ARUP

NSW Ports

Port Kembla Outer Harbour Reconfiguration

MOD 5 - SSI Modification

Reference:

Final | 3 October 2025

Job number 306628

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Declaration

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Proposed development:			
Port Kembla Outer Harbour Reconfiguration Application Number: MP08_0249-Mod-5			
Modification report:			
A modification report for the project is attached and is prepared in accordance with Section 180 of the *Environmental Planning and Assessment Regulation 2021*.			
Declaration:	I certify that I have prepared this modification report to comply with Section 180 of the Environmental Planning and Assessment Regulation 2021, the Secretary's environmental assessment requirements dated 26 February 2025, and with consideration of the State Significant Infrastructure Guidelines. To the best of my knowledge this modification report contains all available information that is relevant to the assessment of the modified project and the information contained in the modification report is neither false nor misleading.		
Signature:			
Name:	Christopher Serrano		
Date:	3 October 2025		
Declaration by registered environmental assessment practitioner			
Name:	Chris Fay		
Registration Number	80001		

Organisation registered with	Arup Australia Pty Ltd
Declaration:	The undersigned declares that this EIS: • has been prepared in accordance with the Environmental Planning and Assessment Regulation 2021; • contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the modification relates; • does not contain information that is false or misleading; • addresses the Planning Secretary's environmental assessment requirements (SEARs) for the project; • identifies and addresses the relevant statutory requirements for the project, including any relevant matters for consideration in environmental planning instruments; • has been prepared having regard to the Department's State Significant infrastructure Guidelines - Preparing a modification report; • contains a simple and easy to understand summary of the project as a whole, having regard to the economic, environmental and social impacts of the project and the principles of ecologically sustainable development; • contains a consolidated description of the project in a single chapter of the modification report; • contains an accurate summary of the findings of any community engagement; and • contains an accurate summary of the detailed technical assessment of the impacts of the project as a whole.
Signature:	
Date:	3 October 2025

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Glossary of terms and abbreviations

Term/Abbreviation	Meaning
ABCP	Algal Bloom Contingency Plan – a plan prepared to manage identified risks related to algal blooms in water bodies.
ACM	Asbestos Containing Material – any material incorporating asbestos fibers (often found in older construction materials).
AEA	Aquatic Ecology Assessment – an evaluation of aquatic ecosystems, including their interactions, health and quality, values, and potential impacts that may affect them.
AEC	Area of Environmental Concern – a location on site identified as having potential contamination or other environmental risk factors.
AEP	Annual Exceedance Probability – the statistical probability of a flood or rainfall event of a given size occurring in any year (e.g. 1% AEP is a 1-in-100-year event).
AHD	Australian Height Datum – the national vertical datum used in Australia, representing height above mean sea level.
ALARP	As Low as Reasonably Practical – a principle used in risk management and safety that encourages risks associated with development to be reduced as far as reasonable practicable.
AN	Ammonium Nitrate.
ANZECC	Australian and New Zealand Conservation Council – The ANZECC was a ministerial council that facilitated cooperation between Australian states, territories, and New Zealand on environmental and conservation matters. It was responsible for developing national strategies and guidelines, including the Australian and New Zealand *Guidelines for Fresh and Marine Water Quality*.
ANZG	*Australia and New Zealand Guidelines* (2018) is a joint initiative between the Australian and New Zealand governments that offer resources for assessing, managing, and monitoring water quality.
AOBV	Area of Outstanding Biodiversity Value – a designated area of very high biodiversity importance under the BC Act 2016 (NSW).
ARI	Average Recurrence Interval – the average interval (in years) between occurrences of a given size event (commonly used in flood frequency analysis).
ARR	*Australian Rainfall and Runoff* 4th edition (2019, Version 4.2) is the national guideline for flood estimation in Australia. The guideline is comprised of relevant documents, data, and software that can be used for assessing and managing flood risks to encourage safe and resilient development.
AS	Australian Standard – documents to provide guidance in maintaining performance, reliability and safety of industrial activities.
ASC NEPM	*National Environment Protection (Assessment of Site Contamination) Measure 1999* – made under the National Environment Protection Council Act 1994 (Cth) and amended in 2013, the measure was established to create a nationally consistent approach to assessing site contamination and provide a framework to determine the associated risks to human health and the environment.
ASS	Acid Sulfate Soil – naturally occurring soil that contains iron sulfides, which can generate sulfuric acid if exposed to air or disturbed.
BAM	Biodiversity Assessment Method – the scientific method prescribed under the BC Act 2016 (NSW) for assessing biodiversity impacts and offsets.
BC Act	*Biodiversity Conservation Act 2016* (NSW) – NSW legislation for conserving biodiversity, including the protection of threatened species and ecological communities.

Term/Abbreviation	Meaning
BCS	DCCEEW Biodiversity, Conservation and Science Group.
BDAR	Biodiversity Development Assessment Report – a detailed report (using the BAM) that assesses a development's biodiversity impacts and outlines required offsets.
bgl	Below ground level.
BMP	Biological Monitoring Program.
BOS	Biodiversity Offsets Scheme – the NSW system under the BC Act for offsetting unavoidable biodiversity impacts of development, typically through habitat restoration or protection elsewhere.
BS Act	*Biosecurity Act 2015* – primary legislation for managing biosecurity threats (to human, animal, and plant health) across Australia and its external territories.
Biosecurity Regulation	*Biosecurity Regulation 2017* (NSW) – regulations under the BS Act that provide detailed procedures and requirements for preventing, detecting, and responding to biosecurity threats.
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes – a group of volatile organic compounds found in petroleum products; commonly tested for in contamination assessments.
CEMP	Construction Environmental Management Plan – a plan detailing environmental protection measures and procedures to be implemented during the construction phase of a project.
CLM Act	*Contaminated Land Management Act 1997* (NSW) – NSW legislation that regulates the investigation and remediation of significantly contaminated land.
CM Act	*Coastal Management Act 2016* (NSW) – NSW legislation aimed at the sustainable management and protection of the coastal environment and coastal resources.
CoA	Condition of Approval – a requirement in a project's development consent or approval that must be complied with (e.g. specific mitigation measures or monitoring obligations).
Concept Plan	The future stages of the project (Stage 2 and 3).
Construction impacts	Construction impacts in this Modification Report have been separated into the potential construction impacts related to Stage 1 works and the construction of the wider Concept Plan.
COPCs	Contaminants of potential concern – these are substances identified in the environment that may pose a risk to the environment or human health.
CSM	Conceptual Site Model – a visual representation of the key information about a site, particularly in relation to environmental contamination.
DA	Development Application – a formal request submitted to gain approval for proposed development projects.
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Cth) – the Australian Government department responsible for federal environmental matters and climate policy (administers the EPBC Act).
DEMP	Dredging Environmental Management Plan – a site-specific document that outlines how environmental impacts associated with dredging activities will be managed, monitored, and mitigated.
DPHI	Department of Planning, Housing and Infrastructure (NSW) – the NSW government department overseeing urban planning and infrastructure development (consent authority for this State Significant Infrastructure project).
DPIRD (Fisheries)	Department of Primary Industries and Regional Development – Fisheries (NSW) – the state agency responsible for fisheries management and the protection of aquatic habitats and resources.

Term/Abbreviation	Meaning
DSI	Detailed Site Investigation – a comprehensive investigation of site conditions (soil, groundwater, etc.) to delineate contamination and assess environmental and health risks, typically following a preliminary investigation.
EIS	Environmental Impact Statement – a detailed document assessing the likely environmental impacts of a proposed development or project, including mitigation measures (prepared as part of the approval process).
EPA	NSW Environment Protection Authority – the primary environmental regulator for NSW. The EPA is responsible for protecting the health of NSW's environment and its communities.
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW) – the primary NSW legislation governing land-use planning and development assessment.
EP&A Regulation	*Environmental Planning and Assessment Regulation 2021* (NSW) – regulations under the EP&A Act that provide detailed procedures and requirements for planning and development processes.
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth) – Australia's national environmental law, which protects Matters of National Environmental Significance (e.g. nationally threatened species, migratory species, wetlands of international importance).
EPI	Environmental Planning Instrument – a legal document such as a State Environmental Planning Policy (SEPP) or Local Environmental Plan (LEP) that sets out land zoning and development controls for an area.
EPL	Environment Protection Licence – a licence issued under the POEO Act to regulate certain activities that may impact the environment (e.g. discharges to air or water), often with conditions to prevent pollution.
ERP	Emergency Response Plan – describes the procedures an organization follows to address emergencies, with the aim of maintaining safety and managing resources appropriately.
ESD	Ecologically Sustainable Development – the principle that development should meet the needs of the present without compromising the ability of future generations to meet their needs, achieved by effectively integrating economic, environmental, and social considerations.
FM Act	*Fisheries Management Act 1994* (NSW) – NSW legislation for the conservation of fish, aquatic habitats, and sustainable fisheries.
GDE	Groundwater Dependent Ecosystem – an ecosystem that relies on groundwater for all or part of its water needs (e.g. some wetlands, rivers, or vegetation communities).
HAB	Harmful Algal Bloom – a rapid growth of algae in water that can harm aquatic life or water quality, often by producing toxins or depleting oxygen.
HSMP	Hazardous Substance Management Plan – a structured document that outlines how hazardous substances—such as chemicals, solvents, or materials with toxic, flammable, or reactive properties—are safely managed throughout their lifecycle at a workplace or project site.
ICNG	Interim Construction Noise Guideline – a framework for managing noise impacts from construction activities. It is primarily used to help the EPA set appropriate noise conditions in environment protection licences and to assist local councils in assessing and approving construction projects.
Key Fish Habitat	Categories of aquatic habitat defined under NSW Fisheries guidelines that are particularly important for fish life cycles. *Type 1* Key Fish Habitat denotes highly sensitive habitats (e.g. seagrass beds, mangroves), while *Type 2* Key Fish Habitat denotes moderately sensitive habitats (e.g. rocky reefs, submerged aquatic vegetation).
KTP	Key Threatening Process – an action or phenomenon listed under the BC Act or FM Act that threatens the survival or evolutionary development of species, populations, or ecological communities (e.g. "clearing of native vegetation" is a KTP).

