEL BEING PROTECTED. LOCATE EACH SUCCESSIVE CHECK DAM SUCH THAT THE CREST OF THE IMMEDIATE DOWNSTREAM DAM IS LEVEL WITH THE TOE OF THE CHECK DAM BEING INSTALLED.

4. ENSURE THE CHANNEL SLOPE IS NO STEEPER THAN 10:1 (H:V). OTHERWISE CONSIDER THE USE OF A SUITABLE CHANNEL LINER INSTEAD OF THE CHECK DAMS.

5. CONSTRUCT THE CHECK DAM TO THE DIMENSIONS AND PROFILE SHOWN WITHIN THE APPROVED PLAN.

6. WHERE SPECIFIED, THE CHECK DAMS SHALL BE CONSTRUCTED ON A SHEET OF GEOTEXTILE FABRIC USED AS A DOWNSTREAM SPLASH PAD.

7. EACH CHECK DAM SHALL BE EXTENDED UP THE CHANNEL BANK (WHERE PRACTICABLE) TO AN ELEVATION AT LEAST 150mm ABOVE THE CREST LEVEL OF THE DAM.

## MAINTENANCE

1. INSPECT EACH CHECK DAM AND THE DRAINAGE CHANNEL AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING RAINFALL.

2. CORRECT ALL DAMAGE IMMEDIATELY. IF SIGNIFICANT EROSION OCCURS BETWEEN ANY OF THE CHECK DAMS, THEN CHECK THE SPACING OF DAMS AND WHERE NECESSARY INSTALL INTERMEDIATE CHECK DAMS OR A SUITABLE CHANNEL LINER.

3. CHECK FOR DISPLACEMENT OF THE CHECK DAMS

4. CHECK FOR SOIL SCOUR AROUND THE ENDS OF EACH CHECK DAM. IF SUCH EROSION IS OCCURRING, CONSIDER EXTENDING THE WIDTH OF THE CHECK DAM TO AVOID SUCH PROBLEMS.

5. IF SEVERE SOIL EROSION OCCURS EITHER UNDER OR AROUND THE CHECK DAMS, THEN SEEK EXPERT ADVICE ON AN ALTERNATIVE TREATMENT MEASURE.

6. REMOVE ANY SEDIMENT ACCUMULATED BY THE CHECK DAMS, UNLESS IT IS INTENDED THAT THIS SEDIMENT WILL REMAIN WITHIN THE CHANNEL.

7. DISPOSE OF COLLECTED SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

## REMOVAL

1. WHEN CONSTRUCTION WORK WITHIN THE DRAINAGE AREA ABOVE THE CHECK DAMS HAS BEEN COMPLETED, AND THE DISTURBED AREAS AND THE DRAINAGE CHANNEL ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, ALL TEMPORARY CHECK DAMS MUST BE REMOVED.

2. REMOVE THE CHECK DAMS AND ASSOCIATED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

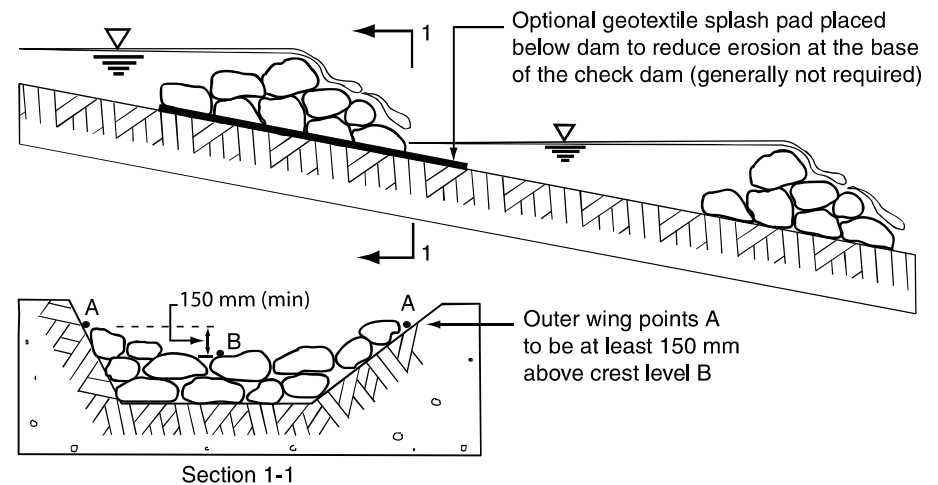
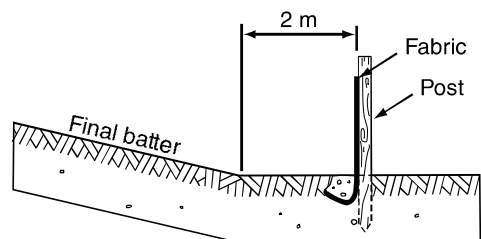
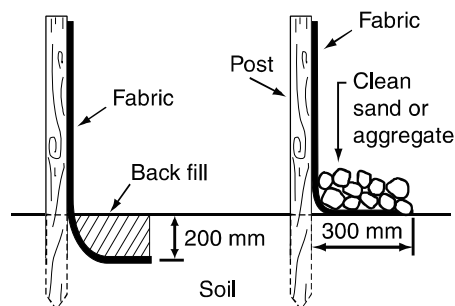


**Figure 1 - Layout and profile of check dams (rock check dams shown)**

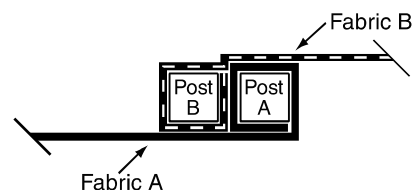
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(a) Location of fence relative to base of slope

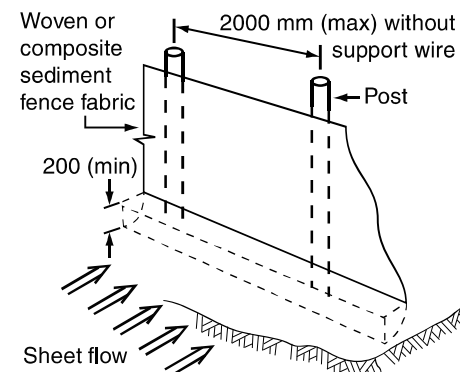


(b) Anchoring base of fabric

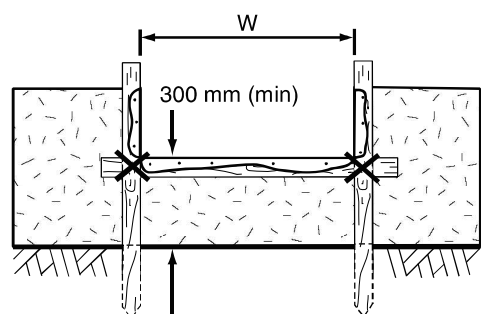


Fabric to fold around each stake one full turn. Stake B to be drive tightly against Stake A. The tops of both stakes to be secured with wire.

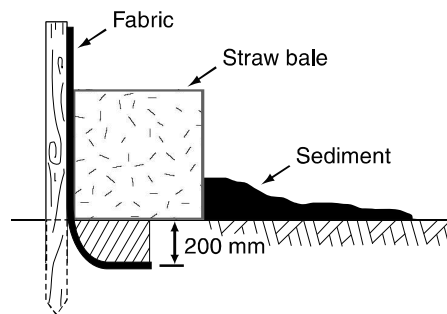
(c) Joining fabric - Method 1



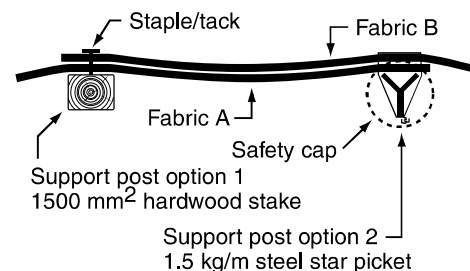
(d) Installation without backing support



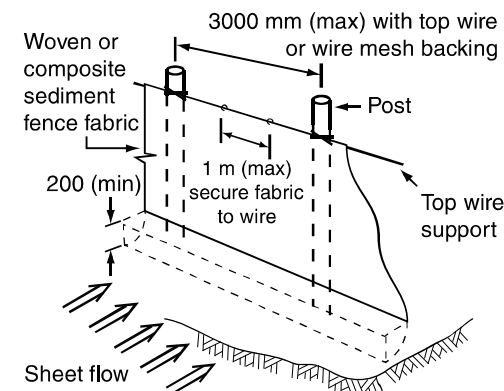
(e) Spill-through weir



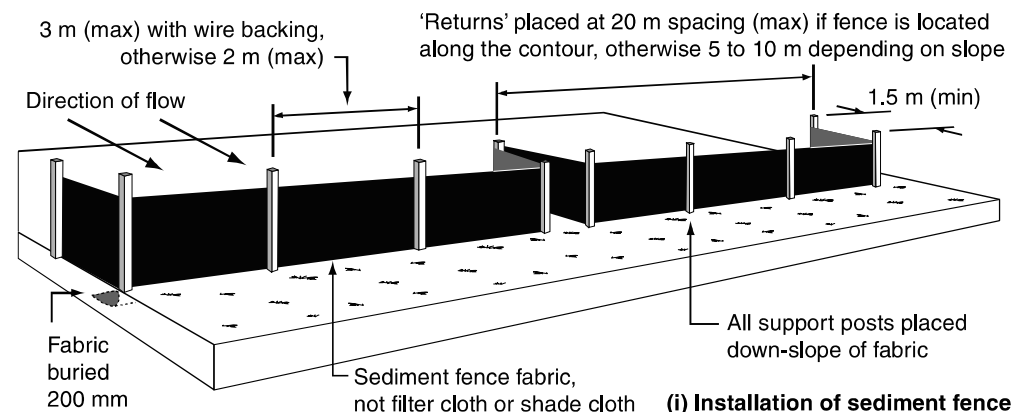
(f) Placement of up-slope straw bale



(g) Joining fabric - Method 2



(h) Installation with top wire support



(i) Installation of sediment fence

#### Notes:

1. Sediment fence to be installed along a line of constant ground elevation wherever practical.
2. Both end of the sediment fence to extend up the slope at least 1m.
3. Support post to be spaced a maximum 2m unless the fence is supported by a top wire or wire mesh backing, in which case 3m maximum spacing.
4. Fence 'returns' shall be installed at maximum 20m spacing if fence is installed along the contour, otherwise 5 to 10m maximum spacing.
5. Minimum 4 staples or tie wires per stake.

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## MATERIALS

**FABRIC:** POLYPROPYLENE, POLYAMIDE, NYLON, POLYESTER, OR POLYETHYLENE WOVEN OR NON-WOVEN FABRIC, AT LEAST 700mm IN WIDTH AND A MINIMUM UNIT WEIGHT OF 140GSM. ALL FABRICS TO CONTAIN ULTRAVIOLET INHIBITORS AND STABILISERS TO PROVIDE A MINIMUM OF 6 MONTHS OF USEABLE CONSTRUCTION LIFE (ULTRAVIOLET STABILITY EXCEEDING 70%).

**FABRIC REINFORCEMENT:** WIRE OR STEEL MESH MINIMUM 14-GAUGE WITH A MAXIMUM MESH SPACING OF 200mm.

**SUPPORT POSTS/STAKES:** 1500mm<sup>2</sup> (MIN) HARDWOOD, 2500mm<sup>2</sup> (MIN) SOFTWOOD, OR 1.5kg/m (MIN) STEEL STAR PICKETS SUITABLE FOR ATTACHING FABRIC.

## INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND REQUIRED TYPE OF FABRIC (IF SPECIFIED). IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, FABRIC TYPE, OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. TO THE MAXIMUM DEGREE PRACTICAL, AND WHERE THE PLANS ALLOW, ENSURE THE FENCE IS LOCATED:

- (i) TOTALLY WITHIN THE PROPERTY BOUNDARIES;
- (ii) ALONG A LINE OF CONSTANT ELEVATION WHEREVER PRACTICAL;
- (iii) AT LEAST 2m FROM THE TOE OF ANY FILLING OPERATIONS THAT MAY RESULT IN SHIFTING SOIL/FILL DAMAGING THE FENCE.

3. INSTALL RETURNS WITHIN THE FENCE AT MAXIMUM 20m INTERVALS IF THE FENCE IS INSTALLED ALONG THE CONTOUR, OR 5 TO 10m MAXIMUM SPACING (DEPENDING ON SLOPE) IF THE FENCE IS INSTALLED AT AN ANGLE TO THE CONTOUR. THE 'RETURNS' SHALL CONSIST OF EITHER:

- (i) V-SHAPED SECTION EXTENDING AT LEAST 1.5m UP THE SLOPE; OR
- (ii) SANDBAG OR ROCK/AGGREGATE CHECK

DAM A MINIMUM 1/3 AND MAXIMUM 1/2 FENCE HEIGHT, AND EXTENDING AT LEAST 1.5m UP THE SLOPE.

4. ENSURE THE EXTREME ENDS OF THE FENCE ARE TURNED UP THE SLOPE AT LEAST 1.5m, OR AS NECESSARY, TO MINIMISE WATER BYPASSING AROUND THE FENCE.

5. ENSURE THE SEDIMENT FENCE IS INSTALLED IN A MANNER THAT AVOIDS THE CONCENTRATION OF FLOW ALONG THE FENCE, AND THE UNDESIRABLE DISCHARGE OF WATER AROUND THE ENDS OF THE FENCE.

6. IF THE SEDIMENT FENCE IS TO BE INSTALLED ALONG THE EDGE OF EXISTING TREES, ENSURE CARE IS TAKEN TO PROTECT THE TREES AND THEIR ROOT SYSTEMS DURING INSTALLATION OF THE FENCE. DO NOT ATTACH THE FABRIC TO THE TREES.

7. UNLESS DIRECTED BY THE SITE SUPERVISOR OR THE APPROVED PLANS, EXCAVATE A 200mm WIDE BY 200mm DEEP TRENCH ALONG THE PROPOSED FENCE LINE, PLACING THE EXCAVATED MATERIAL ON THE UP-SLOPE SIDE OF THE TRENCH.

8. ALONG THE LOWER SIDE OF THE TRENCH, APPROPRIATELY SECURE THE STAKES INTO THE GROUND SPACED NO GREATER THAN 3m IF SUPPORTED BY A TOP SUPPORT WIRE OR WEIR MESH BACKING, OTHERWISE NO GREATER THAN 2m.

9. IF SPECIFIED, SECURELY ATTACH THE SUPPORT WIRE OR MESH TO THE UP-SLOPE SIDE OF THE STAKES WITH THE MESH EXTENDING AT LEAST 200mm INTO THE EXCAVATED TRENCH. ENSURE THE MESH AND FABRIC IS ATTACHED TO THE UP-SLOPE SIDE OF THE STAKES EVEN WHEN DIRECTING A FENCE AROUND A CORNER OR SHARP CHANGE OF DIRECTION.

10. WHEREVER POSSIBLE, CONSTRUCT THE SEDIMENT FENCE FROM A CONTINUOUS ROLL OF FABRIC. TO JOIN FABRIC EITHER:

- (i) ATTACH EACH END TO TWO OVERLAPPING STAKES WITH THE FABRIC FOLDING AROUND THE ASSOCIATED STAKE ONE TURN, AND WITH

THE TWO STAKES TIED TOGETHER WITH WIRE; OR  
(ii) OVERLAP THE FABRIC TO THE NEXT ADJACENT SUPPORT POST.

11. SECURELY ATTACH THE FABRIC TO THE SUPPORT POSTS USING 25 X 12.5mm STAPLES, OR TIE WIRE AT MAXIMUM 150mm SPACING.

12. SECURELY ATTACH THE FABRIC TO THE SUPPORT WIRE/MESH (IF ANY) AT A MAXIMUM SPACING OF 1m.

13. ENSURE THE COMPLETED SEDIMENT FENCE IS AT LEAST 450mm, BUT NOT MORE THAN 700mm HIGH. IF A SPILL-THROUGH WEIR IS INSTALLED, ENSURE THE CREST OF THE WEIR IS AT LEAST 300mm ABOVE GROUND LEVEL.

14. BACKFILL THE TRENCH AND TAMP THE FILL TO FIRMLY ANCHOR THE BOTTOM OF THE FABRIC AND MESH TO PREVENT WATER FROM FLOWING UNDER THE FENCE.

## ADDITIONAL REQUIREMENTS FOR THE INSTALLATION OF A SPILL-THROUGH WEIR

1. LOCATE THE SPILL-THROUGH WEIR SUCH THAT THE WEIR CREST WILL BE LOWER THAN THE GROUND LEVEL AT EACH END OF THE FENCE.

2. ENSURE THE CREST OF THE SPILL-THROUGH WEIR IS AT LEAST 300mm THE GROUND ELEVATION.

3. SECURELY TIE A HORIZONTAL CROSS MEMBER (WEIR) TO THE SUPPORT POSTS/ STAKES EACH SIDE OF THE WEIR. CUT THE FABRIC DOWN THE SIDE OF EACH POST AND FOLD THE FABRIC OVER THE CROSS MEMBER AND APPROPRIATELY SECURE THE FABRIC.

4. INSTALL A SUITABLE SPLASH PAD AND/OR CHUTE IMMEDIATELY DOWN-SLOPE OF THE SPILL-THROUGH WEIR TO CONTROL SOIL EROSION AND APPROPRIATELY DISCHARGE THE CONCENTRATED FLOW PASSING OVER THE WEIR.

## MAINTENANCE

1. INSPECT THE SEDIMENT FENCE AT LEAST WEEKLY AND AFTER ANY SIGNIFICANT RAIN. MAKE NECESSARY REPAIRS IMMEDIATELY.

2. REPAIR ANY TORN SECTIONS WITH A CONTINUOUS PIECE OF FABRIC FROM POST TO POST.

3. WHEN MAKING REPAIRS, ALWAYS RESTORE THE SYSTEM TO ITS ORIGINAL CONFIGURATION UNLESS AN AMENDED LAYOUT IS REQUIRED OR SPECIFIED.

4. IF THE FENCE IS SAGGING BETWEEN STAKES, INSTALL ADDITIONAL SUPPORT POSTS.

5. REMOVE ACCUMULATED SEDIMENT IF THE SEDIMENT DEPOSIT EXCEEDS A DEPTH OF 1/3 THE HEIGHT OF THE FENCE.

6. DISPOSE OF SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

7. REPLACE THE FABRIC IF THE SERVICE LIFE OF THE EXISTING FABRIC EXCEEDS 6-MONTHS.

## REMOVAL

1. WHEN DISTURBED AREAS UP-SLOPE OF THE SEDIMENT FENCE ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, THE FENCE MUST BE REMOVED.

2. REMOVE MATERIALS AND COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

3. REHABILITATE/REVEGETATE THE DISTURBED GROUND AS NECESSARY TO MINIMISE THE EROSION HAZARD.

Drawn:

GMW

Date:

Apr-10

Sediment Fence

SF-02

## APPLICATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND APPLICATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF APPLICATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. FILL OR SUITABLY CONTOUR ANY EXISTING RUTTING, RILLING OR GULLIES.

3. SUITABLY DIVERT UP-SLOPE STORMWATER RUNOFF AROUND TREATED AREA AS DIRECTED WITHIN THE APPROVED PLANS, OR OTHERWISE AS DIRECTED BY THE SITE ENGINEER.

4. APPLY TREATMENT TO THE AREA TO THE DEPTH AND FREQUENCY (SPACING) SPECIFIED ON THE APPROVED PLANS, OR OTHERWISE AS DIRECTED BY THE SITE ENGINEER.

5. IMMEDIATELY SEED AND MULCH ROUGHENED AREAS TO OPTIMISE SEED GERMINATION AND GROWING CONDITIONS.

## MAINTENANCE

1. DURING THE CONSTRUCTION PERIOD, INSPECT THE TREATED AREA PRIOR TO FORECAST RAINFALL, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER SIGNIFICANT RUNOFF PRODUCING RAINFALL, OR OTHERWISE ON A WEEKLY BASIS.

2. FILL EROSION RILLS SLIGHTLY ABOVE THE ORIGINAL GRADE, OR REGRADE THE SLOPE AS DIRECTED TO REMOVE THE RILLS.

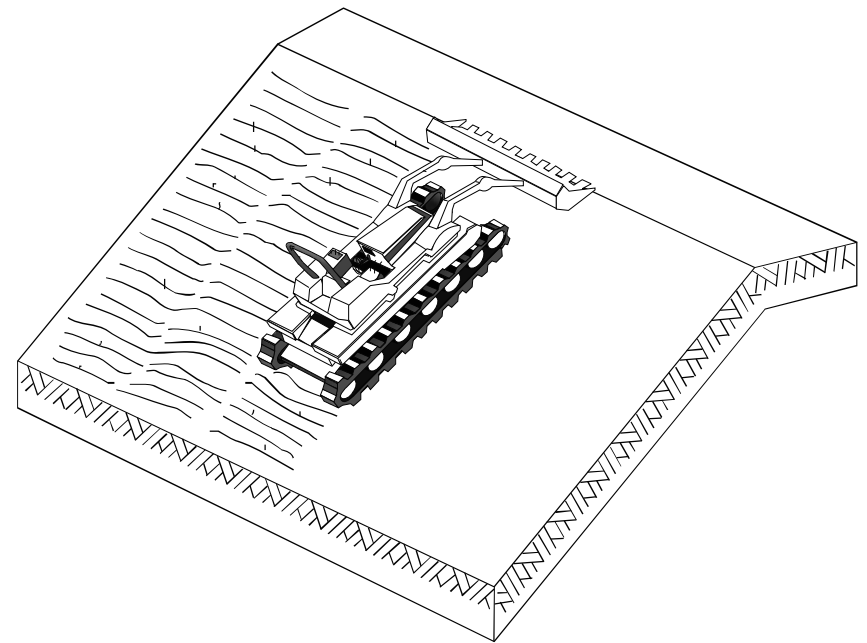


**Figure 1 - Application of surface roughening on slope**

|        |        |                    |       |
|--------|--------|--------------------|-------|
| Drawn: | Date:  |                    |       |
| GMW    | Dec-09 | Surface Roughening | SR-01 |

# **Appendix E**

## **Dredge and Excavation Management Plan**





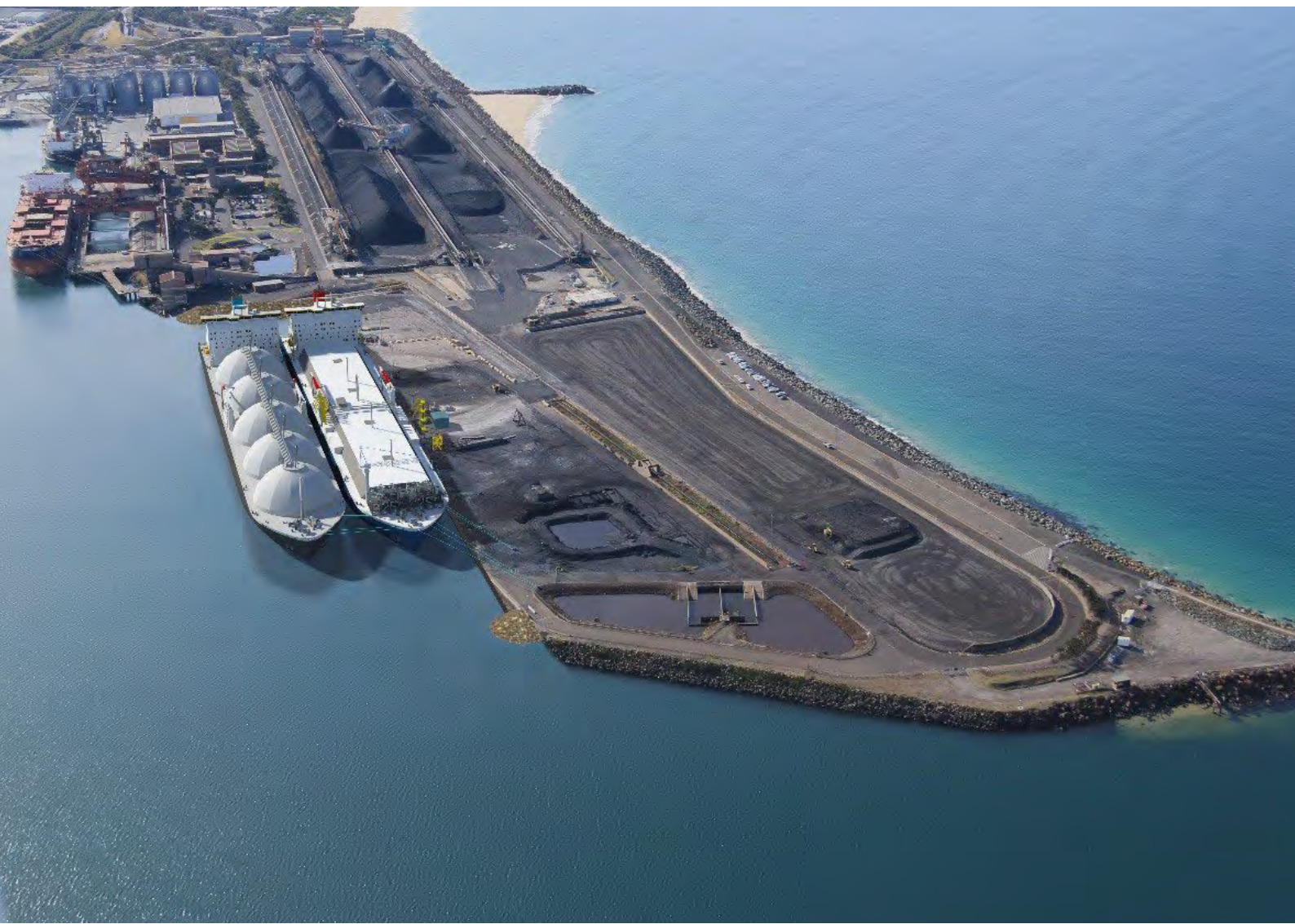
# Port Kembla Gas Terminal

**Dredge and Excavation Management Plan  
Stage 2A and 2B Marine Berth Construction  
and Dredging – Land and Marine Based**

Australian Industrial Energy

30 May 2022

→ **The Power of Commitment**



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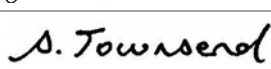
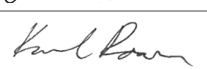
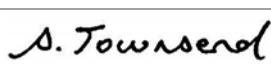
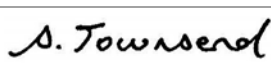
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# Acronyms

| Acronym   | Definition                                                                         |
|-----------|------------------------------------------------------------------------------------|
| ADT       | Articulated dump truck                                                             |
| AHD       | Australian Height Datum                                                            |
| AIE       | Australian Industrial Energy                                                       |
| AIS       | Automatic identification system                                                    |
| AMSA      | Australian Maritime Safety Authority                                               |
| ASS       | Acid Sulfate Soils                                                                 |
| ASSMP     | Acid Sulfate Soil Management Plan                                                  |
| Berth 101 | MBD Site Compound                                                                  |
| BC Act    | <i>Biodiversity Conservation Act 2016</i>                                          |
| BHD       | Backhoe Dredge                                                                     |
| CAD       | Computer aided design                                                              |
| CD        | Chart Datum                                                                        |
| COLREG    | Convention on the International Regulations for Preventing Collisions at Sea, 1972 |
| CSP       | Contaminated Spoil Protocol                                                        |
| CSSI      | Critical State Significant Infrastructure                                          |
| CTMP      | Construction Traffic Management Plan                                               |
| DEMP      | Dredge and Excavation Management Plan                                              |
| DPA       | Designated person ashore                                                           |
| DP&E      | Department of Planning and Environment                                             |
| DPGS      | Differential Global Positioning System                                             |
| ECR       | Emplacement Cell Report                                                            |
| EIS       | Environmental Impact Statement                                                     |
| EMS       | Environmental Management Strategy                                                  |
| EPA       | NSW Environment Protection Authority                                               |
| EP&A Act  | <i>Environmental Planning and Assessment Act 197</i>                               |
| EPBC Act  | <i>Environment Protection Biodiversity Conservation Act 1999</i>                   |
| EPL       | Environment Protection Licence                                                     |
| ESCP      | Erosion and Sediment Control Plan                                                  |
| FFMP      | Flora and Fauna Management Plan                                                    |
| FM Act    | <i>Fisheries Management Act 1994</i>                                               |
| FSRU      | Floating Storage and Re-gasification Unit                                          |
| GHD       | GHD Pty Ltd                                                                        |
| GNSS      | Global Navigation Satellite System                                                 |
| GP        | general purpose                                                                    |
| GPS       | Global Positioning System                                                          |
| Heron     | Heron Construction Co Ltd                                                          |
| HM        | Harbour Muds                                                                       |
| HS        | Harbour Silts                                                                      |
| Hs        | significant wave height                                                            |

| Acronym               | Definition                                                          |
|-----------------------|---------------------------------------------------------------------|
| HSE                   | Health, Safety and Environment                                      |
| IMO                   | International Maritime Organisation                                 |
| IMS                   | invasive marine species                                             |
| ISM Code              | International Safety Management code                                |
| ISPS Code             | International Ship and Port Facility Security Code                  |
| LAT                   | Lowest Astronomical Tide                                            |
| LNG                   | liquefied natural gas                                               |
| KPI                   | Key Performance Indicators                                          |
| m <sup>3</sup>        | Cubic metres                                                        |
| Machiavelli           | Backhoe dredge                                                      |
| Marine Pollution Act  | <i>Marine Pollution Act 2012</i>                                    |
| MARPOL                | International Convention for the Prevention of Pollution from Ships |
| MBD                   | Marine Berth Construction and Dredging                              |
| Mbgl                  | Metres below ground level                                           |
| MHB                   | Material Handling Barge                                             |
| MLA                   | Marine Loading Arms                                                 |
| MSL                   | Mean Seal Level                                                     |
| National Plan         | National Plan for Maritime Environmental Emergencies (AMSA, 2020)   |
| Navigation Act        | <i>Navigation Act 2012 (Cth)</i>                                    |
| OHDSKA                | Outer Harbour Dredged Spoil Containment Area                        |
| ORF                   | Onshore Receiving Facilities                                        |
| PANSW                 | Port Authority of NSW                                               |
| PASS                  | Potential Acid Sulfate Soils                                        |
| PIRMP                 | Pollution Incident Response Management Plan                         |
| PKGT                  | Port Kembla Gas Terminal                                            |
| PKGT EIS              | Port Kembla Gas Terminal Environmental Impact Statement             |
| PKHD                  | Port Kembla Height Datum                                            |
| Planning Systems SEPP | State Environmental Planning Policy (Planning Systems) 2021         |
| POEO Act              | <i>Protection of the Environment Operations Act 1997</i>            |
| POMP                  | Port Operations Management Plan                                     |
| QA                    | Quality Assurance                                                   |
| RL                    | Reduced Level                                                       |
| RTK                   | real-time kinematic                                                 |
| SHB                   | Split Hopper Barges                                                 |
| SMP                   | Spoil Management Plan                                               |
| SMS                   | Safety Management System                                            |
| SMEC                  | SMEC Australia Pty Ltd                                              |
| SOLAS                 | International Convention for the Safety of Life at Sea 1914         |
| SOP                   | Standard Operating Procedure                                        |
| SOPEP                 | Shipboard Oil Pollution Emergency Plan                              |
| SWMS                  | Safe Work Method Statements                                         |
| TfNSW                 | Transport for NSW                                                   |

| Acronym     | Definition                        |
|-------------|-----------------------------------|
| The Project | Port Kembla Gas Terminal Project  |
| VTs         | Vessel Traffic Services           |
| WM Act      | <i>Water Management Act 2000</i>  |
| WQMP        | Water Quality Monitoring Plan     |
| X, y, z     | northing, easting & reduced level |

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# 1. Introduction

## 1.1 Overview

This Dredge and Excavation Management Plan (DEMP) has been developed as a Sub - plan to the Port Kembla Gas Terminal Project (the Project) Spoil Management Plan (SMP). The SMP is a Sub - plan to the Project's overarching Environmental Management Strategy (EMS). This DEMP has been prepared by GHD Pty Ltd (GHD) and Heron Construction Co Ltd (Heron) on behalf of Australian Industrial Energy (AIE) to apply to construction activities associated with Stage 2A and Stage 2B construction of the Project.

This DEMP overarches the other associated Sub-plans, which together describe the proposed structure for environmental management and monitoring requirements for the Project. This DEMP addresses the requirements of the Port Kembla Gas Terminal Environmental Impact Statement (PKGT EIS) and associated Infrastructure Approval (SSI 9471) and Environment Protection Licence (EPL) No. 21529.

## 1.2 Background

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

NSW currently imports more than 95 percent 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 more than 100 petajoules of natural gas, equivalent to more than 70 percent of NSW gas needs and will 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) (NSW) and Schedule 5 of the State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP). The Project received Infrastructure Approval from the Minister for Planning and Public Spaces on 29 April 2019.

The construction of the Project is primarily associated with the establishment of a new berth facility at Port Kembla to enable an LNG carrier to berth alongside the Floating Storage and Re-gasification Unit (FSRU) and new infrastructure to connect the terminal to the existing gas network. Excavation and dredging would be required to establish the new berth facility, with spoil deposited in a cell (referred to as the 'Emplacement Cell') in the Outer Harbour.

The development has progressed to Stage 2A and Stage 2B works located at Berth 101 (referred to as the 'Marine Berth Construction and Dredging (MBD) Site Compound') and the Outer Harbour Dredged Spoil Containment Area (referred to as 'OHDSOA' or the Emplacement Cell). Collectively, these two locations are referred to as "the site". The Stage 2A works include:

- Completion of excavation works undertaken during Stage 1 (including transport of spoil materials to the Emplacement Cell Construction Site).
- Construction of the quay wall at the MBD Site Compound.
- Construction of Onshore Receiving Facilities (ORF) at the MBD Site Compound (including construction of Wharf Topside Area, Utility Area, and Common Area).
- Installation and commissioning of power, communications, and potable water.
- Installation of gas pipeline within the MBD Site Compound as part of ORF.

The Stage 2B works include:

- Continuation of Stage 2A works.

- Excavation and dredging of the MBD Site Compound in the Inner Harbour and the Emplacement Cell in the Outer Harbour.
- Construction of the Emplacement Cell in the Outer Harbour.
- Marine based construction activities including installation of navigational aids and revetments at the MBD Site Compound.

## 1.3 Purpose and scope

This DEMP has been prepared in accordance with the PKGT EIS and associated Infrastructure Approval (SSI 9471) and EPL No. 21529. It describes how the management measures and commitments in the PKGT EIS, Infrastructure Approval (SSI 9471) and EPL No. 21529 relating to dredging are to be implemented by the Principal Contractor's during Stage 2A and Stage 2B construction of the Project. Specifically, this plan includes requirements to:

- Minimise generation and dispersion of sediments during dredging and disposal activities,
- Ensure no waters are polluted as a result of dredging and disposal activities,
- Management and procedures for handling, transporting, storing and disposal of dredged materials, and
- Location and depths of dredging and disposal areas.

This plan addresses the above requirements and includes, but is not limited to:

- Performance criteria for minimising sediment generation and dispersion.
- Mitigation strategies to minimise impacts on water and air quality during dredging works.

Odour and air emission mitigation measures related to the handling of sediments are included in the Stage 2A and Stage 2B Air Quality Management Plan (AQMP).

Minimising sediment generation and dispersion during dredging and placement activity is a key component of the Stage 2A and Stage 2B DEMP. Specific mitigation measures are contained throughout this Plan, and include measures related, but not limited, to the following:

- Implementation and action of a Trigger Action Response Plan (TARP) in the event exceedance of the total suspended solids/turbidity trigger levels are detected (additional detail provided in the Stage 2A and Stage 2B Water Quality Monitoring Plan (WQMP)).
- Installation of silt curtains within the Inner and Outer Harbour areas.
- Design parameters, including defined horizontal and vertical dredge limits, and appropriate equipment selection which seek to minimise sediment disturbance as much as practicable.
- Use of backhoe dredge and mechanical dredging methods have been chosen rather than hydraulic dredging

AIE and its contractors acknowledge that maintaining water and air quality during dredging and placement activity in the vicinity of the Project site is paramount to the successful delivery of the construction phase of the Project. AIE is committed to ensuring this DEMP is implemented, reviewed and updated regularly to ensure its objectives are met and that the approval conditions outlined in the Infrastructure Approval (SSI 9471) and EPL No. 21529 are achieved.

This DEMP is applicable to all staff, employees, subcontractors, and any statutory service authorities undertaking the Stage 2A and Stage 2B works described in Section 2 of this DEMP. The DEMP implementation and on-going development will be managed by the Project Team (refer to Section 3).

## 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 an 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 includes 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. Berth and wharf facilities, as well as 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. The Emplacement Cell will be located in the Outer Harbour. A site overview is provided as Figure 2.1.