Term/Abbreviation	Meaning
LALC	Local Aboriginal Land Council – a locally elected Aboriginal body that represents Aboriginal communities in a region on land rights and heritage matters. (The Illawarra LALC is the relevant council for the Port Kembla area).
LGA	Local Government Area – an administrative region governed by a local council. (Port Kembla is located in the Wollongong City Council LGA).
LTEMP	Long Term Environmental Management Plan – a site-specific document developed to manage and monitor residual environmental risks, ensuring that the site remains safe and suitable over time.
LUSS	Land Use Safety Study – a strategic assessment aimed at evaluating cumulative safety risks from industrial facilities within the Port Kembla area. It identifies key risk contributors, assesses their impact against NSW land use safety criteria, and proposes a framework to guide future development while ensuring public safety. The study also explores opportunities to streamline planning controls and outlines options for ongoing risk reduction and management.
Major Project Approval	The original approved Major Project application (08_0249).
MEM Act	*Marine Estate Management Act 2014* (NSW) – NSW legislation providing for the management of the marine estate (coastal waters, estuaries, marine parks) to conserve marine biodiversity and ensure sustainable use.
MEMA	Marine Estate Management Authority – the NSW government advisory body established by the MEM Act to coordinate management of the marine estate and implement the Marine Estate Management Strategy.
MMMP	Marine Mammal Management Plan.
MNES	Matters of National Environmental Significance – matters protected under the EPBC Act (e.g. nationally threatened species, migratory species, World Heritage properties, Ramsar wetlands).
MOD	Modification – a formal change to an approved project under the EP&A Act. (For example, **MOD 1** refers to the first modification approved in 2011 for the Port Kembla Outer Harbour project, and **MOD 5** refers to the current proposed modification addressed in this report).
NPfI	Noise Policy for Industry – a comprehensive framework developed to manage and regulate noise emissions from industrial activities. It replaces the earlier NSW Industrial Noise Policy (2000) and is designed to balance the needs of industry with the community's expectations for a quieter environment.
NPI	National Pollution Inventory – an Australian database of annual pollutant emissions from industrial facilities (e.g. emissions of substances like NOx, SO_2, metals, etc., reported by facilities such as ports or factories).
OCP/OPP	Organochlorine Pesticides / Organophosphorus Pesticides – classes of older generation pesticides (e.g. DDT is an OCP) often investigated in environmental assessments due to their persistence and potential toxicity.
OEMP	Operational Environmental Management Plan – a practical, site-specific document detailing how environmental risks will be managed during a project's operational phase, once construction is finished and regular activity begins.
Operational impacts	Operational impacts in this Modification Report have been separated into the potential operational impacts related to Stage 1 activities and the operation of the wider Concept Plan elements.
OSOM	Oversize / overmass – a term used to describe load-carrying vehicles, particularly vehicles used to transport heavy or large objects that exceed normal mass and dimension limits.
PAC	Planning Assessment Commission – the former NSW independent panel that reviewed and determined certain Major Project applications (the PAC approved a 2011 modification of the Port Kembla project; it has since been replaced by the Independent Planning Commission).

Term/Abbreviation	Meaning
PAH	Polycyclic Aromatic Hydrocarbons – a group of organic compounds often formed by incomplete burning of coal, oil, wood, or gas. PAHs are common environmental contaminants (e.g. in sediments or soil near industrial sites).
PASS	Potential Acid Sulfate Soil – soil or sediment that contains iron sulfides and can produce sulfuric acid when exposed to oxygen (often found in coastal lowlands); disturbing PASS can lead to acidification of soil and water.
PCBs	Polychlorinated biphenols – man-made organic chemicals that are widely used in commercial and industrial activities (i.e. as insulants) with varying levels of toxicity.
PFAS	Per- and Polyfluoroalkyl Substances – a family of persistent man-made chemicals (used in firefighting foams, coatings, etc.) that can contaminate soil and water and do not break down easily in the environment.
PHA	Process Hazard Analysis – a methodical approach used to identify and assess potential hazards linked to industrial processes, particularly those that involve chemicals, high pressures, or high temperatures.
PKOH	Port Kembla Outer Harbour – the project area and development for the expansion of Port Kembla's outer harbour (includes the Stage 1 development and the broader Concept Plan for future stages).
POEO Act	*Protection of the Environment Operations Act 1997* (NSW) – NSW legislation that regulates pollution (air, water, noise, waste) and establishes the requirement for Environment Protection Licences for certain activities.
PSI	Preliminary Site Investigation – an initial study of a site's history and environmental condition (often including limited soil or groundwater sampling) to identify potential contamination issues that require further investigation.
RAP	Remediation Action Plan – a plan that outlines how contaminated soil or groundwater will be remediated or managed to make a site safe for its intended use, including cleanup objectives and methods.
SAQP	Sampling and Analysis Quality Plan – a plan used in environmental site assessments to ensure that sampling and analysis activities are consistent, meet project objectives, and follow regulatory requirements.
SEARs	Secretary's Environmental Assessment Requirements – the list of matters issued by the Department of Planning that an environmental assessment (EIS or modification report) must address for a project.
SEPP	State Environmental Planning Policy – a NSW environmental planning instrument covering specific topics or regions that prevails over local plans. (For example, SEPP (Resilience and Hazards) 2021 and SEPP (Transport and Infrastructure) 2021 apply to this project and set state-wide planning rules for those matters).
SES	NSW State Emergency Services – a volunteer-based organisation that provides emergency assistance during natural disasters and other emergencies.
SMP	Syngnathid Management Plan – a specialised environmental management plan prepared to protect syngnathids (i.e. an order of fish including seahorses, pipefishes, seadragons, etc.) during development activities.
SMP	Site Management Plan – a plan that outlines how a specific site will be managed during construction to ensure safety, environmental protection, and regulatory compliance.
SSI	State Significant Infrastructure – a class of major infrastructure projects in NSW that are of state importance and are assessed under Part 5, Division 5.2 of the EP&A Act (with the NSW Minister for Planning as the consent authority).
Stage 1	Stage 1 is the first stage of the project – this stage includes demolition of old jetties; dredging and reclamation of land; and construction of berth structures, civil works (including utility services), drainage, and road access.

Term/Abbreviation	Meaning
Stage 2	Stage 2 is the second stage of the project – this stage includes the development and operation of a multi-purpose terminal.
Stage 3	Stage 3 is the third stage of the project – this stage includes the development of a container terminal with road and rail adjustments.
STMP	Stormwater Management Plan – sets out strategies for handling, treating, and directing stormwater runoff to reduce environmental impacts and protect public health and safety.
SVOCs	Semi-Volatile Organic Compounds – organic chemicals that volatilize slowly (between VOCs and non-volatile compounds). They include substances like phenols and some pesticides; SVOCs are often analyzed in contamination assessments.
SWMP	Soil and Water Management Plan – a management plan used to prevent negative impacts occurring to soil and water quality during construction, including erosion and sediment control.
Syngnathiformes	An order of fish that includes seahorses, pipefish, and seadragons. (White's Seahorse, a Syngnathiformes species found in NSW waters, is endangered and was a focus for mitigation in this project's marine ecology management).
TBT	Tributyltin – a toxic antifouling compound formerly used in ship paints to prevent organism growth on hulls. TBT is a common contaminant in port sediments due to historical use and is harmful to marine life.
TEU	Twenty-foot Equivalent Unit – a standard unit for measuring cargo capacity based on a 20-foot long20-foot-long shipping container. (For example, one 40-foot container equals two TEUs).
TfNSW	Transport for NSW – the government agency that is responsible for managing transport-related infrastructure and services in NSW.
TRH	Total Recoverable Hydrocarbons – a measure of the total petroleum hydrocarbons present in a sample (soil, water, etc.), often used in contamination assessments to evaluate oil/fuel residues.
TSS	Total Suspended Solids – the concentration of fine particles suspended in water (a key water quality parameter related to turbidity; high TSS can reduce water clarity and affect aquatic organisms).
UFP	Unexpected Finds Protocol – a procedure to follow if unexpected materials or conditions are encountered during works (such as unidentified contamination or archaeological items), typically requiring work to pause and specialists to assess the find.
VOCs	Volatile Organic Compounds – chemicals that evaporite easily (i.e. room temperature) and have low water solubility. They often pose significant impacts to the environment and human health.
WQMP	Water Quality Monitoring Program – a plan for monitoring water quality (e.g. turbidity, pH, dissolved oxygen) during a project to ensure that construction activities do not adversely affect surrounding waters.
WQOs	Water Quality Objectives – the desired condition or goal for water quality in a given environment, often based on the needs of protecting aquatic ecosystems and human uses (in NSW, defined by the NSW Water Quality and River Flow Objectives).

Executive Summary

NSW Ports proposes to modify the Major Project 08_0249 (referred to as the approved project), for Stage 1 and concept approval for the expansion of the Port Kembla Outer Harbour. The project is located within the Port Kembla Outer Harbour area in the Wollongong Local Government Area (LGA).

The Minister for Planning approved the project under Section 75J and 75O of the *Environmental Planning and Assessment Act 1979* (EP&A Act) 5 on 3 March 2011. The approved project was subsequently modified by the former Planning Assessment Commission on 8 September 2011 (MOD1).

Elements of the approved project identified for Stage 1 have already been completed. This included some reclamation works and work carried out for the Cement Australia Grinding Mill project which was subject to a separate approval.

On 25 September 2024, NSW Ports submitted a modification request to the Department of Planning, Housing and Infrastructure (DPHI) to modify the approved project. The Planning Secretary for DPHI subsequently provided Environmental Assessment Requirements (SEARs) on 26 February 2025. This modification report addresses the SEARs and describes and assesses the potential impacts of the modification and identifies how those impacts would be managed and mitigated.

The modification is to change the layout of the Outer Harbour and associated works. The need for the modification to the reclamation area is partly in response to the changing needs of the port facility to support emerging opportunities in the clean energy sector, and to ultimately provide for a more efficient container terminal layout and operation.

NSW Ports has prepared this modification report in accordance with Section 180 of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) including to comply with the SEARs issued for the modification on 26 February 2025 and having regard to the State Significant Infrastructure and State Significant Project Technical Guidelines.

DPHI has placed this modification report on exhibition to provide the community, government agencies and stakeholders with an understanding of what is proposed and an opportunity to comment.

NSW Ports will consider any submissions and provide a report to the DPHI that documents and responds to issues raised. DPHI will prepare an assessment report for consideration by the Minister for Planning, who will then decide whether or not to approve the modified project.

In the context of already having an approved project in place, options considered for this proposed modification were to reconfigure the reclamation area to support emerging opportunities, or to retain the existing approved layout and not proceed with the modification. The options were evaluated based on their ability to meet the evolving trade needs of NSW against the potential additional impact they could generate. This included a consideration of current economic factors not previously considered as part of the approved project, such as the development of the offshore wind industry. The preferred option (i.e. to reconfigure the reclamation area) meets the project objectives by positioning Port Kembla to continue to support international trade and industry development.

Key concerns raised by stakeholders during consultation to date included the potential impact to recreational fishing and boating activities, and impact to emergency services operations within the port. It was noted that access to publicly accessible recreational fishing and boating areas would be retained.

The main outcomes (both positive and negative) of the proposed modified project are expected to include:

- Improved flexibility of reclamation and navigational areas to cater to emerging industries (e.g. offshore wind) and contemporary container operations
- Improved tidal flushing characteristics of the outer harbour area (how effectively tidal movements can replace/replenish water to disperse heat, nutrients and pollutants) compared to the approved project
- Reduced wave activity at new berths in the Outer Harbour
- Slight increase in area of impact to aquatic habitat disturbance
- Slight decrease in area available for the creation of artificial habitat
- Potential localised increase in wave activity at the B201 near the northern breakwater within the Outer Harbour area from amended reclamation footprint
- Potential to disturb contaminated material
- Potential to reduce water quality risks from improved containment of watercourses and protection from surface contaminants once all stages complete under the Concept Stage.

The majority of mitigation measures previously identified for the approved project would still be effective in managing the changing impacts from the proposed modification. Some additional mitigation measures have been identified to address key changes in potential impact from the modification. These are provided in Appendix B.

DPHI has placed this modification report on public exhibition for a period of 14 days. During the exhibition period, the modification report is available for inspection at:

- DPHI Major Project website: https://www.planningportal.nsw.gov.au/major-projects (search for MOD 5 - Port Kembla Outer Harbour Reconfiguration)
- NSW Ports office: Unit 1, Maritime Centre, 91 Foreshore Road, Port Kembla NSW 2505.