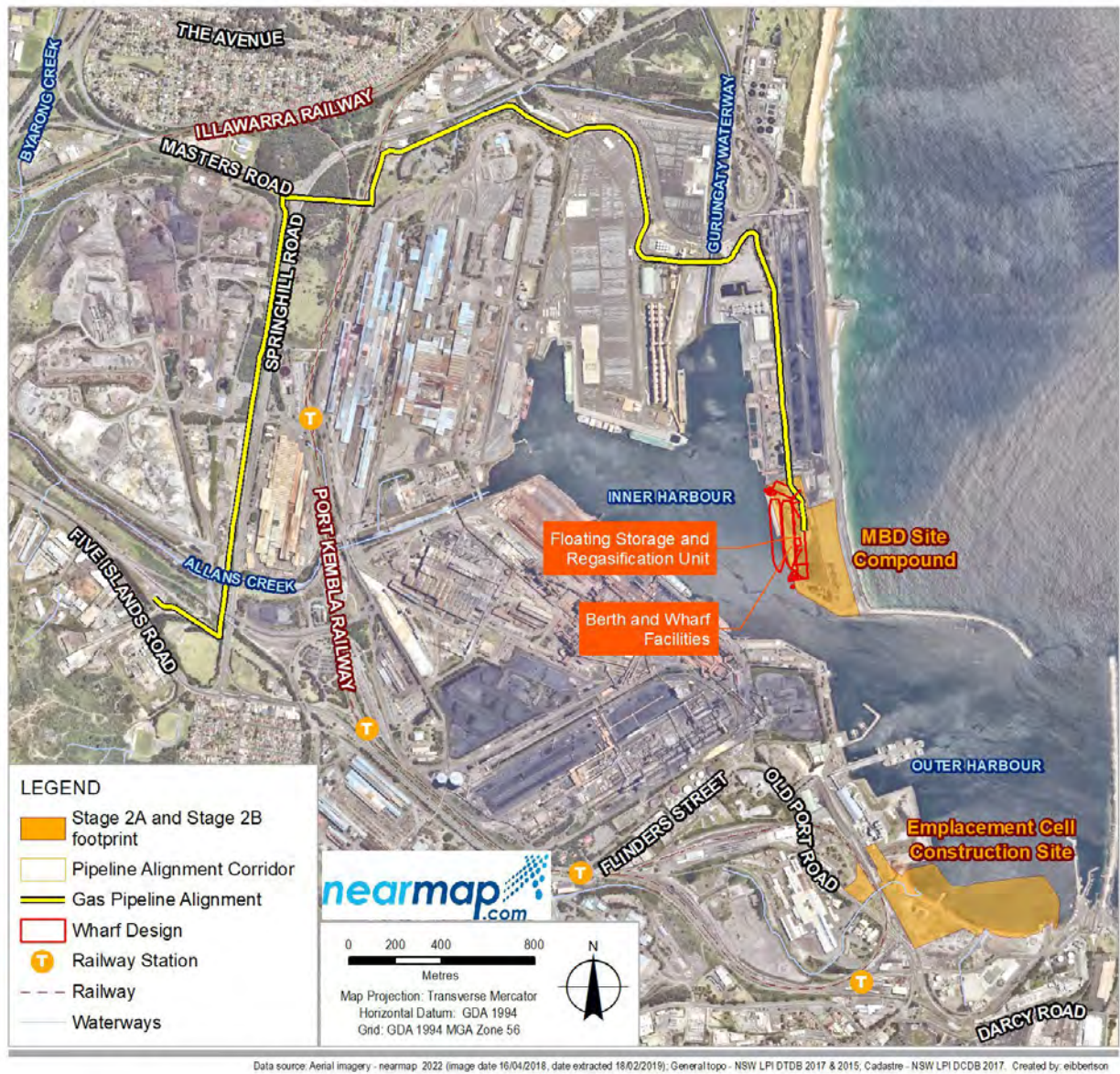


Figure 2.1 Site overview

## 2.2 Project construction scope of works

### 2.2.1 Overview

The Project construction scope of work has been divided into three main packages (with associated activities), as outlined in Table 2.1. Construction staging of the Project has been approved in accordance with Condition 3 of Schedule 4 of Infrastructure Approval (SSI 9471) as per correspondence from the Department of Planning and Environment (DP&E) dated 27 October 2021. This DEMP applies only to the works associated with Stage 2A and Stage 2B.

**Table 2.1** Construction stages/work packages

| Stage | Package                                                        | Proposed commencement | Activities                                                                                                                                                                                                                                                                                               |
|-------|----------------------------------------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | Early Enabling Works                                           | May 2021              | Demolition of Berth 101, removal of structures and land based excavation works, and Cone Penetration Testing in the Outer Harbour to inform Emplacement Cell design and relocation of Bunker Oil Pipeline.                                                                                               |
| 2A    | Marine Berth Construction – Land Based                         | January 2022          | Completion of excavation works undertaken during Stage 1.<br>Transport of spoil materials for storage at the Emplacement Cell Construction Site.<br>Quay wall construction.                                                                                                                              |
|       |                                                                | February 2022         | Installation of communications conduit, potable water line, and 11kV power cable and padmount substation within MBD Site Compound.                                                                                                                                                                       |
|       |                                                                | April 2022            | Construction of the ORF, which comprises three areas: Wharf Topside Area; Utility Area; and Common Area.                                                                                                                                                                                                 |
|       |                                                                | June 2022             | Pipeline construction and associated ancillary infrastructure within MBD Site Compound delivered as part of ORF scope.                                                                                                                                                                                   |
| 2B    | Marine Berth Construction and Dredging – Land and Marine Based | March 2022            | Continuation of Stage 2A with the addition of the following activities:                                                                                                                                                                                                                                  |
|       |                                                                |                       | Excavation/dredging of the MBD Site Compound in the Inner Harbour and construction of the Emplacement Cell in the Outer Harbour.                                                                                                                                                                         |
|       |                                                                |                       | Marine based construction activities including installation of navigational aids and revetment shore protection.                                                                                                                                                                                         |
| 3     | Pipeline installation including tie-ins                        | June 2022             | Construction of an 18" onshore natural gas pipeline approximately 6.3km in length from the Berth 101 site boundary to tie - in facility at Cringila for connection to the Eastern Gas Pipeline.<br>Pipeline construction to occur concurrently with Jemena, subject to separate set of management plans. |

\*Proposed dates and may be subject to change.

The following will be undertaken as part of the Stage 2A land-based works:

- Construction of the quay wall at MBD Site Compound incorporating finalisation of excavation works undertaken during Stage 1 (including transport of spoil materials to Emplacement Cell Construction Site).
- Installation of and commissioning of power, communications, and potable water.
- Construction of ORF at MBD Site Compound (including construction of Wharf Topside Area, Utility Area, and Common Area).
- Installation of gas pipeline within the MBD Compound site.

The following will be undertaken as part of the Stage 2B land and marine-based works:

- Continuation of Stage 2A works.
- Installation of site facilities and preparatory earthworks at Emplacement Cell Construction Site.
- Marine-based construction activities including installation of silt curtains, navigational aids, and revetment shore protection at the MBD Site Compound.



- Construction of the Emplacement Cell in the Outer Harbour.
- Excavation and dredging of the MBD Site Compound in the Inner Harbour.

An outline of the tasks associated with Stage 2A and Stage 2B is provided in Section 2.3 through Section 2.7. The site includes the MBD Site Compound, the Emplacement Cell Construction Site, and the Emplacement Cell located in the Outer Harbour. The location of the Stage 2A and Stage 2B works is shown in Figure 2.2.

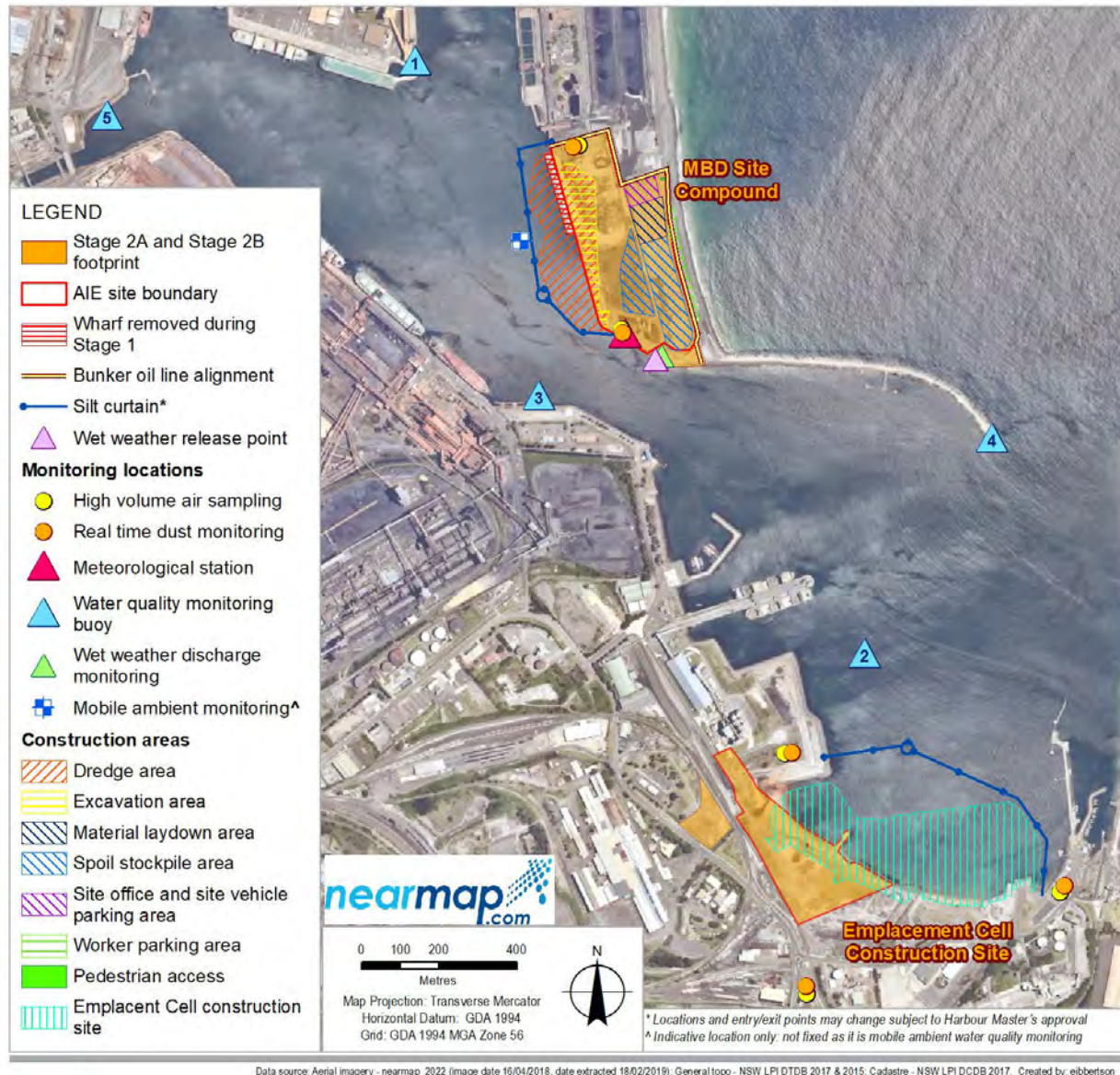


**Figure 2.2** Stage 2A and Stage 2B works and location of MBD Site Compound, Emplacement Cell and Emplacement Cell Construction Site

## 2.2.2 Traffic

Road traffic generated by Stage 2A and Stage 2B will be controlled through the gate on Sea Wall Road. Heavy vehicle movements will be generated by the delivery of materials, equipment, and plant to the MBD Site Compound and transport of stockpiled material to the Emplacement Cell Construction Site.

In addition to the material that has already been transported to Emplacement Cell Construction Site (Outer Harbour Laydown Area) during Stage 2A, up to 30,000 cubic metres (m<sup>3</sup>) of material from the MBD Site Compound is anticipated to be transported via road to the Emplacement Cell Construction Site during Stage 2B. The activities associated with this task will involve loading, road transportation via truck and trailer (approximately 30-tonne capacity), unloading, stockpiling, and management of the stockpiles.



Light vehicle movements will be generated from construction workers accessing the MBD Site Compound and Emplacement Cell Construction Site. Parking will be provided for up to approximately 100 workers at the MBD Site Compound and approximately 37 workers at the Emplacement Cell Construction Site (refer to Figure 2.3 and Figure 2.4).

Road traffic movements will be undertaken in accordance with the Stage 2A and Stage 2B Construction Traffic Management Plan (CTMP).

The road traffic generated by Stage 2B will mainly be associated with the delivery of the quarry materials from quarries located in the surrounding area. It is anticipated that about 40-50 daily truck movements will be required, consisting of three - five axle semi-trailers or rigid truck and five axle dog-trailers of less than 40 tonnes (GML). The activities will take place during the standard daytime construction working hours, averaging approximately eight heavy truck movements per hour (four vehicles in and out of site). The total number of vehicles required for the operation will be 12-16.

The majority of traffic generated during Stage 2B activities will be marine traffic movements during dredging operations. Marine traffic navigation and management will be undertaken in accordance with the CTMP for Stage 2A and Stage 2B, which is made consistent with a Port Navigation Plan, herein referred to as the Port Operations Management Plan (POMP), produced by the Stage 2B Principal Contractor (Heron) in consultation with the Port Authority of NSW (PANSW).

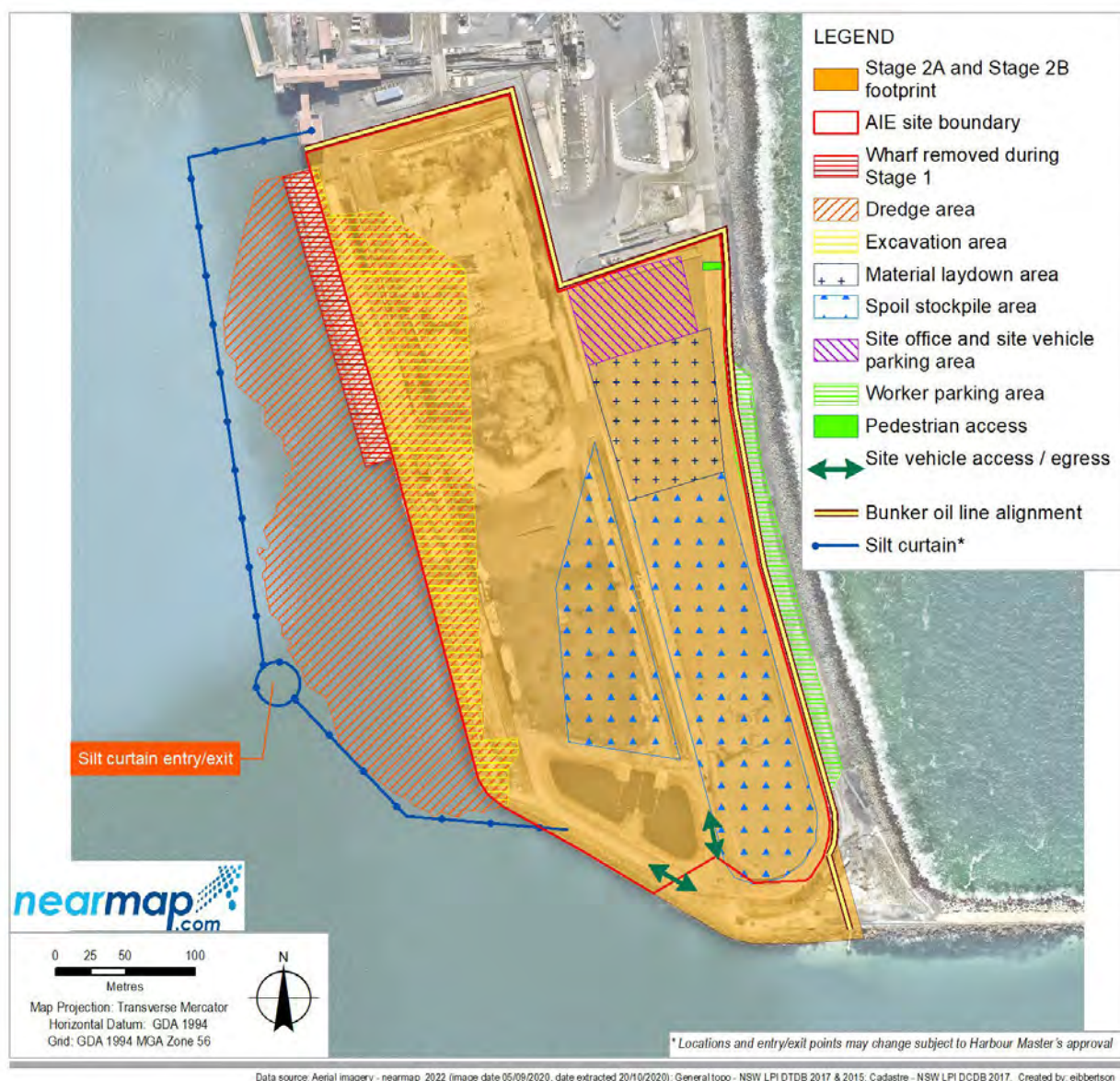


**Figure 2.3**      *Layout of MBD Site Compound*

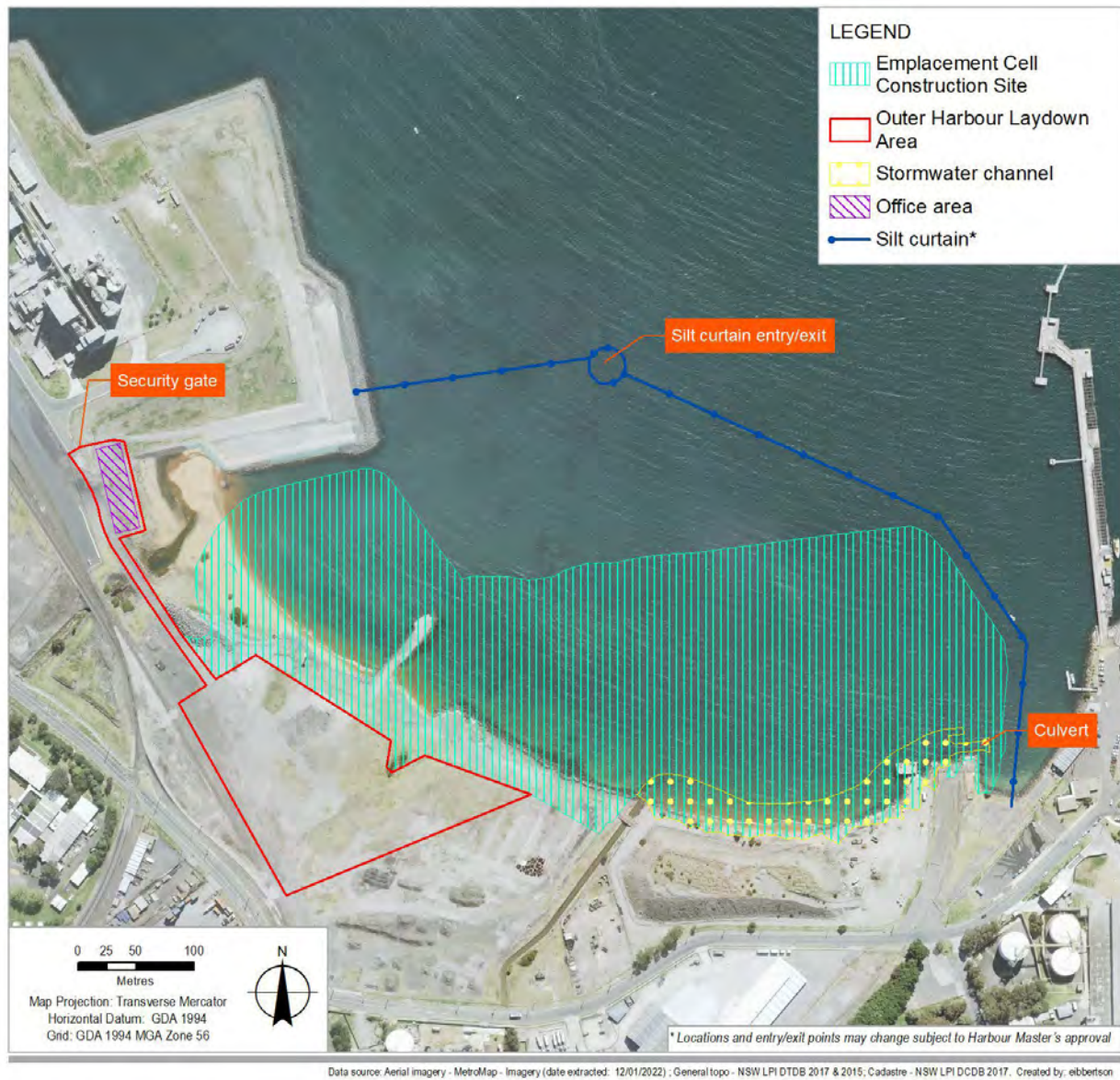


Figure 2.4 Layout of Emplacement Cell Construction Site

## 2.2.3 Program

The Stage 2A works commenced in January 2022. Stage 2B, which includes the continuation of land-based construction and marine-based works, are then anticipated to commence in March 2022 (refer to Table 2.1 for construction staging). As noted in Section 2.2, these dates are only proposed and may be subject to change.



## 2.3 Stage 2A: Construction of quay wall (MBD – Land Based)

A number of structures will be constructed within the MBD Site Compound to accommodate the FSRU and LNG carrier for the Project. Excavation and stockpiling activities from the Stage 1 Early Enabling Works will continue on-site during Stage 2A to lay the platform for ongoing construction activities at the MBD Site Compound.

The new structures that will commence construction during Stage 2A are summarised in Table 2.2. The location of the quay wall and layout of the marine berth and wharf facilities is shown in Figure 2.5.

**Table 2.2** Marine berth and wharf structures to be constructed during Stage 2A

| Component                            | Works required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Earthworks and stockpiles            | <ul style="list-style-type: none"> <li>– Completion of excavation and backfilling works from Stage 1 Early Enabling Works.</li> <li>– Excavated materials from the Early Enabling Works have been stockpiled within the Eastern and Western Stockyards of the MBD Site Compound and the Emplacement Cell Construction Site.</li> <li>– The excavated materials stockpiled at the MBD Site Compound include: <ul style="list-style-type: none"> <li>• Approximately 9,700m<sup>3</sup> of demolished concrete crushed to nominal 70mm minus.</li> <li>• Approximately 12,500m<sup>3</sup> of heavily bound base course crushed to nominal -150mm minus.</li> <li>• Approximately 33,900m<sup>3</sup> of mixed slag, general fill, and coal nominally &lt; 150mm in size.</li> <li>• Approximately 10,700m<sup>3</sup> of predominantly sand material.</li> <li>• Approximately 8,600 m<sup>3</sup> of asbestos impacted soils.</li> </ul> </li> <li>– The excavated materials stockpiled at the Emplacement Cell Construction Site include: <ul style="list-style-type: none"> <li>• Approximately 44,000 m<sup>3</sup> of sand material.*</li> </ul> </li> <li>– The excavated materials will be used/reused for quay wall construction and to backfill the landside area of the quay wall or transported to the Emplacement Cell Construction Site for storage and use in construction of the Emplacement Cell.</li> </ul> |
| Quay wall                            | <ul style="list-style-type: none"> <li>– Construction of a new piled quay wall keyed into bedrock where necessary complete with sheet pile anchor wall, capping beam and tie rods to the south of the existing coal terminal.</li> <li>– Excavated and processed materials from the Stage 1 Early Enabling Works are stockpiled within the MBD Site Compound and will be used during construction of the quay wall and to backfill on landside area of the wall.</li> <li>– Installation of a marine fender system attached to the capping beam along the quay wall to protect the quay wall from berthing and mooring loads.</li> <li>– Installation of a cathodic protection system to the quay wall and associated elements, including assessment of the potential impacts the FSRU and pipeline cathodic protection will have on quay wall.</li> <li>– Backfilling and compaction on landside area of wall utilising the site stockpiled materials.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Mooring dolphins                     | <ul style="list-style-type: none"> <li>– Installation of landside mooring dolphin structures on reinforced concrete platforms supported by steel piles.</li> <li>– Mooring equipment will be installed and comprise the following: <ul style="list-style-type: none"> <li>• 20 load sensing quick release hooks.</li> <li>• Up to four land-based mooring winches on mooring dolphins may be required.</li> <li>• Up to four swivel fairleads may be required to enable each mooring line to land-based winches to be fed in a horizontal alignment.</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Marine Loading Arm (MLA) foundations | Construction of a new reinforced concrete foundation supported on steel piles, located behind the new quay wall.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Gangway tower foundation             | Construction of foundation for Gangway tower.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Fire monitor foundation              | Fire monitor foundations, subject to risk studies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

\*The volumes provided are approximate and may vary.

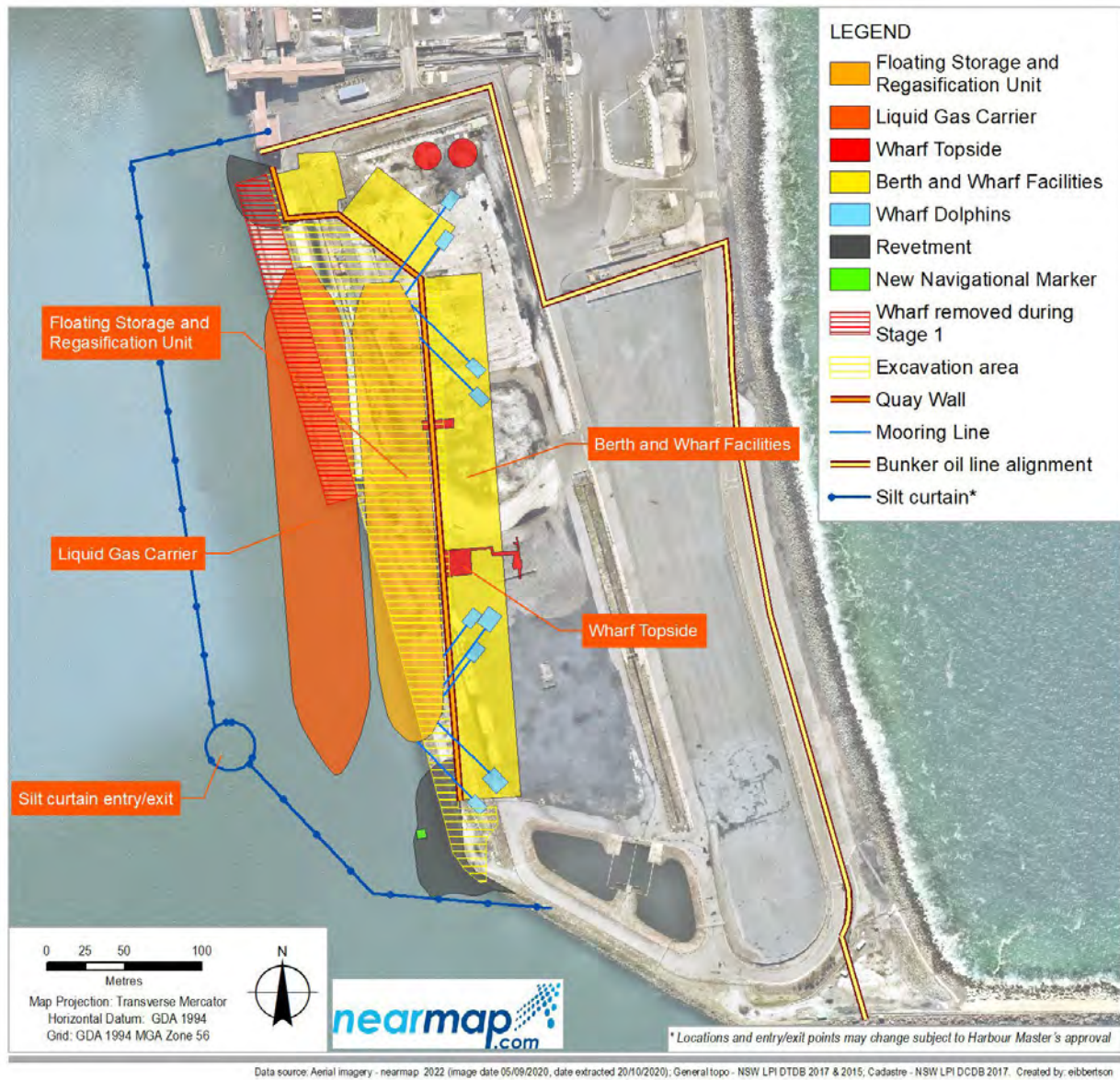


Figure 2.5 Location of quay wall and layout of MBD and ORF (Stage 2A)

## 2.4 Stage 2A: Power, communications, and water connections

Works required for power, communications, and water connections for Stage 2A are summarised in Table 2.3.

Table 2.3 Construction of utility connections for Stage 2A

| Component                | Works required                                                                                                                                                                                                                                                                                     |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power and communications | <ul style="list-style-type: none"> <li>– Construction and installation of a new 11kV power cable in a buried conduit and substation.</li> <li>– Energisation of the padmount substation and 415kV temporary building supply.</li> <li>– Installation of communication conduit and pits.</li> </ul> |
| Potable water            | <ul style="list-style-type: none"> <li>– Extension of existing potable water line within the MBD Site Compound.</li> </ul>                                                                                                                                                                         |

## 2.5 Stage 2A: Construction of ORF

The general layout of the ORF areas is shown in Figure 2.5. Works required for the three ORF areas during Stage 2A are summarised in Table 2.4.

Table 2.4 Structures to be constructed for ORF during Stage 2A

| Component                          | Works required                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Wharf Topside Area</b>          |                                                                                                                                                                                                                                                                                                                                                 |
| MLAs                               | Installation of MLAs, including: <ul style="list-style-type: none"> <li>– Civils and structures.</li> <li>– Associated works such as piping, hydraulics, electrical, instrumentation, and auxiliary systems.</li> </ul>                                                                                                                         |
| Piping and valving                 | <ul style="list-style-type: none"> <li>– All necessary piping and valving.</li> <li>– Odorant injection facilities.</li> <li>– Pig launcher, downstream of the MLAs to tie-in to the natural gas pipeline.</li> </ul>                                                                                                                           |
| Gangway                            | <ul style="list-style-type: none"> <li>– Gangway access tower to provide connection between the wharf and FSRU.</li> </ul>                                                                                                                                                                                                                      |
| Utility connections                | FSRU utilities connections for: <ul style="list-style-type: none"> <li>– Communications.</li> <li>– Marine Diesel Oil.</li> <li>– Freshwater.</li> <li>– Sewage, bilge, and grey water.</li> </ul>                                                                                                                                              |
| <b>Utility Area</b>                |                                                                                                                                                                                                                                                                                                                                                 |
| Site utilities                     | Site utilities including: <ul style="list-style-type: none"> <li>– Potable water and sewerage.</li> <li>– Instrument air and bottled nitrogen.</li> <li>– Diesel storage.</li> <li>– Electrical distribution (including UPS and emergency diesel generators).</li> <li>– Control and instrumentation.</li> <li>– Telecommunications.</li> </ul> |
| <b>Common Areas</b>                |                                                                                                                                                                                                                                                                                                                                                 |
| Firefighting systems and equipment | Firefighting equipment including: <ul style="list-style-type: none"> <li>– Firewater storage.</li> <li>– Pumps.</li> <li>– Firewater monitors.</li> </ul>                                                                                                                                                                                       |
| Security systems and equipment     | <ul style="list-style-type: none"> <li>– CCTV.</li> <li>– Fencing and gates.</li> <li>– Security access and monitoring systems.</li> </ul>                                                                                                                                                                                                      |

| Component                             | Works required                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Equipment housing                     | Equipment shelters and buildings to house: <ul style="list-style-type: none"> <li>– Electrical, control, and operating equipment, critical spares, emergency response and site monitoring facilities.</li> <li>– Buildings will include appropriate building services e.g., heating, ventilation and air conditioning, potable water, amenities, sewerage etc.</li> </ul> |
| Site roadways, lighting, and drainage | <ul style="list-style-type: none"> <li>– Roads and car parking areas.</li> <li>– General lighting, earthing, lightning system.</li> <li>– Drainage system to tie into the existing Port Kembla drainage system.</li> </ul>                                                                                                                                                |
| Gas Pipeline                          | A section of gas pipeline will be installed within the MBD Site Compound as part of the Stage 2A works. Final safety studies will be prepared prior to the construction of the gas pipeline and prior to commencement of operation as per Schedule 3, Condition 21 of Infrastructure Approval (SSI 9471).                                                                 |

## 2.6 Stage 2B: Excavation and dredging

An Emplacement Cell Report (ECR) has been developed by SMEC Australia Pty Ltd (SMEC) titled 'Port Kembla Gas Terminal Development – Emplacement Cell Report' in accordance with Infrastructure Approval (SSI 9471) Schedule 3, Condition 8 and 9. The ECR outlines the design and construction methodology of the Emplacement Cell.

Approximately 450,000 m<sup>3</sup> of materials will be excavated/dredged from the MBD Site Compound and placed within the boundaries of the Emplacement Cell. Further details, including detailed design drawings, can be found in the ECR (SMEC, 2022). A summary of the excavation and dredging works is provided in Section 2.6.2 and Section 2.6.3.

### 2.6.1 Silt curtains

Prior to the commencement of dredging activities, silt curtains will be installed within the Inner Harbour (MBD Site Compound) and Outer Harbour (Emplacement Cell). A fixed gate or bubble curtain gate will be installed to allow for the entrance and exit of barges whilst also controlling the dispersion of silt.

Silt curtains will be suitable for tidal and working harbour conditions.

Navigation and special markers will be installed to the satisfaction of the Harbour Master to alert marine vessels operating in the port harbours of the presence of silt curtains any other risks to navigation.

Further information regarding the use of silt curtains is provided in Section 10.1.

### 2.6.2 Excavation and dredge staging

Construction activities undertaken during Stage 1 involved the excavation of fill materials at the MBD Site Compound. Excavation has continued through Stage 2A and will continue as part of Stage 2B. On completion of existing fill materials being excavated, dredging operations will commence at the MBD Site Compound as part of the Stage 2B works.

Dredging activities at the MBD Site Compound and Emplacement Cell will be staged to accommodate other construction works occurring at the MBD Site Compound.

Construction staging for excavation and dredging activities to be undertaken are summarised in the ECR (SMEC, 2022). Excavation and dredging at the MBD Site Compound is shown in Figure 2.6. An overview of the Emplacement Cell is shown in Figure 2.7.

### 2.6.3 Marine-based construction activities at MBD Site Compound

Marine based construction works required at the MBD Site Compound during Stage 2B are summarised in Table 2.5.