A project information line and email address are available throughout the exhibition period to answer questions from the community relating to the modified project – 1300 922 524 (toll free) and enquiries@nswports.com.au.

During the exhibition period, submissions are to be made online through the DPHI Major Projects Planning Portal before the close of the exhibition period. All submissions received will be placed on the DPHI Major Project website.

Online submissions can be made by signing up and creating an account at https://www.planningportal.nsw.gov.au/major-projects. This allows you to save a submission in progress and stay up to date with the progress of an application. Once you have signed up, search for MOD 5 - Port Kembla Outer Harbour Reconfiguration.

If you think you'll need help making a submission using the portal, it is a good idea to contact customer support sooner rather than later to ensure you have plenty of time to make a submission before the exhibition close date.

Your submission must include:

- Your full name and address
- Reference to MOD 5 - Port Kembla Outer Harbour Reconfiguration and MP08_0249-Mod-5

- A statement on whether you support, object, or are providing comment to the modified project
- The reasons why you support or object to the modified project
- A declaration of any reportable political donations made in the previous two years
- An acknowledgement that you accept DPHI's disclaimer and declaration, including confirmation that your submission does not contain offensive, threatening, defamatory or inappropriate content.

Submissions must reach DPHI by the close of exhibition. Please note DPHI may publish any personal information you have included in your submission on the project. Do not include any personal information in your submission that you do not want published.

1. Introduction and background

This chapter provides an overview of the proposed modification to the approved project and Concept Plan.

1.1 Proponent

Port Kembla Operations Pty Ltd as trustee for Port Kembla Unit Trust

ABN: 50 132 250 580

Gate B103, Penrhyn Road

Port Botany, NSW 2036 Australia

1.2 Introduction

This application relates to the development of the Port Kembla Outer Harbour. Port Kembla is an international trade gateway for bulk agricultural, construction and mining industries. It is New South Wales' largest motor vehicle import hub and home to the state's largest grain export terminal and second largest coal export port.

The purpose of this modification is to reconfigure the proposed expansion of the Outer Harbour area to allow for new development and emerging opportunities. Identified opportunities include supporting development of offshore terminals. These uses require one continuous terminal footprint therefore the need for an amended footprint arises.

Major Project Approval (MP08_0249) was granted on 3 March 2011 under Sections 75J and Section 75O of the *Environmental Planning and Assessment Act 1979* (EP&A Act), comprising a Concept Plan Approval for the staged development of the Port Kembla Outer Harbour. Additionally, project approval for Stage 1 of the development was obtained as part of the same Major Project Approval on 3 March 2011.

The Major Project Approval was subsequently modified by the former Planning Assessment Commission on 8 September 2011 (MOD1) as detailed below under Section 1.3. Since then, there have been several instances of modification applications being submitted and withdrawn. NSW Ports is now proposing to further modify the approval (MOD5), now transitioned to a State Significant Infrastructure (SSI) approval.

The approved project is located within the Wollongong Local Government Area (LGA).

This report justifies proposed changes to the approved development, demonstrates consistency with the original consent and environmental impacts, and supports informed decision-making by the consent authority under the EP&A Act.

1.3 Description of the approved project

The approved project (as shown in Figure 1-1) comprises three key stages as follows:

- Stage 1 *which also has project approval*:
  - Demolition of No.3, No.4 Jetties
  - Reclamation of, and dredging within, the development footprint, excluding dredging in the northern area of the multi-purpose terminals.

  - Construction and operation of the central area of the new multi-purpose terminals
  - Construction of the first container berth
  - Extension of Salty Creek and Darcy Road drain through the reclamation area to the Outer Harbour
  - Relocation of utilities from Berth 206 to support the import of sulfuric acid at the multi-purpose terminals
  - New road link from Christy Drive
  - Rail infrastructure upgrade in South Yard, No.13 siding
  - Civil works for the construction of terminal facilities, including associated services and infrastructure
  - Stage 1A (Cement Australia Grinding Mill) [completed stage under a separate project approval application (MP10_0102)]
    - Establishment of a processing plant including transfer hoppers, storage bins, grinding mill and storage silos for dispatch
    - A materials transfer system, incorporating extensive covered and closed conveyor systems, transfer chutes, dust suppression system and bag house
    - Clinker storage shed
    - Truck and ship loading and unloading facilities
    - Internal road systems and parking
    - Temporary covered stockpile for raw product; and associated office amenities, workshop and substation.
- Stage 2:
  - Reclamation for the northern area of the multi-purpose terminals
  - Operation of the first container berth
  - Construction and operation of second container berth
  - Construction and operation of a second multi-purpose terminal
  - Extension of new road link from Christy Drive, including an option for a new parallel road to Foreshore Road
  - Construction of a new road link from Darcy Road to the recreational boat harbour
  - Construction of a new rail overbridge across Foreshore Road
  - Construction of a new rail link and siding to the container terminals.
- Stage 3:
  - Demolition of No.6 Jetty
  - Reclamation and dredging of the northern area for the multi-purpose terminals and berth

- Dredging to widen swing basin in northern Outer Harbour
- Construction and operation of third and fourth container berths.

As noted above, the approved Concept Plan was split into three construction stages, which originally included the following proposed timeframes:

- Stage 1 (2010–2018)
- Stage 2 (2014–2025)
- Stage 3 (2026–2037).

A portion of the Stage 1 reclamation works have been completed since approval was granted as noted above.

Some of the reclamation works noted for Stage 1 have also been completed for the central portion of the original multi-purpose terminals area (i.e. where the Cement Australia Grinding Mill project is located).

A more detailed description of the approved Concept Plan and project and how the potential impacts would be managed and mitigated is found in the Environmental Assessment Report (AECOM, 2010) on the Major Projects NSW website.

Development history

In summary, the history of the project to date is as follows:

- MP08_0249 (2011) | Development of Outer Harbour as per above discussion
- MP08_0249 (1) (2011) | Revise the cap on operational traffic volumes to allow a maximum of 70 vehicle movements per hour for Stage 1 and 121 vehicle movements per hour for the overall Concept Plan (MOD1).
- MP08_0249 (2) [withdrawn] | Modify the project to allow for additional construction stockpile capacity
- MP08_0249 (3) [withdrawn] and MP08_0249(4) [withdrawn] | Modify the project to increase the total volume of bulk cargo from 4.25 million tonnes per annum to 16 million tonnes per annum. They also sought to modify the footprint of the reclamation area and berthing basins and other amendments to the handling and storage of bulk materials.

Figure 1-1: Approved project reclamation and dredging footprint

1.4 Changes introduced by the proposed modification

The ‘proposed modification’ to the approved project will optimise the layout and functionality of the site. The ‘modified project’ will be conducted across three key stages, as follows:

- **Stage 1:** Demolition of old jetties; dredging and reclamation of land; and construction of berth structures, civil works (including utility services), drainage and road access
- **Stage 2:** Development and operation of a multi-purpose terminal
- **Stage 3:** Development of a container terminal with road and rail adjustments.

These stages will not necessarily be undertaken sequentially as there are scenarios where project approval for Stage 2 is sought and commences operation prior to the completion of the full extent of the Stage 1 reclamation. This would allow flexibility for Port Kembla to cater for the trade needs of the State as they arise.

The proposed changes involve reconfiguring the facility layout to establish a contiguous land and berth area, which will:

- Enhance flexibility in accommodating a broader range of port uses
- Enable the relocation of rail infrastructure to better support the expanded facility
- Maintain the total reclamation area in line with the originally 42 hectares under the approved project.

Chapter 4 describes the options considered for the proposed modification.

Chapter 5 describes the proposed modification. Appendix A provides an updated project description, which includes the proposed modification (the modified project).

Figure 1-2: Proposed modifications to approved reclamation and dredging area – Stage 1

Figure 1-3: Proposed modifications to approved reclamation and dredging area – Concept (Stages 2 and 3)

1.5 Purpose and structure of this modification report

Arup on behalf of NSW Ports has prepared this modification report for the purposes of Section 180 of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation). It has been prepared to comply with the Planning Secretary's Environmental Assessment Requirements (SEARs) issued on 26 February 2025 and having regard to DPHI's State Significant Infrastructure and State Significant Project Guidelines.

The structure of the modification report is outlined in Table 1-1.

Table 1-1: Structure of this report

Chapter	Description
Chapter 1	Introduction and background (this chapter) *Provides a broad overview of the Major Project Approval and the proposed modification.*
Chapter 2	Approval framework *Provides an overview of the statutory context including for the proposed modification and the next steps in the approval process.*
Chapter 3	Strategic context and need *Provides an updated strategic context and need for the proposed modification.*
Chapter 4	Selection of the preferred modification option *Describes the options considered and identifies the preferred modification option.*
Chapter 5	Description of proposed modification *Provides a detailed description of the proposed modification made to the approved project.*
Chapter 6	Community and stakeholder engagement *Provides an overview of the stakeholder engagement process that has been carried out for the proposed modification and any changes to the approved engagement that would be carried out if the modification is approved.*
Chapter 7	Assessment of impacts *Outlines the assessment of potential impacts associated with the proposed modification.*
Chapter 8	Proposed change to conditions of approval *Outlines the relevant conditions of approval that would need to be modified because of the proposed modification.*
Chapter 9	Justification of the modified project and conclusion *Presents a justification and evaluation of the modified project, having regard to its environmental, social and economic impacts and the principles of ecologically sustainable development.*
Chapter 10	References
Appendix A	Updated project description
Appendix B	Updated environmental management measures
Appendix C	Updated statutory compliance table
Appendix D	Secretary's Environmental Assessment Requirements (SEARs) checklist
Appendix E	Community and stakeholder engagement table
Appendix F	Aquatic Ecology Assessment
Appendix G1	Preliminary Site Investigation
Appendix G2	Site Auditor Assessment
Appendix H	Surface and Groundwater Assessment
Appendix I	Hydrodynamics Assessment
Appendix J	Aboriginal Heritage Assessment
Appendix K	Non-Aboriginal Heritage Assessment

2. Approval framework

This chapter provides an overview of the statutory context for the proposed modification application.

2.1 Minister's approval to modify the Division 5.2 approval

Under Section 5.25 of the EP&A Act, the Minister's approval is not required for modifying an SSI approval if the resulting works remain substantially the same as the approved infrastructure. However, should the modification extend beyond this, resulting in a materially different project, a new SSI application is required.

In this instance, NSW Ports formed the view that the proposed modification, while departing from certain elements of the original approval, would not constitute a new project. This position was confirmed by the Department, which determined that the modification meets the requirements of Section 5.25 of the EP&A Act. As a result, the project is proceeding as a modification to the existing SSI approval, with a scoping report submitted on 25 September 2024 and SEARs issued on 26 February 2025.

This modification report is prepared to address the SEARs as issued by DPHI. Appendix D shows where each SEAR has been addressed in this modification report.

A review of the statutory context is provided below. Appendix C includes an updated statutory compliance table for the modified project.

2.2 Commonwealth legislation

This section outlines the relevant Commonwealth environmental legislation considered in the assessment of the proposed modification.

2.2.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the key piece of environmental legislation to protect and manage nationally important flora, fauna, ecological communities and heritage places. These are defined under the EPBC Act as Matters of Environmental Significance (MNES).

The EPBC Act requires a proponent to determine whether its proposal is defined as an 'action' under the EPBC Act due to it likely having a significant impact on any MNES in accordance with the Significant Impact Guidelines 1.1, Matters of National Environmental Significance (DE, 2013). Any action that is likely to have a significant impact on a MNES is referred to the Minister for the Environment and Water (Australia) for a decision whether it should be assessed and approved under the EPBC Act with Australian Government taking regulatory control of the action under the EPBC Act.

The original project approval did not require assessment or approval under the EPBC Act.

A self-assessment under the EPBC Act has been undertaken for the proposed modification of PKOH in accordance with the Significant Impact Guidelines (Australian Government, 2013). This assessment identified that MNES likely to occur within the Port Kembla Outer Harbour include several threatened, protected and migratory species.

Assessment of potential impacts was conducted by Arup and associated technical experts. The self-assessment under the EPBC Act concluded:

- Habitat loss from the proposed modification is not considered to have a real chance or possibility of meeting any of the significant impact criteria for listed threatened, protected and migratory fish, marine mammals, marine reptiles and birds.
- The potential temporary deterrence from lower value foraging habitat due to changed water quality and underwater noise for listed threatened, protected and migratory fish, marine mammals, marine reptiles and birds is not considered to have a real chance or possibility to meet any of the significant impact criteria for these species.
- With the implementation of identified mitigations, (both those already required under the existing project approval, and additional ones identified for this proposed modification) it is unlikely underwater noise would impact listed threatened, protected and migratory fish, marine mammals, marine reptiles and birds above that expected with the approved project.

Therefore, the proposed modification poses no additional risk to Matters of National Environmental Significance (MNES) and significant impacts to MNES are unlikely. The proposed modification does not trigger requirements for a referral to the Minister under the EPBC Act.

2.3 NSW legislation

This section outlines the relevant State legislation and environmental planning instruments (EPIs) considered in the assessment of the proposed modification and identifies any key changes or inconsistencies in relation to the original approval.

2.3.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) and Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) are key pieces of legislation to regulate land use in NSW. The Act outlines the system for environmental planning and assessment, including approvals and assessment requirements for proposed development. The Minister for Planning is the consent authority for the proposed modification, with the application assessed in accordance with the provisions of Division 5.2 of the EP&A Act. Under Section 5.22(2) of the EP&A Act, EPIs, which guide development on State, regional and local scales, do not apply by default to SSI unless by exception.

As noted above, modifications to an approved SSI project are made under Section 5.25 of the EP&A Act, which allows changes to proceed without a new application where the modified project remains substantially the same as the approved infrastructure. The environmental assessment of such modifications must also address the SEARs, as required by Section 5.28 of the Act.

2.3.2 Environmental Planning and Assessment Regulation 2021

The supporting EPA&A Regulation sets out the procedural requirements for SSI applications (and modifications), including setting SEARs, public exhibition, agency consultation, and environmental impact assessment processes. This modification report has been prepared in accordance with the guidance set out under the EP&A Regulation and relevant clauses.

2.3.3 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act* 1997 (POEO Act) contains provisions to protect, restore, and enhance the quality of the environment through regulation of pollution control and waste management. The POEO Act establishes a list of activities that require an Environment Protection Licence (EPL) from the NSW Environmental Protection Authority (EPA). These activities are called 'scheduled activities' and are listed in Schedule 1 of the POEO Act. A review of Schedule 1 of the POEO Act has been undertaken to identify activities associated with the proposed modification which may require an EPL.

Activities that the approved project that are likely to trigger the need for an EPL application include storage of raw materials for cement and processing of cement, dredging of soft sediments and rock, contaminated soil treatment, shipping of dry bulk goods, installation of new railway infrastructure, upgrading existing railway infrastructure as well as the operation of rolling stock and sorting and separation of rock material for bund and revetment structures.

Applications for relevant EPL's are required to be made by the proponent of the trigger activity (NSW Ports / contractor / lessee) and obtained from the NSW Environment Protection Authority, prior to the carrying out of any scheduled activities. Variations to the EPLs would be applied for as the development progresses and changes to the activities are required.

A preliminary site investigation report (PSI) has been prepared to support this modification. This included a review of nearby sites listed on the POEO Public Register and how these may integrate with the proposed modification. An aquatic ecology assessment (AEA) has also been prepared to support this modification. This includes an assessment of potential impacts to the aquatic environment from pollution likely caused by the proposed modification.

2.3.4 Fisheries Management Act 1994

The *NSW Fisheries Management Act 1994* (FM Act) contains provisions to conserve, develop and share the fishery resources of NSW for the benefit of present and future generations. Part 7 of the FM Act identifies requirements for the protection of marine habitats including a permit for activities involving dredging and reclamation work and those involving harm to marine vegetation. In accordance with Section 5.23 of the EP&A Act, a permit under the FM Act for activities such as building or using structures that block waterways (like dams or weirs, Section 201); stopping fish from moving through rivers or estuaries (Section 205); damaging marine vegetation like mangroves and seagrass (Section 219) is not required for approved SSI, although full assessments of potential impacts must be submitted to the consent authority for consideration.

Part 7A of the FM Act lists threatened species, populations and ecological communities occurring in NSW as well as associated key threatening processes (KTPs). In accordance with Section 220ZZ of the FM Act, if a planned development or activity is likely to have any impact on a threatened species, population or ecological community, a preliminary assessment of the potential impacts must be made (the 'assessment of significance'). If the impacts are likely to be significant, or if critical habitat is affected, then impacts on key fish habitat, marine vegetation, and threatened aquatic species, must be addressed in the modification application, with supporting consultation with NSW Department of Primary Industries and Regional Development – Fisheries (NSW DPIRD Fisheries).

The AEA prepared for this modification considers potential impacts to key fish habitat, critical habitat, marine vegetation and threatened species, populations and ecological communities regulated under this Act. The AEA found that the proposed modification would result in an increased impact to habitat disturbance and impacts to aquatic flora and fauna from dredging and reclamation activities as well as sediment dispersion compared to the approved project. This is predominantly from the modified dredging area

increasing the area of impacted habitat (including key fish habitat) discussed further in Section 7.2. However, this increased impact is expected to be minimal.

2.3.5 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) contains provisions to conserve biodiversity at a bioregional and state scale. Schedule 1 of the BC Act provides a list of threatened species, populations and ecological communities occurring in NSW. Section 7.3 of the BC Act requires proponents of activities subject to Division 5.2 of the EP&A Act to determine whether the works will have a significant impact on threatened species, populations, ecological communities, and/or areas of outstanding biodiversity value (AOBV).

In accordance with Section 7.3 of the BC Act, if a planned development or activity is likely to have any impact on a threatened species, population or ecological community, a preliminary assessment of the potential impacts must be made (the 'test of significance'). If the impacts, including those that are serious and irreversible, are likely to be significant, or if an AOBV is affected, a biodiversity development assessment report (BDAR) must be prepared under the Biodiversity Assessment Method (BAM) and the Biodiversity Offset Scheme (BOS) may apply if the impacts exceed the scheme's thresholds.

Based on the current assessment, the proposed modification does not trigger the requirement for the preparation of a BDAR. However, it is important to note that the determination of whether a BDAR is required for a modification must be confirmed by NSW DCCEEW. Under Section 7.17(2)(c) of the BC Act, a BDAR must be prepared for a modification unless the decision maker is satisfied that the modification will not increase impacts on biodiversity values beyond those already approved.

The AEA report prepared for this proposed modification assessed the potential impacts to AOBV and threatened species, populations and ecological communities. The report concluded that there would be no increase in impacts to biodiversity values and no areas of critical habitat, AOBV, biodiversity values or protected areas within the Outer Harbour that could be impacted by the proposed modification.

2.3.6 Marine Estate Management Act 2014

The *Marine Estate Management Act 2014* (MEM Act) applies to all marine waters, estuaries, coastal areas, and the six marine parks in NSW and aims to promote the strategic and integrated management of marine waters. The Marine Estate Management Authority (MEMA) is a state government advisory body tasked with implementing a management strategy comprising nine key initiatives to address threats and sustainably manage the marine estate. Under the Act, MEMA has statutory responsibilities, including conducting threat and risk assessments for key threats to the marine estate including modification of waterways for boat navigation, altered hydrology from dredging, and conserving marine habitats and biodiversity. The strategy mandates that dredging activities demonstrate measurable outcomes that maintain or enhance estuarine and marine habitat health.

While the proposed modification is not within a mapped marine protected area, it is still within marine waters. As such, the AEA report and Hydrodynamics Assessment report prepared for this proposed modification assess potential impacts to the marine environment.

These impacts are discussed in Section 7.2, concluding that while the proposed modification would result in some changes to the marine environment within the Outer Harbour, it is unlikely to impact the existing aquatic biodiversity values of the Harbour.

2.3.7 Coastal Management Act 2016

The *Coastal Management Act 2016* (CM Act) aims to manage the coastal environment in NSW in a manner consistent with the principles of ecologically sustainable development for the social, cultural and economic wellbeing of the State. A key object (purpose) of the CM Act is to "protect and enhance natural coastal processes and coastal environmental values including natural character, scenic value, biological diversity and ecosystem integrity and resilience". It does this by protecting and enhancing the biodiversity of the general coastal zone, actively restoring coastal wetlands, while linking to the marine habitat and biodiversity conservation objects of the MEM Act.

From a statutory perspective, the Act requires decision-makers to consider how the proposed modification may affect natural coastal processes, including tides, wave action, sediment transport, and shoreline movement. In the context of Port Kembla, this directly implicates hydrodynamic conditions associated with port infrastructure, dredging activities, and coastal modifications.

The proposed modification is located within a coastal use area and coastal environment area, and as such, the management objectives of Part 2 of the CM Act have been considered as part of the modification assessment within the AEA report. The Hydrodynamics Assessment report also assess the potential implications on hydrodynamic conditions associated with the modification. The report concludes while the proposed modification would result in some changes to the coastal environment such as increased wave energy, it is unlikely to impact the existing aquatic biodiversity values.

2.3.8 Biosecurity Act 2015

The *Biosecurity Act 2015* (BS Act) provides a consolidated regulatory framework to effectively respond to and manage biosecurity risks. The broad objectives in NSW are to manage biosecurity risks from animal and plant pests and diseases, weeds and contaminants through a flexible and responsive statutory framework for the benefit of the NSW economy, environment and community. Part 2, Division 2 of the *Biosecurity Regulation 2017* (NSW) identifies notifiable aquatic pests and diseases. There is an obligation under the BS Act to avoid disturbance and spread of aquatic and terrestrial pests.

The AEA report assesses the potential impact to the aquatic environment from introduced species likely to be caused by the proposed modification.

This report concluded that the proposed modification has the potential to introduce or spread non-indigenous flora and fauna (including pest species), particularly once Stage 1 is complete and during the operation of the Concept Plan. However, given that Port Kembla is an operating port with several pest species already established in the area and is subject to stringent biosecurity regulation (As to be expected for a Port of Entry), the proposed modification is unlikely to result in an increased risk over that already accounted for in the approved project and Concept Plan.

2.3.9 Water Management Act 2000

The *Water Management Act 2000* provides the statutory framework for the sustainable use and conservation of surface water, groundwater, and estuarine systems in NSW. Where development activities such as dredging, reclamation, or stormwater discharge may alter natural flow regimes, salinity gradients, or water levels, this Act requires their consideration under the proposed modification application. At Port Kembla, such works can influence estuarine hydrodynamics, with potential downstream effects on sediment transport and water quality. The Act reinforces the need to protect water-dependent ecosystems and maintain the ecological functions of estuarine environments, requiring proponents to demonstrate that hydrodynamic alterations are avoided, minimised, or appropriately mitigated.