**Table 2.5**      *Marine based construction works during Stage 2B*

| Component                  | Works required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Navigational aids          | <ul style="list-style-type: none"> <li>– Construction of new navigation aid pile through the new southern revetment.</li> <li>– Installation of navigation platform, tower, and lights, including all access requirements such as ladders, platforms, and handrails.</li> <li>– Lights will be battery powered and charged via solar panels.</li> <li>– Existing navigation aid to be removed after the commission of the new navigation aid.</li> </ul>                                                                           |
| Revetment shore protection | <ul style="list-style-type: none"> <li>– Revetments will be constructed at the north and south embankments of the new MBD Site Compound wharf (refer to Figure 2.6) following completion of dredging works.</li> <li>– Works will comprise: <ul style="list-style-type: none"> <li>• Laydown of Texcel 1200R geotextile.</li> <li>• Placement of thick quarry run to a depth of 190mm.</li> <li>• Placement of underlay rock to a depth of 400mm.</li> <li>• Placement of armour rock to a depth of 900 mm.</li> </ul> </li> </ul> |
| Revetted Trench            | <ul style="list-style-type: none"> <li>– Dredging of an approximate 10x10m trench to -14.5 reduced level (RL) Port Kembla Height Datum (PKHD) for accommodating the under-keel requirements of the FSRU strainers. An approach channel may also be required.</li> <li>– The trench should have sufficient scour protection.</li> </ul>                                                                                                                                                                                             |
| Berthing box               | <ul style="list-style-type: none"> <li>– Dredging will be undertaken to facilitate berthing boxes to be constructed.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                    |



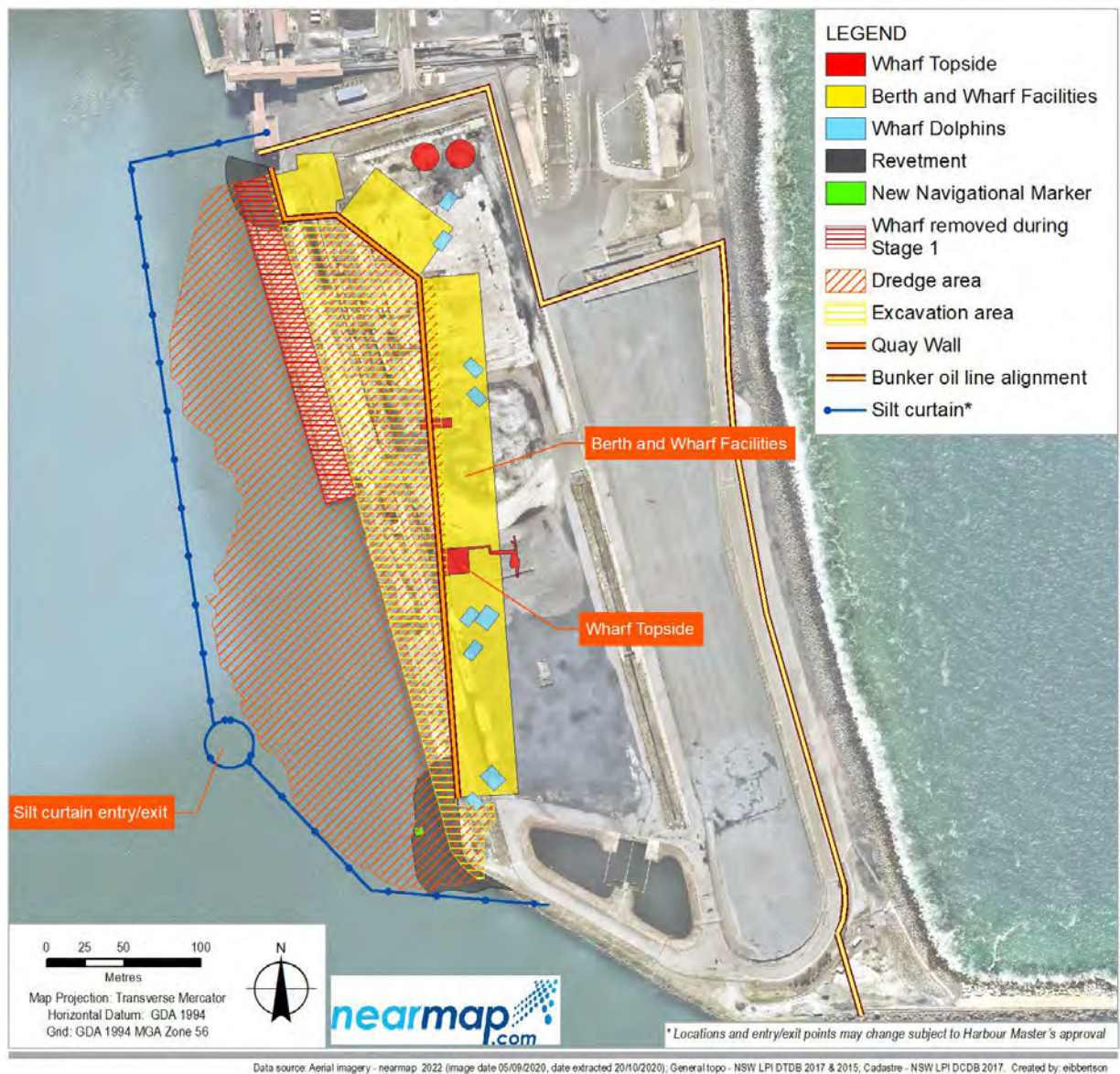


**Figure 2.6** Dredging and excavation works for MBD Site Compound (Stage 2B)

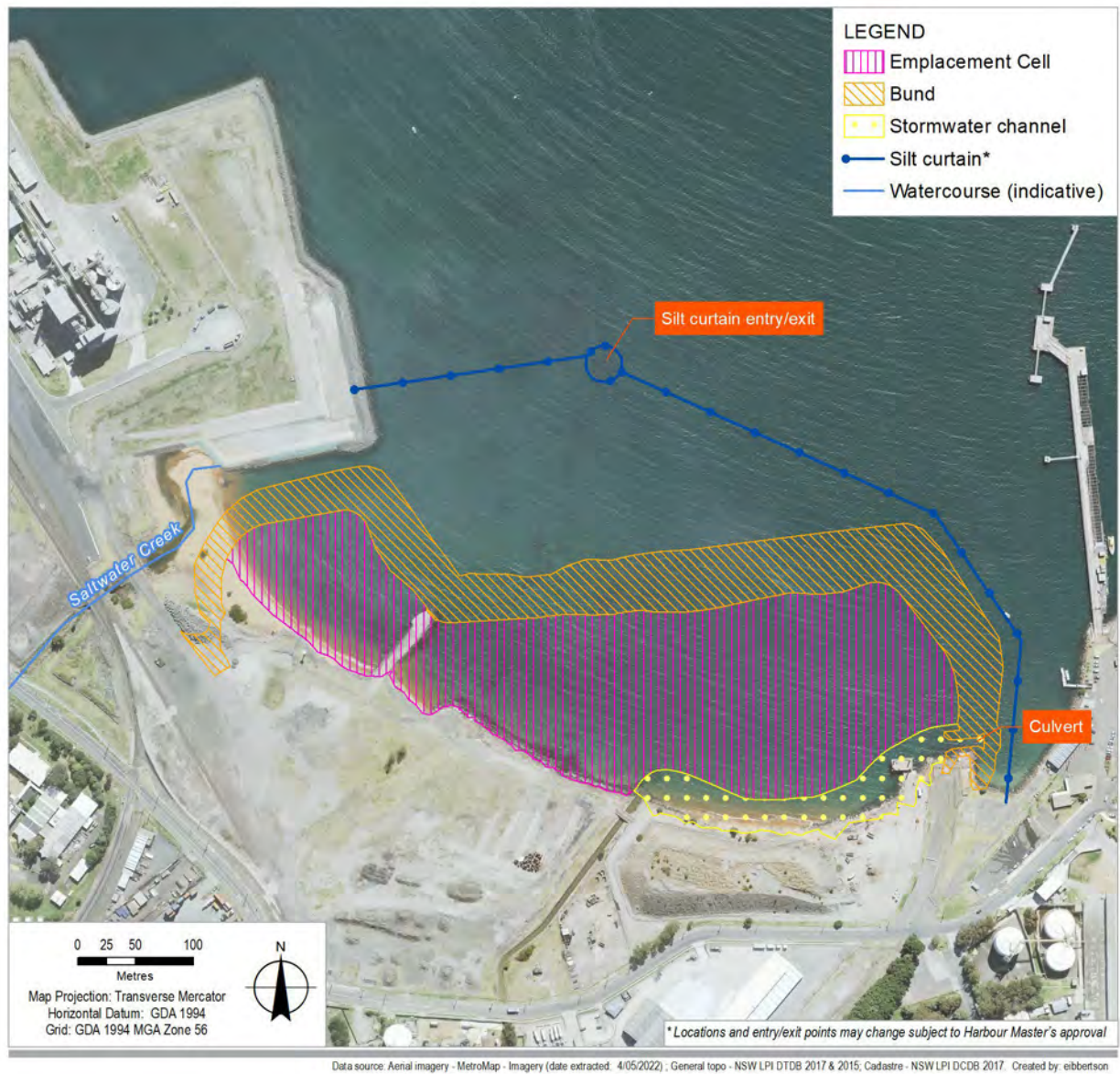


**Figure 2.7**      **Emplacement Cell overview (Stage 2B)**

## 2.7 Stage 2B: Construction of the Emplacement Cell

The Emplacement Cell will be located within the Outer Harbour, comprising of an approximate 800-metre perimeter bund. The Emplacement Cell has been designed and constructed to receive approximately 450,000 m<sup>3</sup> of dredged materials from the MBD Site Compound. All contaminated materials including Harbour Muds (HM)/Harbour Silts (HS) Harbour Muds (HM)/Harbour Silts (HS) is to be placed below -1 m PKHD and at a maximum below LAT [below ~-0.02 m PKHD], and Potential Acid Sulfate Soils (PASS) will be placed below +0.9m PKHD within the Emplacement Cell.

The construction work components and key features of the Emplacement Cell are summarised in Table 2.6. An overview of the Emplacement Cell is shown in Figure 2.7. Further details are provided in the ECR (SMEC, 2022).

**Table 2.6** *Emplacement Cell key features – Stage 2B*

| Component          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Emplacement Cell   | <ul style="list-style-type: none"> <li>– All contaminated soils, including HM/HS and PASS, will be placed within the Emplacement Cell generally below lower than -1.0m PKHD and in no instances above the LAT (~-0.02m PKHD).</li> <li>– The final Emplacement Cell levels will be graded towards the proposed stormwater channel.</li> <li>– Design life of 15 years.</li> </ul>                                                                                                                                                                                                                                 |
| Perimeter bund     | <ul style="list-style-type: none"> <li>– The design bund crest level was derived based on tide, storm surge, sea level rise and wave overtopping and assumed to be +3.55m PKHD. The adopted crest level also includes allowance for assessed post-construction settlement of up to 250mm.</li> <li>– Minimum crest width of 6m and 11m at passing bays.</li> <li>– Maximum permanent batter slopes of 1V:3H for seaward slopes and 1V:2H for landward/internal slopes.</li> <li>– The bund is to accommodate a 110t long reach excavator, fully loaded semi-trailer and temporary material stockpiles.</li> </ul> |
| Rock revetment     | <ul style="list-style-type: none"> <li>– Rock revetment structure will extend to the toe of the main bund to provide protection to the bund structure against coastal processes.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Stormwater channel | <ul style="list-style-type: none"> <li>– Stormwater channel to extend from the existing Darcy Road drain outlet to the eastern side of the Emplacement Cell.</li> <li>– Stormwater channel outlet is to comprise a box culvert structure on the eastern end of the Emplacement Cell, providing vehicular access onto the bund at the Jetty 3 abutment and within the NSW Ports property boundary.</li> </ul>                                                                                                                                                                                                      |



### 3. Roles and responsibilities

The Project Team is responsible for all activities associated with Stage 2A and Stage 2B, including the implementation and maintenance of the various mitigation/management measures outlined in this DEMP. Relevant roles and responsibilities of the Project Team are outlined in Table 3.1.

**Table 3.1** Roles and responsibilities of Project Team

| Project Role                                                                                              | Responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AIE Project Director                                                                                      | <ul style="list-style-type: none"> <li>Responsible for the overall funding and direction of works associated with Stage 2A and Stage 2B.</li> <li>Ensuring provision of adequate resources to achieve the environmental objectives for the Project including ensuring sufficient resourcing for the Environmental Team, Engineering and Construction Teams.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| AIE Construction Manager                                                                                  | <ul style="list-style-type: none"> <li>Proactively stewards the effective implementation of Stage 2A and Stage 2B in accordance with requirements of the Infrastructure Approval (SSI 9471), this DEMP, Environmental Strategy and all related Sub - plans.</li> <li>Demonstrate proactive support for environmental requirements.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| AIE HSE Manager                                                                                           | <ul style="list-style-type: none"> <li>Develop and update of all Health, Safety and Environmental (HSE) Management Strategies and Sub - plans.</li> <li>Ongoing liaison and engagement with government agencies and point of escalation for any environmental incidents.</li> <li>Identifying environmental issues as they arise and proposing solutions.</li> <li>Coordinate and facilitate periodic environmental inspections with the key contractors.</li> <li>Environmental Reporting.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Emplacement Cell Auditor                                                                                  | <ul style="list-style-type: none"> <li>Audit the construction of the Emplacement Cell and verify that works have been completed in accordance with the design intent (Emplacement Cell), The auditor role is to satisfy Condition 10 Schedule 3 of the Infrastructure Approval and any other relevant conditions therein.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager           | <ul style="list-style-type: none"> <li>On-site Project management and control.</li> <li>Decision-making authority relating to environmental performance of the construction program.</li> <li>Authority over Project construction and site activities in accordance with the EMS.</li> <li>Ensure relevant training is provided to all Project staff prior to commencing individual activities.</li> <li>Reports to AIE Construction Manager on environmental matters.</li> <li>Ensures appropriate Contractor resources are allocated to implement the environmental requirements.</li> <li>Responsible for planning and scheduling of construction, and to ensure operations are conducted in accordance with statutory requirements and the EMS.</li> <li>Monitors performance against environmental Key Performance Indicators (KPIs).</li> <li>Ensures that all environmental objectives associated with the Project are achieved.</li> <li>Day-to-day decision-making authority relating to environmental performance of construction activities and direct site activities and construction.</li> <li>To provide resources to ensure environmental compliance and continuous improvement, including IMS risk assessment.</li> <li>Ensure all personnel are aware of any changes to EMS, this DEMP and improved procedures.</li> <li>Ensure this DEMP is implemented for the duration of Stage 2A and Stage 2B.</li> </ul> |
| Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman | <ul style="list-style-type: none"> <li>Implement requirements contained in the EMS and Sub - plans, work procedures and standard drawings.</li> <li>Maintaining open and transparent communication with other Project discipline managers and other areas of the Project.</li> <li>Reporting of hazards and incidents and implementing any rectification measures.</li> <li>Ensures appropriate contractor resources are allocated.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| Project Role                                                                                                              | Responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                           | <ul style="list-style-type: none"> <li>– Orders STOP WORK for any environmental breaches and reports incidents to the Project Manager.</li> <li>– Ensure this DEMP is implemented for the duration of Stage 2A and Stage 2B.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Stage 2A Principal Contractor Environmental Representative and Stage 2B Principal Contractor Environmental Representative | <ul style="list-style-type: none"> <li>– Delivers environmentally focussed toolbox talks and provides applicable site inductions.</li> <li>– Provides environmental advice, assistance, and direction to Project Manager to ensure construction activities are conducted in accordance with regulatory legislation and this DEMP.</li> <li>– Participate and cooperate with AIE HSE Manager with regards to undertaking of joint environmental site inspections.</li> <li>– Coordinate / undertake wet-weather inspections as per EPL No.21529 and report accordingly to the AIE HSE Manager.</li> <li>– Develop strong working relationships with the AIE team and Consultants.</li> <li>– Ensure environmental risks are appropriately identified, communicated, and effectively managed.</li> <li>– Ensure communication of relevant environmental information to Project personnel.</li> <li>– Provide specialist advice and input as required.</li> <li>– 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.</li> <li>– Orders STOP WORK for any environmental breaches and immediately reports incidents to Principal Contractor Project Manager and AIE HSE Manager.</li> </ul> |
| AIE Environmental Representative and AIE Environmental Contractor                                                         | <ul style="list-style-type: none"> <li>– Develop strong working relationships with the Principal Contractor Team and Consultants.</li> <li>– Ensure environmental risks are appropriately identified, communicated, and effectively managed.</li> <li>– Instruct and advise management team on compliance issues.</li> <li>– Provide specialist advice and input as required.</li> <li>– Co-ordinate internal audits of this DEMP.</li> <li>– Conduct audit review as required.</li> <li>– Reports on the performance of this DEMP and recommends changes or improvements to Project Manager.</li> <li>– Orders STOP WORK for any environmental breaches and immediately reports incidents to the AIE Construction Manager and AIE HSE Manager.</li> <li>– Conducts investigation and response to environmental complaints and inquiries, where required.</li> <li>– Undertake all required environmental monitoring for this phase of the Project.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Subcontractors and construction personnel                                                                                 | <ul style="list-style-type: none"> <li>– Undertake an environmental induction prior to accessing to site.</li> <li>– Comply with legislative requirements.</li> <li>– Participate in weekly inspections and audits.</li> <li>– Follow environmental procedures.</li> <li>– Report all environmental incidents and hazards.</li> <li>– Introduce environmental topics to prestart meetings.</li> <li>– Ensure that all relevant permits and clearances are in place prior to commencing work.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| NSW EPA Accredited Site Auditor                                                                                           | <ul style="list-style-type: none"> <li>– Reviews various documentation associated with the contaminated land aspects of the Project.</li> <li>– Prepares and issues a Section A site audit statement confirming the suitability of the site for its intended use at the completion of dredging, excavation, and disposal.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Dredging Superintendent                                                                                                   | <p>The Dredging Superintendent is responsible for the dredge spread. He is responsible for safety, pollution prevention and the efficient operation of the dredge spread. He may deviate from documented Dredging Procedures, if human life, property and/or the environment is at risk. The Dredging Superintendent will:</p> <ul style="list-style-type: none"> <li>– Oversee and enforce the correct utilisation of Personal Protective Equipment (PPE) and safety equipment.</li> <li>– Ensure procedures are followed.</li> <li>– Ensure latest Survey is available and utilised.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

| Project Role                           | Responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                        | <ul style="list-style-type: none"> <li>– Ensure preventative maintenance is implemented as per schedule.</li> <li>– Ensure machinery and equipment is safe and properly maintained.</li> <li>– Report all near misses and incidents to Project Manager.</li> <li>– Act on safety problems in an appropriate and timely manner.</li> <li>– Ensure work areas are maintained in a safe condition.</li> <li>– Lead and manage emergency procedures.</li> <li>– Ensure all employees are inducted onto dredge.</li> <li>– Report any safety concerns to the HSE Manager or Project Manager; and</li> <li>– Lead by example.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Dredging Principal Contractor Surveyor | <p>The Surveyor will be responsible for the overall set out, monitoring and verification of the dredging and placement of the material in the Emplacement Cell. Providing up to date data to the Dredging Superintendent and Works Manager on a daily basis, of the material removed, material placed, design levels in real time, rock placement and all aspects of quality control. In addition, the surveyor is responsible for:</p> <ul style="list-style-type: none"> <li>– Initial establishment of benchmarks and all the stations as the reference.</li> <li>– Positioning systems are calibrated and operational prior to mobilisation.</li> <li>– Conduct both hydrographic and a terrestrial survey of the MBD Site Compound dredge area, Emplacement Cell and stockyard areas.</li> <li>– Managing positioning data and tracking data on board vessels.</li> <li>– Ensuring that the survey vessel is available for operation.</li> <li>– Processes data and produce drawings to the Project standard.</li> <li>– Liaise with the PANSW survey team as required.</li> <li>– Having sufficient redundancy parts.</li> <li>– Managing the project as per the Survey Project Plan.</li> <li>– Standard operating procedures (SOP) are adhered to, and PPE worn at all times where required.</li> <li>– Liaising with stakeholders as per the contract requirements; and</li> <li>– Ensuring deliverables are on time according to schedule.</li> </ul>                                                                                                                     |
| Vessel/Tug Master                      | <p>The Master is always in charge of the vessel. The Master has complete authority and is responsible for safety, pollution prevention and the efficient operation of the vessel. The Master may deviate from documented vessel procedures if human life, property, or the environment is at risk.</p> <p>In everything to do with the safety of persons, property or the environment, the Master reports directly to the designated person ashore (DPA). The Master is responsible for:</p> <ul style="list-style-type: none"> <li>– Making sure the safety policy is implemented.</li> <li>– Making sure the crew understands all AIE and Contractor policies.</li> <li>– Making sure the crew understands and carries out AIE safety and environmental protection policy.</li> <li>– Reviewing safety and pollution prevention activities and reporting any problems to the DPA.</li> <li>– Issuing orders in a clear and concise manner.</li> <li>– Making sure that procedures for safe operations and the protection of the environment are followed.</li> <li>– Reporting defects, hazards, incidents/accidents to the office.</li> <li>– Making sure the crew understands their duties and responsibilities as described in the Safety Management System (SMS).</li> <li>– Evaluating and reviewing the SMS on board the vessel and reporting any problems to the office.</li> <li>– Making sure that SMS records are up to date and available; and</li> <li>– Making sure when manoeuvring vessels that cetacean management requirements are always considered.</li> </ul> |

## 4. Legislative requirements

The legislative requirements applicable to Stage 2A and Stage 2B are listed in Table 4.1.

**Table 4.1** Legislation and relevant policy applicable to this DEMP

| Legislation                                                                                 | Project Relevance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Applicability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>International</b>                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| International Safety Management code (ISM Code)                                             | The ISM Code is the international standard for the safe operation of ships and pollution prevention through various ISM Code certifications. The Australian Maritime Safety Authority (AMSA) is the recognised government body who issues certifications to Australian registered vessels. AMSA have established a number of standards, legislation and guidelines to support the implementation of the objectives and requirements set out by the ISM Code.                                                                                                                                                                                                                                                                                                                                                                                                                  | The ISM Code is primarily implemented through the <i>Federal Navigation Act 2012</i> (Navigation Act) and NSW legislation as outlined below. Applicable legislative requirements to Stage 2A and Stage 2B works are addressed below in the respective legislation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREG) | The COLREGs are managed by the International Maritime Organisation and outline internationally agreed upon rules for safe navigation between vessels and other safety requirements regarding travel speed, narrow channel navigation and signals to be used to prevent collisions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | The requirements of COLREGs apply to all vessels on waters within NSW, including harbours. Provisions are implemented in the NSW Marine Safety Regulation 2016 which is addressed below.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| International Convention for the Prevention of Pollution from Ships (MARPOL)                | <p>MARPOL is the international standard for addressing ship sourced pollution. It includes regulations aimed at preventing accidental pollution and pollution generated from routine vessel operations. MARPOL includes the following six technical annexes:</p> <ul style="list-style-type: none"> <li>– Annex I: Regulations for the prevention of pollution by oil.</li> <li>– Annex II: Regulations for the control of pollution by noxious liquid substances in bulk.</li> <li>– Annex III: Regulations for the prevention of pollution by harmful substances carried by sea in packaged form.</li> <li>– Annex IV: Regulations for the prevention of pollution by sewage from ships.</li> <li>– Annex V: Regulations for the prevention of pollution by garbage from ships.</li> <li>– Annex VI: Regulations for the prevention of air pollution from ships.</li> </ul> | <p>MARPOL is implemented through various Federal legislation which are applicable to Stage 2A and Stage 2B works, including:</p> <ul style="list-style-type: none"> <li>– <i>Protection of the Sea (Prevention of Pollution From Ships) Act 1983.</i></li> <li>– <i>Protection of the Sea (Prevention of Pollution From Ships) (orders) Regulations 1994.</i></li> <li>– Navigation Act.</li> </ul> <p>AMSA also implements the following marine orders which give effect to MARPOL:</p> <ul style="list-style-type: none"> <li>– Marine Order 91 (Marine pollution prevention—oil) 2014</li> <li>– Marine Order 93 (Marine pollution prevention—noxious liquid substances) 2014</li> <li>– Marine Order 94 (Marine pollution prevention—packaged harmful substances) 2014</li> <li>– Marine Order 95 (Marine pollution prevention—garbage) 2013</li> <li>– Marine Order 96 (Marine pollution prevention—sewage) 2013</li> <li>– Marine Order 97 (Marine pollution prevention—air pollution) 2013.</li> </ul> <p>NSW legislation which gives effect to MARPOL is the <i>Marine Pollution Act 2012</i> (Marine Pollution Act). These requirements are addressed below.</p> |
| International Convention for the Safety of Life at Sea 1914 (SOLAS)                         | The International Ship and Port Facility Security Code (ISPS Code) is made under Chapter XI-2 of SOLAS and provides comprehensive measures for the security of ships and port facilities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | The PANSW requires all vessels arriving in Port Kembla to be in possession of an International Ship Security Certificate in accordance with the ISPS Code.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

| Legislation                                                                | Project Relevance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Applicability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Federal</b>                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Navigation Act                                                             | The Navigation Act implements Australia's obligations under MARPOL. It outlines matters relating to maritime safety and the prevention of pollution to the marine environment. The Act also provides provisions related to construction standards, occupational health and safety and monitoring and enforcement activities.                                                                                                                                                                                                                      | Chapter 3 of the Navigation Act outlines vessel safety requirements, including the safety regulations and certifications of vessels, and offences and penalties related to the use of unseaworthy vessels being used.<br><br>Chapter 4 outlines measures related to pollution from vessels and prevention of pollution. Division 2 states that vessels must not be operated in a manner that causes pollution or damage to the Australian marine environment and includes penalties for offences.<br><br>Marine movements undertaken during Stage 2A and Stage 2B will be undertaken in accordance with the Navigation Act and are addressed in greater detail in the CTMP. |
| <i>Protection of the Sea (Prevention of Pollution from Ships) Act 1983</i> | The <i>Protection of the Sea (Prevention of Pollution from Ships) Act 1983</i> implements Australia's obligations under MARPOL. The Act outlines requirements to prevent pollution, duty to report incidents and penalties related to failure to comply with the requirements of the Act.                                                                                                                                                                                                                                                         | Section 11A states that Australian ships with a gross tonnage of 400 or more must keep on board a Shipboard Oil Pollution Emergency Plan (SOPEP). A SOPEP has been developed by the Dredging Principal Contractor for the Stage 2A and Stage 2B activities (refer to Section 14.3).                                                                                                                                                                                                                                                                                                                                                                                         |
| <i>Maritime Transport and Offshore Facilities Security Act 2003</i>        | The <i>Maritime Transport and Offshore Facilities Security Act 2003</i> regulates the security of Australian maritime transport. The Act was introduced to meet Australia's obligations to Chapter XI-2 of SOLAS. The Act outlines the regulatory framework for maritime operators (including ports) to assess their operations for security risks and undertake security assessments. Under the Act port and ship operators are obligated to have an approved security plan.                                                                     | Ships are defined as any vessel that is capable of navigating the high seas but does not include vessels that are not self-propelled. Under Part 4 of the Act, ship security plans and ISCCs are required for regulated Australian ships.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <i>Marine Safety (Domestic Commercial Vessel) National Law Act 2012</i>    | The <i>Marine Safety (Domestic Commercial Vessel) National Law Act 2012</i> creates a national cooperative scheme between the Commonwealth, States and Territories to provide a single framework for safe operation, design, construction and equipping of domestic commercial vessels. The Act delegates the AMSA as the National Marine Safety Regulator, which has function to make and maintain marine orders under Section 163, develop and maintain national standards and undertake investigations, monitoring and enforcement activities. | The provisions of the Act are given effect by the NSW <i>Marine Safety Act 1998</i> . Relevant provisions applicable to the Stage 2A and Stage 2B works under the <i>Marine Safety Act 1998</i> (NSW) are discussed below.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>Biosecurity Act 2015</i>                                                | The Federal <i>Biosecurity Act 2015</i> provides for the management of biosecurity risks, risks related to ballast water, and gives effect to Australia's international rights and obligations under the International Convention for the Control and Management of Ships' Ballast Water and Sediments, the United Nations Convention on the Law of the Sea, and the Biodiversity Convention.                                                                                                                                                     | The Australian Ballast Water Management Requirements (DAWE, 2020) provides guidance to vessel operators on the management of ballast water when operating in Australian waters in order to comply with the legislative requirements of the Federal <i>Biosecurity Act 2015</i> measures. Under the Requirements, vessel masters must comply with the applicable provisions and obligations with regards to the management of ballast water. Additional information on ballast water requirements related to the Stage 2A and Stage 2B activities is provided in Section 7.1.2.                                                                                              |
| <i>Occupational Health and Safety (Maritime Industry) Act 1993</i>         | The <i>Occupational Health and Safety (Maritime Industry) Act 1993</i> provides for the health, safety, and welfare for maritime workers. It aims to protect all people at or near maritime                                                                                                                                                                                                                                                                                                                                                       | Part 2 outlines the general duties relating to occupational health and safety. AIE and both Principal Contractor's involved in the Stage 2A and Stage 2B works (refer to Section 3) are committed to ensuring all reasonable steps are                                                                                                                                                                                                                                                                                                                                                                                                                                      |



| Legislation                                                                       | Project Relevance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Applicability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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|                                                                                   | operations, including contractors and employees.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | taken to protect the health and safety of all persons involved in the construction of the Project. Roles and responsibilities are outlined in Table 3.1 and health and safety matters outlined in Section 14.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| National Plan for Maritime Environmental Emergencies (AMSA, 2020) (National Plan) | The National Plan is an integrated arrangement between the Federal, State and Northern Territory governments and industry that sets out the national arrangements, policies and principles for the management of maritime environmental emergencies. The National Plan aims to protect the community and environment of Australia from the adverse effects of oil and other hazardous substances spilt into the marine environment. The plan is managed by AMSA and implements Australia's obligations to international treaties such as the United Nations Convention on the Law of the Sea (1982); the International Convention on Oil Pollution Preparedness, Response and Co-operation, (1990); and the Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances (2000). | The NSW State Waters Marine Oil and Chemical Spill Contingency Plan (RMS, 2016) is the applicable State plan that has been prepared in support of the National Plan. The NSW State Waters Marine Oil and Chemical Spill Contingency Plan outlines arrangements and protocols for managing marine and chemical spills and maritime incidents within NSW waters. Further requirements of this are addressed below.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>State</b>                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>Marine Safety Act 1998</i>                                                     | The <i>Marine Safety Act 1998</i> ensures the safe operations of vessels within ports and waterways within NSW and promotes the responsible operation of vessels to ensure the safety and amenity of users. The Act outlines the framework for marine legislation enforcement and investigation of marine accidents. The Act applies and makes provisions of the Commonwealth <i>Marine Safety (Domestic Commercial Vessel) National Law Act 2012</i> as a law of NSW.                                                                                                                                                                                                                                                                                                                                                             | A 'vessel' under the Act is defined as 'water craft of any description used or capable of being used as a means of transportation on water'. Marine based activities undertaken during Stage 2A and Stage 2B will be subject to the provisions of the Act. Division 3 outlines the requirements of port pilotage, stating pilotage is compulsory in every pilotage port for vessel movements entering, leaving or within the port. Tugs towing and all other vessels 30 metres or greater in length are required to have a pilot on board as per Section 74. Under Section 75, pilotage is not compulsory if vessel master holds a marine pilotage exemption, or a certification of local knowledge administered under the Act. Additional information regarding pilotage of vessels is included in the Stage 2A and Stage 2B CTMP. |
| Marine Safety Regulation 2016                                                     | The Marine Safety Regulation 2016 incorporates safety requirements of the COLREGs in an NSW localised context. Schedule 4 outlines modifications to the COLREGs to NSW 'special rules' regarding signals, diving operations and flag and lighting requirements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Vessel movements required for the Stage 2A and Stage 2B works will be managed and undertaken in accordance with the Regulations for preventing collisions at sea. Additional information regarding pilotage of vessels is included in the POMP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Marine Pollution Act                                                              | The Marine Pollution Act aims to enhance and protect NSW waters from marine pollution from vessels. The Act gives effect to the following annexes of MARPOL: <ul style="list-style-type: none"> <li>– Annex I: Regulations for the prevention of pollution by oil.</li> <li>– Annex II: Regulations for the control of pollution by noxious liquid substances in bulk.</li> <li>– Annex III: Regulations for the prevention of pollution by harmful substances carried by sea in packaged form.</li> <li>– Annex IV: Regulations for the prevention of pollution by sewage from ships.</li> </ul>                                                                                                                                                                                                                                  | A 'ship' is defined under the Act as any vessel capable of being used on or in water, including floating craft, fixed or floating platforms and barges (self-propelled or not). Under Part 10 of the Act, it is an obligation for a SOPEP to be carried on board a ship. Section 97 outlines the contents that must be included in the SOPEP, including procedures to be followed in reporting incidents, authorities to be notified in reporting a reportable incident and actions to be taken in combating pollution caused by the incident. The Dredging Principal Contractor have prepared a SOPEP for the Stage 2A and Stage 2B works.                                                                                                                                                                                         |

| Legislation                                        | Project Relevance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Applicability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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|                                                    | <ul style="list-style-type: none"> <li>Annex V: Regulations for the prevention of pollution by garbage from ships.</li> </ul> <p>The Act provides the framework for the protection of NSW water from vessel pollution that is complementary of Commonwealth legislation.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>Biodiversity Conservation Act 2016</i> (BC Act) | The BC Act aims to conserve biodiversity at the bioregional and state scale and lists a number of threatened species, populations, and ecological communities to be considered when deciding if a project is likely to have a significant impact on threatened biota, or their habitats.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | The MBD Site Compound where Stage 2A and Stage 2B construction works will occur has had previous sightings of the Green and Golden Bell Frog, a listed threatened species of both the BC Act and <i>Environment Protection Biodiversity Conservation Act 1999 Cth</i> (EPBC Act). Three marine species listed under Schedule 1 of the BC Act were assessed as likely to occur within the Port Kembla harbour. Additional information on potential impacts and management of flora and fauna species is included in the Stage 2A and Stage 2B Flora and Fauna Management Plan (FFMP). |
| <i>Biosecurity Act 2015</i>                        | The <i>Biosecurity Act 2015</i> specifies the duties of public and private landholders as to the control of priority weeds and biosecurity matters including terrestrial, aquatic, and marine species. The Act defines priority weeds by local government area and assigns duties for their control. Part 3 of the Biosecurity Act provides that any person who deals with biosecurity matter and who knows, or ought reasonably to know, the biosecurity risk posed or likely to be posed by the biosecurity matter has a duty to ensure that, so far as is reasonably practicable, the biosecurity risk is prevented, eliminated, or minimised. Part 4, Division 5 outlines the duties to notify biosecurity events, which are defined as 'something that has occurred, is occurring or is likely to occur and that has had, is having, or is likely to have, a significant biosecurity impact'. | <p>The Stage 2A and Stage 2B works have the potential to introduce and/or spread terrestrial and marine weed and pest species if not appropriately managed.</p> <p>The terrestrial and marine biodiversity assessments prepared as part of the EIS identified weed and marine pest species in the Project area and vicinity. The management of terrestrial and marine weed and pest species are included in the Stage 2A and Stage 2B FFMP.</p>                                                                                                                                      |
| <i>Fisheries Management Act 1994</i> (FM Act)      | The objectives of the FM Act are to conserve, develop and share the fishery resources of NSW for the benefit of present and future generations. Part 7 of the FM Act requires a permit for a number of activities, including those involving dredging and reclamation work and those involving harm to marine vegetation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p>Permits under Section 201, 205 or 219 of the FM Act are not required for approved CSSI in accordance with Section 5.23 of the EP&amp;A Act.</p> <p>The PKGT EIS Marine Ecology Impact Assessment assessed potential impacts associated with dredging and disposal works on fisheries and marine vegetation. Management measures related to potential impacts from dredging activities on marine flora and fauna species are included in the Stage 2A and Stage 2B FFMP.</p>                                                                                                       |
| <i>Water Management Act 2000</i> (WM Act)          | <p>The WM Act aims to provide for sustainable and integrated management of water sources in NSW for the benefit of present and future generations. In particular the Act seeks to protect, enhance and restore water sources, apply the principles of ecologically sustainable development and encourage best practice in the management and use of water.</p> <p>Part 2 of the WM Act requires a licence for the "taking of water" from a water source. A licence entitles its holder to specified shares in the available water within a defined water management area or from a specified water source.</p> <p>Part 3 specifies approval requirements for water use, water management works approvals and</p>                                                                                                                                                                                   | <p>Stage 2A and Stage 2B works will involve excavation within 40 metres of the shoreline and has the potential to intercept water within an aquifer. Approval under Sections 89, 90 and 91 of the WM Act are not required for CSSI in accordance with Section 5.23 of the EP&amp;A Act. Water quality monitoring and management measures are included in the Stage 2A and Stage 2B WQMP.</p>                                                                                                                                                                                         |

| Legislation                                                                 | Project Relevance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Applicability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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|                                                                             | activity approvals. The two activities are controlled activities (works within 40 metres of a water source) and aquifer interference. Approvals are outlined under Sections 89, 90 and 91 of the WM Act.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <i>Protection of the Environment Operations Act 1997 (POEO Act)</i>         | <p>The objectives of the POEO Act are to protect and enhance the environment of NSW with regard to the need for ecologically sustainable development. The Act provides mechanisms to reduce risks to human health and the degradation of the environment. The POEO also outlines the Scheduled Activities that require an EPL in order to be carried out.</p> <p>Part 5.3 outlines provisions related to water pollution. It is prohibited to pollute any waters under Section 120 of the POEO Act.</p>                                                                                                                                                                                                                                                                                                                                              | <p>An EPL has been issued for the Project (EPL No. 21529) which outlines the requirements related to dredging and excavation that must be implemented for the construction and operational phases of the Project. Conditions related to monitoring and management requirements for Stage 2A and Stage 2B construction works regarding dredging and excavation are addressed in this DEMP.</p> <p>Part 5.7 states a licence holder must prepare a Pollution Incident Response Management Plan (PIRMP). A PIRMP has been prepared for the Stage 2A and Stage 2B works and will be kept at the premises where the activities are taking place.</p>                                                                                                                                                                                                                           |
| <i>Ports and Maritime Administration Act 1995</i>                           | <p>The <i>Ports and Maritime Administration Act 1995</i> 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 Transport for NSW (TfNSW) in relation to port operations. Section 6 establishes the PANSW as a statutory State-owned corporation.</p> <p>The Act provides broad powers to port operators to regulate activities that may pose a risk to the safety or security of the port including but not limited to the movement of vehicles and the loading/unloading of material.</p>                                                                                                                                                                                  | <p>A Port Safety Operating Licence has been issued to the PANSW under Section 12 of the Act which enables the PANSW to perform safety functions related to pilotage, navigation aids and emergency response.</p> <p>The PANSW manages water-based activities, including navigation and operational safety, and waterside security. NSW Ports are responsible for land activities, including leases and port infrastructure. This DEMP has been prepared in consultation with both the PAWNSW and NSW Ports for Stage 2A and Stage 2B construction activities.</p>                                                                                                                                                                                                                                                                                                         |
| NSW State Waters Marine Oil and Chemical Spill Contingency Plan (RMS, 2016) | <p>The NSW State Waters Marine Oil and Chemical Spill Contingency Plan has been prepared in support of the NSW State Emergency Plan, and National Plan to outline the management and procedures related to marine oil or chemical spills and incidents that could result in an oil and/or chemical spill in NSW waters. The Plan lists the agencies responsible for specific areas of NSW waters and the typical sequencing of responding to maritime incidents. Oil and chemical spills and the responses required are categorised into the following levels:</p> <ul style="list-style-type: none"> <li>– Level 1: potential emergency condition – small spill/incident.</li> <li>– Level 2: limited emergency condition – medium or significant spill/incident.</li> <li>– Level 3: full emergency condition – a major spill/incident.</li> </ul> | <p>The PANSW is listed as the agency responsible for responding and combating oil and chemical spills within Port Kembla. In its capacity as the combat agency, the PANSW must notify other appropriate agencies, provide an Incident Controller, and establish an incident control centre.</p> <p>The PANSW also holds the Port Kembla Marine Oil and Chemical Spill Contingency Plan which forms part of the NSW State Waters Marine Oil and Chemical Spill Contingency Plan (RMS, 2016).</p> <p>In the event of an incident that results in a chemical/oil spill, both Principal Contractors and AIE representatives responsible for notifying and responding to incidents will notify the PANSW as soon as they become aware of an incident (refer to Section 3). Additional information on incident management and emergency response is provided in Section 17.</p> |

## **5. Planning requirements**

### **5.1 Conditions of approval**

The planning requirements and the corresponding dredging management measures applicable to Stage 2A and Stage 2B are listed in Table 5.1 and Table 5.2. Management measures are detailed in Section 9 through Section 14.

The planning requirements include the conditions set out in the Infrastructure Approval (SSI 9471) dated 13 October 2021, the EPL No. 21529 conditions and the mitigation/management measures outlined in the PKGT EIS.