The licensing provisions of the Act do not apply to the proposed modification of an SSI approval because, under Section 5.32 of the EP&A Act, separate water licences are not required when water use, water management works, or waterfront land impacts are assessed and approved as part of the SSI consent. However, the application must still assess these matters in detail to ensure potential impacts on water resources, water-dependent ecosystems, and water-related infrastructure are properly considered in the environmental assessment.

Accordingly, a Surface and Groundwater Assessment report was prepared for this proposed modification which assessed the potential impact from the diversion of Darcy Road Drain and Salty Creek through the modified reclamation footprint. Additional considerations were also given to the potential flooding and water quality impacts of the proposed modified footprint. The report found that the potential impacts from the proposed modification would generally be consistent with the impacts identified in the approved project as part of the original Major Project Approval.

2.3.10 Contaminated Land Management Act 1997

The *Contaminated Land Management Act 1997* (CLM Act) outlines the process for investigating and remediating land that is contaminated. Section 59(2) of the Act requires notification of contaminated sites and Section 60 outlines the requirement for landowners to report any contamination that represents a significant risk of harm to human or environmental health to the NSW Environment Protection Authority (EPA).

A Preliminary Site Investigation (PSI) report was prepared for this proposed modification which reviewed sites registered as contaminated under the Act and assessed how the proposed works for Stage 1 and the Concept Plan could mobilise these contaminants. This found that the modification would not significantly alter the risk of contamination above what has already been assessed for the approved project. While the proposed modification would include disturbance of the Emplacement Cell that has been developed after the approved project was initially assessed, the PSI indicates that the potential risk of disturbing contaminants from this would reduce with the implementation of the existing and additional mitigation measures identified.

2.3.11 State Environmental Planning Policy (Resilience and Hazards) 2021

The State Environmental Planning Policy (SEPP) (Resilience and Hazards) 2021 applies to land identified within the coastal zone, which the proposed modification is. The key aim of this SEPP is to manage the development of land, to protect the natural, cultural, recreational, and economic qualities of the coastal zone and to ensure that development is compatible with its natural attributes.

While the proposed modification is within a coastal zone, Section 2.5(2) of the Resilience and Hazards SEPP clarifies that the Coastal Management chapter does not apply to land within the Lease Area of the (then) *State Environmental Planning Policy (Three Ports) 2013.* The approved project is wholly within the Lease Area.

Despite the above, impacts to this zone are explored within the AEA report and the Hydrodynamics Assessment report which identified that the proposed modification would result in some changes to the coastal environment such as increased wave energy but is unlikely to impact the existing aquatic biodiversity values.

Additional considerations were given to the impacts associated with hazards and risk and climate change. These are explored in Sections 7.6 and 7.7 respectively which found that the proposed modification is unlikely to significantly increase this existing hazard or climate change risk.

2.3.12 State Environmental Planning Policy (Transport and Infrastructure) 2021

Chapter 5 of the SEPP (Transport and Infrastructure) 2021 aims to provide a consistent planning regime for the development and delivery of infrastructure on land in Port Botany, Port Kembla and the Port of Newcastle. Chapter 5 aims to ensure the land around the Lease Area is retained for port related and industrial purposes.

The proposed modification is located on land zoned as SP1: Special Activities and port facilities are permitted with consent.

3. Strategic context and need

This chapter outlines the relevant strategic framework and considerations pertaining to the proposed modification. Understanding the strategic context helps clarify how the project aligns with State and regional planning objectives.

3.1 Strategic planning and policy framework

The approved project is a long-term major infrastructure initiative designed to expand port capacity, support trade growth, and accommodate future industry over a 30-year horizon. The proposed modification remains consistent with following policies and strategies that have been developed since the approved project was originally assessed in 2011.

3.1.1 NSW State Infrastructure Strategy 2022-2042

The NSW State Infrastructure Strategy 2022–2042 sets a long-term vision for infrastructure investment across the State and identifies Port Kembla as a strategically critical international trade gateway. It specifically recommends:

- Undertaking transport network planning, including road and rail linkages, to support the development of a second container port at Port Kembla, connected to strategic hubs such as the Western Parkland City
- Embedding resilience, economic productivity, community servicing, and a net-zero transition as core principles underpinning infrastructure decisions.

NSW Ports' own 40-Year Master Plan ('NSW Ports 2063') reinforces this direction, forecasting doubling of container and specialist cargo volumes through Port Kembla by mid-century. The plan emphasises Port Kembla's role in supporting offshore wind logistics, hydrogen imports and critical mineral supply chains, positioning it squarely within the State's evolving clean energy infrastructure initiative.

The proposed modification aligns closely with these strategic objectives by:

- Reconfiguring the approved reclamation layout to better support emerging economic industries (e.g. offshore wind and logistics) that were not considered in the original approval
- Enhancing port capability and resilience in support of NSW's transition to net zero, energy security, and regional industrial stabilisation.

Directly advancing the recommended transport corridor planning that links Port Kembla with Greater Sydney's freight and logistics infrastructure backbone. By doing so, the modification strengthens Port Kembla's role as the State's future container port and aligns with objectives to serve growing communities, boost competitiveness, integrate land-use and infrastructure planning, and support a sustainable transition to renewable energy-driven industrial activity.

3.1.2 NSW Freight and Ports Plan 2018-2023

The NSW Government's current freight strategy, Delivering Freight Policy Reform in New South Wales, outlines a framework to enhance the efficiency, sustainability, and resilience of the state's freight network. This reform agenda prioritises infrastructure that supports modal integration, unlocks capacity for emerging industries, and ensures freight systems are adaptable to trade demands.

- Port Kembla is identified as a key strategic asset within this framework, positioned to play a central role in supporting NSW's transition to a low-carbon economy and accommodating future freight growth. Its

proximity to industrial precincts and renewable energy zones makes it individually suited to serve as a hub for offshore wind development, bulk cargo handling, and logistics operations tied to the clean energy supply chain.

- The Outer Harbour Modification aligns with these strategic priorities by preserving the potential for future container terminal operations while enabling flexible land use to support new and emerging freight tasks. This includes infrastructure to accommodate renewable energy components, expanded bulk handling capacity, and improved port–rail–road connectivity. The modification reinforces Port Kembla's role as a resilient, multi-purpose gateway that supports both traditional trade and the infrastructure demands of a decarbonising economy.
- The proposed modification maintains compatibility with these freight objectives by preserving the potential for future container terminal operations, while also enabling a broader range of uses aligned with emerging freight needs, such as offshore wind, logistics, and bulk cargo handling. The reconfiguration supports modal integration and land-use flexibility while aligning with ongoing state priorities to improve supply chain resilience, sustainability, and port–rail–road connectivity.

3.1.3 Illawarra Shoalhaven Regional Plan 2041

This regional plan sets out the strategic framework for land use planning in the Illawarra Shoalhaven region up to 2041. It provides an overarching vision, supported by four key themes:

- A productive and innovative region
- A sustainable and resilient region
- A region that values its people and places
- A smart and connected region.

There are a series of objectives and actions under each theme. Some key relevant objectives and actions to the proposed modification include:

- Grow the Port of Port Kembla as an international trade hub
- Plan for a net zero region by 2050
- Support the development of a circular economy.

Port Kembla is recognised as a key gateway for international trade for the region and supports more than 3,500 jobs and contributes $543 million to the regional economy each year. It is also identified as a regionally significant employment land that continues to support steelmaking operations. It is also recognised as a potential hub for hydrogen production. Port Kembla and associated operations create the opportunity for highly paid and skilled jobs in advanced manufacturing, services, research and development.

The proposed modification aligns with the Plan by supporting the continued growth of Port Kembla as a key international trade and employment hub, while enabling the Port to adapt to emerging economic and industrial opportunities. The reconfigured reclamation area has been designed to accommodate a broader range of future port uses, including logistics support for offshore wind and other infrastructure. These industries are specifically identified in the Regional Plan as part of the pathway toward a net zero economy. By preserving flexibility for these future uses, the modification enables long-term land use planning that is consistent with regional objectives for decarbonisation, innovation, and sustainable industry development. The proposed modification also maintains capacity to support ongoing steelmaking operations, in line with the plan's emphasis on employment retention, productivity, and circular economy transition.

3.1.4 Wollongong Local Strategic Planning Statement

This document sets out the 20-year vision for land use within the Wollongong LGA that is aligned with the local community values, characteristics and identity. The key strategic themes identified in this document relevant to the proposed modification are:

- Jobs and economic growth
- Climate action and resilience
- Enabling infrastructure and transport.

Port Kembla is recognised in this document as one of the key economic assets for Wollongong and a hub for international trade.

The proposed modification would continue to support the economic function of this port for Wollongong and expand its reach into other market opportunities, such as offshore wind energy. The proposed modification is strategically aligned with the long-range land-use vision established by Wollongong City Council through its Local Strategic Planning Statement (LSPS), which sets a 20-year framework for the Wollongong LGA. The LSPS identifies three priority thematic areas directly relevant to the modification: jobs and economic growth, climate action and resilience, and enabling infrastructure and transport. Port Kembla is explicitly recognised in the LSPS as a major industrial precinct and employment hub, critical to the region's freight network and international trade function.

NSW Ports have provided input in the Wollongong LSPS 2025-2045 which went to Council on 28 July 2025 and is recommended to be adopted.

Further, the modification continues to support Port Kembla's role in creating high-quality jobs and economic activity within Wollongong by maintaining its capability as a container port and expanding its flexibility to enable new market uses such as offshore wind logistics. These emerging sectors align with the LSPS's emphasis on climate resilience and sustainable industrial development.

The proposed modification enhances the Port's infrastructure and land-use adaptability while preserving its freight and transport connectivity. The proposed modification advances the LSPS priorities of integrated infrastructure planning and regional prosperity in a way that is consistent with community values and local land-use policy.

3.1.5 NSW Ports Masterplan 2063

This masterplan outlines the port trade growth and changes expected over the next 40 years and actions that would need to be undertaken to respond to future drivers. Port Kembla is noted as NSW's motor vehicle import port and an international trade gateway for bulk agricultural, construction and mining industries. The expansion of this port is noted to support the growth of the region and become a critical part of the NSW's renewable energy future.

The reconfigured reclamation layout proposed in the modification directly supports this vision by creating the spatial flexibility required to accommodate new port uses and specialised infrastructure associated with renewable energy supply chains, while still preserving capacity for established trades. This approach ensures the Port can continue to evolve in line with long-term freight trends and sustainability priorities identified in the master plan and 2025 Sustainability Strategy.

3.2 Proposed modification need

The proposed modification responds to a clear and evolving strategic need to futureproof Port Kembla's long-term role as a critical infrastructure asset for NSW. Since the approval of the original project in 2011, Government strategy at both the State and regional levels have shifted to prioritise energy transition, trade resilience, and infrastructure integration, placing Port Kembla at the centre of this transformation.

Specifically, the modification is needed to reconfigure the approved reclamation layout to support greater flexibility of port uses, including as a support port for offshore wind energy projects. These emerging industries are now identified in the NSW State Infrastructure Strategy 2022–2042, NSW Ports 2063 Master Plan, and Illawarra Shoalhaven Regional Plan 2041 as essential to the State's productivity, energy security, and transition to net zero.