Table 5.1 Planning requirements

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Reference                | Responsibility                                                                                                                                                                 | Evidence                      | Applicability to this DEMP |
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| <b>Infrastructure Approval Requirements (SSI 9471)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |                                                                                                                                                                                |                               |                            |
| <b>Spoil Management</b><br>The Proponent must not transport more than 360,000 cubic metres of spoil to the disposal area by road and must maintain records of the volume of spoil transported by road to track compliance against this condition.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Schedule 3, Condition 7  | <ul style="list-style-type: none"> <li>– AIE Construction Manager</li> <li>– Principal Contractor Project Manager</li> </ul>                                                   | Refer to CTMP                 | Applicable                 |
| <b>Acid Sulfate Soils (ASS)</b><br>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).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Schedule 3, Condition 6  | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> </ul> | Section 6.3<br>Refer to ASSMP | Applicable                 |
| <b>Emplacement Cell Report</b><br>Prior to the commencement of dredging, disposal and emplacement activities, the Proponent must prepare an ECR to the satisfaction of the Planning Secretary. This report must be prepared in consultation with the Environment Protection Authority (EPA), NSW Ports, DPI Water, the PANSW and an EPA accredited site auditor, and must: <ul style="list-style-type: none"> <li>– be prepared by a suitably qualified and experienced expert/s approved by the Planning Secretary.</li> <li>– include details of the emplacement cell design and construction methodology, including the final shape, depth and capping.</li> <li>– demonstrate that the design would achieve the performance objectives in condition 8 of this schedule, including a description of the measures to be implemented to achieve this outcome.</li> <li>– includes details of the stormwater drainage design for managing runoff and tidal flows from and into stormwater systems discharging into the disposal area, including the Salt Creek and Darcy Road drains.</li> <li>– describe the contingency measures that would be implemented in the event of a failure or deficiency; and</li> <li>– include details of the process and timing for transferring responsibility for the long-term monitoring and maintenance of the emplacement cells to NSW Ports or another entity.</li> </ul> | Schedule 3, Condition 9  | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Principal Contractor for Emplacement Cell Design</li> </ul>                                                | Refer to ECR (SMEC, 2022)     | Applicable                 |
| <b>Emplacement Cell Audit</b><br>The Proponent must engage a suitably qualified and experienced person to audit the construction of the emplacement cells and the emplacement of dredged sediments at the completion of each of the following stages:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Schedule 3, Condition 10 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Principal Contractor for Emplacement cell Design</li> </ul>                                                | Refer to EMS                  | Applicable                 |

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Reference                | Responsibility                                                                                                                                                                                                                                                                                                      | Evidence                                                  | Applicability to this DEMP |
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| <ul style="list-style-type: none"> <li>– the dredging and relocation of existing spoil within the disposal area</li> <li>– construction of bunds within and around the disposal area</li> <li>– emplacement of dredged and excavated spoil in the disposal area; and</li> <li>– the emplacement cell capping.</li> </ul> <p>The auditor must provide the Planning Secretary with a report within one month of each audit confirming that the cell construction and sediment emplacement are in accordance with the conditions of this approval and the Emplacement Cell Report required under condition 9 of this approval.</p> |                          |                                                                                                                                                                                                                                                                                                                     |                                                           |                            |
| <b>Spoil Management Plan</b><br>Prior to the commencement of construction, the proponent must prepare a Spoil Management Plan to the satisfaction of the Planning Secretary and in consultation with the EPA, DP&I Water, NSW Ports, PANSW and an EPA accredited contaminated site auditor. The plan must be consistent with the Emplacement Cell Report and include:                                                                                                                                                                                                                                                           | Schedule 3, Condition 11 | – AIE HSE Manager                                                                                                                                                                                                                                                                                                   | Refer to SMP                                              | Applicable                 |
| (a) a CSP that includes: <ul style="list-style-type: none"> <li>– procedures for identifying and managing unexpected finds of contaminated or asbestos containing materials along the pipeline route and at Berth 101.</li> <li>– a strategy for addressing any contamination that has been encountered, if required (including the remediation and/or removal of contaminated soil or groundwater); and</li> <li>– details on how environmental and health risks will be mitigated and managed.</li> </ul>                                                                                                                     |                          | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Stage 2A Principal Contractor Environmental Representative and Stage 2B Principal Contractor Environmental Representative</li> </ul> | Refer to CSP                                              | Applicable                 |
| (b) a DEMP that:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Dredging Principal Contractor Surveyor</li> </ul>                                                                                    | This Plan                                                 | Applicable                 |
| – describes all activities to be undertaken during dredging, excavation and disposal works.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                          |                                                                                                                                                                                                                                                                                                                     | Section 9<br>Section 10                                   |                            |
| – describes in detail the location and depth of disposal areas during all stages of construction, including the final form of the emplaced material.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                          |                                                                                                                                                                                                                                                                                                                     | Section 10<br>Section 11                                  |                            |
| – includes procedures for handling, transporting, storing and disposing of dredge and excavated material, including: <ul style="list-style-type: none"> <li>• potentially acid forming material</li> <li>• contaminated material</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                     |                          |                                                                                                                                                                                                                                                                                                                     | Section 9.3<br>Section 9.4<br>Refer to ASSMP, SMP and CSP |                            |

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Reference                | Responsibility                                                                                                                                                                                                                                                                                                | Evidence                                                                                                    | Applicability to this DEMP |
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| <ul style="list-style-type: none"> <li>asbestos containing materials; and</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                          |                                                                                                                                                                                                                                                                                                               |                                                                                                             |                            |
| – includes an investigation of all reasonable and feasible measures to reduce the road haulage of spoil.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |                                                                                                                                                                                                                                                                                                               | Section 10.10<br>Refer to CTMP                                                                              |                            |
| – includes a description of measures that would be implemented to: <ul style="list-style-type: none"> <li>minimise the generation and dispersion of sediments during dredging and disposal.</li> <li>minimise soil erosion and discharge of sediment and other pollutants to lands and/or Port Kembla harbour.</li> <li>monitor and manage odours and air emissions during handling of sediments or from stored material prior to emplacement within the disposal area; and</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                |                          |                                                                                                                                                                                                                                                                                                               | Section 1.3<br>Section 9.1<br>Section 10.1<br>Section 10.2<br>Refer to ESCP and Air Quality Management Plan |                            |
| – includes contingency measures in the event of a failure of the silt curtains.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |                                                                                                                                                                                                                                                                                                               | Section 10.1                                                                                                |                            |
| (c) a WQMP that includes: <ul style="list-style-type: none"> <li>a description of the water quality monitoring that would be undertaken to monitor turbidity and pollutant concentrations surrounding dredging and disposal works, including real-time turbidity monitoring.</li> <li>a broader program to monitor harbour-wide water quality trends and the ecological health of Port Kembla Harbour.</li> <li>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.</li> <li>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,</li> <li>reporting procedures for the results of the monitoring program.</li> </ul> |                          | <ul style="list-style-type: none"> <li>AIE HSE Manager</li> <li>Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>Stage 2A Principal Contractor Environmental Representative and Stage 2B Principal Contractor Environmental Representative</li> </ul> | Refer to WQMP                                                                                               | Applicable                 |
| At the completion of any dredging, excavation and disposal works, the Proponent must engage a site auditor accredited by the EPA to issue a Section A Site Audit Statement confirming the suitability of the site for its intended use.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Schedule 3, Condition 13 | <ul style="list-style-type: none"> <li>AIE HSE Manager</li> <li>Emplacement Cell Auditor</li> </ul>                                                                                                                                                                                                           | Section 16.3                                                                                                | Applicable                 |
| <b>TRAFFIC</b><br><b>Construction Traffic Management Plan</b><br>Prior to the commencement of construction, unless the Planning Secretary agrees otherwise, the Proponent must prepare a CTMP for the development to the satisfaction of the Planning Secretary. This plan must: <ul style="list-style-type: none"> <li>be prepared in consultation with TfNSW, NSW Ports and Council.</li> <li>include details of the transport route to be used for all construction traffic.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                            | Schedule 3, Condition 15 | <ul style="list-style-type: none"> <li>AIE HSE Manager</li> <li>Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>Dredging Superintendent</li> </ul>                                                                                                   | Section 10.10<br>Refer to CTMP                                                                              | Applicable                 |

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Reference       | Responsibility                                                                                                                                                                                        | Evidence                        | Applicability to this DEMP |
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| <ul style="list-style-type: none"> <li>include details of the measures that would be implemented to minimise traffic safety issues and disruption to local users of the transport route/s during construction works, including: <ul style="list-style-type: none"> <li>facilitating the use of barges to transfer spoil to the disposal site.</li> <li>temporary traffic controls, including detours and signage.</li> <li>ensure loaded vehicles entering or leaving the site have their loads covered or contained.</li> <li>minimise dirt being tracked on the public road network from development-related traffic.</li> </ul> </li> </ul> |                 | <ul style="list-style-type: none"> <li>Vessel/Tug Master</li> </ul>                                                                                                                                   |                                 |                            |
| <p>includes a driver's code of conduct that addresses:</p> <ul style="list-style-type: none"> <li>travelling speeds</li> <li>driver fatigue</li> <li>procedures to ensure that drivers adhere to the designated transport route/s; and</li> <li>procedures to ensure that drivers implement safe driving practices.</li> </ul>                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                                                                                                                       | Refer to CTMP                   | Not applicable             |
| <b>PKGT EIS Management Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |                                                                                                                                                                                                       |                                 |                            |
| <p>The movement of barges will be coordinated by the Port Authority Vessel Traffic Services (VTS).</p> <p>Adherence with existing Port Kembla navigational protocols through close liaison and compliance to directions of the Harbour Master.</p>                                                                                                                                                                                                                                                                                                                                                                                             | EIS Measure PN2 | <ul style="list-style-type: none"> <li>AIE HSE Manager</li> <li>Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>Vessel/Tug Master</li> </ul> | Section 13.1.2<br>Refer to CTMP | Applicable                 |
| Development of a construction marine traffic management plan for submission to the Harbour Master.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | EIS Measure PN3 | <ul style="list-style-type: none"> <li>AIE HSE Manager</li> <li>Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> </ul>                            | Refer to CTMP                   | Applicable                 |
| Barge operation will be controlled through a permit system under the control of the Harbour Master (through the VTS) and Masters will be required to obtain Certificates of Local Knowledge as required by the Harbour Master and NSW Marine Safety Regulation 2016.                                                                                                                                                                                                                                                                                                                                                                           | EIS Measure PN4 | <ul style="list-style-type: none"> <li>AIE HSE Manager</li> <li>Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>Vessel/Tug Master</li> </ul> | Section 4<br>Refer to CTMP      | Applicable                 |



| Requirement                                                                                                                                                                                                                                                                                                                                                      | Reference       | Responsibility                                                                                                                                                                                                                                                                                      | Evidence                   | Applicability to this DEMP |
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| <p>Permission of the Harbour Master will be sought for split hopper barges to be used at night.</p> <p>Construction will be coordinated so as to not impact other vessels and port navigation, with due regard to the port instructions and port protocols (Port Authority of NSW, 2015).</p>                                                                    | EIS Measure PN5 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Vessel/Tug Master</li> </ul>                                                                                         | Refer to CTMP              | Applicable                 |
| <p>Monitoring of the depth of deposited dredged material from the seabed in the disposal area to ensure that the barges transferring dredged material are not at risk of grounding.</p>                                                                                                                                                                          | EIS Measure PN6 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Dredging Principal Contractor Surveyor</li> </ul>                                                                    | Section 11                 | Applicable                 |
| <p>Adherence with the existing port instructions and port protocols (PANSW, 2015).</p>                                                                                                                                                                                                                                                                           | EIS Measure PN7 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Vessel/Tug Master</li> </ul>                                                                                         | Section 4<br>Refer to CTMP | Applicable                 |
| <p>Removal of any remnant asbestos containing materials fragments from the ground surface. The removal should be undertaken by a licenced removalist in accordance with relevant SafeWork NSW codes of practice. Following removal, a licenced asbestos assessor should inspect the site and provide a clearance certificate confirming removal of asbestos.</p> | EIS Measure C02 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Refer to SMP               | Applicable                 |
| <p>Inclusion of an unexpected finds protocol (UFP) for contamination in the EMS for the work associated with construction activities.</p>                                                                                                                                                                                                                        | EIS Measure C03 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– AIE Construction Manager</li> <li>– Stage 2A Principal Contractor Project</li> </ul>                                                                                                                                            | Refer to CSP               | Applicable                 |

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Reference       | Responsibility                                                                                                                                                           | Evidence       | Applicability to this DEMP |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 | Manager and Stage 2B Principal Contractor Project Manager<br>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman |                |                            |
| Preparation of an ASSMP by a consultant experienced in the identification and management of ASS. This will also include appropriate management and/or treatment of ASS. The ASSMP will be developed in line with the requirements of the Acid Sulphate Soils Management Advisory Committee Guidelines (ASSMAC, August 1998 and as updated). The ASSMP will be prepared to identify, manage and treat the ASS encountered during excavation and dredging to minimise the production of acid leachate. | EIS Measure C04 | – AIE HSE Manager                                                                                                                                                        | Refer to ASSMP |                            |
| Preparation and implementation of an EMS to include an UFP to effectively manage the potential contamination issues identified from both a human health and environmental perspective. This would include the assessment of materials to be disturbed across the site to inform appropriate management strategies.                                                                                                                                                                                   | EIS Measure C05 | – AIE HSE Manager<br>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager                                                   | Refer to CSP   | Applicable                 |
| Assessment and classification of all material to be disposed of offsite as per NSW EPA (2014) Waste Classification Guidelines, Part 1: Classifying Waste and Part 4: Acid Sulfate Soils prior to off-site disposal.                                                                                                                                                                                                                                                                                  | EIS Measure C06 | – AIE HSE Manager<br>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager                                                   | Refer to SMP   | Applicable                 |
| A dredge management plan will be prepared prior to the dredging of Berth 101, outlining the contamination management measures, including:<br>– surface water monitoring, which will be implemented during the course of the works to minimise potential impacts to the receiving waters.<br>– use of a turbidity curtain to restrict the generation of turbidity plumes and localise any water quality issues.                                                                                       | EIS Measure C08 | – AIE HSE Manager<br>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager                                                   | This Plan      | Applicable                 |
| The western extent of the reclamation footprint has been limited to ensure Salty Creek remains open to the Outer Harbour without the need for enclosed culverts, thereby minimising the impacts to fish passage.                                                                                                                                                                                                                                                                                     | EIS Measure W3  | – AIE HSE Manager<br>– Stage 2A Principal Contractor Project Manager and Stage 2B                                                                                        | Section 7.2    | Applicable                 |

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Reference      | Responsibility                                                                                                                                                                                | Evidence               | Applicability to this DEMP |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                | Principal Contractor Project Manager<br>– AIE Environmental Representative and AIE Environmental Contractor                                                                                   |                        |                            |
| The footprint of the Outer Harbour placement area has been minimised by raising the proposed fill height to include emergent reclamation. This approach minimises the quantity of material to be bottom dumped and thereby reduces the potential for generation of turbid plumes and mobilisation of sediments.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | EIS Measure W4 | – AIE HSE Manager<br>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager<br>– AIE Environmental Representative and AIE Environmental Contractor | Section 7.2            | Applicable                 |
| Preparation of a EMS 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | EIS Measure W5 | – AIE HSE Manager<br>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager<br>– AIE Environmental Representative and AIE Environmental Contractor | Refer to EMS This Plan | Applicable                 |
| Design and implementation of a WQMP 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 EPL for similar activities within Port Kembla such as the Berth 103 Stage 2 Dredging & Spoil Disposal EPL20563).<br><br>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 | EIS Measure W6 | – AIE HSE Manager<br>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager<br>– AIE Environmental Representative and AIE Environmental Contractor | Refer to WQMP          | Applicable                 |

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Reference      | Responsibility                                                                                                                                                                                                                                                                                                                                                                   | Evidence     | Applicability to this DEMP |
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| <p>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>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>The WQMP would include regular reporting, evaluation and revision where required to ensure the project objectives and approval conditions are achieved.</p>                                                                                                                                                                                                                                                                                                                                                                                                        |                |                                                                                                                                                                                                                                                                                                                                                                                  |              |                            |
| <p>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.</p> <p>Silt curtains are available in a range of designs and would be provided by the successful Contractor. It is envisaged that the silt curtain would comprise a geocomposite material consisting of a non-woven geotextile sewn to a woven geotextile, which would provide the required filtering capacity and rigidity respectively. Vessel access would be via gated or overlapped curtains or through installation of a bubble curtain. The top of the curtain would be supported by a floating boom, whilst the lower portion of the curtain would be weighted with appropriate ballasting (e.g., bars or chains) to ensure that the full length of the curtain is maintained at all times. The curtain would be anchored or fixed to existing structures as necessary.</p> | EIS Measure W7 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– AIE Environmental Representative and AIE Environmental Contractor</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Section 10.1 | Applicable                 |
| <p>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 in-situ 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.</p>                                                                                                                                                                                                                                                                                                                                                                                                                     | EIS Measure W8 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– AIE Environmental Representative and AIE Environmental Contractor</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Section 11   | Applicable                 |

| Requirement                                                                                                                                                                                                                                                                                                                                                    | Reference       | Responsibility                                                                                                                                                                                                                                                                                                                                                                   | Evidence                      | Applicability to this DEMP |
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| A perimeter bund would be constructed within the Outer Harbour placement area to ensure long term stability of dredged materials and to minimise sediment migration during placement.                                                                                                                                                                          | EIS Measure W9  | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– AIE Environmental Representative and AIE Environmental Contractor</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Section 10.8                  | Applicable                 |
| A site-specific ESCP will be prepared as part of the SMP 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).                 | EIS Measure 10  | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– AIE Environmental Representative and AIE Environmental Contractor</li> </ul>                                                                                                                      | Refer to ESCP                 | Applicable                 |
| 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 emergency services and relevant authorities (including TfNSW and EPA officers). | EIS Measure W11 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– AIE Environmental Representative and AIE Environmental Contractor</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> | Refer to Emergency Spill Plan | Applicable                 |

| Requirement                                                                                                                                                                                                                          | Reference       | Responsibility                                                                                                                                                                                                                                                                                                                                                                                                                        | Evidence                               | Applicability to this DEMP |
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|                                                                                                                                                                                                                                      |                 | Contractor Construction Foreman                                                                                                                                                                                                                                                                                                                                                                                                       |                                        |                            |
| 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.                                                                                      | EIS Measure W12 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– AIE Environmental Representative and AIE Environmental Contractor</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> <li>– Subcontractors and construction personnel</li> </ul> | Refer to WQMP and Emergency Spill Plan | Applicable                 |
| 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. | EIS Measure W13 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– AIE Environmental Representative and AIE Environmental Contractor</li> <li>– Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> <li>– Subcontractors and construction personnel</li> </ul> | Refer to Emergency Spill Plan          | Applicable                 |
| The following controls should be implemented prior to dredge activities:                                                                                                                                                             | EIS Measure ME2 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> </ul>                                                                                                                                                                                                                                                                                                                                                                   | Section 7.1                            | Applicable                 |

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Reference       | Responsibility                                                                                                                                                                                                                                                                                                                                  | Evidence                                | Applicability to this DEMP |
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| <ul style="list-style-type: none"> <li>Physical controls such as installation of silt curtains prior to commencement of construction works would be adequate in minimising the spread of any sediments within the water column at the dredging and disposal locations.</li> <li>Dredging techniques that minimise sediment resuspension during excavation and disposal (such as using mechanical methods over hydraulic methods) should be implemented throughout the project. Barge loads will also be controlled such that overflow of barge loads is avoided.</li> <li>Screening technologies will be implemented to ensure that any contaminated sediments are disposed of responsibly. Contaminated dredge material will be placed such that it may be capped by uncontaminated material in accordance with a dredge management plan.</li> <li>Implementation of a water quality monitoring program to ensure construction works do not exceed the project's agreed marine water quality criteria.</li> <li>Daily visual observations of any potential toxic dinoflagellate blooms within the Inner Harbour.</li> </ul> |                 | <ul style="list-style-type: none"> <li>Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>AIE Environmental Representative and AIE Environmental Contractor</li> <li>Stage 2A Principal Contractor Construction Foreman and Stage 2B Principal Contractor Construction Foreman</li> </ul> |                                         |                            |
| <p>Locally sourced vessels (within NSW waters) to complete the construction works, where possible. International vessels to empty ballast water in accordance with the latest version of the Australian Ballast Water Management Requirements (DAWE, 2020).</p> <p>If an Introduced Marine Pest is identified or suspected, then the Contractor is obliged to immediately (within 24 hours) notify the NSW Department of Primary Industries Aquatic Biosecurity Unit hotline on (02) 4916 3877.</p> <p>Project activities to adhere to the National System for the Prevention and Management of Marine Pest Incursions and NSW requirements for Introduced Marine Pest identification and management.</p>                                                                                                                                                                                                                                                                                                                                                                                                                    | EIS Measure ME9 | <ul style="list-style-type: none"> <li>AIE HSE Manager</li> <li>Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>AIE Environmental Representative and AIE Environmental Contractor</li> <li>Vessel/Tug Master</li> </ul>                                                                | Section 7.1.2<br>Refer to FFMP and CTMP | Applicable                 |
| <p>Appropriate waste containment facilities will be included on site and managed to avoid overflow or accidental release to the environment.</p> <p>No waste materials will be disposed of overboard of vessels, all non-biodegradable and hazardous wastes will be collected, stored, processed and disposed of in accordance with the vessel's Garbage Management Plan as required under Regulation 9 of MARPOL Annex V.</p> <p>All marine vessels will be operated and maintained in accordance with the South Australian Government's Code of practice for vessel and facility management (marine and inland waters) 2008.</p> <p>Hazardous wastes will be separated, labelled and retained in storage onboard within secondary containment (e.g. bin located in a bund).</p> <p>All recyclable and general wastes to be collected in labelled, covered bins (and compacted where possible) for appropriate disposal at a regulated waste facility.</p>                                                                                                                                                                  | EIS Measure M10 | <ul style="list-style-type: none"> <li>AIE HSE Manager</li> <li>Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>AIE Environmental Representative and AIE Environmental Contractor</li> <li>Vessel/Tug Master</li> </ul>                                                                | Section 13.5                            | Applicable                 |

| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Reference        | Responsibility                                                                                                                                                                                                                                                                           | Evidence                                      | Applicability to this DEMP |
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| Solid non-biodegradable and hazardous wastes will be collected and disposed of onshore at a suitable waste facility.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |                                                                                                                                                                                                                                                                                          |                                               |                            |
| <p>All liquid waste to be stored for discharge to an appropriate onshore facility</p> <p>Chemicals and hydrocarbons will be packaged, marked, labelled and stowed in accordance with MARPOL Annex I, II and III regulations. These include provisions for all chemicals (environmentally hazardous) and hydrocarbons to be stored in closed, secure and appropriately bunded areas.</p> <p>A Materials Safety Data Sheet (MSDS) will be available for chemicals and hydrocarbons in locations nearby to where the chemicals / wastes are stored</p> <p>Vessel operators will have an up to date SOPEP and Shipboard Marine Pollution Emergency Plan (SMPEP). All shipboard chemical and hydrocarbon spills will be managed in accordance with these plans by trained and competent crew.</p> <p>Any contaminated material collected will be contained for appropriate onshore disposal</p> <p>Any equipment or machinery with the potential to leak oil will be enclosed in continuous bunding or will have drip trays in place where appropriate</p> <p>Following rainfall events, bunded areas on open decks of the vessels or within any construction laydown areas will be cleared of rainwater</p> <p>All hoses for pumping and transfers will be maintained and checked as per the PMS</p> | EIS Measure M11  | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– AIE Environmental Representative and AIE Environmental Contractor</li> <li>– Vessel/Tug Master</li> </ul> | Section 13.5<br>Section 14.3                  | Applicable                 |
| <p>Visual observations will be maintained by watch keepers on all vessels and plant/moving machinery.</p> <p>All vessels must comply with relevant marine navigation and safety standards.</p> <p>Marine diesel oil compliant with MARPOL Annex VI Regulation 14.2 (i.e. sulphur content of less than 3.50% m/m) is the only diesel engine fuel to be used by the vessels</p> <p>Oil spill responses will be executed in accordance with the vessel's SOPEP, as required under MARPOL.</p> <p>Emergency spill response procedures would be developed and implemented when required.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | EIS Measure M12  | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– AIE Environmental Representative and AIE Environmental Contractor</li> <li>– Vessel/Tug Master</li> </ul> | Section 13.5<br>Refer to Emergency Spill Plan | Applicable                 |
| It is recommended that a 109-metre observation zone be established around the underwater piling zone. The 100-metre observation zone would permit up to thirty minutes of continuous piling. Larger observation zones can permit longer durations of piling.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | EIS Measure NV16 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– AIE Environmental Representative and</li> </ul>                                                           | Refer to NVMP                                 |                            |



| Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Reference          | Responsibility                                                                                                                                                                                                                                                                           | Evidence      | Applicability to this DEMP |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    | AIE Environmental Contractor<br>– Vessel/Tug Master                                                                                                                                                                                                                                      |               |                            |
| <p>The Underwater Piling Noise Guidelines (2012) recommends the following standard management and mitigation procedures with respect to underwater piling operations:</p> <ul style="list-style-type: none"> <li>– Avoid conducting piling activities during times when marine mammals are likely to be breeding, calving, feeding, migrating, or resting in biologically important habitats located within the potential noise impact footprint.</li> <li>– Use low noise piling methods, instead of impact piling, where possible.</li> <li>– Presence of marine mammals should be visually monitored by a suitably trained crew member for at least 30 minutes before the commencement of the piling procedure</li> <li>– If no marine mammals are nearby, a soft-start piling procedure should be used. This involves gradually increasing the piling impact energy over a 10-minute time period. Visual observations of marine mammals within the safety zone should be maintained by trained crew throughout the start period.</li> <li>– If a marine mammal is sighted within the observation zone during the soft start of normal operation procedures, the operator of the piling rig should be placed on stand-by to shut down the piling rig.</li> <li>– A record of procedures employed during the operations should be maintained by the piling contractor.</li> </ul> | – EIS Measure NV17 | <ul style="list-style-type: none"> <li>– AIE HSE Manager</li> <li>– Stage 2A Principal Contractor Project Manager and Stage 2B Principal Contractor Project Manager</li> <li>– AIE Environmental Representative and AIE Environmental Contractor</li> <li>– Vessel/Tug Master</li> </ul> | Refer to FFMP | Applicable                 |

## 5.2 Environment Protection Licence

The NSW EPA has issued an EPL (EPL No. 21529) for the Project, with the relevant monitoring and reporting conditions incorporated in this plan. Conditions applicable to dredging activities are outlined in Table 5.2.

Table 5.2 EPL No. 21529 conditions

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Reference             | Evidence                     |
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| <b>Processes and management</b><br>Silt curtains must be installed and operated at the premises to minimise the pollution of waters beyond the boundary of the premises during any marine based works. Marine based works includes but is not limited to: pile removal; or any dredging; or construction of the Outer Harbour emplacement cell.<br>Note: Any reclamation of material to the emplacement cell is subject to a licence variation in accordance with Licence Condition A1.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Condition O4.6        | Section 10.1                 |
| Care must be taken with the installation and maintenance of silt curtains to ensure that there are no gaps at the ends, or in the fabric, or in the floating boom.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Condition O4.7        |                              |
| There must be no spillages of any materials from above the water surface into waters outside of the silt curtain/s.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Condition O4.8        |                              |
| The silt curtain/s may only be removed following the prior written approval of the EPA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Condition O4.9        |                              |
| Vessels used for the transport of dredge spoil from the dredge site to the Outer Harbour stockpile area must not leak or release dredge spoil into waters en-route.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Condition O4.10       | Section 11.6<br>Section 13.5 |
| All dredgers and associated vessels must have their ballast & bilge water pumped out prior to arriving in Port Kembla Harbour.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Condition O4.11       | Section 7.1.2                |
| The licensee must continue to treat water from the southern ponds in Berth 101 prior to discharge from Licensed Discharge Point 20. The treatment method must be provided in writing to the EPA and cannot be changed without EPA approval.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Condition O4.12       | Section 13.3                 |
| <b>Waste management</b><br>Excavated material and/or dredged spoil must not be stockpiled in Outer Harbour unless it will be re-used within the proposed Outer Harbour emplacement cell.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Condition O5.1        | Section 13.5                 |
| Stockpiles of material stored at the premises must either be used as on-site backfill or emplacement cell construction or disposed offsite to a facility licensed to accept the material, within 12 months following stockpile creation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Condition O5.2        | Refer to CSP                 |
| <b>Monitoring records</b><br>The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.<br>All records required to be kept by this licence must be: <ol style="list-style-type: none"> <li>in a legible form, or in a form that can readily be reduced to a legible form</li> <li>kept for at least 4 years after the monitoring or event to which they relate took place; and</li> <li>produced in a legible form to any authorised officer of the EPA who asks to see them.</li> </ol> The following records must be kept in respect of any samples required to be collected for the purposes of this licence: <ol style="list-style-type: none"> <li>the date(s) on which the sample was taken</li> <li>the time(s) at which the sample was collected</li> <li>the point at which the sample was taken; and</li> <li>the name of the person who collected the sample</li> </ol> | Condition M1.1 – M1.3 | Refer to SMP                 |
| <b>Recording of pollution complaints</b><br>The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Condition M7.1        | Section 15.3                 |
| The record must include details of the following:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Condition M7.2        |                              |

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Reference                                          | Evidence                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|------------------------------------------|
| <ul style="list-style-type: none"> <li>a. the date and time of the complaint</li> <li>b. the method by which the complaint was made</li> <li>c. any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect</li> <li>d. the nature of the complaint</li> <li>e. the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and</li> <li>f. if no action was taken by the licensee, the reasons why no action was taken.</li> </ul> <p>The record of a complaint must be kept for at least 4 years after the complaint was made.</p> <p>The record must be produced to any authorised officer of the EPA who asks to see them.</p> | Condition M7.3                                     |                                          |
| <p><b>Telephone complaints line</b></p> <p>The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.</p> <p>The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.</p> <p>The preceding two conditions do not apply until 1 month after the date of the issue of this licence.</p>                                                                                                                            | Condition M8.1<br>Condition M8.2<br>Condition M8.3 | Section 15.3                             |
| <p><b>Other monitoring and recording conditions</b></p> <p>The licensee must carry out, as a minimum, daily inspections of all water pollution control measures required by this licence. A record of each inspection must be made and produced to an EPA authorised officer if requested. The record must include:</p> <ul style="list-style-type: none"> <li>a. Date and time of inspection</li> <li>b. Details of the location of dredging operations</li> <li>c. Condition of silt curtains and other water pollution controls.</li> </ul> <p>Note: No movement of dredge spoil is permitted when a silt curtain required by this licence has not been maintained or is not achieving the requirements of this licence.</p>                                            | Condition M10.1                                    | Section 16                               |
| <p><b>Notification of environmental harm</b></p> <p>Notifications must be made by telephoning the Environment Line service on 131 555.</p> <p>Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.</p> <p>The licensee must provide written details of the notification to the EPA within 7 days of the date on which they became aware of the incident.</p>                                                                                                                                                                                               | Condition R2.1<br>Condition R2.2                   | Section 17.2                             |
| <p><b>ECR</b></p> <p>Condition of consent No. 8 for the Project (SSI 9471) requires that an ECR (report) is prepared to the satisfaction of the Planning Secretary prior to the commencement of dredging, disposal and emplacement activities.</p> <p>The licensee must provide a ECR to the EPA for comment. The report must be provided to the EPA at least four weeks prior to commencement of dredging disposal and emplacement activities.</p>                                                                                                                                                                                                                                                                                                                        | Condition E1.1                                     | Section 2.7<br>Refer to ECR (SMEC, 2022) |
| <p><b>PIRMP</b></p> <p>The Licensee must prepare a PIRMP that complies with Part 5.7A of the POEO Act (1997) in relation to the activity to which the licence relates. The PIRMP must be in the form required by the 'Regulations' and include the following:</p> <ul style="list-style-type: none"> <li>– the procedures to be followed by the holder of the relevant environment protection licence, or the occupier of the relevant premises, in notifying a pollution incident to:</li> </ul>                                                                                                                                                                                                                                                                          | Condition E2.1                                     | Section 17.2<br>Section 18.3             |

| Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Reference | Evidence |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------|
| <ul style="list-style-type: none"> <li>i. the owners or occupiers of premises in the vicinity of the premises to which the environment protection licence or the direction under section 153B relates, and</li> <li>ii. the local authority for the area in which the premises to which the environment protection licence or the direction under section 153B relates are located and any area affected, or potentially affected, by the pollution, and</li> <li>iii. any persons or authorities required to be notified by Part 5.7,</li> </ul> <ul style="list-style-type: none"> <li>– a detailed description of the action to be taken, immediately after a pollution incident, by the holder of the relevant environment protection licence, or the occupier of the relevant premises, to reduce or control any pollution,</li> <li>– the procedures to be followed for co-ordinating, with the authorities or persons that have been notified, any action taken in combating the pollution caused by the incident and, in particular, the persons through whom all communications are to be made,</li> <li>– any other matter required by the regulations, including 'Keeping of Plan', 'Testing of Plan', 'Making Plan Readily Available' and 'Implementation of Plan'.</li> </ul> |           |          |

## 6. Summary of site conditions

Construction works for Stage 2A and Stage 2B will be undertaken within the MBD Site Compound, the Emplacement Cell Construction site located in the Outer Harbour and the Emplacement Cell located in the Outer Harbour (refer to Figure 2.2).

The following summary is applicable to excavation and dredging works based on information from previous GHD investigations (GHD, 2018a), (GHD, 2021a) and (GHD, 2021b) and the Stage 2A and Stage 2B SMP. Reference should be made to these reports and the SMP for more detailed information.

### 6.1 Site conditions

Following the completion of the Stage 1 Early Enabling Works (proposed completion date of December 2021) the existing above and underground structures within the MBD Site Compound will have been demolished. Excavation down to level of RL +2.5 metres PKHD has been undertaken and the following materials stockpiled at the MBD Site Compound:

- Approximately 9,700 m<sup>3</sup> of demolished concrete crushed to nominal 70mm minus.
- Approximately 12,500 m<sup>3</sup> of heavily bound base course crushed to nominal -150mm minus.
- Approximately 33,900 m<sup>3</sup> of mixed slag, general fill, and coal nominally < 150mm in size.
- Approximately 10,700 m<sup>3</sup> of predominantly sand material.
- Approximately 8,600 m<sup>3</sup> of asbestos impacted soils.

The excavated materials stockpiled at the Emplacement Cell Construction Site include:

- Approximately 44,000 m<sup>3</sup> of sand material.

Land based construction works proposed to be underway by the commencement of excavation and dredging include:

- Completion of all Stage 1 excavation works.
- Transport of spoil materials to the Emplacement Cell Construction Site.
- Quay wall construction within MBD Site Compound, and
- Installation of communications conduit, potable water line, 11kV power cable, and 315 kVA padmount substation within the MBD Site Compound.

Many of the activities associated with Stage 2A and Stage 2B will be required to be undertaken concurrently to enable continuity of the works. All aspects of the dredging and placement of the material will rely on the smooth unloading of the barges.

### 6.2 General soil description

The soil to be dredged consist of sand, clayey sand, clay, silt and some rock. Additional site-specific information is included in the SMP and CSP for Stage 2A and Stage 2B. Generalised fill materials observed during the GHD investigations and ECR (SMEC, 2022) are summarised in Table 6.1.

**Table 6.1** Generalised material descriptions for Fill and Unit 1

| Stratigraphic Unit<br>Average thickness<br>(m) | Generalised Description                                                                                                                                                                                                                                                                                                                                                 | Corresponding<br>Stratigraphic Unit                                 | Depth range<br>(mPKHD) |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|------------------------|
| Fill<br>3.9                                    | Gravelly SAND, sand, silt, black, dark brown, grey, some to trace, silts and cobbles.<br>Foreign materials, coal wash, coal, slag, steel, wood, concrete.                                                                                                                                                                                                               | Fill                                                                | 5 to 2.5               |
| Unit 1A <sup>1</sup>                           | SAND, brown, pale brown, yellow, orange, fine to coarse grained, trace amounts of shell fragments, fine to coarse gravel, silt bands and layers, clayey sand layers, trace iron stained sand, fine black sand layers (probable heavy mineral sands), rounded to sub-rounded gravel, clay lenses and layers.<br>Foreign materials: charcoal, wood and coal.              | Marine/Aeolian (SMEC, 2022)<br>Probable reclaimed sand (GHD, 2021a) | 4 to -6                |
|                                                | SAND, brown, pale brown, yellow, orange, fine to coarse grained, trace amounts of shell fragments, fine to coarse gravel, silt bands and layers, clayey sand layers, trace iron-stained sand, fine black sand layers (probable heavy mineral sands), rounded to subrounded gravel, clay lenses and layers.                                                              | Possible Alluvium/Tidal Sands (GHD, 2021c)                          |                        |
| Unit 1B <sup>1</sup><br>5.5                    | Clayey SAND, black, dark grey, grey, fine to coarse grained sand, medium to high plasticity clay, trace silt, shell fragments, gravel.                                                                                                                                                                                                                                  | Estuarine (SMEC, 2022)                                              | -1 to -9               |
|                                                | Gravelly CLAY, black, dark grey, grey, low to medium plasticity, fine to coarse grained angular to sub-angular gravel, trace of fine to coarse grained sand.                                                                                                                                                                                                            |                                                                     |                        |
| Unit 1C<br>varies                              | Clayey SAND, black, dark grey, grey, fine to coarse grained sand, medium to high plasticity clay, trace silt, shell fragments, gravel (SMEC, 2022).                                                                                                                                                                                                                     | Not observed by GHD (GHD, 2021d)                                    | N/A                    |
|                                                | Gravelly CLAY, black, dark grey, grey, low to medium plasticity, fine to coarse grained angular to subangular gravel, trace of fine to coarse grained sand (SMEC, 2022).                                                                                                                                                                                                |                                                                     |                        |
| Unit 2<br>6.1                                  | SAND, brown, pale brown, yellow, orange, fine to coarse grained, trace amounts of shell fragments, fine to coarse gravel, silt bands and layers, clayey sand layers, trace iron-stained sand, fine black sand layers (probable heavy mineral sands), rounded to sub-rounded gravel, clay lenses and layers.<br>Low to High Plasticity Clays and Sandy Clay (SMEC, 2022) | Estuarine (SMEC, 2022)                                              | -9 to -16              |
| Unit 3<br>4.3                                  | Sandy CLAY with lesser amounts of Silty CLAY, Silty/Clayey SAND and CLAY<br>SILTSTONE with lesser amounts of Sandy                                                                                                                                                                                                                                                      | Residual Soil (SMEC, 2022)                                          | -15 to -21             |
| Unit 4<br>N/A                                  | SILTSTONE, Silty SANDSTONE and SANDSTONE                                                                                                                                                                                                                                                                                                                                | Bedrock (SMEC, 2022)                                                | -16 to unknown         |
| Harbour Muds & Harbour Sands                   | Upper unit black-brown clayey silt mud (HM) with coarse sand and gravel sized coal and lower unit of grey silty clay (HS).                                                                                                                                                                                                                                              | (Worley Parsons, 2012)                                              | unknown                |

<sup>1</sup> Unit 1A/1B often only display subtle variations and cannot always be easily distinguished.