The modification also ensures the Port remains aligned with the NSW Freight Policy and Wollongong's Local Strategic Planning Statement by:

- Preserving the potential for future container terminal operations to relieve Port Botany and support Greater Sydney's growing population and freight demands
- Enhancing integration with road and rail networks to unlock national and regional supply chain efficiencies
- Supporting ongoing steelmaking operations and associated employment
- Enabling adaptation to future port-related industries, in line with decarbonisation, circular economy, and land-use objectives.

In doing so, the modification is not only consistent with, but actively advances, the key priorities of these strategic frameworks, delivering a resilient, adaptive, and sustainable port that supports the economic, environmental, and social future of NSW.

3.3 Project location and setting

The project is located within the Port Kembla Outer Harbour Area in the Wollongong LGA. It comprises of the following lots:

- Lot 105, DP1013971
- Lot 106, DP1013971
- Lot 41, DP1158340
- Lot 71, DP1175848
- Lot 72, DP1175848
- Lot 2003, DP1176582
- Lot 2002, DP1176582
- Lot 2, DP1182823
- Lot 4, DP1236743
- Lot 5, DP1236743
- Lot 7, DP1304363
- Lot 8, DP1304363
- Lot 9, DP1304363.

3.4 Proposed modification objectives

Port Kembla is NSW's motor vehicle import port and international trade gateway for bulk agricultural, construction, and mining industries. The expansion and diversification of the Port would help support growth in NSW through the ability to handle changing trade needs, support 24/7 operations, and to be the State's next container terminal once Port Botany nears capacity.

The modification would also allow for additional opportunities in emerging industry sectors such as offshore wind development. Offshore wind developments require larger areas of land to store the components and materials associated with the wind turbines.

In this context, the specific objectives of the proposed modification are to:

- Reconfigure the approved reclamation layout to enable greater operational flexibility and responsiveness to evolving market demands
- Preserve future capacity for container terminal development, consistent with the State's freight planning objectives
- Accommodate port infrastructure and logistics support for the offshore wind sector and other renewable energy-related industries
- Enhance navigational access and berth capacity to support larger vessel types and new trade profiles
- Maintain compatibility with ongoing bulk and break-bulk operations, including steelmaking inputs and vehicle imports
- Support resilient, long-term industrial employment within the region through adaptive and sustainable port development
- Align the project footprint and staging with long-term land use, transport, and decarbonisation planning strategies across all levels of government.

These specific objectives reflect the evolution of State and regional policy since the original project approval and ensure the Port remains positioned to serve NSW's economic and energy transition priorities over the next 30+ years.

3.5 Place making and urban design principles and objectives

Port Kembla is identified as a key international trade gateway for NSW. The proposed modification aligns with this strategic role by enhancing the Port's capacity and flexibility to support international trade and emerging industries.

The modification does not include detailed project applications for Stage 2 and Stage 3, therefore does not trigger full assessment of internal layout or architectural detail. However, urban design and placemaking considerations have still been addressed at a strategic level.

The proposed modification is situated entirely within an existing operational port environment that is zoned for industrial use and is not publicly accessible. The design retains and respects the established character and function of this area. The modification does not introduce new public domain elements or alter existing public access arrangements and, therefore, maintains consistency with the surrounding urban context.

Nonetheless, the layout of the reclamation has been revised to provide flexibility for a broader range of port-related uses, which may in future include renewable energy industries and other logistics infrastructure. This

forward-looking configuration allows for potential future integration with transport linkages, servicing infrastructure, and regional employment precincts, thereby supporting broader placemaking principles related to resilience, legibility of land use, and spatial integration. Future stages will consider more detailed urban design responses as specific project applications are developed.

3.6 Sustainability objectives

NSW Ports aims to sustainably manage and deliver essential trade infrastructure for the Australian economy and community. This includes a focus on:

- Continued delivery of existing sustainability initiatives
- Maintaining Net-Zero Scope 1 and 2 greenhouse gas emissions whilst engaging tenants on Scope 3 emissions
- Enhancing resilience through cyber security controls and port disruption monitoring
- Strengthening sustainability requirements from port operators in procurement and port developments
- Developing and sharing stronger social impact indicators for community engagement, sponsorships and partnerships to maximise positive outcomes.

The proposed modification supports NSW Ports' vision of becoming a world-class logistics hub by delivering infrastructure that is flexible, future-ready, and aligned with long-term sustainability goals. By reconfiguring the approved reclamation area, the modification enables more efficient and resilient use of port land.

This contributes directly to responsible asset management and future-proofed trade infrastructure. The modification also has the potential to facilitate decarbonisation by supporting renewable energy logistics. Although the modification does not alter public access arrangements, it upholds NSW Ports' commitment to community trust by ensuring consistency with approved land uses and avoiding impacts to surrounding neighbourhoods. Taken together, the proposed modification helps deliver infrastructure that supports sustainable trade and reduces emissions.

4. Selection of the preferred modification alternative and option

This chapter provides an overview of the alternative options explored for the proposed modification.

4.1 Alternatives and options development

NSW Ports carried out an options development process for the reconfigured reclamation area and location of dredging activities. This considered emerging industry trends (particularly in the offshore wind energy sector) and a construction method that minimises changes to the approved project.

4.1.1 Development framework

To identify the most suitable modification to the approved project and Concept Plan, NSW Ports adopted a structured process that considered how best to achieve the strategic, placemaking, and sustainability objectives outlined above in Section 3.4, Section 3.5, and Section 3.6. This involved:

- Revising the original project approvals and conditions
- Mapping emerging drivers for redevelopment including the need for larger vessels, offshore wind and renewables demand, container port capacity needs, and decarbonisation targets
- Testing layouts and configuration of alternatives and technologies to support these evolving needs.

4.1.2 Objective-based evaluation process

A multi-criteria framework was used to assess how well each option aligned with the project's core objectives. The table below outlines how each objective informed the evaluation of alternatives.

Table 4-1: Objective-based evaluation process

Category	Key considerations	How alternatives were assessed
Strategic port function	Compatibility with bulk, break-bulk, and offshore wind cargo	Layout flexibility, berth capacity, staging potential
Future container capacity	Alignment with positive economic outcomes and the NSW Government policy	Reclamation geometry and access corridors
Offshore wind requirements	Suitable for heavy lift vessels, (floating) foundation and nacelle[1] transport.	Quay strength, apron size and contiguity[2], and landside staging areas.
Navigational access	Accommodating vessels and safe manoeuvring	Turning circle clearance, channel alignment, and berthing depth and orientation.
Placemaking and urban design	Visual cohesion, land use compatibility and spatial legibility.	Industrial fit, integration with land use zoning and visual profiling.
Sustainability	Support for decarbonisation, resilient infrastructure, and reduction of greenhouse gas emissions.	Modal flexibility, opportunity for rail, and renewable logistics infrastructure.
Implementation efficiency	Feasibility with the current approval framework and program alignment.	Constructability, staging, and approvals complexity.

[1] Large housing on top of a wind turbine tower that contains key components like the generator, gearbox, and drive train

[2] The amount of usable space for operations and how well the areas are joined together

4.2 Concept Plan

In accordance with good environmental planning practice, NSW Ports considered a range of feasible alternatives and design options to ensure the proposed modification would best meet project objectives while balancing operational, environmental, and strategic considerations. Feasible alternatives refer to fundamentally different and practicable ways the project could be delivered and include the option of doing nothing, adjusting the scale or staging, or pursuing different end uses.

In contrast, design options refer to variations in how the preferred alternative could be implemented, such as changes to the reclamation layout, construction methods, or sequencing. This section outlines the process used to identify, assess, and compare these alternatives and options, culminating in the selection of the preferred modification.

4.2.1 Feasible alternatives to the proposed modification

Feasible alternatives are fundamentally different ways of achieving the project's core objectives. They involve strategic choices about where, or how to proceed with the proposed modification, and may include changes to the scale, purpose, or delivery approach. To be considered feasible, alternatives must be technically viable, economically reasonable, and capable of meeting the intended function of the proposed modification. Assessing these alternatives helps ensure the project proceeds in the most appropriate and sustainable manner.

Alternative 1 | Do nothing: retain the approved reclamation layout

This alternative considered is to retain the approved project reclamation area layout and not proceed with this proposed modification. This option would not result in any changes to the approved project and Concept Plan; however, it would prevent the ability of Port Kembla to both support the emerging offshore wind industry in Australia and to service future container vessels. This is due to the layout of the approved project and Concept Plan, not providing the appropriate terminal storage space. As such, this option is not considered to be the preferred approach and is a key catalyst showcasing the need for this modification.

Alternative 2 | Reduced scale reclamation

This alternative focuses on the near-term operational opportunities to expand existing trades of the Port (e.g. imports and exports of dry bulk and break bulk) by providing several vessel berths alongside jetties but reducing the reclamation footprint. This omits the ability to develop offshore wind terminal and a container terminal in the future given that these both need large terminal storage areas. This alternative would likely have a lower environmental impact. However, it would also provide lower long-term flexibility in capacity and use of the Port.

Alternative 3 | Offshore wind only configuration

This alternative increases the reclamation footprint to its maximum size but provides only two berths for medium-size vessels to specifically cater to offshore wind logistics (e.g. large storage area for wind turbine assembly, offshore wind foundation manufacturing and assembly, decommissioning of offshore oil and gas platforms, heavy lift cargo, etc.). This would align strongly with emerging offshore wind objectives and the need to decommission offshore oil and gas platforms, but would exclude using the Port as a future container terminal because there would not be enough navigational area to manoeuvre large container vessels, and therefore would not preserve broader freight flexibility.

Alternative 4 | Reconfigured reclamation layout

This alternative provides a large continuous landside storage area as well as a large continuous waterside navigational area. This alternative meets the spatial demands for significant onshore storage space needed for offshore wind and subsequent container industries, as well as the large navigational areas required for manoeuvring very wide offshore wind vessels and future container vessels. This reconfigured layout reduces the number of berths available at the port but increases the length of continuous wharf line. It increases the storage space area of terminal which would allow for the port to support offshore wind infrastructure development and future container terminal operations. This reconfigured area, if not used by offshore wind or containers, would still retain flexibility to support other potential trades previously identified for the approved multi-purpose terminal imports and exports dry bulk and break bulk.

4.2.2 Feasible options to the modification

Design and implementation options are specific variations in how the preferred alternative can be delivered. They focus on layout, construction method, sequencing, or operational configuration, without changing the fundamental purpose of the proposed modification. Exploring these options helps optimise performance, reduce impacts, and improve integration with environmental, economic, and community objectives.

Option A | Berth orientation variations

Different options around the quay alignment (e.g. angled versus parallel orientation) were explored. These were reviewed to optimise wave attenuation, minimise sedimentation, and improve navigational safety. They were also explored to improve tug operations and turning circles.

Option B | Dredging and fill methods

Consideration of different construction techniques was carried out, such as backhoe dredging, cutter suction dredging, trailing suction hopper dredging, use of recycled fill or beneficial reuse of materials. Each of these techniques have different implications for things like sediment dispersion, impacts to water quality, construction duration, etc. Options to retain flexibility in construction methods or use a specific technique were explored.