Dredge volume estimates for the various materials are provided in the ECR (SMEC, 2022), including estimates based on bulking factors.

During dredging operations, the dredge operators will work in controlled cuts, limit the amount of spillage from the buckets and have in place sediment controls devices i.e., a fixed silt curtain around the active dredge area.

The information provided in the model below showing the various depths of each material Unit will be input into the SeaTools dredge system on the dredge. Operators will be alerted by the SeaTools system if they are dredging beyond the defined layers that are intended to be dredged. Dredge operators will also report visually on the types of material they are dredging, in particular if material changes significantly. Each barge load of material will be tracked from the dredge to final placement.

## 6.3 Acid Sulfate Soils

The ASS Risk Map (DLWC, 1997) indicates that the MBD Site Compound area (in red outline) is situated in an area mapped as disturbed terrain at an elevation >4 metres (shown in grey shading) in Figure 6.1 below. Estuarine sediments exist within the harbour and are mapped as high probability of ASS.

Low risk ASS was identified in probable reclaimed sands and alluvial / tidal sands encountered at depths between 0 metres and 25 metres below ground level (mbgl). The probable reclaimed sands had pockets and lenses of high-risk ASS. Estuarine material encountered at depths between 0.4 metres and 25 mbgl, typically below the alluvium, was assessed as high-risk ASS.



Figure 6.1 ASS risk map

## 6.4 Tidal conditions

The Australian Tides Manual Special Publication No 9 Version 5 (ICSM, 2018) summarises the various datums used around Australia to predict tidal behaviour. An understanding of the tidal terminology is required when comparing chart datums, tidal effects on ASS and the potential for acid production. Table 6.2 provides a definition of the relevant terminology and gives the average limits observed at Port Kembla, and Figure 6.2 shows the tidal variation at Port Kembla from 1957 to 2020 (Fox Environmental Consulting, 2020).

**Table 6.2** Explanation of terms and datums used in Australian ports

| Term                           | Purpose                                                                                                | Definition <sup>1</sup>                                                                                                                             | Port Kembla                             |
|--------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Highest Astronomical Tide      | Landward limit of the tidal interface.                                                                 | The highest level of water which can be predicted to occur under any combination of astronomical conditions.                                        | 2.33m CD<br>(+1.458m AHD) <sup>2</sup>  |
| Lowest Astronomical Tide (LAT) | Baseline for the purposes of defining Australia's maritime boundaries.                                 | The lowest tide level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions. | -0.0217m CD<br>(-0.655 m AHD)           |
| Mean High Water (MHW)          | Common datum for cadastral mapping and common limit for topographic mapping.                           | The average of all high waters observed.                                                                                                            | ~1.80m CD<br>(+1.458m AHD) <sup>2</sup> |
| Mean Sea Level (MSL)           | Average limit of tides.                                                                                | Arithmetic mean of hourly heights of sea over a sufficient period of time.                                                                          | ~0.910m CD<br>(0.0m AHD) <sup>3,4</sup> |
| Mean Low Water                 | Used as the limit of Australian States As definition of 'low water'.                                   | Arithmetic mean of all low water heights of sea over a sufficient period of time.                                                                   | ~0.20m CD<br>(-0.655m AHD) <sup>2</sup> |
| Australian Height Datum (AHD)  | National vertical Datum of Australia and refers to Australian Height Datum 71 for Australian Mainland. | AHD71 is a surface that passes through approximate MSL measured between 1966 and 1968 at 30 tide gauges around the Australian mainland.             | 0.0mAHD<br>(0.872m CD) <sup>3,4</sup>   |
| Chart Datum (CD)               | Local Port Kembla Sea Level Datum.                                                                     | In use since at least 1957.                                                                                                                         | 0.0m CD<br>(-0.872m AHD) <sup>3,4</sup> |

Table notes:

<sup>1</sup> Definitions taken from Australian Tides manual v5 (ICSM, 2018).

<sup>2</sup> Mean High Water and Mean Low Water taken from monthly recorded sea levels for Port Kembla - 1957 to 2020

[http://www.bom.gov.au/ntc/IDO70000/IDO70000\\_60420\\_SLD.shtml](http://www.bom.gov.au/ntc/IDO70000/IDO70000_60420_SLD.shtml)

<sup>3</sup> Chart Datum from <http://www.bom.gov.au/oceanography/projects/absImp/data/data.shtml>

<sup>4</sup> MSL at Port Kembla also given as 0.910m CD on [http://www.bom.gov.au/ntc/IDO70000/IDO70000\\_60420\\_SLD.shtml](http://www.bom.gov.au/ntc/IDO70000/IDO70000_60420_SLD.shtml)

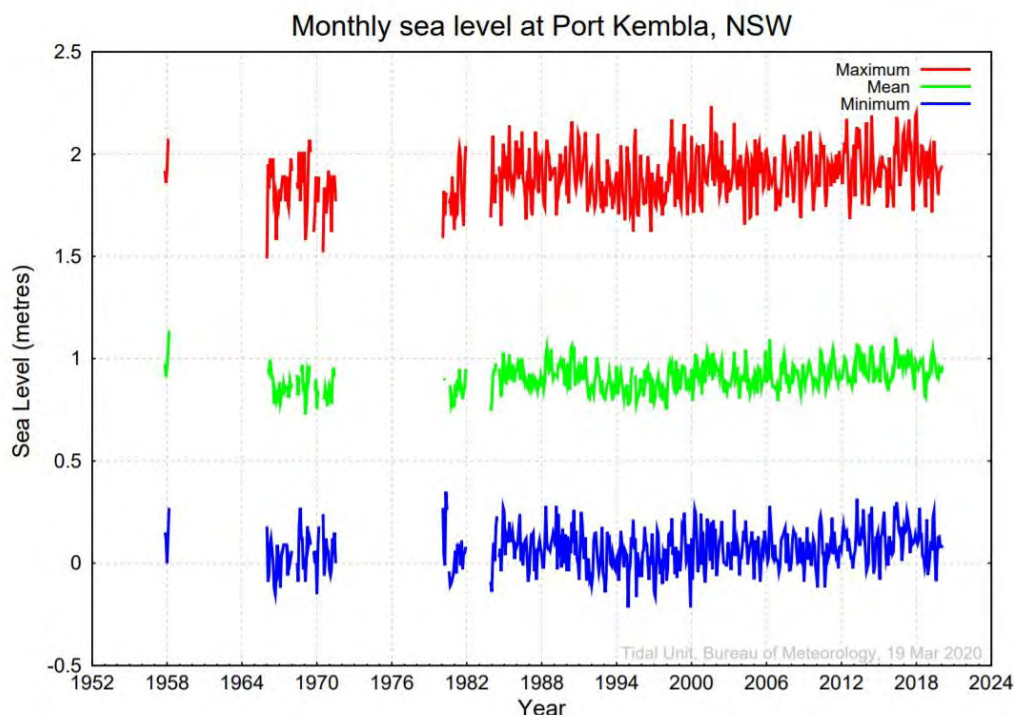


**Figure 6.2** Monthly Tidal Range in LAT Port Kembla Harbour (source: BOM website)



## 6.5 Water quality

The Port Kembla marine environment has been historically impacted by urban and industrial development and port activities. The Inner and Outer Harbours are highly modified and industrial settings receiving stormwater runoff and waste discharge from neighbouring industries. Additional information regarding water quality in Port Kembla Harbour and contamination status of its marine environment is included in the Stage 2A and Stage 2B SMP and WQMP.

## 7. Project preparation

Stage 2A and Stage 2B dredging and excavation activities will be undertaken in accordance with the methodology described in Section 9 of this DEMP. This DEMP aims to minimise impacts from the dredging, transport and unloading of materials. This is achieved through the implementation of mitigation and management controls, including defined horizontal and vertical dredge limits, controls to minimise disturbance to recreational activities, and controls for the placement of material inside the Emplacement Cell.

The Stage 2A and Stage 2B dredging and excavation works will be completed using a Backhoe Dredge (BHD), the Machiavelli, tugs pulling/pushing two Split Hopper Barges (SHB) and unloading via the Mesenge barge. The BHD will remain on site with SHBs manoeuvred using a tug. Once loaded, the SHB will be taken directly to the Emplacement Cell and be dumped or unloaded by the Material Handling Barge (MHB). Equipment specification sheets for all proposed equipment is included in Appendix A.

### 7.1 Pre-construction activities

Prior to the commencement of any construction activities, the following pre-construction activities are required to be carried out:

- Ensure that all necessary permits have been obtained prior to commencement of works, including the obtainment of a Certificate of Local Knowledge by vessel Masters as required by the Harbour Master and NSW Marine Safety Regulation 2016 and completion of the PANSW Port Kembla Vessel 48 Hour Pre-Arrival Checklist and Harbour Master Approval to disturb the seabed.
- All applicable pre-surveys have been conducted (refer to Section 12.1).
- Biofouling requirements (refer to Section 7.1.1).
- Ballast water requirements (refer to Section 7.1.2).
- Vessel inspections (refer to Section 7.1.3).

#### 7.1.1 Biofouling requirements

Marine vessels have the potential to unintentionally translocate and introduce invasive marine species (IMS) to new environments. IMS have the potential to significantly impact local ecosystems through the introduction of disease, damage the natural environment and impact human health and the economy. There are both international and national guidelines related to the management of biofouling. The National biofouling management guidelines on non-trading vessels (DAWE, 2009) have been developed to prevent biofouling on vessels, including guidance on cleaning of vessels, reporting of pests and prevention of the spread of IMS. The International Maritime Organisation (IMO) have developed the 2011 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species, adopted under Resolution MEPC.207 (62) on 15 July 2011 (IMO, 2011).

Marine plant and equipment required for the Stage 2A and Stage 2B works will be towed from Newcastle, NSW where it has been laid up since completing a small project at in Port Latta, Tasmania and New Zealand. The Machiavelli BHD and two SHBs were slipped in January/February 2019 as part of their survey requirements. The Mesenge barge will be towed from New Zealand to Port Kembla on completion of inspections. Hulls of the vessels will be cleaned and new five year antifoul system applied.

Each of the vessels proposed for the Project will have a Biofouling Management Plan that is specific to that vessel in accordance with the IMO 2011 guidelines (IMO, 2011). Additional information regarding biofouling related to the Project is included in the Stage 2A and Stage 2B FFMP.

In preparation for mobilising to Port Kembla, the Dredging Principal Contractor will have an IMS risk assessments of all vessels to be used during the Stage 2A and Stage 2B works completed by a Marine Biologist. The IMS risk assessment will be obtained from the Dredging Principal Contractor prior to mobilisation to site to ensure that the contractor has complied with all State and Federal requirements.

## 7.1.2 Ballast water

As described in Table 4.1, the Australian Ballast Water Management Requirements (DAWE, 2020) outlines the obligations of vessel operators regarding the management of ballast water and ballast water tank sediment when operating in Australian waters. Under the requirements, vessel Masters are required to:

- Ensure the vessel has a valid Ballast Water Management Plan and a valid Ballast Water Management Certificate.
- Ensure all operations are recorded in the Ballast Water Record System.
- Ensure the vessels have met the reporting obligations.
- Ensure all ballast water is managed in accordance with one of the approved methods of management. The approved methods are:
  - use of a Ballast Water Management System.
  - ballast water exchange conducted in an acceptable area.
  - use of low-risk ballast water (such as fresh potable water, high seas water or fresh water from an on-board freshwater production facility).
  - retention of high-risk ballast water on board the vessel.
  - discharge to an approved ballast water reception facility.

All dredge equipment and associated vessels that will arrive to be used for the project will not have ballast and bilge water. When dredging equipment and vessels are in operations, it is expected to accumulate bilge water which will be pumped out in accordance with one of the approved methods under the DAWE, 2020 requirements.

## 7.1.3 Vessel inspections

All vessels are to be inspected prior to mobilisation by the Dredging Principal Contractor Marine Superintendent who will provide a report for each vessel in the dredge spread showing they have in place a current certificate of classification, insurances and are in good working order. The AIE HSE Manager or delegate may be present for all or any of the IMS inspections, condition inspections and verification inspections prior to mobilisation of plant and equipment to the Port Kembla harbour.

## 7.1.4 Weather predictions

Heron will engage to provide daily weather reports and seven-day forecasting. These forecasts will predict wind speed and direction, wave height, period and direction, sea height, tide time for a seven-day period. Forecasts will be provided for the site to assist with construction operation and planning.

# 7.2 Design parameters

## 7.2.1 Outer Harbour footprint

The development footprint for the Emplacement Cell is detailed in the ECR (SMEC, 2022). The extent of the footprint has been limited to avoid Salty Creek and no diversions or modifications of the catchment will be required during Stage 2A and Stage 2B construction works (refer to Figure 2.7). This also enables the waterway to remain open and minimises any potential impacts to fish passage. Impacts related to traffic and potential runoff from stockpiles will be mitigated as per the management measures outlined in the Stage 2A and Stage 2B CTMP and ESCP.

The overall footprint of the Emplacement Cell has been minimised by excluding Sandy Creek and the submerged finger, and by raising the proposed fill height to include emergent reclamation. This reduces the need for bottom dumping materials into the Emplacement Cell, reducing the potential for turbid plumes generating and the mobilisation of sediments. Section 9 outlines the dredging methodology. Additional information is provided in the ECR (SMEC, 2022).

## 7.2.2 Dredging limits and depths

Dredge depths at the MBD Site Compound are proposed to RL -13.3 PKHD. This includes a 300-millimetre siltation allowance on the declared dredge depth berth pocket. Local deepening to RL -14.9m PKHD may be required in some areas as dictated by design drawings. The design dredge depth shall be achieved over the entire extent of the various dredge areas for clearance sounding purposes. The Dredging Principal Contractor shall have an over dredge allowance of 300 millimetre below the finished design level. The Dredging Principal Contractor Project Manager, AIE Construction Manager and HSE Manager Representative shall ensure that no dredging is to be carried out outside this extent or levels.

Dredging is specified in the vicinity of existing and proposed structures. Section 9 outlines the methodology details regarding how the dredging work will be achieved safely and without any potential for damage to the existing structure. The dredging may need to be carried out in a sequential manner to accommodate the installation and curing of the combi pile wall capping beam.

Within the dredge profile, various material types are anticipated be encountered, including PASS and contaminated materials. All PASS and contaminated material must be placed within the Emplacement Cell and capped with Unit 1 material. Bunding and/or capping of the Emplacement Cell with Unit 1 material is subject to ASS neutralising capacity verification testing. Additional information on PASS materials is provided in Section 6.3 and the Stage 2A and Stage 2B ASSMP. Additional information related to contaminated materials is provided in Section 6.9 of the Stage 2A and Stage 2B SMP.

## 7.2.3 Dredging tolerances

The Dredging Principal Contractor shall achieve the required depth and profile at all locations. The Dredging Principal Contractor shall dredge all areas to leave the seabed surface as level as possible, consistent with good dredging practice.

Dredge tolerances to be achieved are outlined in Table 7.1.

**Table 7.1**      *Dredge tolerances*

| Dimension  | Location                                                                                                                                | Tolerance dredge design |       |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------|
| Vertical   | Toe lines to existing and proposed structures, to a distance of 10m off the existing or proposed structure                              | Deeper                  | 0.3 m |
|            |                                                                                                                                         | Shallower               | 0.0 m |
|            | Scour Mat and Rock Revetment                                                                                                            | Deeper                  | 0.3 m |
|            |                                                                                                                                         | Shallower               | 0.0 m |
|            | Front of completed Quay wall                                                                                                            | Deeper                  | 0.3 m |
|            |                                                                                                                                         | Shallower               | 0.0 m |
|            | All other areas:                                                                                                                        | Deeper                  | 0.3 m |
|            |                                                                                                                                         | Shallower               | 0.0 m |
| Horizontal | All areas. For clarity, it is not allowable to dredge outside the provided dredging limits or lines indicating changes in batter slope. | Deeper                  | 0.0 m |
|            |                                                                                                                                         | Shallower               | 1.0 m |
|            | Front of completed Quay wall.                                                                                                           | Deeper                  | 0.0 m |
|            |                                                                                                                                         | Shallower               | 1.0 m |

In the unlikely event that materials have been removed from outside the tolerances as indicated above, the AIE Project Manager may require the Dredging Principal Contractor to backfill such over-depth in an approved manner and timing, with materials to be selected by the AIE representative. Additional information related to backfill and reinstatement are provided in Section 7.4.2 of the Stage 2A and Stage 2B SMP.

## 8. Plant and equipment

Plant and equipment associated with the works will be in good working order and have the capacity to safely and efficiently do the work required. All necessary plant inspections and invasive marine species assessments will be undertaken in accordance with the Infrastructure Approval (SSI 9471) and EPL No. 21529 requirements (refer to Section 7.1).

Table 8.1 lists the plant and equipment expected for the Stage 2A and Stage 2B works. Additional plant or equipment necessary may be identified following assessment processes. Section 8.1 and Section 8.2 outline the specific information related to the BHD Machiavelli and SHBs. A copy of each of the proposed plant and equipment specifications are provided in Appendix A.

**Table 8.1**      *Plant and equipment*

| <b>Plant and Equipment required for the works:</b> | <b>Type of Works</b>                                                  |
|----------------------------------------------------|-----------------------------------------------------------------------|
| Machiavelli BHD                                    | Dredge material into barges from the MBD Site Compound and toe trench |
| H1201 SHB                                          | Transporting material to the Emplacement Cell                         |
| H1202 SHB                                          | Transporting material to the Emplacement Cell                         |
| Mesenge spudded barge                              | Unloading barges                                                      |
| PT May – Tug                                       | Pushing barges from dredge to Emplacement Cell                        |
| Kaiwea Survey Vessel                               | Hydrographic survey and crew changes                                  |
| MHB fitted with a Liebherr- material handler       | Unloading barges and revetment placement from water side.             |
| Longreach or similar – excavator                   | Installing revetment, bund trimming                                   |
| Excavator                                          | Loading trucks                                                        |
| Bulldozer                                          | Assisting the MHB                                                     |
| Articulated dump truck (ADT) dump trucks           | Placing fill material                                                 |

### 8.1 Backhoe dredge - Machiavelli

BHD Machiavelli is a De Donge built, mechanical dredger with a heavy-duty hydraulic excavator mounted on a pontoon, best suited for dredging in shallow areas with little opportunity for manoeuvring. The BHD Machiavelli can be fitted with multiple combinations of buckets, sticks and booms depending on the material to be excavated and the depth of the design. The pontoon features two spuds in a fixed position and one travel spud on a carriage used to reposition the pontoon. The general layout of the Machiavelli is provided in Figure 8.1.

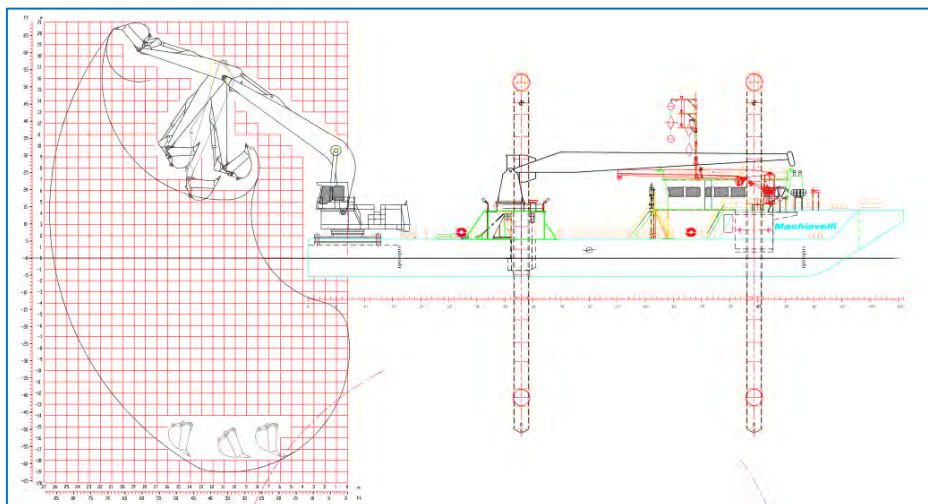


**Figure 8.1** General layout of the Machiavelli

The dredging spread proposed for the Stage 2A and Stage 2B works utilises several measures to prevent hydrocarbons and/or other environmentally hazardous substances from entering the water or impacting on the marine environment.

The prevention measures include, but are not limited to:

- Periodic documented preventative maintenance program.
- Replacement of high-risk hydraulic hoses after a predetermined time (machine hours), not after they have failed.
- A hydraulic hose register that records the details of every hose e.g., manufacturer, date of manufacture, date of installation, type, size, length, etc.
- Boom and dipper cylinders fitted with anti-burst valves which prevent loss of oil from the hydraulic ram should a hose fail.
- One further measure implemented that minimises the potential of environmentally hazardous substances entering the water is that all hydraulic systems on the Machiavelli and hopper barges use Panolin HLP Synth 46 biodegradable hydraulic oil.

### 8.1.1 Deck area

The Machiavelli has a significant amount of deck space available to store spare buckets. The Machiavelli is fitted with two service cranes, the largest with a capacity of 15 tonne at 25 metres. This capacity allows the crew of the Machiavelli to change sticks and buckets without the assistance of land-based cranes. The location of the cranes ensures that there is 100 per cent crane coverage over the deck.

The ability of a BHD to operate requires that weather and sea state are within the capabilities of the dredge. Generally, this can be limited by a combination of wave height, swell direction and current. The Machiavelli can operate in sea conditions of between significant wave height (Hs) <1.0-1.5 metres. Without a barge alongside the vessel, these parameters may increase if the bow of the dredge can be positioned into the prevailing swell/wind direction.

If the BHD pontoon has reached its limitations, the Principal Contractor Dredging Manager, or delegate, will decide when dredging will be terminated as per the De Donge operational manual requirements.

Daily weather information and forecasts will be made available to each of the project vessels so the vessel Masters can inform their decisions relevant to the conditions.

### 8.1.2 Working principles

BHDs generally work backwards as this generates less spillage from the dredging operation than working forwards and is preferable in terms of productivity and efficiency (refer to Figure 8.2). In some instances, if the existing

water depth is less than the draft of the pontoon or when dredging is required alongside or near to a structure, then forward dredging allows the BHD to create its own channel.

Dredging is carried out by removing all the material within reach of the excavator in a radius from the centre the excavator. Cut depths and radius depend on material types to be dredged and the configuration of the excavator.

During excavation of material, a SHB will be moored alongside the BHD. The excavator will load the material into barges until the required draft is attained and the 1,200 m<sup>3</sup> hopper barges will be used to transport the material to the Emplacement Cell. Once a profile / cut has been completed the dredge will move to the next cut.

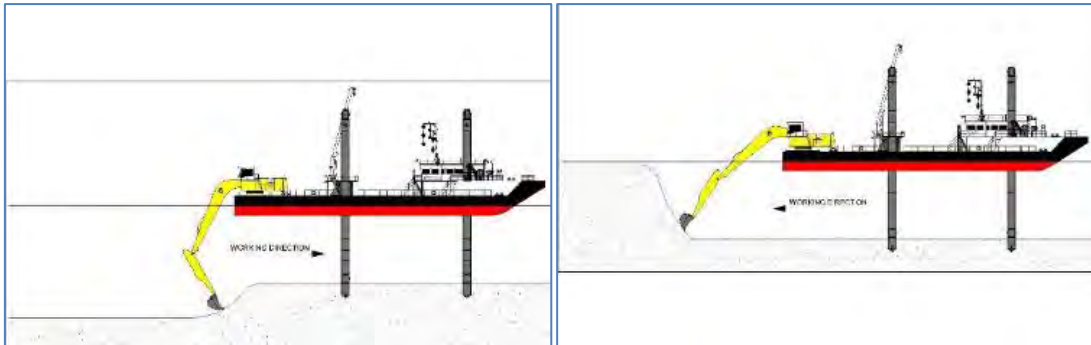


Figure 8.2 Working principles

## 8.2 Split Hopper Barges

SHBs assisted by tugs will transport and place the dredged material on a continual basis moving between five and eight loads to the Emplacement Cell site per day. SHBs will be predominately pushed to the Emplacement Cell site.

The Dredging Principal Contractor undertaking dredging works have two identical 1,200 m<sup>3</sup> SHBs that will be used for the Stage 2A and Stage 2B works (refer to Figure 8.3 and Appendix A). These SHBs are set up to be remotely started, opened, closed, and stopped by the crew on the tugs. The SHBs will be fitted with a Differential Global Positioning System (DGPS) and data logger systems. This will provide track plots for the SHBs and record the position, elevation, and time and that the SHB opened and closed.

The design of the SHB includes the installation of a stern thruster system. The thruster is remotely operated from the tug. This is beneficial when accuracy is required to position the SHB in the Emplacement Cell disposal area. Thrusters will also assist with manoeuvrability and speed up the process of berthing SHBs alongside the Machiavelli and the MHB.

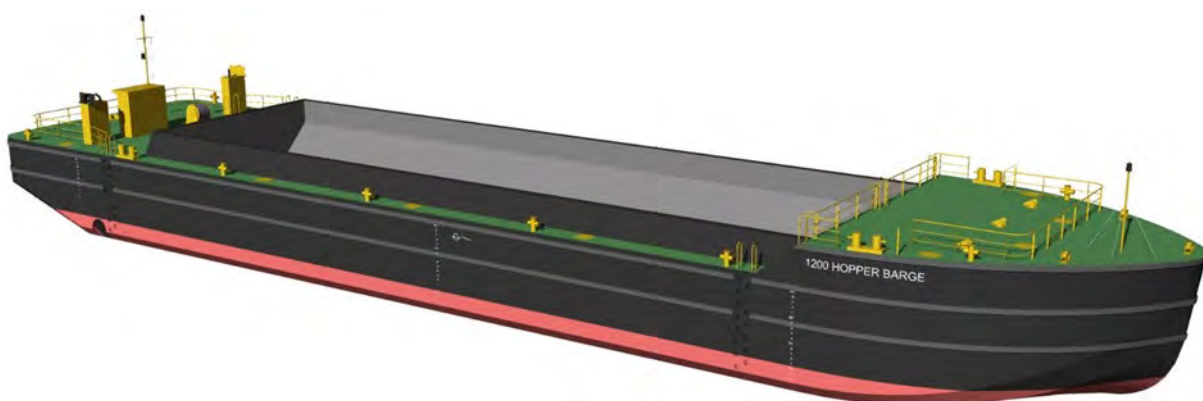


Figure 8.3 Split Hopper Barge

### 8.2.1 Sea state

Tugs with a hipped-up barge can operate in sea conditions that are up to Hs<1.0m. When the SHB is connected to a tug, the Tug Master is deemed responsible (refer to Section 3). The Tug Master, prior to commencing any voyage, is to satisfy themselves that they have considered the conditions for sailing to and from the Emplacement Cell. Checks to be completed may include but not be limited to:



- Assess sea state conditions through VTS weather reports. Check weather, swell, wave height – are conditions worsening or improving?
- Communicate the above information with the Dredging Principal Contractor Marine Superintendent about the current/future sea state conditions.
- Is there restricted visibility due to fog, rain, or smog?
- Communicate with the incoming tug as to sea state in the Emplacement Cell site.
- Sea state is to be reassessed on approach to Emplacement Cell site.
- The Tug Master is to log the communication process.

If the Tug Master considers that conditions are not suitable to safely move a barge to the Emplacement Cell, they are to communicate with the Dredging Principal Contractor Marine Superintendent immediately. Under no circumstances are they to sail if there is doubt that the vessel can safely transit to the Emplacement Cell.

## 8.2.2 Barge Movement

The preferred method of connection between the tug and SHB when transiting will be “hipped up” to the SHB and push the SHB to the dredge area. All tugs will be fitted with heavy duty towing winches so that SHBs can be retrieved to the tug quickly and safely. Tugs hipping up to a barge retrieve set lines and do not require, in most instances, a person to board the SHB until it is secured to the tug. In the event of broken lines or mechanical issues a crew member may be required to board a SHB. In these circumstances, the SOP must always be followed (refer to Section 14.2).

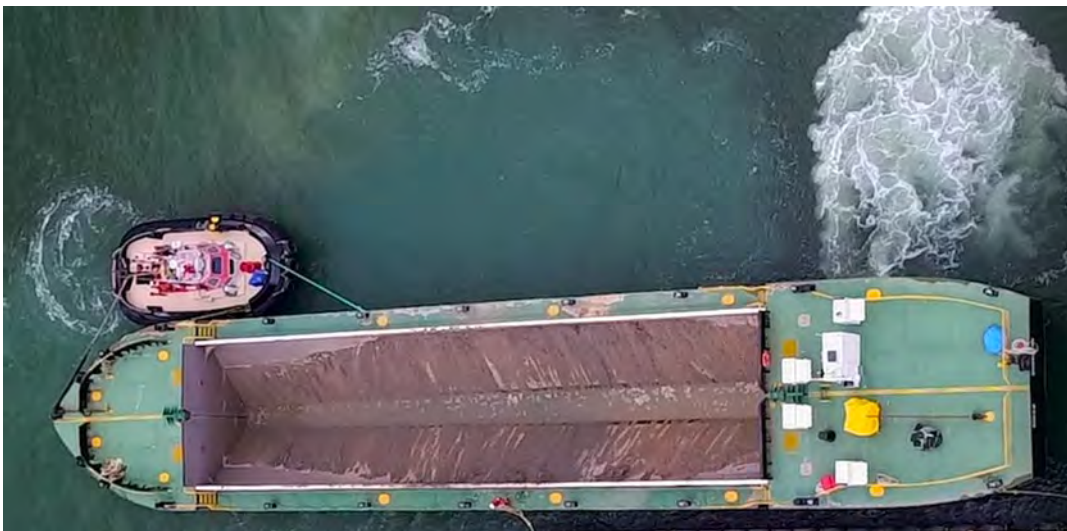


*Figure 8.4 Hipped up configuration with thruster operational*

Additional plant and equipment specification information is provided in Appendix A.



## 9. Dredging works methodology

The dredging works will be undertaken in accordance with the methodology described in this section.

### 9.1 Dredging

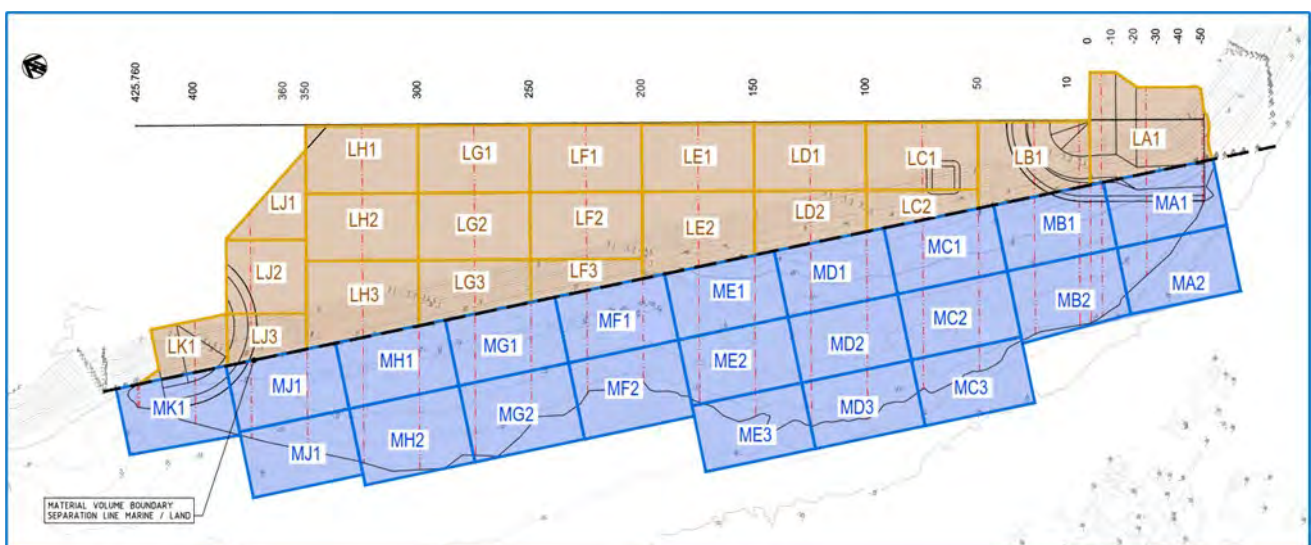
Dredging will be carried out by the BHD Machiavelli and two SHBs for the duration of the Stage 2A and Stage 2B activities. The BHD will be configured to allow for maximum production in the material expected to be encountered at the depths required whilst minimising environmental impact. Currently it is planned to use the BHD with a 16-metre boom, seven-metre stick and a 5.6 m<sup>3</sup> general purpose (GP) bucket for the majority of dredging activity. This will allow production rates greater than 4,000 m<sup>3</sup> per day at the design depths while minimising impact to the surrounding environment. Two additional bucket types may be used during dredging activity, a demolition bucket for the removal of the existing revetment at the MBD Site Compound, and a 3.5 m<sup>3</sup> HD rock bucket if harder than expected rock is encountered.

To aid in the sequencing and overall management of the dredging works, The Dredging Principal Contractor personnel overlay a box system on the dredge area for easy identification of work areas, typically boxes 30 metres wide and 50 metres long. Dredge boxes are displayed on all vessel computers so that all vessels view the same image. Programming and daily reporting of the dredge progress also references the box the dredge has worked in for the last 24-hour period. An example of the grid overlay is shown in Figure 9.1.

Prior to dredging operations commencing, a 12D model will be developed using existing bore hole information. This model identifies the levels that material type changes. In addition, the 12D model has a tolerance, or buffer, applied to the 'inferred geotechnical profile' to manage both dredging tolerance and variances in material horizons between boreholes. The buffer increases the volume of PASS material to be contained in the Emplacement Cell but ensures compliance in material management. Additionally, the use of the buffer in assessing variances in materials enables efficient transfer of materials as buckets will not require assessment from personnel.

Each of the dredge boxes will be split into layers that reflects the identified material types. This information will be input into the dredge computer to create a working design for the dredge operators (refer to Section 11.1). In addition, regular hydrographic survey will be conducted to monitor the results of the dredging compared to the design (refer to Section 12.2).

A comprehensive reporting system will track all material removed from the dredge area to its placement area within the Emplacement Cell.



## 9.2 Outer Harbour Emplacement Cell

The Dredging Principal Contractor will use a combination of bottom dumping and unloading of barges to place the dredge material in the Emplacement Cell disposal area. This will maximise the capacity of the Emplacement Cell and provide the most economical solution for the Project. Where possible SHBs will place material by bottom dumping. However, due to the restricted draft this will not be possible for the entire duration of Stage 2A and Stage 2B dredging activities.

A MHB with a material handling excavator installed on the barge will be mobilised for the duration of the Stage 2A and Stage 2B works. Unloading of material by MHB will be controlled by a SeaTools dredge management system allowing the northing, easting & reduced level (x,y,z) data of the excavator to be downloaded for all operations. A grid system is set up on the operators' screen which indicates where material is to be placed and records the time, position, and depth the grab is opened (refer to Figure 10.9). A 500-millimetre buffer has been incorporated into the dredge model to assist in separation of potentially contaminated materials from the uncontaminated materials to be used in the construction of the Emplacement Cell bund. Additional design and buffer information is included in the ECR (SMEC, 2022).

SHBs will be moored alongside the MHB and then unloaded by the material handler directly to the required storage area at the required elevation. SHBs may be completely or partially unloaded by the MHB. Once the required barge draft has been achieved, the barge will then be bottom dumped and returned to the dredge.

When unloading to the final design bund crest of RL+3.55m, landside equipment will be required to trim and place some material, including access pavement materials, which are either imported or sourced from the MBD Site Compound.

Using this combination of unloading methods, it will be possible to place 100 per cent of the dredged material from the marine side, eliminating the need for road trucks on public roads. Transport via road will be required for the transport of revetment rock, or materials delivered as part of Stage 2A and 2B site mobilisation and preparation.

Construction of the bunds will commence with the excavation of the bund foundation trench (pre-dredge) and placing the excavated pre-dredge material in the shallow near shore waters of the Emplacement Cell. Nominally, a 350-metre trench will initially be excavated.

Once the dredge area at the MBD Site Compound is prepared, the initial removal of revetment rock will be followed by the dredging of fill and Unit 1 materials for transfer and bottom dumping into the toe trench. This will progressively raise the level to RL-3m PKHD. Once barges become draft restricted, the bund construction will continue using the MHB, unloading SHB's and placing materials directly over the bund.