Option C | Alternative staging and sequencing

Options to progressively implement Stage 1 dredging and reclamation were considered to allow early operation of select berths and reclamation areas while safeguarding existing operations at Jetty No.6 until future expansion takes place here. This may help align with future demand curves, workforce availability, funding cycles, and trade growth forecasts.

Option D | Servicing and access configurations

Variations in the proposed internal road layout, rail siding integration (future proofing for modal shift), utility corridors for energy or water-intensive trades, and alternative drain/stormwater arrangements were explored. This may result in additional environmental impacts depending on the change.

4.2.3 Analysis

The options were evaluated based on their ability to meet project objectives against the potential additional impact they could generate. This included consideration of current economic factors not previously considered as part of the approved project, such as the development of the offshore wind industry.

4.2.4 Preferred alternative and option

The preferred alternative is a reconfigured reclamation layout (**Alternative 4**) that builds on the existing project approval while enhancing flexibility, capacity, and long-term strategic readiness. It retains the overall intent of the original Concept Plan but adapts the layout to better accommodate evolving trade demands, particularly the need to support storage areas and vessels for emerging offshore wind industry and the future container industry. It importantly, also preserves future capacity for a container terminal, consistent with State freight strategies, while maintaining compatibility with dry bulk and break-bulk trades.

This alternative was selected following consideration of other feasible alternatives, which were found to have critical limitations:

- The 'do-nothing' or approved layout alternative would have limited the Port's ability to support the spatial flexibility needed to accommodate new trade types or evolving logistics demands
- The reduced-scale reclamation alternative with more vessel berths on jetties offered a smaller footprint with lower upfront impact but significantly constrained the operational flexibility and strategic role of the Port as a future container terminal and renewable energy hub
- Alternatives focused solely on offshore wind use would have reduced the Port's ability to remain responsive to future container needs.

By contrast, the preferred alternative was selected as it:

- Delivers greater operational flexibility to progressively support all of the foreseen cargo types including offshore wind, containers and mixed dry and break bulk
- Improves navigational access and optimises use of the deepwater frontage for larger vessel classes (both longer and wider vessels)
- Supports decarbonisation and energy transition goals by enabling renewable energy logistics and efficient cargo handling
- Aligns with long-term land use, transport, and employment strategies at State and regional levels
- Minimises environmental and planning risks by staying within the existing project approval footprint and the Port of Port Kembla and avoiding new offsite impacts.

Taken together, the reconfigured layout provides a robust and adaptable platform for Port Kembla's continued evolution as a strategic international gateway in line with NSW Ports' vision and the State's infrastructure, trade, and sustainability priorities.

Having considered the preferred feasible alternative, the justification for selecting the preferred layout, construction method, sequencing, or operational configuration was justified based on strategic, operational, environmental, and policy objectives. This justification draws on the comparative assessment of functionality, flexibility, environmental performance, and long-term alignment with port planning and State infrastructure priorities.

Overall, the preferred alternative and option will ensure that the modified design is not only feasible but also better positioned to respond to future market, policy, and environmental drivers over the next 30 years.

4.3 Stage 1

4.3.1 Objectives

To accommodate the preferred alternative (**Alternative 4**), modifications were made to Stage 1 works to include all reclamation and dredging activities in this stage as well as extend the timing for this stage. The layout of the reclamation footprint has also been modified to meet the key objectives of this alternative.

4.3.2 Avoiding and minimising impacts

The modified reclamation footprint has been designed to align with the approved footprint as much as possible so that it reduces the extent of additional areas impacted. The dredging footprint identified also aligns as much as possible with the areas previously assessed in the original environmental assessment for the approved project and Concept Plan.

4.3.3 Alternative construction methods

As discussed above, potential alternative construction methods were explored for the proposed modification. This included cutter suction dredging, trailing suction hopper dredging, use of recycled fill or beneficial reuse materials. Retaining the flexibility in the dredging methodology was identified as the preferred approach to reduce the potential change in impact allow for context specific adjustments to be made. Alternatives to the timing of Stage 1 were also considered to better align with future demand curves, workforce availability, funding cycles, and trade growth forecasts. Extending the timeframe in which Stage 1 could occur was identified as the preferred approach.

4.4 Design refinement

As noted within the approved project, there will be ongoing design refinements as the project progresses through the different stages (particularly Stage 2 and Stage 3). Once the operational use for the reconfigured area of the port is determined, the layout of the infrastructure within the reclaimed area may need to be further refined and detailed in future project applications.

4.5 Environmental and social outcomes achieved through the selection of the preferred modification option

The preferred alternative and option (i.e. the proposed modification) would generate additional opportunities to support emerging industries while minimising changes to the approved project design. It better aligns with changing strategic directions for NSW towards the clean energy sector and would help provide additional economic opportunities in this space for the region. It would also provide additional opportunities to support national sustainability objectives through support of clean energy facilities.

This option was also developed with consideration for retaining the same construction and dredging method as included in the approved project to reduce potential additional impacts on the surrounding environment that were not previously considered and mitigated for.

5. Description of proposed modification

This chapter provides a summary of the project description outlined in the approved project EIS and how it differs with this proposed modification (MOD 5).

5.1 Proposed modification description

As noted in Section 1.4, the proposed modification is to reconfigure the layout of the reclamation and dredging area to allow for a continuous port layout that provides greater flexibility in future uses.

5.1.1 Comparison against the approved project description

Table 5-1 provides a comparative summary on the key differences proposed (highlighted in black text) against the approved project.

Table 5-1: Summary comparison of proposed modification against approved project

Project element	Summary of the approved project	Summary of the proposed modification	Figure reference
Concept			
Terminal use	Provide container and multi-purpose terminals	Provide increased flexibility in potential future terminal use.	N/A
Reclamation footprint	Total of 42 hectares in a reconfigured layout to allow for future port expansion.	No further dredging or reclamation proposed as part of the Concept. These works have been removed from Concept and incorporated entirely into Stage 1 as a reconfigured layout.	Figure 5-1
Swing basin turning diameter	450 metre minimum	590 metre minimum	N/A
Container throughput	1.2 million TEU[3]/year	No change	N/A
Multi-purpose terminal capacity	6.25 million tonnes/year	No change	N/A
Road links	Upgrades to Christy Drive, Foreshore Road, Darcy Road, Five Island Road, Flinders Street, Springhill Road, and Old Port Road. New access road from Christy Drive running southeast to multi-purpose terminals and a new road link to North-South Link Road.	No change	N/A
Relocation of tug facility	Not in original approval	Relocation of facility to reclaim land	N/A
Vessel traffic increase	100 (current) to 1,500 annually	No change	N/A
Container stacking height	Up to eight containers	No change	N/A
Staging	Stage 2: 2014-2025	Stage 2: 2029-2040	N/A

[3] Twenty-foot equivalent unit, which is the standard measure of cargo capacity for container ships and terminals. 1 TEU = one 20-foot shipping container

Project element	Summary of the approved project	Summary of the proposed modification	Figure reference
	Stage 3: 2026-2037	Stage 3: beyond 2045	
Stage 1			
Dredging footprint	Total of 26.3 ha in area	Total of 33.7 ha in area, which is about 7.4 ha larger than the approved project. The revised dredging area is largely within the original project footprint, with part of the previously approved reclamation area now allocated for dredging, and a small extension of the dredging zone toward the eastern breakwater.	Figure 5-1
Dredge fill volume	Approximately 5.3 million m3	Approximately 6.6 million m3	N/A
Dredging depth	-15 to -16.5m	No change	N/A
Construction staging	Stage 1: 2010-2018	Stage 1: 2026-end, noting that reclamation could be undertaken in phases	N/A
Rail infrastructure	Siding no.13 extension, new rail sidings, new rail overbridge.	No change	N/A
Stockpile / surcharge capacity	Up to 100,000m^3	No change	N/A
Demolition	Demolition of Jetty 3 and 4	Demolition of No.3 Jetty *(complete)*, No.4 Jetty, No. 6 Jetty and the demolition of Berth 206.	N/A
Drainage	Extension of Darcy Road drain through the reclamation area to the harbour. Note: An interim extension of Darcy Road drain is complete. Redirection of Salty Creek from the foreshore through the reclamation area to the harbour.	Extension of Darcy Road drain and Salty Creek through the reclamation area would still occur, however given the changed layout of the reclamation footprint, this extension covers a slightly different area.	No change
Workforce	150 construction staff	No change	N/A
Construction work hours	7 am-6 pm Mon-Fri 8 am-1 pm Sat No work Sunday or public holidays Note: Dredging activities may be conducted at all times in accordance with the noise limits specified in condition C6.	No change	N/A

5.1.2 Construction method

The construction method for both the dredging and reclamation works proposed for Stage 1 would be the same as those outlined in the original approved project other than differences noted in Table 5-1.
Table 5-2 below provides a summary of key construction methods for Stage 1 and the Concept Plan and how these have / have not changed with the proposed modification.

Table 5-2: Construction methodology

Construction element	Activity	Summary of the proposed modification
Concept		
Terminal development	Construction and operation of the multi-purpose terminal and container berth structures	Still proposed
	Pavement for central operational portion of multi-purpose terminals, extending west from the harbour to the existing rail sidings.	Still proposed, noting pavement will occur across the proposed new configuration
Utilities and services	A services corridor would be developed for the central operational portion of the multi-purpose terminals running along the southern edge of the hardstand area. Utilities required for operation of the first multi-purpose berth include: • Water • Power (240V and 415V) including a high voltage substation • Telecommunications • Sewer • Stormwater drainage	Still proposed, utilities remain the same noting that the alignment for services will be as required to service the new layout
	Relocation of utilities for import of sulphuric acid (currently at Berth 206) to the central operational portion of the multi-purpose terminals, including developing a dedicated pipeline/services corridor running south from the multi-purpose terminal and across Foreshore Road to the Orica site.	Still proposed
Stage 1		
Construction and demolition	Delineation of a temporary stockpile/surcharge area south of the proposed multi-purpose terminals, capable of handling up to 100,000 m^3 of material at any one time.	Still proposed
	Temporary construction of an access road from Foreshore Road to the proposed container terminal area to be utilised for reclamation and dredging activities	Still proposed
	Erection of site compound area around 1ha in size located about 100m southeast of Salty Creek. This would include site offices and staff amenities as temporary structures which would be removed at the completion of construction activities.	Still proposed
	A temporary stockpiling/surcharge area south of the proposed multi-purpose terminals would be demarcated, capable of handling up to 100,000m3 of fill material at any one time.	Still proposed
	Demolition of ~~No.3 Jetty~~ and No.4 Jetty (including Berth 206). Note No.3 Jetty is already demolished	Still proposed
	Redirection of Salty Creek from the foreshore, through the reclamation are to the harbour.	Still proposed
	Extension of Darcy Road Drain, through the reclamation to the harbour.	Still proposed
	Appropriate signage would direct workers to relevant sections of the construction works and restrict public access.	Still proposed
	Site parking would be available within the site compound and would be designed to cater for the construction workforce. The parking facility would be levelled and compacted, with a pavement material placed on top, such as road base. The exact size and parking requirements would be determined during detailed design prior to construction.	Still proposed
	If counterfort structures are selected for the wharf structures they would be erected on land adjacent to the Port and transported on barges to their	Still proposed