At this stage of the works, it will become possible for land-based equipment to progressively work out from the shore on the bunds, which will enable the use of stockpiled Unit 1 fill to be used on the bunds. Only Unit 1 material will be stockpiled for bund construction or capping of the contaminated/PASS material by land-based equipment. All other material will be placed directly from the barge or by the MHB below RL +0.9m PKHD.

Dredging activities between the MBD Site Compound and Emplacement Cell will be staged to accommodate other construction works being undertaken at the MBD Site Compound (refer to Section 2.2). The staging works are outlined in Section 10 and detailed information is provided in the ECR (SMEC, 2022).

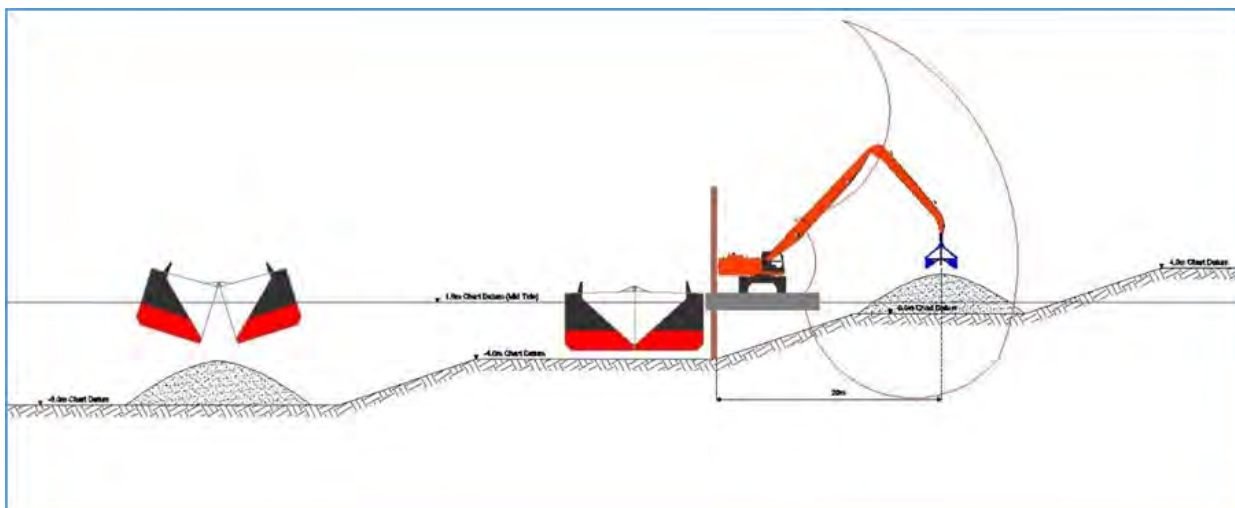


Figure 9.2 Placement Options

## 9.2.1 Repositioning the BHD

The Machiavelli is held in position by three “spud” legs. The two aft spuds are fixed and operate up and down. The third forward spud travels backwards and forwards in a spud carriage, with a stroke of approximately seven metres enabling the Machiavelli to manoeuvre while it is dredging without assistance from tugs, anchors, cables, or winches. The spuds are lowered to the seabed and hold the Machiavelli in position for the dredging operation. They are controlled from the operator cab and movement is seen in real-time on the DipMate screens by the operator.

The manoeuvring of the BHD with the spud legs is done only whilst dredging; for movements of further distances a tug is employed to relocate the Machiavelli.

## 9.2.2 Relocating BHD non-assisted

The process for non-assisted repositioning (stepping) is to centre the BHD with the pontoon, bucket lowered to the seabed, and hydraulics put into float. The forward spud is then lifted and travelled back to the start position and lowered. Once this has been done the two main spuds are lifted, and the forward spud now pulls the BHD back approximately 7 metres. The BHD is then centred, and the two main spuds are lowered. For normal dredging operations the two main spuds are raised first, the forward spud is then retracted in increments that suit the dredging sequence. The main spuds are then lowered, and dredging continues.

## 9.2.3 Relocating BHD assisted

When the assisted relocation of the BHD is required, a tug will assist. The Tug Master and Dredging Principal Contractor Marine Superintendent shall communicate the best arrangement for the tow and barge combination depending on relocation distance. The tug may hip-up or be connected via a tow line. The SHB may or may not be attached to the BHD during this process.

## 9.2.4 Configuration

Current configuration of the Machiavelli is with a 16-metre boom, 8-metre stick and a 5.6 m<sup>3</sup> GP bucket. The configuration of the BHD can be changed to suit different conditions and production requirements. It is not envisaged that the stick or boom will be changed for the dredging works. Changes of buckets and or rippers may be required dependent on material strengths and wear factors.

A change of setup will only be undertaken when the increased productivity justifies the down time required to make the change.

## 9.2.5 SHB loading

The dredged material will be loaded in the SHB moored alongside the BHD. The loading is controlled by the operator of the BHD who will communicate directly with the Tug Master that has control of the tug if required. These communications are carried out via radio and are to direct the shifting of the SHB, the checking of draft marks and letting go once it is full.

Once the SHB has been fully loaded, the mooring ropes will be released, and the tug will manoeuvre the SHB out to sail to the Emplacement Cell disposal site.

The barges have safety systems in place and available on board, including training for crews (refer to Section 14), ensuring vessels are not overloaded, loads are stable, centre of gravity and stability are maintained and there is no loss of material to the environment.

## 9.2.6 SHB changes

The coordination of SHBs and tugs will be at the discretion of the BHD operator. Barges returning from the Emplacement Cell to the MBD Site Compound will slow or hold off until contacted by the BHD operator. Once permission has been given the tug will push the SHB over to the MBD Site Compound dredge area. Approach will be controlled to enable deck crew to transfer lines and secure the SHB. Positive radio communication is maintained at all times between the BHD, tug and deck operators and personnel.

When the SHB has been positioned and securely fastened, the BHD will start loading. Whilst berthing and departing the dredge area, the 1,200m<sup>3</sup> barges will also be assisted using a remotely controlled thruster. Once a SHB is confirmed loaded the BHD will wash down any spillage off the sides of the SHB in the dredge area. The BHD operator will communicate with the tugs and instruct the crew to drop the lines and sail to the Emplacement Cell site.

## 9.3 PASS materials

PASS material has been identified in Unit 2 material and HM and HS. Localised lenses of PASS have also been found in Unit 1. While the HM and HS will be contained within the Emplacement Cell, the larger volume of Unit 2 material requires planning to ensure that it is placed below RL+0.9m PKHD. Key to the management of PASS material is identification, material tracking and maintaining saturation of the material. Unit 1 materials will be utilised for the Emplacement Cell bund given the PASS lenses, will be neutralised by the Acid Neutralising Capacity of the larger Unit 1 volume (Fox, 2022). Bunding and/or capping of the Emplacement Cell with Unit 1 material is subject to ASS neutralising capacity verification testing. Further detail is provided in the Stage 2A and Stage 2B ASSMP. All identified PASS material is located below RL-10m PKHD within the dredge footprint, which allows for dredging of adequate clean material, Fill, Unit 1A and Unit 1B to be excavated and placed to form the containment bund.

The Stage 2A and Stage 2B dredging works will require two SHBs that will take the dredged material from the MBD Site Compound dredge footprint to the Emplacement Cell disposal area. Transport from the MBD Site Compound to the Emplacement Cell will, on average, take less than 30 minutes. Once inside the Emplacement Cell site, unloading will commence immediately. Dredged material within the SHB will effectively remain saturated during transport to the disposal point. Under normal operating activities there is little opportunity for these materials to oxidise and generate acid.

In the event of equipment breakdown or severe weather events preventing the safe transportation of SHBs, temporary stockpiling of materials in barges may be required. Temporary stockpiling of untreated materials has the potential for acid to build up in the dredged materials. The *Queensland Acid Sulfate Soils Technical Manual: Soil Management Guidelines* (DSITIA, 2014) outlines the recommended maximum time that materials comprising of coarse, sands to loamy sands and peats can be temporarily stockpiled without treatment is 18 hours. Contingency measures for equipment breakdown of longer than 12 hours are required to address the potential for dredged material oxidation in the SHB. Measures would include a continuous system of spraying water onto the dredge material to maintain saturation. Additional contingency measures related to PASS materials are included in the Stage 2A and Stage 2B ASSMP.

Tracking of all material types from the MBD Site Compound to the Emplacement Cell will be completed for every load. PASS material will only be placed in a pre-determined area within the Emplacement Cell. Daily reports will

provide evidence of the placed material including track plots, print screens, tug reports and all backed by daily hydrographic survey.

## **9.4 Contaminated material**

HS and HM have been identified as being contaminated within the Project area and are to be contained and capped within the Emplacement Cell. Dredging of the HS and HM materials will be programmed to occur when a suitable cell has been created within the Emplacement Cell. This will require an area with capacity to contain the entire volume of HS/HM behind a section of the Emplacement Cell bund.

Dredging of contaminated material is to take place prior to lowering the adjacent dredge to level lower than the contaminated level to reduce the risk of HS/HM being able to migrate during the dredging process. It will also aid in the positive identification and tracking of the contaminated material. Underlying PASS and/or rock will be removed as part of this process and disposed of in the same area within the Emplacement Cell.

Tracking of all material types from the MBD Site Compound to the Emplacement Cell disposal area will be completed for every load. Contaminated material will only be placed in a pre-determined cell within the perimeter bund. Daily reports will provide evidence of the placed material including track plots, print screens, tug reports and all backed by daily hydrographic survey.

## **9.5 Asbestos containing materials**

In the event any ACM is encountered at depth during dredging activities, the UFP included in Section 6.5 of the Stage 2A and Stage 2B CSP will be enacted. Naturally occurring ACM at depth is highly unlikely and is not anticipated to occur during the dredging activities.

## 10. Sequence of works

Demolition of the existing MBD Site Compound wharf and excavation of fill materials down to RL-2.5m has been undertaken during the Stage 1 Early Enabling Works. Approximately 45,000 of materials has been excavated and stockpiled within the MBD Site Compound and Emplacement Cell Construction Site (refer to Figure 2.3 and Figure 2.4). The excavated materials stockpiled at the MBD Site Compound comprise of:

- Approximately 9,700m<sup>3</sup> of demolished concrete crushed to nominal 70mm minus.
- Approximately 12,500m<sup>3</sup> of heavily bound base course crushed to nominal -150mm minus.
- Approximately 33,900m<sup>3</sup> of mixed slag, general fill, and coal nominally < 150mm in size.
- Approximately 10,700m<sup>3</sup> of predominantly sand material.
- Approximately 8,600 m<sup>3</sup> of asbestos impacted soils.

The excavated materials stockpiled at the Emplacement Cell Construction Site includes approximately 44,000 m<sup>3</sup> of sand material.

Additional land-based works will be undertaken prior to the commencement of dredging. Once the new wharf construction at the MBD Site Compound has progressed to a stage that the dredging can proceed continuously, the Machiavelli dredge and MHB will mobilised to site. Subject to mobilisation, timing review sequencing of the dredge works may be dependent on the release of material within the exclusion zone running 20 metres off and parallel to the new wharf capping beam.

A brief outline of the sequencing is described in the sections below for the following activities:

- Silt curtain installation at both the MBD Site Compound and surrounding the Emplacement Cell.
- Excavation of the toe trench for the Emplacement Cell bunds (split program).
- Removal of the existing armour rock from RL2.5m down, loading into barges and unloading at the Emplacement Cell.
- Dredging of remaining fill, Type 1A and B materials and placing in the Emplacement Cell bunds.
- Progressively dredging wedges of material within the exclusion zone to within 0.5 metres of the pile face (subject to mobilisation timing review).
- Potentially washing of material trapped within the pile line to provide clearance.
- Clean up cut and possible sweeping of the dredge area.

### 10.1 Silt curtains installation

The installation of silt curtains will be carried out prior to dredging activities, including revetment rock removal, at the MBD Site Compound and surrounding the Emplacement Cell. It is proposed to use a heavy duty curtain piled and / or anchored to the seabed. Sea state and water conditions at Port Kembla Outer Harbour varies according to prevailing weather and vessel traffic. Generally, conditions are comparable with 'open water' conditions and the calibre of silt curtain and turbidity controls are to be designed and manufactured accordingly to best withstand the conditions.

Anchoring of the silt curtains may require input from PANSW to determine the level of and requirement for navigation and special markers to alert vessels operating in the port area of the presence of the marine hazard.

A entrance / exit gate will be maintained for barges to enter and exit the disposal area.



**Figure 10.1**      *Example of similar installations*

In the event of silt curtain failure, operations will cease until silt curtains are repaired / replaced. The Dredging Principal Contractor will implement a maintenance program and a substantial inventory of replacement curtain and fittings. Silt curtains will be inspected initially on a weekly basis with ongoing inspections determined by local weather conditions. Storms and heavy rainfall will trigger additional inspections to be undertaken.

An inspection checklist and photographic records will be taken on completion of the silt curtain inspection. Records will include information on:

- Installed nav aids and lights.
- Anchoring position.
- Fatigue and effectiveness.

Visual inspection of the above will aid in identifying any silt curtain failures requiring repair / replacement, and to ensure no spillage of any materials from above the water surface into waters outside of the silt curtain occurs.

The silt curtain is being designed by a specialist. Specifications will be documented, and the specification sheet provided as required. The silt curtain will be deep enough to provide sufficient disruption to the water flow (current), remain clear from the seabed of the Port at low tide, and adhere to any other requirements issued by the NSW EPA. The silt curtain will be installed and maintained to ensure that there are no gaps at the ends, or in the fabric, or in the floating boom.

The silt curtains will only be removed following written approval from the EPA.

## **10.2 MBD Site Compound revetment armour rock removal**

The existing revetment armour rock is to be removed and stockpiled for either disposal or reuse if meeting the Project specifications. Armour rock down to approximately RL-PKHD 2.5m will be removed using a land-based 80 tonne Longreach excavator and stockpiled on the construction site (refer to Figure 2.3).

The balance of the armour rock will be removed by the BHD and SHBs to the Emplacement Cell Construction Site. Armour rocks will then be unloaded in a position for reuse once construction of sections of the bund wall have been finalised around the Emplacement Cell area.

A demolition bucket will be used on the dredge to recover the existing revetment rock, this allows the recovery of the rock without removing the underlying sediments (refer to Appendix A for specification sheet). The BHD will operate parallel to the existing wharf alignment with the barge on the outside. Rocks will be carefully placed in the SHB by the BHD operator. Each SHB load would contain approximately 1,800 tonnes of rock once loaded.

Transportation of revetment armour rock via barges will reduce the need for road transportation. The majority of revetment armour rock transport will be via barge. Some road transportation may be required.





Figure 10.2 Demolition bucket

## 10.3 Pile management

Any remaining steel piles that are above the proposed dredging level within the MBD Site Compound will be cut off to a level suitable for dredging.

Any remaining timber piles that are within the proposed dredging level in the MBD Site Compound will be removed as part of dredged material and to be managed and disposed of appropriately.

Any materials such as former timber pile remnants encountered during the dredging of the Emplacement Cell bund footing will be managed as unexpected finds.

Unexpected finds and any materials to be disposed offsite will follow the process stipulated in Section 8.3 of the Stage 2A and Stage 2B SMP and Section 6.5 of the Stage 2A and Stage 2B CSP.

## 10.4 Pre-dredging Outer Harbour toe trench

Once the silt curtain has been installed surrounding the Emplacement Cell and the turbidity monitoring is in place, the Machiavelli BHD will be mobilised to the Outer Harbour to commence dredging of the toe trench.

The BHD will start at approximately chainage 75 and continue around to approximately chainage 400 in the first instance. Construction of the bund will then commence to avoid leaving the trench opened for too long and risk having to rework the profile. Continued excavation of the toe trench may be driven by construction sequence of the wharf. If dredging is delayed at the MBD Site Compound, it can be optimal to have an alternative dredge area to avoid time delays.

The trench design will be input into the SeaTools dredge computer, and a full calibration of survey control completed by the surveyor. As the trench is excavated, the dredged material will be placed in the barge alongside the BHD, rather than side-casting the material. Once barges are full, they will be taken to a position within the Emplacement Cell and the load placed. Additional information on the construction of the Emplacement Cell is provided in the ECR (SMEC, 2022).



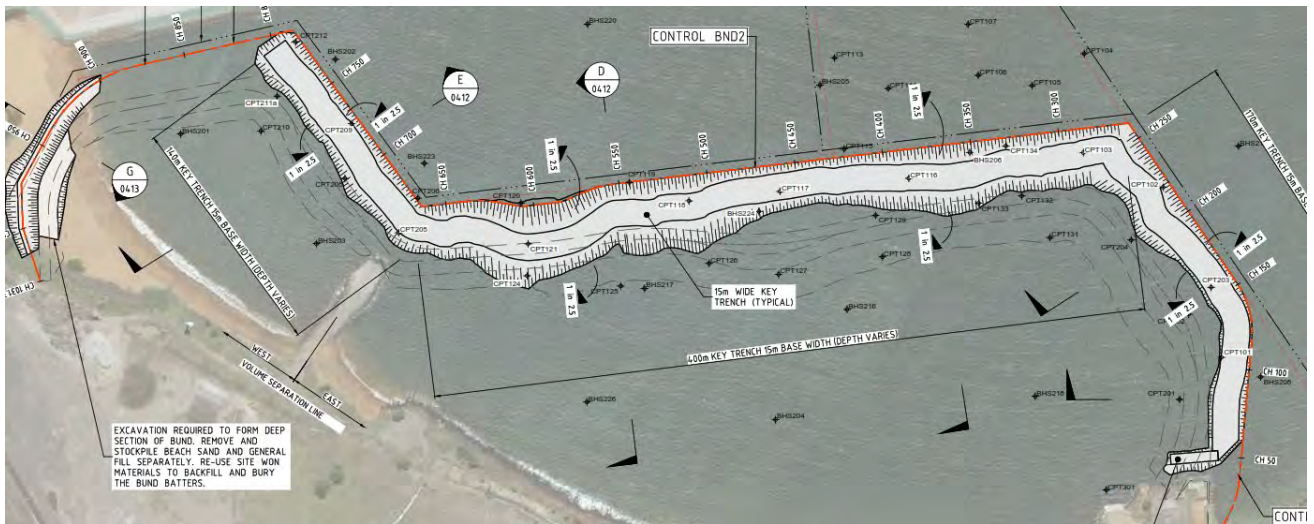


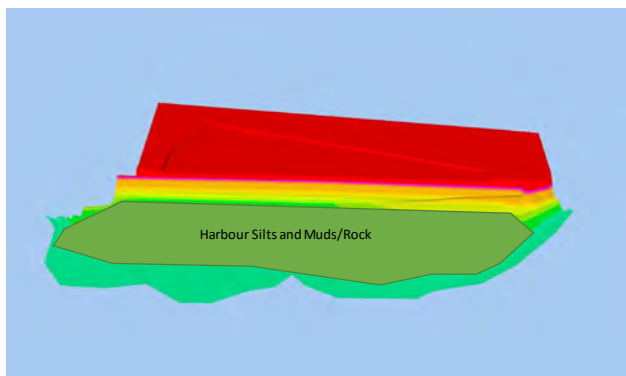
Figure 10.3 Required scope of trench for bunds

## 10.5 Dredging sequence

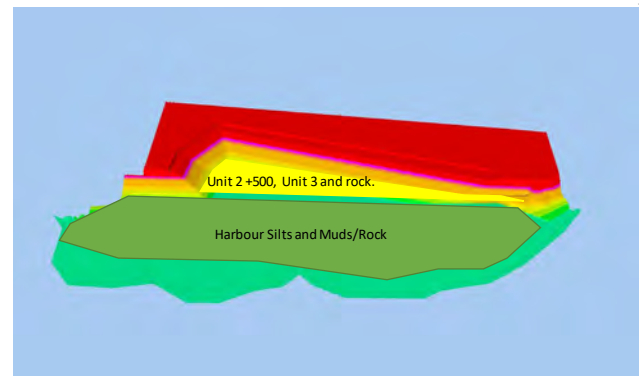
A number of elements dictate the sequencing of the dredging of the new FSRU berth. This dredging sequence may change depending on various reasons including material types, construction sequence of the new wharf and the availability of suitable containment areas within the Emplacement Cell.

The SeaTools system enables for effective dredging of a defined model. The proposed dredging sequence is shown in Figure 10.4. Balancing works with the disposal of the material in the Emplacement Cell may result in the sequencing below needing to be adjusted at short notice, and thus the sequencing diagrams are subject to change. This is to ensure that any PASS or contaminated material is placed below RL0.9m PKHD and that the construction of the revetment can continue progressively protecting the bunds.

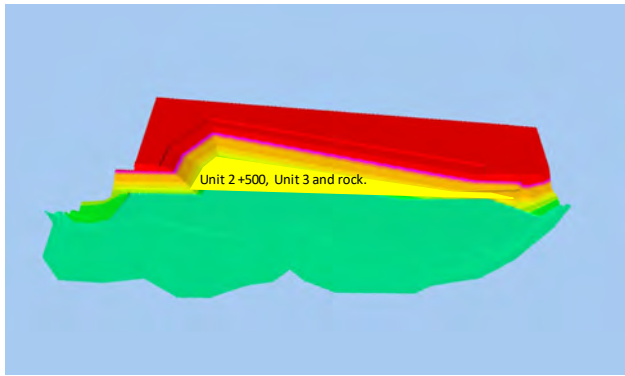
HM and HS will be deposited in the Emplacement Cell early in the dredging campaign. Once the Emplacement Cell bund construction is advanced sufficiently to provide containment, and, in most cases, in advance of the ASS/PASS materials, HM/HS materials will generally be deposited lower than -1.0m PKHD and in no instances above the LAT (~-0.02 m PKHD).



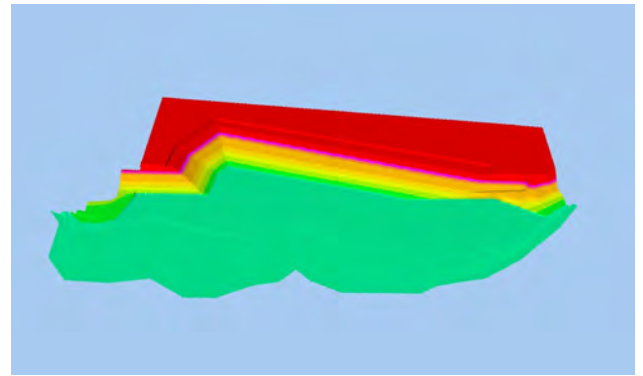
1. Pre-dredge - fill removed to RL2.5m PKHD



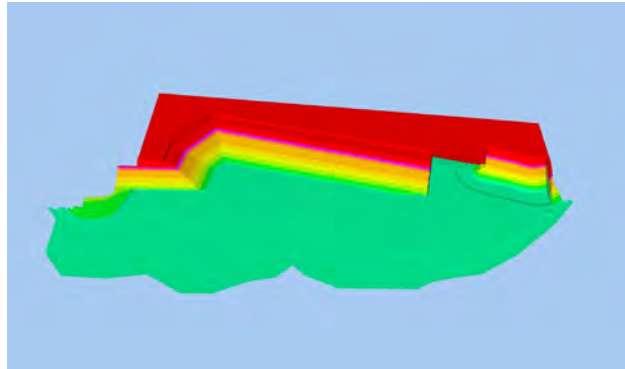
2. Dredge Unit 1A/B material to 20m exclusion zone



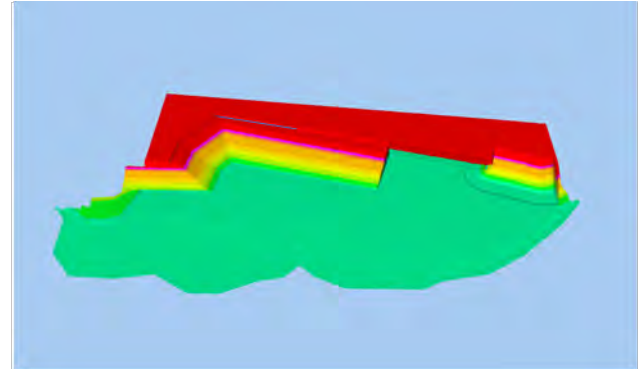
3. Dredge HS/HM, rock and over dredge



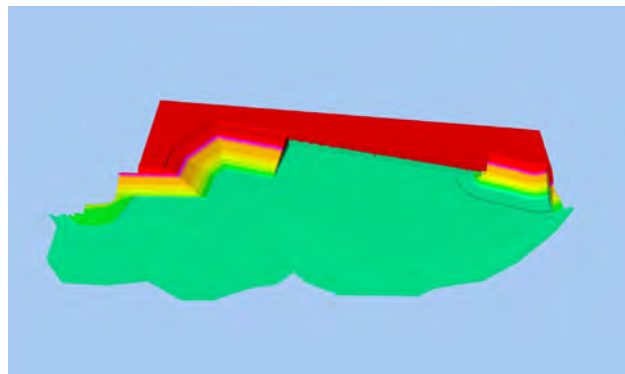
4. Dredge Unit 2/3 and rock in 20m exclusion zone



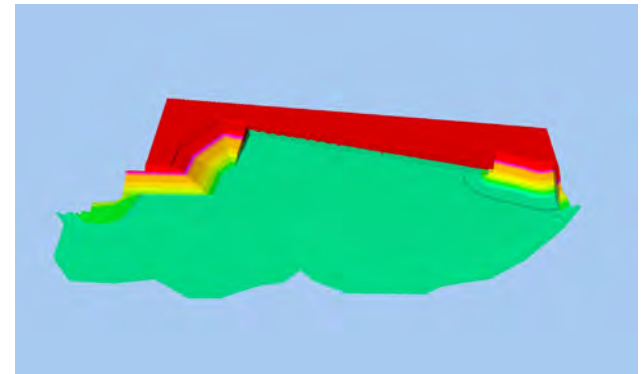
5. Dredge from Ch-50 to 50. Area for revetment south



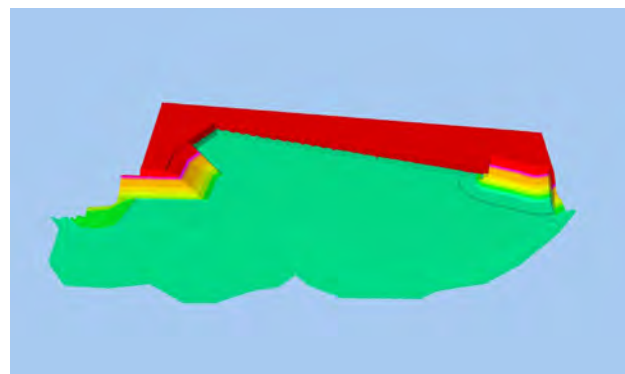
6. Dredge from CH 50 to Ch 150 all units



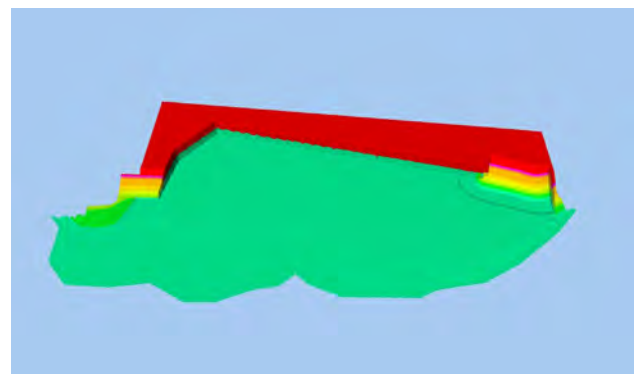
6. Dredge form Ch 150 to Ch 250 all units



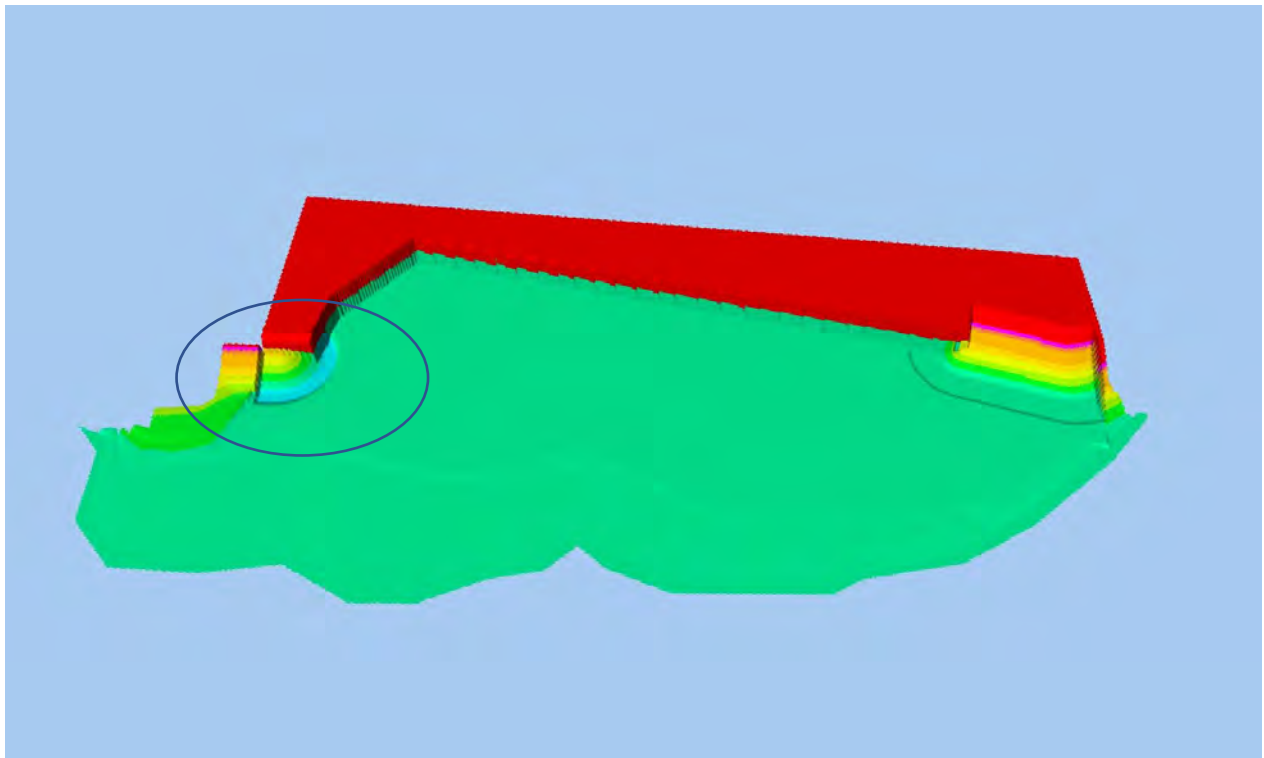
7. Dredge form Ch 250 to Ch 300 all units



8. Dredge form Ch 300 to Ch 300+50 all units



9. Dredge form Ch 300+50 to end all units



10. Dredge revetment section and place revetment

Figure 10.4 Proposed dredging sequence

## 10.6 Dredging adjacent to structures

The Dredging Principal Contractor will be required to dredge within 500 millimetres of the new MBD Site Compound piles and revetment during the Stage 2A and Stage 2B works. The Machiavelli BHD has a lockout system installed on the hydraulics system for dredging close to or over structures. The system is controlled by the Seatools Dipmate dredge computer and aids the operator while dredging close to structures is undertaken.

Prior to the commencement of dredging, surveyed data of the wharf, piles and capping beam will be input into the dredge computer allowing for boundaries to be placed around structures to within 0.5 metres. No part of the BHD, including the bucket, boom, and stick, is then able to enter this area as the computer overrides the hydraulic system. A full description of the system is detailed in Section 11.2.

## 10.7 Sweeping operations

Sweeping or blading of the dredge area may be required to remove excess material if the design level is exceeded, or areas require levelling during the final survey. This operation is carried out using a tug with a suspended “grader blade” which is lowered to a required depth and dragged along the seabed. While these operations are being conducted, continuous adjustment and survey is undertaken with the onboard survey equipment.

Sweep vessels will be fitted with a calibrated depth monitoring system and positioning system that accurately displays the position of the vessel continuously. Track plots are to be recorded and supplied to AIE if required.

## 10.8 Revetment installation

Rock revetments will be constructed at the MBD Site Compound and Emplacement Cell bund.



### 10.8.1 MBD Site Compound

Two rock revetments will be constructed using igneous rock for protection of each end of the newly constructed MBD Site Compound wharf. The southern revetment will be completed shortly after dredging has been completed in the area. The northern revetment will be completed at the end of the dredging campaign.

Revetment design includes the following works to be undertaken:

- Placement of a Texcel 1200R geotextile.
- Thick quarry run with a  $D_{50}$  of 190 millimetres.
- An underlay rock with a  $D_{50}$  of 40 millimetres, and
- an armour rock with a  $D_{50}$  of 900 millimetres.

Locations of the MBD Site Compound revetments is shown in Figure 10.5 and a typical revetment cross section is shown in Figure 10.6.

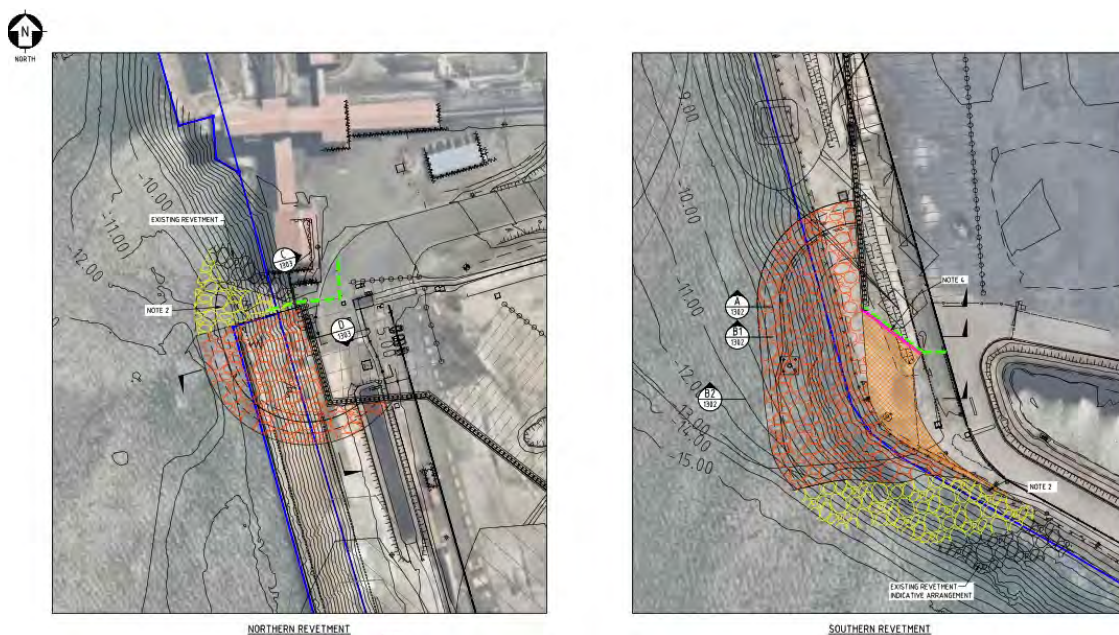


**Figure 10.5** *MBD Site Compound revetment locations*

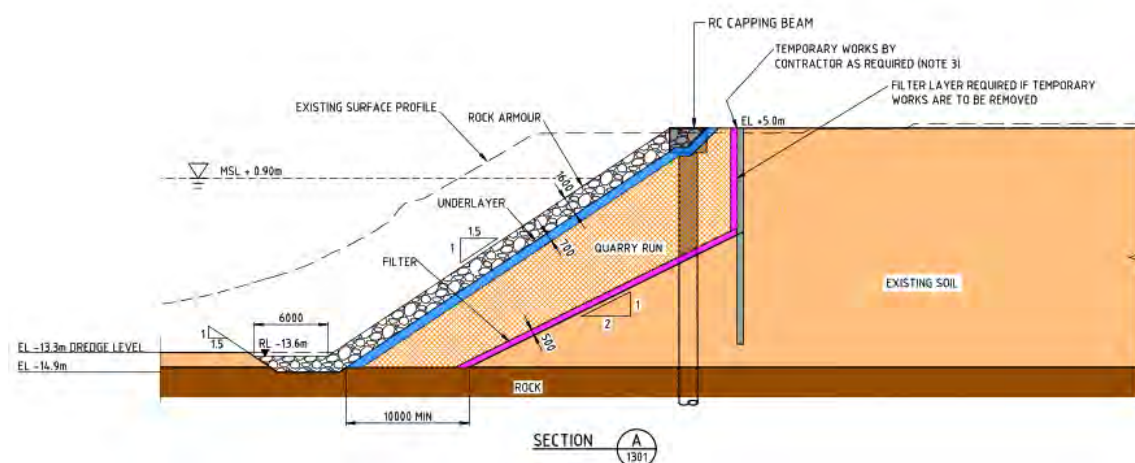


**Figure 10.6** Typical revetment section

## 10.8.2 Emplacement Cell bund

The Emplacement Cell rock revetment will provide protection to the bund structure from coastal processes such as wind, waves, currents, and varying water levels, and loading from propellor wash. The rock revetment will comprise of:

- Placement of geotextile filter to provide separation and filtration between the Emplacement Cell bund material and rock revetment.
- A riprap 'underlayer' over the geotextile of a sufficiently small size to avoid damage to the geotextile.
- A riprap armour layer of sufficient size to ensure hydraulic stability.
- A rock toe to reinforce the slope against slumping in response to any geotechnical instability due to soft material beneath the seabed.

Four revetment sections with different riprap armour thickness and size will be constructed along the bund alignment. Armour differences are in response to the identified environmental and water considerations such as hydraulic stability under waves, propellor wash from tugs, water depth and wave presence. The revetment segments have been defined as shown in Figure 10.7.

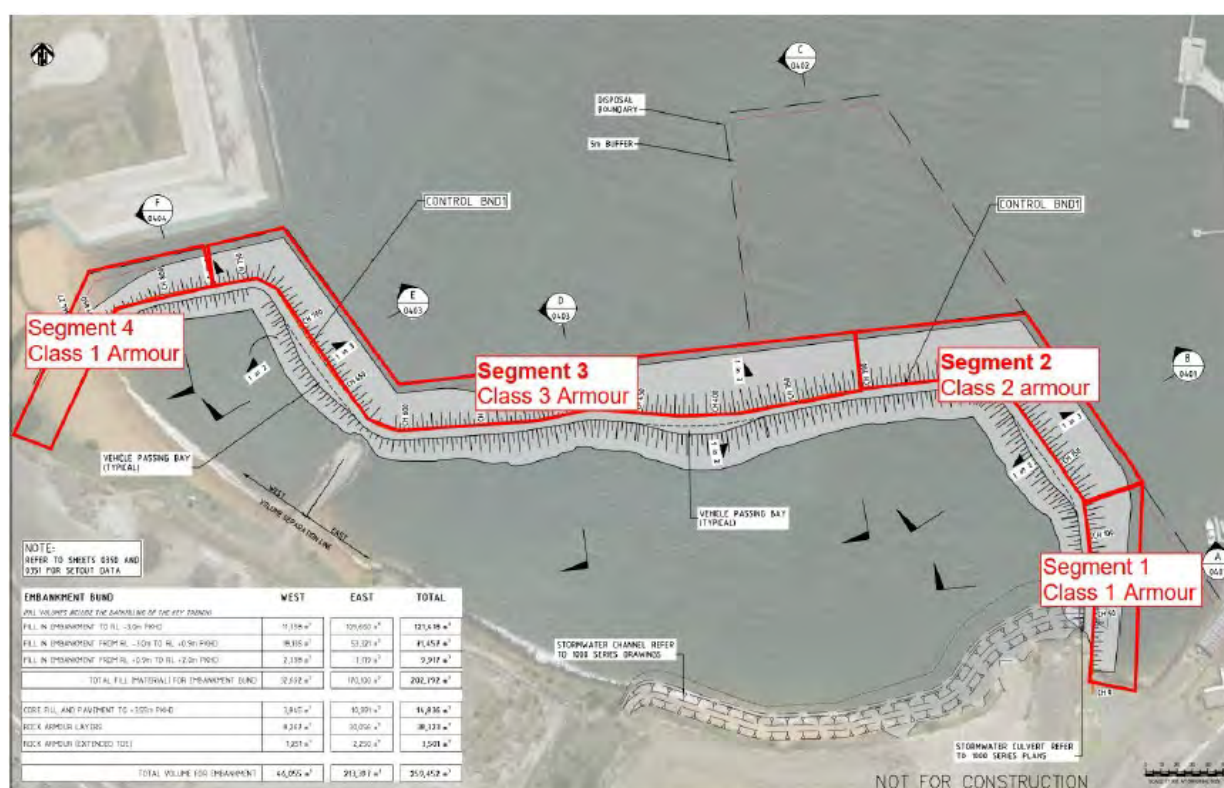


Figure 10.7 Emplacement Cell bund rock revetments

## 10.9 Rock stockpiles

Stockpiles of rock will be required at both the MBD Site Compound and Emplacement Cell Construction Site. Transport of revetment rock materials will be transported by barge and road trucks to the designated laydown areas. These rock materials are from the former Berth101 revetment structures or sourced externally. These materials are clean and uncontaminated materials that will be stockpiled in a designated area in the Outer Harbour laydown area to avoid cross contamination from the known existing contamination in the Outer Harbour site.

The recovered rock will not be used as armour protection for the Emplacement Cell bund above water level but will be used at the bottom of the trench for the bund. The rock will be removed using a demolition bucket which will minimise the amount of additional sediment collected with the rock. The rock will then be transported to the Emplacement Cell area and placed in the designated area below LAT in the same manner as other dredged materials. Records of revetment removal, transport and placement to the Emplacement Cell will be maintained to ensure recovered rock can be tracked for validation purposes.

## 10.10 Rock transport

The majority of revetment rock will be transported to the MBD Site Compound via barges. Rocks will be loaded from the Outer Harbour and then transported to the MBD Site Compound for unloading.

Rocks being delivered via the road to the MBD Site Compound will be transported to the excavator in 40 tonne ADTs, as required to reduce the area required for the revetment operations. Additional information related construction traffic is included in the Stage 2A and Stage 2B CTMP.

Where safe and practicable, a visual inspection of rocks will be undertaken to check for contaminated materials to ensure rocks transported are free from contamination.

## 10.11 Geotextile installation

Geotextile will be installed using a combination of the marine-based material handling barge and a land-side Longreach excavator with a rollout frame attached to their stick's arm. The excavators use the SeaTools system to accurately place the geotextile. This program allows the operator to accurately determine the position of the excavator's rollout frame, boom, and stick. The information the operator receives from the monitor is in real time so the position, angle, depth and reach of the bucket are known at any stage throughout the excavation cycle. In addition to the elevation view, a plan view of the dredge is also provided showing the actual position of the excavator in relation to the bund, and where the last piece of geotextile was placed ensuring the correct overlap is maintained.

Measured pre-cut lengths of geotextile will be placed at the top of the bund and rolled down the batter to the seabed or design level. Each section will have a minimum overlap of 1,000 millimetres and be weighted using rebar, rock, or sandbags. The leading edge will be buried in a small trench to prevent it moving, ensuring that there is no sag in the fabric. An example of a Longreach excavator placing geotextile is shown in Figure 10.8.



*Figure 10.8 Longreach assisting in geotextile installation*

## 10.12 Rock placement

Rocks will be transported to the designated work area from the stockpile sites using 40t ADTs. Smaller rocks will be tipped near the required placement area while larger rocks will be unloaded individually with a grab. All grades of rock will be placed using either a bucket or grab fitted to a GPS-controlled 50t excavator or MHB. This will allow for accurate placement to ensure that the requirements of the technical specifications are met.

A grid system will set up over the extent of the bund wall showing the operator of the excavator where rock is required and how many dumps are required to achieve the profile. This model will be updated following



hydrographic survey of the revetment. Figure 10.9 shows the grid system used to place rock. The numbers indicate the number of rocks required to fill the area.

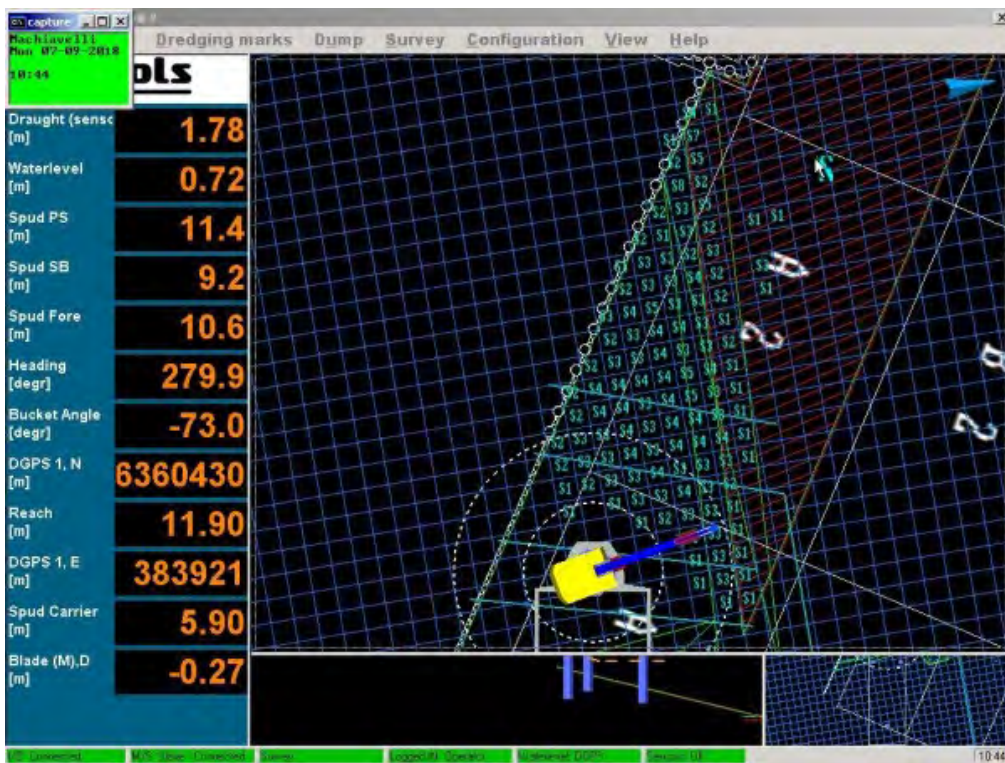


Figure 10.9 Excavator operators view of placement plan

# 11. Dredge positioning, control and calibration

## 11.1 Dredging controls

The Machiavelli uses a SeaTools electronic dredging program called DipMate. This program allows the operator to accurately determine the position of the excavator's bucket, boom, and dipper. The information the operator receives from the monitor is in real time so the position, angle, depth and reach of the bucket are known at any stage throughout the excavation cycle. In addition to the elevation view, a plan view of the dredge is also provided showing the actual position of the dredge and excavator in relation to the Project coordinate system (refer Figure 11.1).

The dredging monitor receives data from rotation sensors mounted on the excavator's attachments and from real-time kinematic (RTK) Global Navigation Satellite System (GNSS) receivers mounted on-board the vessel. Both the rotation sensors and the GNSS receivers supply data to the electronic monitor meaning that any time the x, y, z position of the bucket is known.

A feature of the SeaTools system is the ability to data log or "map" the movement of the bucket in x,y,z positions. This information can be downloaded from the dredging computer via a simple ASCII format file. The data can be used to create long sections and cross sections to prove that the bucket has achieved the design dredge profile.

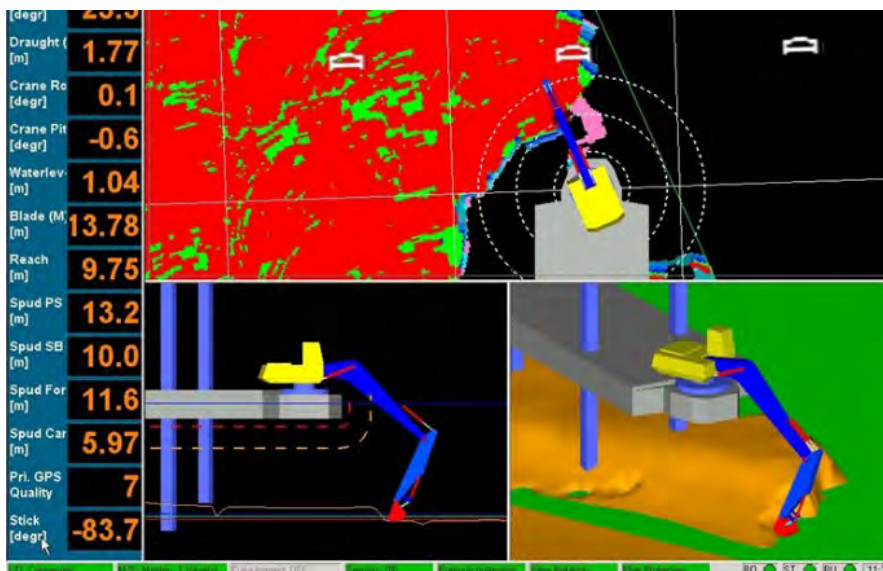


Figure 11.1 Dredge operators screen

## 11.2 Excavator automation

Excavators are powerful machines, which can damage objects very quickly. A number of protection aids are installed to prevent damaging the excavator, the pontoon, and structures such as pipelines and wharfs. The functionalities will monitor the movement of the excavator and will intervene when required by reducing or even disabling the output to the control valves in order to slow down or stop the hazardous movements.

The pipe protection function is intended to prevent the operator damaging pre-defined structures. When a part of the crane (i.e., boom, stick or bucket) comes too close to one of these structures, the protection will intervene by slowing down and/or stopping the movement of the excavator.

Using the SeaTools software, structures can be defined using the same coordinate system used by the DGPS devices. When the objects are added to the software, the system can calculate the distance between each excavator part and the structure. When the distance to the nearest object becomes lower than the outer/warning limit (orange), the output to the control valves is proportionally reduced to slowdown the movement of the excavator. When distance becomes smaller than the inner/safety limit, the pipe protection will disable all output to the control valves, disabling any movement by the excavator. This system can be used for the controlling the spud



system as well. If the operator lowers the spud onto a predefined object or pipeline, the protection will intervene by slowing down and/or stopping the movement of the spud.

In Figure 11.2 an example of a screen lockout is shown. The excavator bucket has become closer to the wharf than the inner/safety limit, which has alarmed the pipe protection turning the status red, and automatically disabling any movement by the excavator.

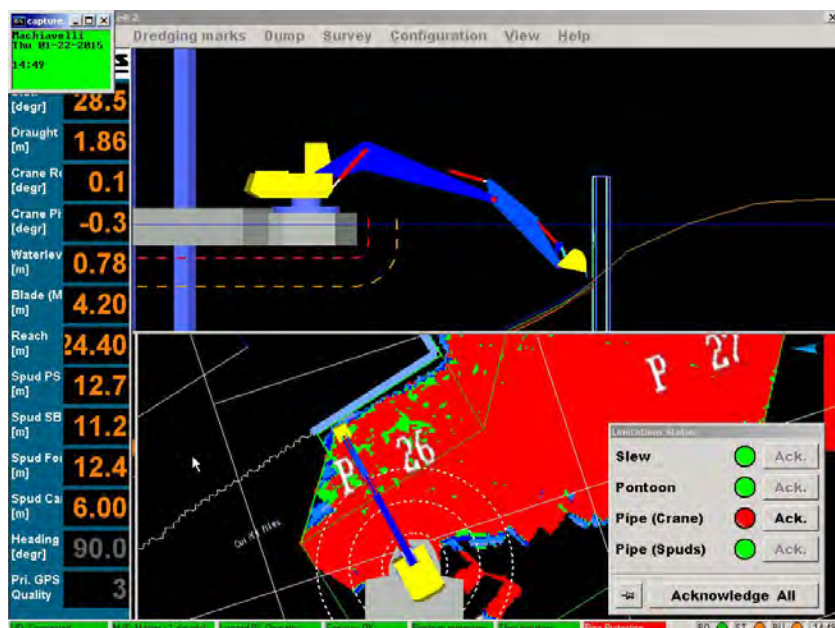


Figure 11.2 Operator screen showing lockouts

## 11.3 Dredge profile model

The dredge profile model combines the dredge design and the pre-dredge survey to create a comparison between what exists and what is required (refer to Figure 11.3). Dredge profiles are designed using a computer aided design (CAD) package, then imported into SeaTools as a DXF file. Due to the ability to utilise CAD, these profiles can be made to be as complex as the design surface requires.

Once the profile is imported into DipMate, the dredging margins are assigned. These margins are set to suit the soil conditions and accuracy requirements specific to the dredge areas. The over-dredge limit will be set as the lower margin. The operator then targets the gap between the design depth and the lower margin.

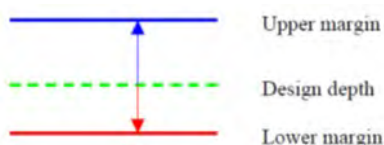


Figure 11.3 Model margins

The model is used throughout the dredging activity by both the surveying equipment and the Machiavelli BHD. The Machiavelli BHD can use the model in two distinct ways:

- The model can be used by the operator as a guide with the BHD tracking excavation against the design. In this setting, the operator has total control of the dredge, and
- Alternatively, the model can be used to limit the movement of the excavator. The operator has free reign within set boundaries however, the excavator will not let the bucket go beyond.

## 11.4 Calibration

### 11.4.1 Error budget

The error budget for the dredge is calculated as 100 millimetres (horizontal) and 100 millimetres (vertical).

In the event that the precision of the dredging system falls outside acceptable limits, the system will alarm, and the operator ceases dredging until the problem is remedied.

### 11.4.2 Redundancy

- **Dredging Software:** Software breakdowns/glitches are generally remedied by the Dredging Principal Contractor Surveyor who has remote access to the dredging computer. For anything outside of the Dredging Principal Contractor Surveyor capabilities, SeaTools also have remote access to the dredging computers.
- **Dredging Hardware:** The Machiavelli carries a set of spare sensors on board, as well as a spare dredging computer, and an array of spare components for the Dipmate2 system.
- **Horizontal & Vertical Positioning:** The Machiavelli carries a spare GPS antenna, and GPS Radio Antenna on board. If required an alternate Trimble SPS855 GNSS RTK Receiver, with SPS555H Heading Receiver can either be sourced from the Trimble agent in Melbourne or removed from one of the SHBs.

## 11.5 Calibration, audits and checks

When the plant arrives on site a full calibration of the dredging controls is conducted using the techniques described below and is logged using the applicable Dredging Principal Contractor BHD calibration form. Audits on the calibration will be conducted weekly for the duration of the Stage 2A and Stage 2B and logged.

Daily visual checks will also be conducted. This will involve putting the bucket onto the water and comparing it with the Dipmate display (refer to Figure 11.4).

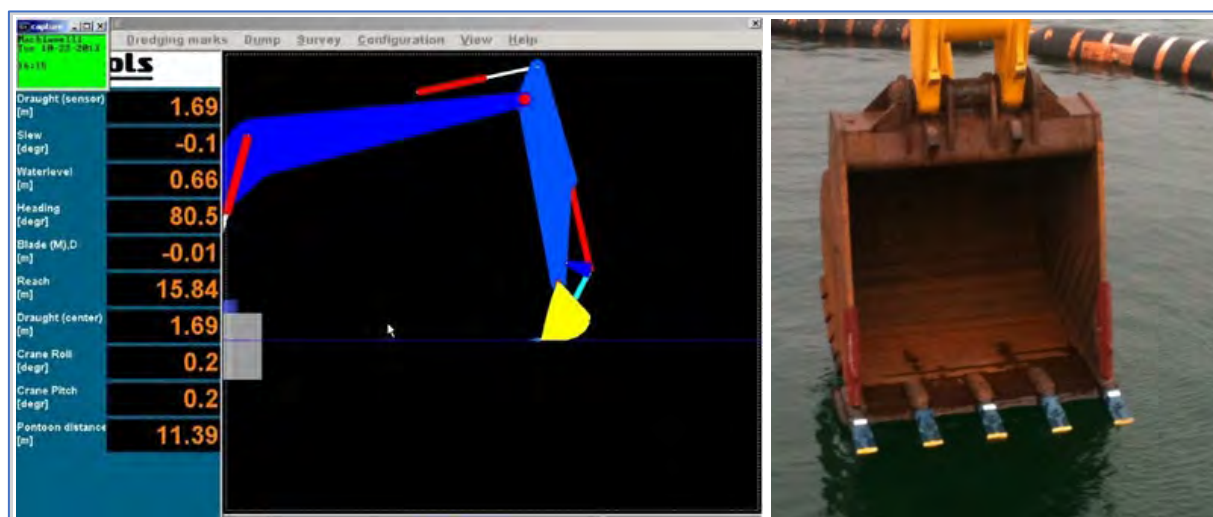


Figure 11.4 Bucket calibration (visual)

## 11.6 SHB dumping

Discharging in the Emplacement Cell will primarily be undertaken with the SHBs remaining hipped up. The tug, prior to discharging the SHB, will reduce speed, maintain Cetacean spotting, and place the load of dredged material in the required cell. The Tug Master will generally hold the SHB into the weather and, once positioned correctly, discharge the load. SHB positional accuracy of +/- 2 metres is achievable.

If material remains in the SHB after it has been discharged, the SHB will be closed prior to leaving the Emplacement Cell and returned to the MBD Site Compound dredge site. Depending on the size of the remaining material build-up, the excavator may be used to dislodge it within the SHB, or the SHB simply reloaded, and the additional material used to drag the build-up out during the next discharge.

All SHBs will be fitted with low pressure flashing strobe lights to alert dredge operators if the SHB is not properly closed.

## 11.7 SHB tracking

The BHD, SHBs and tugs continuously record position in an x, y, z format. Tug and SHB activities are monitored, and track plots are recorded during their transition to and from the Emplacement Cell.

Real time telemetry logging of the SHBs shows location and time of movements, which is backed up to the cloud. Additionally, SHBs are fitted with DGPS and data logger systems. This provides track plots for the SHBs and records the position, elevation, and time that the SHB opened and closed. Tugs and the BHD are equipped with an automatic identification system (AIS).

Print screens of the SHB opening and placing its load are recorded prior to opening, and once they have been closed, they also show the position of all previous placed loads. Figure 11.5 below provides an overview of the information provided on each print screen.

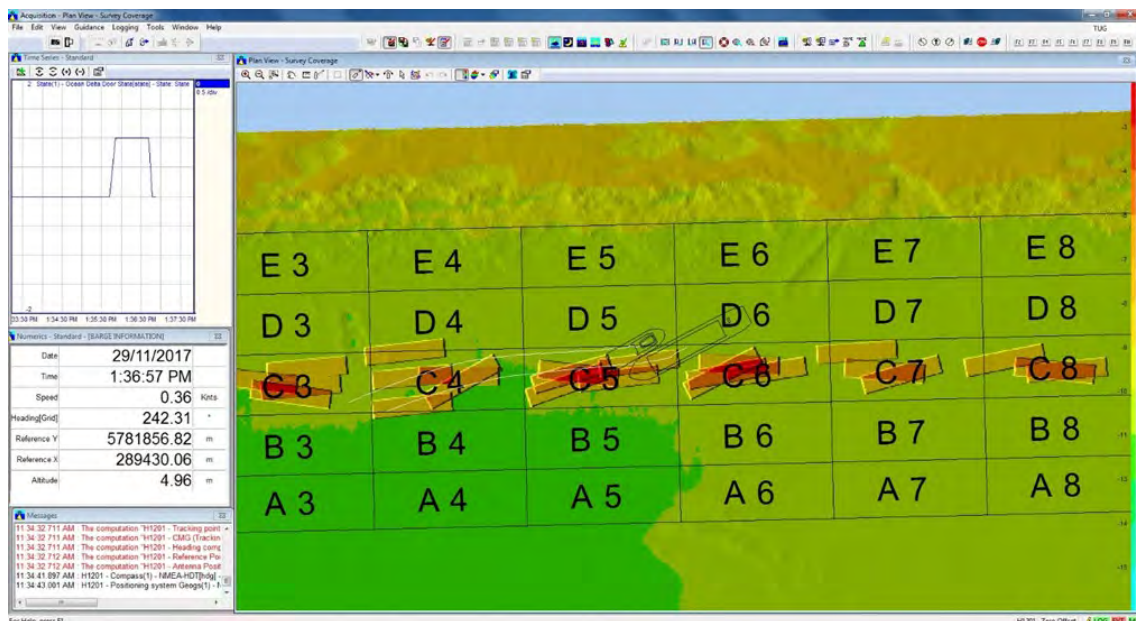


Figure 11.5 SHB opening and placing print screen

SHB track plots are produced in different colour tracks to show their exact movements as they transit between the dredge area and disposal area as indicated in Figure 11.6.

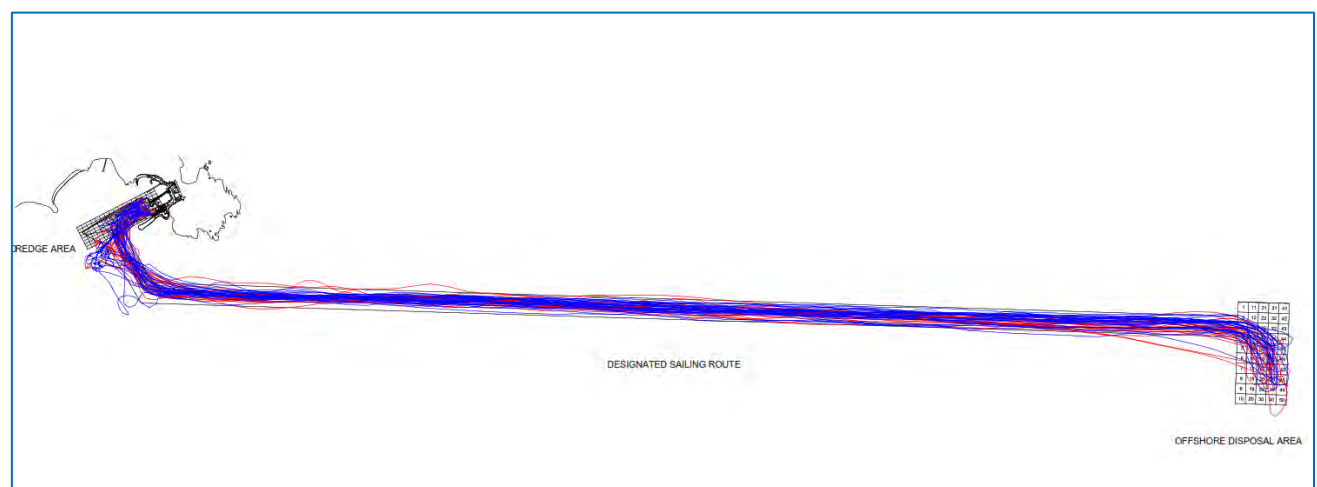


Figure 11.6 SHB track plots

When the SHB is open it also produces a track that show where it has been while open as shown in Figure 11.7.

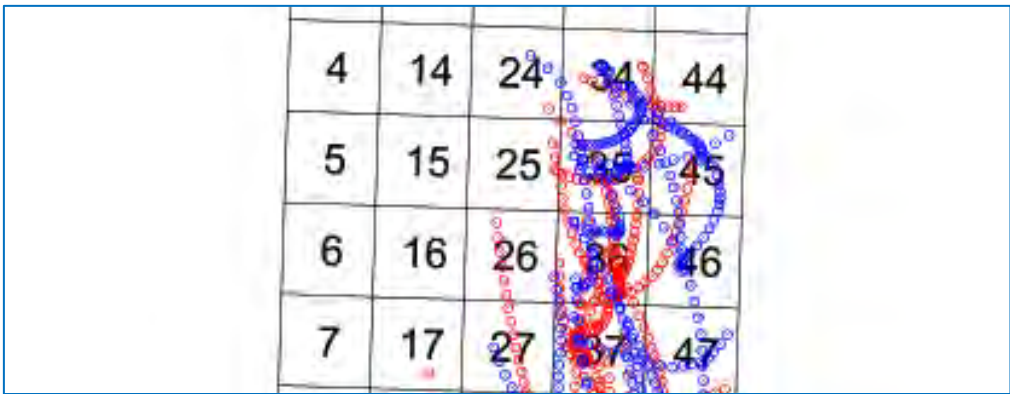


Figure 11.7 SHB open tracks

## 12. Surveys

Survey forms a critical component of the Stage 2A and Stage 2B dredging works. A Survey Project Management Plan will be developed by the Dredging Principal Contractor to inform specific technical information required when undertaking the various surveys discussed below.

All surveys will be carried out using a high resolution Multi Beam Echo Sounder system capable of achieving the required accuracy, precision, bottom coverage, and object detection as required by the specifications. Detailed information regarding equipment specifications, calibrations and Quality Assurance (QA) are included in the Principal Contractor's Survey Project Management Plan.

### 12.1 Pre-dredge survey

The pre-dredge survey will be undertaken using the survey vessel, Kaiwea (refer to Appendix A) by the Dredging Principal Contractor team. Valid calibration procedures are conducted prior to commencing pre-dredge surveys, as detailed in the Survey Project Management Plan.

The pre-dredge survey will establish the existing surface layers and be used to calculate volumes of material removed from the dredge area and unloaded into the Emplacement Cell.

Once verified, the pre-dredge surface layer will be input into all project dredge computers and used for navigation and excavation purposes.

### 12.2 Interim survey

Regular surveys will be conducted by the Dredging Principal Contractor team to monitor progress by comparing current profile to the original benchmark survey. Interim surveys also form the basis for scheduling and payment.

This survey will have full bottom coverage and survey plans in both PDF and 3D DWG formats will be prepared and submitted to the AIE Project team in electronic copy form. The Dredging Principal Contractor will allow for a period of 24 hours for the AIE Project team to review and approve the design.

Interim surveys will extend to the sailing route from the MBD Site Compound dredge area to the Emplacement Cell which will be subjected to the same survey requirements as the dredging areas.

### 12.3 Clearance survey

On completion of all dredging works a clearance survey will be undertaken of the dredge area by the Dredging Principal Contractor team.

## 13. Environmental management

This section outlines the specific environmental management strategies to address potential risks that may arise during the Stage 2A and Stage 2B dredging and excavation works.

### 13.1 Port operations

#### 13.1.1 Interface management

AIE and the Dredging Principal Contractor recognise that the Stage 2A and Stage 2B works have the potential to disrupt port operations and other port users if not carried out in a planned and controlled manner. The following initiatives will be undertaken to ensure the construction works will not significantly impact on port operations:

- Pre-planning and coordination of operations during project initiation phase, e.g., Survey of the site, meetings with stakeholders, acceptance of the management plans approved by DP&E, NSW EPA and PANSW.
- Remaining flexible and able to modify access arrangements, work methods, and/or reschedule works as required, so as not impede the port operations.
- Communication and management of Simultaneous Operations throughout the Stage 2A and Stage 2B delivery e.g., regular meetings.
- Dredging activities are always to remain within the construction area.
- Marine-based activities to be approved and coordinated with the Harbour Master.
- Daily coordination meetings will be held with the AIE HSE Manager and/or Project Manager.
- Where required, Simultaneous Operations meetings will be conducted on a regular basis to provide visibility into work being performed and provide an opportunity for discussion among all stakeholders
- All marine activities will be coordinated through the PANSW VTS, and Project vessels are to be conscious of not interfering with the commercial traffic in the port.
- All marine activities will be carried out in accordance with the approved CTMP and Notice to Mariners and are to be adequately planned and performed safely while the port is operational.

To ensure interface management it is important to effectively manage the timely flow of accurate information across identified interfaces. This requires ensuring that all interface information is properly requested/received and promptly distributed to ensure complete coverage of all interfaces, and that the works of both Contractors involved for Stage 2A and Stage 2B works will be executed in the safest, most efficient, and convenient manner.

#### 13.1.2 Vessel movements

All procedures for vessel movements undertaking dredging activities carried out by the Dredging Principal Contractor will be managed in accordance with the Stage 2A and Stage 2B CTMP.

### 13.2 Underwater obstructions

AIE have identified that underwater obstructions and debris may be encountered during the dredging of the toe trench in the Outer Harbour of a previously demolished wharf. If an obstruction is identified, the AIE Construction Manager and HSE Manager will be immediately notified and the UFP included in the Stage 2A and Stage 2B CSP will be followed. The GPS location of the obstruction and photographs of the obstruction, if possible, will be provided. Records will also detail the date of removal and approximate location where the item was encountered.

Recovery of all debris and obstructions shall be in accordance with the PANSW guidelines and/ or the applicable Statutory requirements. Solid objects, debris and obstructions encountered during dredging may not be disposed of back into the dredge area or any other navigable water, including waters outside of the declared shipping channels.

All obstructions and debris encountered by the dredge are to be placed in designated bins onboard for disposal or recycling. All materials recovered must be disposed of in accordance with the Stage 2A and Stage 2B SMP.



## 13.3 Water quality

Dredging activities have the potential to impact on water quality of the Port Kembla harbour during the Stage 2A and Stage 2B works. Additional information on impacts and mitigation measures related to water quality monitoring is included in the Stage 2A and Stage 2B WQMP.

## 13.4 Fauna interactions

There is potential for marine fauna species (e.g., whales, dolphins, seals, etc.) to be present with the harbour waters during dredging activities being undertaken. Vessel movements have the potential to impact on marine fauna present through collision, accidental release of waste/chemicals and artificial noise emissions. Additional information on impacts and mitigation measures related to marine fauna is included in the Stage 2A and Stage 2B FFMP.

## 13.5 Spoil and waste

As per EPL No. 21529 Condition O5.11, excavated materials and dredged spoil must not be stockpiled in the Emplacement Cell Construction Site except for re-use within the Emplacement Cell.

Mitigation measures to be implemented to manage waste materials generated during dredging activities include the following:

- Hazardous/chemical waste:
  - No waste materials will be disposed of overboard of vessels, all non-biodegradable and hazardous wastes will be collected, stored, processed and disposed of in accordance with the vessel's Garbage Management Plan (as required under Regulation 9 of MARPOL Annex V).
  - Hazardous wastes will be separated, labelled and retained in storage onboard within secondary containment (e.g. bin located in a bund). Solid non-biodegradable and hazardous wastes will be collected and disposed of onshore at a suitable waste facility.
  - Vessel operators will have an up to date SOPEP and SMPEP. All shipboard chemical and hydrocarbon spills will be managed in accordance with these plans by trained and competent crew.
  - Any contaminated material collected will be contained for appropriate onshore disposal. Any equipment or machinery with the potential to leak oil will be enclosed in continuous bunding or will have drip trays in place where appropriate
  - Chemicals and hydrocarbons will be packaged, marked, labelled and stowed in accordance with MARPOL Annex I, II and III regulations. These include provisions for all chemicals (environmentally hazardous) and hydrocarbons to be stored in closed, secure and appropriately bunded areas.
  - All liquid waste to be stored for discharge to an appropriate onshore facility.
  - A Materials Safety Data Sheet (MSDS) will be available for chemicals and hydrocarbons in locations nearby to where the chemicals / wastes are stored.
- General/all other wastes:
  - Appropriate waste containment facilities will be included on site and on board vessels and managed to avoid overflow or accidental release to the environment. All recyclable and general wastes to be collected in labelled, covered bins (and compacted where possible) for appropriate disposal at a regulated waste facility.
  - Following rainfall events, bunded areas on open decks of the vessels or within any construction laydown areas will be cleared of rainwater. All hoses for pumping and transfers will be maintained and checked as per the PMS.
  - All marine vessels will be operated and maintained in accordance with the South Australian Government's Code of practice for vessel and facility management (marine and inland waters) 2008.

Vessels used during dredging operations have the potential to spill fuel/oil and impact the natural environment. The following mitigation measures will be implemented to prevent fuel/oil spill impacts occurring:

- Vessels transporting materials to the Emplacement Cell will be inspected regularly to ensure that no dredged spoil materials leak or are released into water during construction activities.

- Visual observations will be maintained by watch keepers on all vessels and plant/moving machinery.
- All vessels must comply with relevant marine navigation and safety standards (refer to Section 4).
- Marine diesel oil compliant with MARPOL Annex VI Regulation 14.2 (i.e. sulphur content of less than 3.50% m/m) is the only diesel engine fuel to be used by the vessels.
- Oil spill responses will be executed in accordance with the vessel's SOPEP, as required under MARPOL.
- Emergency spill response procedures would be developed and implemented when required (refer to Stage 2A and Stage 2B Emergency Spill Plan).

Additional information on impacts and mitigation measures related to spoil management is included in the Stage 2A and Stage 2B SMP.



# 14. Risk management and emergency response

## 14.1 Risk management

Hazard identification, risk assessment, requirements and controls will be managed in accordance with the Dredging Principal Contractor Workplace Health and Safety Management Plan.

Prior to the commencement of dredging works, a risk workshop will be completed in conjunction with this DEMP, and all relevant parties identified in Table 3.1. This will include, but is not limited to:

- Dredging Principal Contractor team
- AIE HSE Manager
- AIE Environmental Representative
- All construction personnel and subcontractors undertaking dredging work.

Following the risk workshop, Safe Work Method Statements (SWMS) will be developed in consultation with the relevant parties to cover specific risks and controls.

Table 14.1 outlines the SWMS that may be required for the Stage 2A and Stage 2B dredging works. The Dredging Principal Contractor is the responsible party for SWMS development and implementation for the Stage 2A and Stage 2B dredging works.

**Table 14.1** Safe work method statement

| SWMS Title | Activity description                    |
|------------|-----------------------------------------|
| 001        | Dredging Operations                     |
| 002        | Towing non-propelled barges             |
| 003        | Confined Space                          |
| 004        | Deck crane operations                   |
| 005        | Working at heights                      |
| 006        | Transfer of personnel                   |
| 007        | Maintenance                             |
| 008        | Hot works                               |
| 009        | Working at heights on boom              |
| 010        | Hydrographic surveying                  |
| 011        | Bunkering & Transfer of Liquid          |
| 012        | Changing out Hydraulic Cylinder         |
| 013        | Use of Liquid Nitrogen                  |
| 014        | Changing out Hydraulic Cylinder on HB   |
| 017        | Refuelling HB 1201 & 1202               |
| 018        | Sweep Bar and General Vessel Operations |

All personnel will be required to complete the site induction prior to the commencement of works. Operator competency will be recorded, and plant inspections will be undertaken prior to any activity commencing. Daily start up meetings will be conducted and documented by supervisors to ensure all safety measures are in place for the day's activities. Additional information related to international communications and inspections is outlined in Section 15.1 and Section 16.1.

## 14.2 Standard operating procedures

The Workplace Health and Safety Management Plan will outline the procedures, processes and tools required to effectively manage health and safety matters related to the dredging works.

During the risk workshop these controls will be assessed and, where applicable, additional risk controls will be implemented to reduce the risk in so far as reasonably practicable. The additional risk controls will be documented in the Workplace Health and Safety Management Plan .

Table 14.2 details the SOP for the Stage 2A and Stage 2B activities, specifically relating to the dredging works.

**Table 14.2** Safe operating procedures

| Activity               | Specific Activity              | System Controls |
|------------------------|--------------------------------|-----------------|
| Machiavelli operations | General Operations             | SOP-HSE-001     |
|                        | Anchoring                      | SOP-HSE-002     |
|                        | Generators                     | SOP-HSE-003     |
|                        | Bunkering & Refuelling         | SOP-HSE-004     |
|                        | Bilge Pumping                  | SOP-HSE-005     |
|                        | Fire Response                  | SOP-HSE-006     |
|                        | Isolation                      | SOP-HSE-007     |
|                        | MOB                            | SOP-HSE-008     |
|                        | Abandon Ship                   | SOP-HSE-009     |
|                        | Changing Bucket Teeth          | SOP-HSE-010     |
|                        | Environmental Spill Response   | SOP-HSE-011     |
|                        | Emergency Fire Pump            | SOP-HSE-012     |
|                        | Emergency Response             | SOP-HSE-013     |
|                        | Taking Slack out of Spud Wires | SOP-HSE-014     |
|                        | Hydraulic System               | SOP-HSE-015     |
|                        | Split Hopper Operations        | SOP-HSE-016     |
|                        | Transfer of Personnel          | SOP-HSE-017     |
|                        | Configuration Change           | SOP-HSE-018     |
|                        | Bucket Change                  | SOP-HSE-020     |
|                        | Mooring Vessels                | SOP-HSE-021     |
| Tug operations         | Transfer of Personnel          | SOP-HSE-017     |
|                        | Mooring Vessels                | SOP-HSE-021     |
|                        | Split Hopper Operations        | SOP-HSE-016     |

## 14.3 Emergency response

The Dredging Principal Contractor has developed an Emergency Response Plan for the Stage 2A and Stage 2B works related to dredging activities. Specific rescue and retrieval plans will be developed and implemented into the Emergency Response Plan .

Crews of all vessels will participate in regular drills for all emergency scenarios. Applicable vessels will have an approved SOPEP developed and implemented. The following sections outline the various drills and emergency responses construction personnel will participate in and will be included in the Emergency Response Plan .

### 14.3.1 Vessel emergency response

Applicable vessels have an on-board detailed safety plan as per survey requirements. The plan indicates the positions, quantities and types of safety and emergency response equipment located on-board the vessel. This safety plan is displayed in dedicated positions on-board that is accessible to all crew and visitors.

All lifesaving, firefighting and other emergency equipment will be supplied and in accordance with the vessels survey requirements. All equipment required will be maintained and inspected in accordance with applicable international standards, requirements of survey authorities and State legislative regulations. All personnel that have been through the induction process will be supplied with the applicable instructions and make themselves fully conversant with these instructions.

Drills will be conducted in accordance with each vessels SMS manual.

In the event of an emergency on any vessel, the most senior person on board is responsible for implementing emergency procedures. The most senior person on the tug is the Vessel Master and on the Machiavelli BHD is the Dredge Superintendent /Supervisor.

### 14.3.2 Emergency drills

The following drills will be undertaken during the Stage 2A and Stage 2B dredging activities:

- Person overboard drill.
- Medical emergency drill.
- Marine pollution drill.
- Collision drill.
- Abandon ship drill.

Emergency drills will be undertaken during the first week of the dredging activities and then ongoing as per the drill schedule. Drill information will be recorded on the Dredging Principal Contractor Emergency Drill Record Form to capture information related to drills such as timing and any actions requiring to be undertaken following the drill. Additional information on emergency drills is included in the POMP.

### 14.3.3 Diving

Diving activity may be required to be carried out during the Stage 2A and Stage 2B works, to carry out vessel repairs and cleaning, pile removal, cleaning of the quay wall, rock placement and as required during construction activities. A risk assessment will be undertaken and the Dredging Principal Contractor and AIE HSE Manager will ensure all applicable statutory requirements and approvals are strictly applied to and finalised prior to the diving activity being undertaken. Any diving required will be undertaken in accordance with the AS/NZS 2299.1 -2007 Occupational Diving Operations Part 1: Standard Operational Practice.

No diving activities will be undertaken in shipping areas without the prior approval from the Harbour Master and PANSW. The Port Kembla Authority to Dive Form will be submitted to the PANSW. Prior to the commencement of diving work a Dive Safety Plan will be prepared and submitted to the AIE HSE Manager and other applicable agencies.

## 15. Communication and complaints

Effective communication between the Project Director, Project team, contractors and external stakeholders will be undertaken throughout the Project to ensure effective implementation of this DEMP and associated Sub - plans.

Project communication can be categorised into internal and external communications, as well as communications specifically dealing with complaints. The specific communication methods for each category are discussed below.

### 15.1 Internal communications

Communication on environmental issues within the Project team will be maintained, as a minimum, through the following forums (organiser as noted):

- Weekly project construction team meetings (AIE Construction Manager or delegate).
- Periodic Environmental management team meetings with relevant contractors (AIE HSE Manager or Delegate).
- Toolbox talks and daily pre-start briefings (Principal Contractor Project Manager or delegate).
- Minutes of formal meetings will be taken and distributed to record issues raised and actions required, with action status established at subsequent meetings.
- Monthly review of the internal AIE Environmental Compliance Tracking register (AIE HSE Manager or delegate).

All internal meetings include appropriate documentation in the form of agenda and formal distribution via the Project's document system.

In addition to the above, the AIE Environment Team will also undertake informal planning sessions and resource review meetings to plan and forecast for upcoming key construction dates, critical issues and other relevant matters associated with environmental planning and approvals.

### 15.2 External communications

AIE is committed to keeping the local community and relevant agencies informed about the development of the Project. The principal external communication objectives are, therefore, to:

- Continue to maintain open communication with relevant stakeholders.
- Minimise environmental impacts.
- Be proactive in addressing any concerns that the community / external stakeholder may express.

AIE will build upon the stakeholder and community engagement phase undertaken during project development including multiple group or one on one briefings. A Project website ([www.ausindenergy.com](http://www.ausindenergy.com)) has been developed and provides comprehensive, clear, and accessible information that is updated on a regular basis.

As well as the local Port Kembla and broader community of the Wollongong region, extensive engagement was also undertaken with a range of other interested key stakeholders, such as local commerce organisations, the PANSW and local and state government.

Consultation with key stakeholders and the wider community on the Project will continue throughout Stage 2A and Stage 2B and subsequent construction phases. These measures will ensure the stakeholders, including the wider community, remain informed of the Project's progress.

Key methods of engagement are provided in the Stage 2A and Stage 2B EMS.

### 15.3 Complaints management

All complaints where a third party has identified a construction activity as being unsatisfactory or unacceptable will be dealt with promptly and efficiently in accordance with the complaint and dispute response outlined in the Project's Stage 2A and Stage 2B EMS.

AIE will operate a free 24-hour Community Information Line (1800 789 177) where members of the community can leave details about an inquiry they may have regarding construction activities and this message will be passed on to site personnel and/or the Stakeholder Engagement Team, as appropriate. The phone number is listed on the AIE website (<https://ausindenergy.com/contact-us/>) and will be provided on all community newsletters. The AIE HSE Manager has notified the Port Kembla Harbour Environment Group of the Community Information Line.

Initial responses to complaints will be provided within 24 hours of the complaint being received. As part of the response, a review of the activity will be undertaken. If required and possible, immediate changes will be made to reduce any impact on the community. In some cases, the issues cannot be resolved immediately, and ongoing actions might be required to resolve the issue.

All complaints will be recorded in a Complaints and Disputes Register. The following information will be recorded for each complaint:

1. The date and time of the complaint.
2. The method by which the complaint was made.
3. Any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect.
4. The nature of the complaint.
5. The action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant.
6. If no action was taken by the licensee, the reasons why no action was taken.

The Complaints and Disputes Register will be maintained by the Project's HSE Manager or delegate, and will detail what the issue was, initial response provided, how and when the issue was resolved, and by whom. Records will be kept for at least four years after the complaint was made and will be produced on request by any authorised officer of the EPA.

Where resolving a complaint with a third party is protracted or develops into a dispute, the AIE HSE Manager shall escalate proactively to Senior Project Leadership (e.g., AIE Project Manager and/or Project Director) to assist with resolution. AIE will work proactively with the complainant to resolve the dispute including having face to face meetings, site familiarisation sessions and agreeing on actions to resolve the dispute. All communications and agreed actions shall be documented.

For the management and reporting of corrective actions (which may be required in response to a complaint), refer to the Project's Stage 2A and Stage 2B EMS.

## 16. Inspections, monitoring and audits

Monitoring and auditing will be undertaken to determine the impact on the environment and identify opportunities for improvement. Monitoring to be implemented for specific actions or environmental issues (e.g., water quality monitoring, air quality monitoring) will be detailed in their relevant Sub - plan and will specifically address the monitoring requirements for those issues.

### 16.1 Environmental inspections

#### 16.1.1 AIE and Principal Contractor joint environmental inspection

As a minimum, the AIE HSE Manager (or nominated delegate) will undertake periodic inspection of the work sites with the relevant Principal Contractor's environmental personnel (Environmental Representative or similar) to evaluate the effectiveness of environmental controls (inclusive of erosion and sediment control measures) and general compliance with the implementation of the EMS (and associated Sub - plans) for site-based activities.

If any maintenance and / or deficiencies in environmental controls or in the standard of environmental performance are observed, they will be recorded on the checklist form. Records will also include details of any maintenance required, the nature of the deficiency, any actions required and an implementation priority.

Actions raised during inspections will be documented on the *Environmental Site Checklist* and will be issued formally through the Project's document management system to the relevant Contractor for action. If they represent an actual or potential significant environmental risk, these issues shall be reviewed at the Project Planning meetings and will have non - compliances raised if not closed out in the nominated timeframe (Non-compliance Report).

#### 16.1.2 Contractor environmental inspections

In addition to the joint periodic environmental site inspection with AIE, the Principal Contractors will be required to undertake daily site environmental inspections, targeting key environmental risks commensurate with the activity being undertaken. The daily environmental site inspection will be documented on a checklist or similar to be prepared and completed by the Principal Contractors.

Copies of the environmental site inspection records are to be provided to AIE on request.

The HSE Manager is responsible for the initial reporting of significant non-compliances with the DEMP or relevant legislation to the AIE Project Director and government authorities (refer to Section 17).

#### 16.1.3 EPL inspection requirements

In accordance with Condition O4.4 of the EPL No 21529, the Contractors will undertake wet-weather inspections daily during periods of rainfall and within 24 hours of cessation of a rainfall event causing runoff to occur on or from the premises (based on site observation, this equates to 20 millimetres of rainfall in a 24-hour period).

Daily inspections of water pollution controls will be undertaken in accordance with Condition M.10.1 of the EPL No 21529 and recorded. Records will include the date and time of inspection, location of dredging operations and conditions of silt curtains and other water pollution controls. Records will be produced to an EPA authorised officer on request.

The Principal Contractors must record all such inspections including observations and works undertaken to repair and / or maintain erosion and sediment controls.

## 16.2 Monitoring

Monitoring will be undertaken to validate the impacts predicted for the work, to measure the effectiveness of management plans, environmental controls, and implementation of this DEMP, and to address approval requirements.

Monitoring requirements applicable to the DEMP include:

- Odour and air quality during handling of sediments and stored materials.
- Condition of silt curtains and water pollution controls.

## 16.3 Auditing

AIE will conduct internal audits at frequencies as determined in the risk-based auditing schedule. The purpose of auditing is to verify compliance with:

- This DEMP.
- Compliance with the requirements of relevant components to this DEMP, including but not limited to, site inspection compliance, document control / management, non-compliance, and incident management etc.
- Monitoring and reporting requirements as set out under EPL No. 21529.

The undertaking of the internal audits will be in accordance with the Project's risk-based internal audit schedule, developed to assess the risk associated with various audit elements with an assigned auditing frequency based on perceived risk.

A brief audit report / table will be prepared for each internal audit, documenting the audit outcome and compliance status against each of the key elements of the audit. The purpose of the internal audits is to assist in the identification of non-conformances and environmental management gaps, with an overall objective of identifying improvement opportunities and driving a process of continual improvement. Any observed non-conformances and improvement opportunities will be managed in accordance with Section 16.6.

On completion of the Stage 2A and Stage 2B dredging, excavation and disposal works, AIE will advise the site auditor, Melissa Porter of Senversa, and a Section A Site Audit Statement will be issued confirming the suitability of the site for its intended use.

## 16.4 Environmental reporting

### 16.4.1 DP&E reporting

Regular reports on compliance and other matters will be provided during the construction phase of the Project. This will include reporting to DP&E in accordance with Schedule 4, Conditions 7 and 8 of the Infrastructure Approval (SSI 9471), with specific reference to the *Compliance Reporting Post Approval Requirements* (2020).

In addition, DP&E will be notified in writing of the date of commencement of each of the relevant phases of the Project in accordance with Schedule 2, Condition 8 of the Infrastructure Approval (SSI 9471).

Reporting applicable to this DEMP will consist of:

- Water and air quality monitoring results.
- Requirements of EPL No. 21529.
- Construction works progress and appraisal of water, air, and spoil management quality controls.
- Environmental Incident Report(s), as required.
- Annual returns, as required by EPL No. 21529.

### 16.4.2 Other reporting requirements

A monthly environmental monitoring report will be developed for each calendar month which will include details of the monitoring results and frequencies and inclusion of any exceedance of EPL No. 21529 limits / criteria. A copy of the monthly environmental monitoring report will be made available on the AIE Project website.

Further reporting requirements are provided in Section 16.6 and Section 17.

## 16.5 Compliance tracking register

A Compliance Tracking Register has been developed as a monitoring tool to assist with the compliance reporting requirement as set out under Condition 7, Schedule 4 of the Infrastructure Approval (SSI 9471).

The compliance tracking register includes a breakdown of the requirements from the following key approval and Project documents:

- Infrastructure Approval (SSI 9471).
- EPL No. 21529.
- EMS and Sub - plan requirements.
- *Compliance Reporting Post Approval Requirements* (DPIE, 2020), or its most recent edition.

The Compliance Tracking Register includes tabulation of reference conditions, the requirements, responsibility, status (i.e., ongoing, close - out, not triggered, etc.) and supporting evidence where required.

A routine review of the Compliance Tracking Register is undertaken by the AIE HSE Manager (or delegate) with input sought from the relevant contractors as required. The Compliance Tracking is a live document which is kept up to date for each stage of the construction works.

## **16.6 Non - compliance, corrective, and preventive actions**

Non - compliances or potential non - compliances are situations or events that do not comply with the safeguards and procedures stipulated in the EMS or this DEMP.

Non - compliances or potential non-compliances may be identified in any of the following situations:

- As part of site inspections, supervision or monitoring of construction activities.
- During internal audits.
- Following justified / supported verbal or written third party complaints.

All non - compliances related to dredging and disposal activities will be managed and reported using the non - compliance function of the Project's document management system. Each non - compliance event and follow-up action will be documented and traceable, including identification of key dates and responsible personnel.

Additional details regarding corrective and preventative actions are outlined in the Project's Stage 2A and Stage 2B EMS.

The Department must be notified in writing via the Department's Major Projects Website within seven days after the identification of any non - compliance issue. 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.



# 17. Incident management and emergency response

## 17.1 Incident management

### 17.1.1 Overview

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 non-compliance. The consequences of such incidents may result in material environmental harm, damage, or asset loss. 'Near misses' are extraordinary events that could have reasonably resulted in an incident.

All incidents related to dredging and disposal, including those of the Principal Contractors, its subcontractors, and visitors that occur during the undertaking of the construction works for the Project will be managed to satisfy the requirements of AIE's Incident Reporting and Investigation System Requirements. Whilst it is noted that key Contractors will be implementing their own environmental management system procedures and processes, AIE will be responsible for ensuring that these systems and processes satisfy the requirements of the AIE EMS, including the incident management components. The Principal Contractors will be responsible for providing all necessary documentation with regards to the incident investigation and close - out actions where required. The timing of the provision of this documentation is to align with the AIE requirements.

The AIE HSE Manager must be notified immediately of any environmental incident or near miss related to dredging and disposal. These may include, but are not limited to the following:

- Silt curtain failure.
- Exceedance of monitoring criteria as required under the Project EPL (EPL No. 21529) (refer to the individual Sub - Plans for specific criteria and incident reporting requirements for individual environmental aspect such as air quality, water quality, traffic management, waste and resource management and noise and vibration management).
- Spill of any dangerous goods or hazardous substance to ground or water.
- Substantiated complaints received from members of the community or regulatory authorities.
- Regulatory breaches such as fines, prosecutions, improvement notices, breaches of licence conditions.
- All incidents of third-party property damage or loss.
- Incidents involving impact or potential damage to items or places of cultural heritage significance.
- Land-based off-site sediment loss to the environment, including sediment tracking onto the roadway.

The AIE HSE Manager will be responsible for regulatory notification of all notifiable environmental incidents (refer to Section 17.1.1 for notifiable incidents). All environmental incidents will be reported immediately to DP&E in writing via the Department's Major Projects Website after AIE becomes aware of the incident, as per Schedule 4 Condition 5 of the Infrastructure Approval (SSI 9471). The notification must identify the development, including the application number, and set out the location and nature of the incident.

In the event of a notifiable non - compliance incident arising, the Principal Contractors will notify the AIE HSE Manager immediately to allow the AIE HSE Manager to notify DP&E in writing via the Department's Major Projects Website within seven days of AIE becoming aware of the non - compliance, as per Schedule 4 Condition 6 of the Infrastructure Approval (SSI 9471). 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.

### 17.1.2 Notifiable incident under the POEO Act

In the event of a Notifiable Incident as defined under the POEO Act, AIE is responsible for immediately notifying the EPA, and any other relevant authority, of pollution incidents on or around the site via the EPA Environment

Line (telephone 131 555) in accordance with Part 5.7 of the POEO Act. The circumstances where this will take place include:

- *If the actual or potential harm to the health or safety of human beings or ecosystems is not trivial.*
- *If actual or potential loss or property damage (including clean-up costs) associated with an environmental incident exceeds \$10,000.*

Follow-up written notification to the EPA and any other relevant authorities will be required in accordance with the POEO Act and requirements of the EPA. This includes the provision of written details of the notification to the EPA within seven days of the date on which the incident occurred.

All notifiable incidents will also be managed, documented, and reported in accordance with the AIE *Incident Reporting and Investigation System Requirement*.

In addition, an authorised officer of the EPA has the right to request a written report (in accordance with Condition R3 of the EPL No. 21529) if they suspect on reasonable grounds that an event has occurred at the licensed premises which has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies). The written report is to address all the requirements under Condition R3 of the EPL.

### 17.1.3 Notifiable incident under the Infrastructure Approval (SSI-9471)

In accordance with Condition 5 of Schedule 4, DP&E must be notified in writing via the Department's Major Projects Website immediately after AIE becomes aware of an incident on site.

Additional details regarding notifiable incidents and procedures are outlined in the Project's Stage 2A and Stage 2B EMS.

## 17.2 Emergency response

Actual or potential emergency situations will vary in type and severity. The required level of response and notification will be at the discretion of the AIE Construction Manager in consultation with the AIE HSE Manager.

Any emergency situation may require only isolated containment and control or may require the complete evacuation of the site and notification of relevant emergency services. Consideration should be made of the response requirements for different situations. If at any time there is uncertainty on how to proceed, response should be for the worst possible scenario. Ultimately, the AIE Construction Manager or representative has authority and responsibility to instigate an evacuation if he/she feels it is warranted.

In the event of an emergency, the following plans listed in Table 17.1 shall be consulted and implemented, as relevant.

Table 17.1      *Emergency plans*

| Plan                                               | Reference        | Application                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Principal Contractor Local Emergency Response Plan | -                | Principal Contractor's emergency response plan implemented in the event of any incident occurring during a Project activity as per the Contractor's policies and management framework.                                                                                                                                                                           |
| AIE Port Kembla Gas Terminal Emergency Spill Plan  | PKGT-AIE-PRO-039 | Developed as a Sub - plan to the EMS to be implemented detailing: <ul style="list-style-type: none"><li>– Response plans in the event of land or water-based spill events.</li><li>– Inspections, notification, and incident management requirements in accordance with the Infrastructure Approval (SSI 9471) and EPL No 21529 in relation to spills.</li></ul> |
| PIRMP                                              | PKGT-AIE-PRO-007 | Implemented immediately in the event of a pollution incident occurring during a Project activity. The PIRMP: <ul style="list-style-type: none"><li>– Outlines the actions to be taken during or immediately after a pollution incident.</li></ul>                                                                                                                |

| Plan                                | Reference        | Application                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     |                  | <ul style="list-style-type: none"> <li>– Lists details of relevant authorities to be notified, as required.</li> <li>– Outlines community and neighbour notification details, as required.</li> </ul>                                                                                                                                                                                                                                             |
| AIE Emergency Management Procedures | PKGT-AIE-PRO-014 | <p>Implemented immediately in the event of any emergency incident occurring during the Project. Procedures include:</p> <ul style="list-style-type: none"> <li>– Types of emergencies and the detailed steps to be taken in response.</li> <li>– Notification details to relevant authorities and AIE Project team.</li> <li>– Incident response to follow up from incident and preventative actions to be implemented, if applicable.</li> </ul> |

## **18. Document management and review**

### **18.1 Record management**

Records and registers specified in this DEMP for Stage 2A and Stage 2B shall be maintained. Records to be kept may include but will not be limited to the following:

- Environmental Inspection Checklist.
- Environment Reporting.
- Environmental Monitoring Reports / Records.
- Fauna and Weed Register.
- Internal Audit Reports.
- Incident Reports and Register.
- Toolbox Talk Records.
- Induction Presentation and Register.
- Environmental Activities SWMS.
- Corrective Actions Register.
- Waste and Resource Register.
- Material Tracking Register.
- Training Register / Matrix.
- Complaints Register.

### **18.2 Review and revision of DEMP**

This DEMP will be reviewed and updated, as required under Condition 3 of Schedule 4 of Infrastructure Approval (SSI 9471) to ensure the objectives of the applicable approval conditions contained within are being met throughout Stage 2A and Stage 2B.

In addition, as required under Condition 4 of Schedule 4 of Infrastructure Approval (SSI 9471), the EMS and associated Sub - plans must be reviewed, and if necessary, revised within three months (unless otherwise agreed with DP&E) for any of the following:

- Following the submission of an incident report as per Condition 5, Schedule 4 in Infrastructure Approval (SSI 9471) (refer to Section 17).
- Following approval of any modification to the conditions of approval outlined in Infrastructure Approval (SSI 9471).
- At the direction of the Planning Secretary as per Condition 4, Schedule 2 in Infrastructure Approval (SSI 9471).

Where a review leads to a revision of this plan, within four weeks the revised DEMP will be submitted to the Planning Secretary for approval unless otherwise agreed with the Planning Secretary.

### **18.3 Access to information**

AIE will make the following information publicly available on the PKGT website, as per Schedule 4, Condition 12 of the Infrastructure Approval (SSI 9471) and the requirements as set-out under the Project EPL (No. 21529):

- The PKGT EIS.
- Current statutory approvals for the Project.
- Approved strategies, plans or programs required under the conditions of Infrastructure Approval (SSI 9471).

- A comprehensive summary of the monitoring results of the development, reported in accordance with the specification of any conditions, or any approved plans and programs relating to Infrastructure Approval (SSI 9471).
- A summary of complaints (updated monthly).
- Any independent environmental audit, and responses to the recommendations in any audit.
- The approved premises map (EPL No. 21259, Condition A2.4).
- PIRMP (EPL No. 21529, Condition E2).
- Any other matter required by the Planning Secretary.

This information will be kept up to date by AIE when required.

# References

AMSA 2020, National Plan for Maritime Environmental Emergencies.

AS/NZS 2299.1 -2007 Occupational Diving Operations Part 1: Standard Operational Practice.

BOM 2021, Mean High Water and Mean Low Water for monthly sea levels for Port Kembla 1975 – 2021, [http://www.bom.gov.au/ntc/IDO70000/IDO70000\\_60420\\_SLD.shtml](http://www.bom.gov.au/ntc/IDO70000/IDO70000_60420_SLD.shtml).

DAWE 2020, Australian Ballast Water Management Requirements.

DAWE 2009, National biofouling management guidelines for non-trading vessels.

DPIE 2020, Compliance Reporting Post Approval Requirements.

DSITIA 2014, Queensland Acid Sulfate Soils Technical Manual: Soil Management Guidelines.

Environmental Protection Licence No. 21529, dated 3 December 2021.

GHD 2018, Port Kembla Gas Terminal Environmental Impact Statement.

GHD 2018a. Contamination Assessment Report for Berth 101, Proposed Port Kembla Gas Terminal.

GHD 2021a, Baseline Contamination Assessment. Southern Part of Lot 22 DP 1128396, Port Kembla.

GHD 2021b, Port Kembla Gas Terminal. Additional Targeted Investigation – Berth 101.

GHD 2021c, Environmental Condition Report (Outer Harbour Laydown Areas) Site 2 and Site 3.

Heron 2021, Port Operations Management Plan.

ICSM 2018, Australian Tides Manual Special Publication No 9 Version 5.

IMO 1990, International Convention on Oil Pollution Preparedness, Response and Co-operation.

IMO 2000, Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances.

IMO 2011, Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species Resolution MEPC.207 (62).

Infrastructure Approval SSI 9471 dated 13 October 2021.

Roads and Maritime Services 2016, NSW State Waters Marine Oil and Chemical Spill Contingency Plan.

SMEC 2022, Port Kembla Gas Terminal Development – Emplacement Cell Report.

**UN General Assembly** 1982, Convention on the Law of the Sea.

# Appendices

# **Appendix A**

**Dredging plant and equipment  
specification sheets**



## **A-1 Plant and equipment specifications**

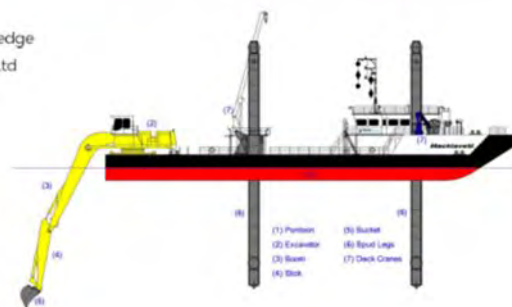
- A-1-1 Machiavelli Backhoe dredge
- A-1-2 Non-propelled Split Hopper Barges
- A-1-3 PT May (Tug)
- A-1-4 Mesenge unloading barge
- A-1-5 Kaiwea (survey vessel)

# MACHIAVELLI

## Backhoe Dredger



**Name:** Machiavelli  
**Type:** De Donge 'D' Type Backhoe Dredge  
**Operators:** Heron Construction Company Ltd  
**Port of registry:** Auckland, New Zealand  
**Class:** Lloyd's Register  
**MNZ #:** 131883  
**Official Number:** 876411  
**Year built:** 2005  
**Gross tonnage:** 648  
**Displacement:** 1,200 tonne  
**Length overall:** 53.0m  
**Breadth:** 15.0m



**Excavator:** Liebherr P994  
**Max dredge depth:** 23.0m  
**Monobloc (boom) length:** 16.0m, 19.0m  
**Stick (dipper) lengths:** 4.0m, 5.6m, 8.0m and 9.5m  
**Bucket sizes:** 4.0m<sup>3</sup>, 5.0m<sup>3</sup> and 5.7m<sup>3</sup>, 6.0 m<sup>3</sup>  
**Clamshell sizes:** 3.5 m<sup>3</sup> Heavy duty and 6.0m<sup>3</sup> Environmental  
**Dredging control:** DipMate v3 by Seatools  
**Position and height control:** Twin 5700 Trimble RTK GPS  
**Aft spuds:** Two @ 30m long x 60 tonne each  
**Forward spuds:** One @ 30m long x 60 tonne in carrier  
**Spud carrier stroke:** 7.5m  
**Jackup capacity:** 780 tonnes

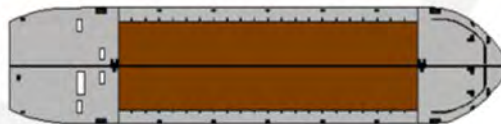


# H1201 & H1202

## Non-propelled Split Hopper Barges



|                               |                                   |
|-------------------------------|-----------------------------------|
| Names:                        | H1201 & H1202                     |
| Type:                         | Non propelled, Split Hopper Barge |
| Class:                        | Lloyd's Register                  |
| Official Numbers:             | 876380 & 876384                   |
| MNZ Numbers:                  | 135367 & 135368                   |
| Operators:                    | Heron Construction Company Ltd    |
| Port of registry:             | Auckland, New Zealand             |
| Year Built:                   | 2015                              |
| Manoeuvring:                  | Stern tunnel thruster             |
| Thruster Power:               | Cummins QSM 11 (425hp)            |
| Hopper capacity:              | 1200m <sup>3</sup>                |
| GRT:                          | 1148                              |
| Length overall:               | 66.2m                             |
| Breadth moulded:              | 12.0m                             |
| Draft loaded:                 | 4.25m                             |
| Draft lightships:             | 1.5m                              |
| Displacement lightships:      | 750 tonne                         |
| Hopper dimensions at coaming: | 39.6m x 9.0m                      |
| Hopper bottom opening:        | 3.6m (max.)                       |





**P.T. MAY**



| PRINCIPAL PARTICULARS |                                                     | PROPULSION MACHINERY                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                   |
|-----------------------|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Vessel Type           | <b>Twin Screw Tug</b>                               | Main Engines                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>2 x Cummins KTA-19-M3</b>                                                      |
| Year Built            | <b>2011</b>                                         | Power Rating                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>2 x 447 kW (1200 HP)</b>                                                       |
| Flag                  | <b>Australian</b>                                   | Gearboxes                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>6.10 : 1 ratio</b>                                                             |
| Operational Area      | <b>AMSA 2B</b>                                      | Propellers                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>1800mm 4 blade Manganese Bronze</b>                                            |
| Class                 | <b>GL</b>                                           | Steering Gear                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Independent steering nozzles – Electro hydraulic</b>                           |
| GRT / NRT             | <b>54 / 14</b>                                      | AUXILIARY EQUIPMENT                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                   |
| Speed (free run)      | <b>10 Kts</b>                                       | Generator                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>1 x 180 kW (6CT Cummins), 1x 80kW (6BT Cummins)</b>                            |
| Accommodation         | <b>4 persons. All spaces air con</b>                | Capacity                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>80 kW 415/230 volts</b>                                                        |
| Bollard Pull          | <b>17.0 tonne (continuous) 18.9 tonne (maximum)</b> | Fuel Transfer p/p                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>1 x 15m<sup>3</sup> / hr</b>                                                   |
| Length OA             | <b>15.0 mtrs</b>                                    | DECK EQUIPMENT                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                   |
| Breadth               | <b>6.50 mtrs</b>                                    | Towing Hook                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Fitted with emergency release</b>                                              |
| Depth                 | <b>2.75 mtrs</b>                                    | Towing Winch                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>10T line pull Electric with 65t brake, remote opp, full electronic control</b> |
| Summer Draft          | <b>2.00 mtrs</b>                                    | Drum Capacity                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>36mm WRC x 600 mtrs</b>                                                        |
| Summer Displacement   | <b>114 tonnes</b>                                   | Capstan                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>5T on bow</b>                                                                  |
| Light Ship            | <b>82 tonnes</b>                                    | Stern Roller                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>400mm with towing pins and Shark Jaws 65T SWL</b>                              |
| Fuel Capacity         | <b>21,000 ltrs</b>                                  | COMMENTS                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                   |
| Fuel Consumption      | <b>4m<sup>3</sup> / day</b>                         | <p>Compact design with a large amount of flexibility and function, built to Australian standard and classed by GL for USL 2B. Independent steering nozzles, highly manoeuvrable and high horsepower for length. Very effective for in close operations, including smaller ship assist roles. Effective towing vessel, construction and dredging support vessel, setup for anchor relocation. Electronic chart system, AIS equipment.</p> |                                                                                   |
| F/water Capacity      | <b>2,800 ltrs</b>                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                   |

P.T. MARY



PRINCIPAL PARTICULARS

|                     |                                                     |
|---------------------|-----------------------------------------------------|
| Vessel Type         | <b>Twin Screw Tug</b>                               |
| Year Built          | <b>2011 / 2012</b>                                  |
| Flag                | <b>Australian</b>                                   |
| Operational Area    | <b>AMSA 2B</b>                                      |
| Class               | <b>GL</b>                                           |
| GRT / NRT           | <b>54 / 14 (est)</b>                                |
| Speed (free run)    | <b>10 Kts</b>                                       |
| Accommodation       | <b>4 persons. All spaces air con</b>                |
| Bollard Pull        | <b>17.0 tonne (continuous) 18.9 tonne (maximum)</b> |
| Length OA           | <b>15.00 mtrs</b>                                   |
| Breadth             | <b>6.50 mtrs</b>                                    |
| Depth               | <b>2.75 mtrs</b>                                    |
| Summer Draft        | <b>2.00 mtrs</b>                                    |
| Summer Displacement | <b>114 tonnes</b>                                   |
| Light Ship          | <b>82 tonnes</b>                                    |
| Fuel Capacity       | <b>21,000 ltrs</b>                                  |
| Fuel Consumption    | <b>4m<sup>3</sup> / day</b>                         |
| F/water Capacity    | <b>2,800 ltrs</b>                                   |

PROPULSION MACHINERY

|               |                                                         |
|---------------|---------------------------------------------------------|
| Main Engines  | <b>2 x Cummins KTA-19-M3</b>                            |
| Power Rating  | <b>2 x 447 kW (1200 HP)</b>                             |
| Gearboxes     | <b>6.10 : 1 ratio</b>                                   |
| Propellers    | <b>1800mm 4 blade Manganese Bronze</b>                  |
| Steering Gear | <b>Independent steering nozzles – Electro hydraulic</b> |

AUXILIARY EQUIPMENT

|                   |                                                         |
|-------------------|---------------------------------------------------------|
| Generator         | <b>1 x 180 kw (6CT Cummins), 1x 80 kw (6BT Cummins)</b> |
| Capacity          | <b>80 kW 415/230 volts</b>                              |
| Fuel Transfer p/p | <b>1 x 15m<sup>3</sup> / hr</b>                         |

DECK EQUIPMENT

|               |                                                                                   |
|---------------|-----------------------------------------------------------------------------------|
| Towing Hook   | <b>Fitted</b>                                                                     |
| Towing Winch  | <b>10T line pull Electric with 65t brake, remote opp, full electronic control</b> |
| Drum Capacity | <b>36mm WRC x 600 mtrs</b>                                                        |
| Capstan       | <b>5T on Bow</b>                                                                  |
| Stern Roller  | <b>400mm with towing pins and Shark Jaws 65T SWL</b>                              |

COMMENTS

Sister vessel to the PT May.

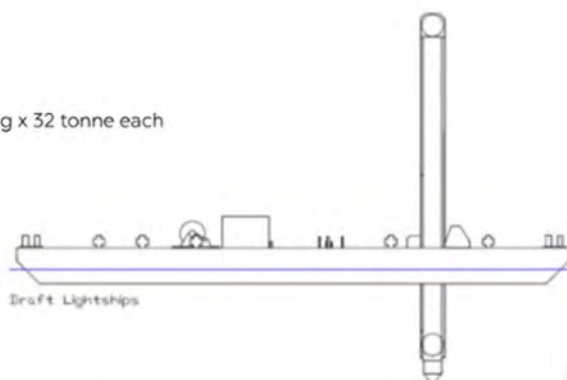
Compact design with a large amount of flexibility and function, built to Australian standard and classed by GL for USL 2B. Independent steering nozzles, highly manoeuvrable and high horsepower for length. Very effective for in close operations, including smaller ship assist roles. Effective towing vessel, construction and dredging support vessel, setup for anchor relocation. Electronic chart system, AIS equipment.

# MESENCE

## Flat Top Construction Barge



Name: Mesenge  
Type: Flat Top Barge  
Operators: Heron Construction Company Ltd  
Class: MNZ Barge Safety Certificate  
Official Number: MNZ 133374  
Gross tonnage: 396  
Nett tonnage: 118  
Displacement: 460 tonne  
Length overall: 35.2m  
Breadth: 19.4m  
Depth: 2.3m  
Fuel capacity: 90,000 litres  
Aft spuds: Two @ 24m long x 32 tonne each  
Jackup capacity: 140 tonnes





# KAIWEA

## Hydrographic Survey/Crew Change Vessel



|                      |                                                      |
|----------------------|------------------------------------------------------|
| Name:                | Kaiwea                                               |
| Type:                | Hydrographic Survey/Crew Change Vessel               |
| Year built/place:    | 2010, Gisborne New Zealand                           |
| Displacement:        | 1.52 tonne                                           |
| Length overall:      | 5.8m                                                 |
| Breadth:             | 2.8m                                                 |
| Max draft:           | 0.75m                                                |
| Power:               | 160hp                                                |
| Main engines:        | 2 x Yamaha 4 Stroke Outboards                        |
| Auxiliary Power:     | 2400W 240V generator<br>600W 240V Sine wave inverter |
| VHF radio:           | 2 x ICOM VHF's                                       |
| GPS/Plotter/sounder: | Lowrance 8.4 LCX37C Plotter/Sounder                  |



### HYDROGRAPHIC SURVEY EQUIPMENT

|                          |                                                       |
|--------------------------|-------------------------------------------------------|
| Survey RTK GPS:          | POS MV Wavemaster                                     |
| Single Beam Echosounder: | Reson Navisound Dual Frequency NS210                  |
| Transducers:             | Dual frequency transducer 200kHz @ 8° and 33kHz @ 19° |
| Multi Beam Echosounder:  | Reson T50                                             |
| Attitude Sensor:         | POS MV Wavemaster                                     |
| Sound Velocity Probe:    | AML Base X                                            |
| Data logging:            | Reson PDS2000<br>Trimble HydroPro Navigation v6.06    |





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