Construction element	Activity	Summary of the proposed modification
	destination. If a piled structure is required the piles would be delivered by barge to the workface.	
	Temporary utilities such as lighting and power would be hired or connected to existing mains to service the compound yard and construction activities.	Still proposed
Access	Access to the construction site compound and staff parking facilities would be via Foreshore Road. Construction access for new road infrastructure supporting the multi-purpose terminals and reclamation of the container terminals would be from Christy Drive and Foreshore Road respectively.	Still proposed
Timing	7am–6pm Mon–Fri, 8am–1pm Sat	Still proposed, however dredging activities would occur across all hours of the day.
Dredging	Dredging would be completed over a series of dredging campaigns for: • The basin between the multi-purpose terminals and container terminals. • The basin east of the container terminal. • All container berth boxes. • Approach channels.	Still proposed, however dredging activities would all occur under Stage 1.
	Material arising from demolition (e.g. jetty demolition) would be transported off-site for disposal.	Still proposed
	Material would be dredged to sufficient depth alongside quay walls to facilitate the docking of vessels for both the multi-purpose and container terminals.	Still proposed
	The majority of dredging required for the total development would be undertaken as part of Stage 1. The exception to this is an area north of Port Kembla Gateway which would remain operational until the existing lease arrangements for the jetty ceases before dredging works are undertaken, as well as dredging for the purposes of extending the existing swing basin in an area to the south of the northern breakwater.	All dredging activities would now take place within Stage 1, however, these areas would not all be dredged and reclaimed at the same time. Dredging and reclamation is proposed to occur progressively and may occur simultaneously with Stage 2 and Stage 3 developments.
	The staging of the dredging campaigns would be aligned with the reclamation activity.	Still proposed, however as noted above, all dredging and reclamation activities now occurring progressively as part of Stage 1.
	Dredging of the in-situ soft bed material would be required together with excavation of some rock in the vicinity of the berth facility.	Still proposed
	A combination of dredging types would be employed for dredging campaigns for Stage 1. This includes cutter suction, backhoe dredging and/or grab dredging of the soft sediment materials	Still proposed
	Hard rock material would be drilled, blasted and excavated using a grab dredge following review of geotechnical results	Still proposed
	Silt curtains would be used for all dredging activities	Still proposed
	Plant and equipment that would be utilised for the dredging campaigns would include the following: • Small cutter suction dredger • Backhoe dredger • Grab dredger • Self-propelled barges • Workboat • Survey/crew boat • Flat top barge	Still proposed

Construction element	Activity	Summary of the proposed modification
	• Auxiliary equipment e.g. spreader/diffuser pontoon, pipeline (floating), excavators, wheel loader, articulated dump trucks.	
Reclamation*	Construction of permanent revetment structures along the northern perimeter of the container terminal area and the perimeter of reclaimed area between container terminals and multi-purpose terminals.	Still proposed
	A series of containment structures (discrete bunded fill areas) to be constructed within the reclamation footprint for encapsulation of contaminated dredged material. Bund size and location would reflect dredging phases.	Still proposed
	Reclamation edge structures (temporary and permanent) would incorporate geotextile sediment filtration, mitigating effects of wave actions and any significant hydraulic gradient between the sediment and the Outer Harbour which could result in leaching of contaminants.	Still proposed
	Temporary sediment basins on unsealed reclamation areas to channel surface water flow including stormwater.	Still proposed
	Initial reclamation fill would be sourced from the dredging campaigns, with the balance sourced and imported from external locations (yet to be determined).	Still proposed

* Note: reclamation, by definition, occurs within the 'wet land', i.e. to the mean high water mark. Fill will be required adjacent to these areas to achieve a level port facility. This is consistent with the development approval and methodology will remain the same.

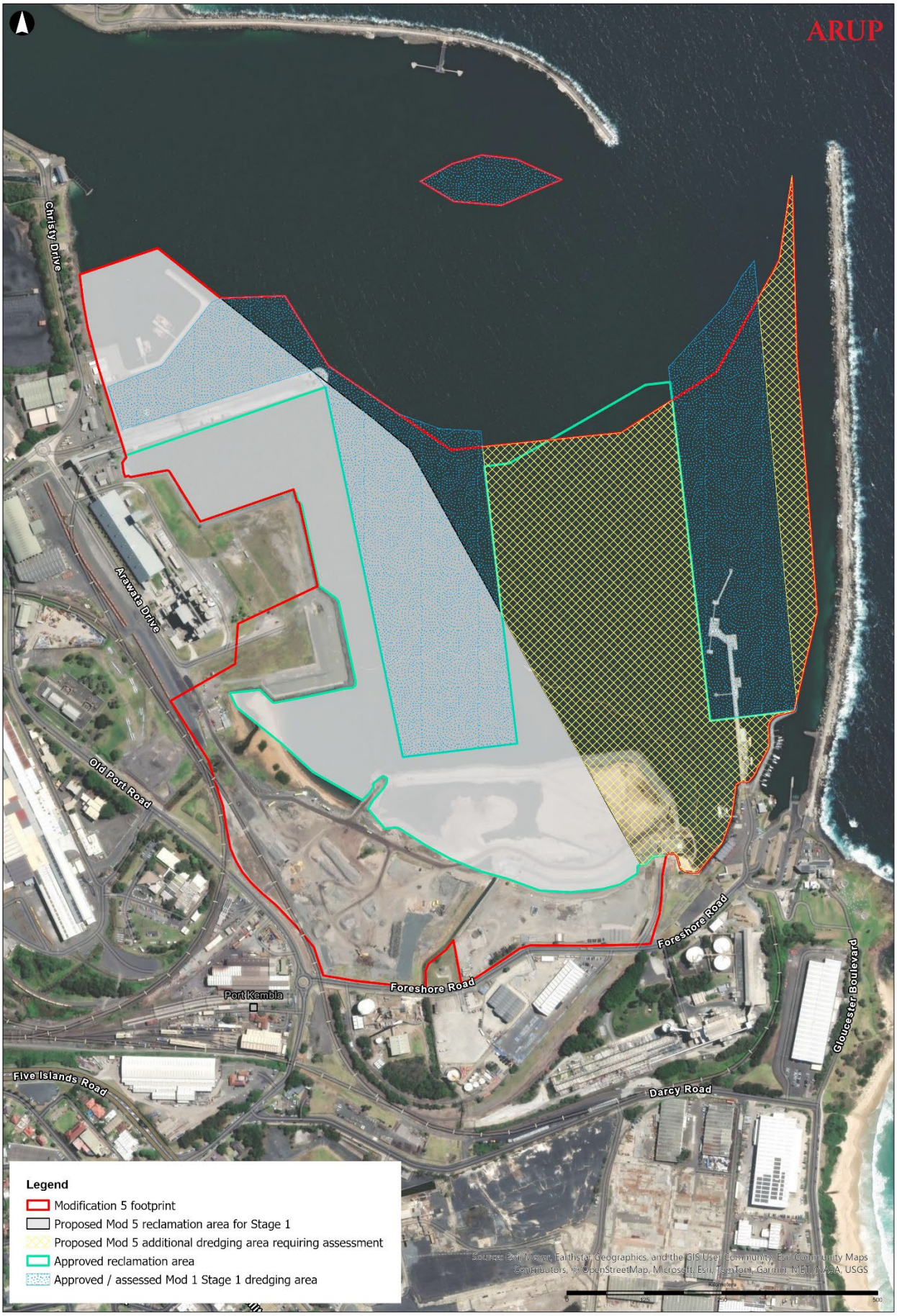

Figure 5-1: Comparison between approved project and proposed modification areas

6. Community and stakeholder engagement

This chapter outlines the community and stakeholder engagement activities that have taken place as part of this modification process and those the planned for the future.

6.1 Engagement processes and activities carried out

Community and stakeholder engagement carried out for purposes of the proposed modification is described in the following sections.

6.1.1 Government agencies

A series of notification letters were sent to several relevant Government agencies on 17 June 2025 to inform them of the proposed modification and allow them the opportunity to provide feedback by 9 July 2025. Table 6-1 outlines the outcomes of this consultation.

Table 6-1: Government agency consultation outcomes

Government agency	Response received	How this has been addressed
Department of Climate Change, Energy, the Environment and Water (DCCEEW) – Biodiversity, Conservation and Science Group (BCS)	On 17 June 2025, DCCEEW BCS noted that they would review the information and wanted to confirm if this information had also been sent to DPI Fisheries. Additional queries on the proposed modification were not made.	The project team provided confirmation that DPI Fisheries has been consulted with (see below).
Department of Planning, Housing and Infrastructure (DPHI)	A meeting with DPHI was held on 4 June 2025 to discuss the status of the modification and program, as well as the plan for engagement with other agencies. In this meeting it was reiterated that the modification report should focus on assessing the changes in impact from the approved project. A site visit for the DPHI assessment team was also proposed.	Chapter 7 assesses the proposed change in impact from the modification. Ongoing collaboration with DPHI on the progress of the proposed modification has been carried out since the initial meeting on 4 June 2025. A site visit was also held on 25 July 2025 with the DPHI team to provide context on what is being proposed.
Department of Primary Industries and Regional Development (DPIRD)	On 18 June 2025, DPIRD responded with the below key considerations: • Recommended addressing specific environmental assessment requirements outlined in Section 3.3 of the Policy and Guidelines for Fish Habitat Conservation and Management and noted that the proposed methodology used for this assessment would be suitable. • The assessment should address dredging and spoil management impacts, including sediment dispersion and resuspension • Potential impacts on key fish habitat, fish populations, and fishing activities should be considered and suitable measures to mitigate these impacts were strongly recommended • Potential impacts on recreational fishing activities should be addressed.	A meeting with DPIRD was held on 24 June 2025. DPIRD sought to confirm that changes to recreational fishing areas would not occur because of the modification. There are no prescribed recreational fishing areas within the Outer Harbour therefore the proposed modification would not impact any designated fishing locations. The proposed modification would also not impact on any public access arrangements from land (including the boat harbour) as the works would occur within private access areas only. Dredging activities would also occur in phases, occupying sections of the Outer Harbour but maintaining access for vessels to move around these works. These impacts are explored further in Section 7.2.

Government agency	Response received	How this has been addressed
		NSW Ports will ensure that during dredging, the public is notified of any areas which will be temporarily closed. For the other points raised by DPIRD, the AEA Report was prepared with consideration to the Policy and Guideline for Fish Habitat Conservation and Management and included consideration of dredging impacts and impact to key fish habitat. Sediment plume modelling was also undertaken as part of the Hydrodynamics Assessment report. The outcomes of this modelling were assessed to determine their potential impact on the aquatic environment.
Fire and Rescue NSW	On 18 June 2025, Fire and Rescue noted that they would review the project once the modification application has been submitted.	Any comments will therefore be captured through the display and submissions response period.
Heritage NSW	On 18 June 2025, Heritage NSW noted that they would review the project once the modification application has been submitted.	Any comments will therefore be captured through the display and submissions response period.
Marine Estate Management Authority	No response received.	N/A
NSW Environment Protection Authority (EPA)	On 19 June 2025, NSW EPA noted that they would review the project once the modification application has been submitted.	Any comments will therefore be captured through the display and submissions response period.
Port Authority of NSW	A full bridge simulation at the Australian Maritime Centre (AMC) in Launceston was undertaken with the Port Kembla Harbour Master (Port Authority of NSW) and pilots in September 2023 to showcase future operations of the new port development aligned with the proposed modification. NSW Ports met with Port Authority on 14 February 2025 to provide a high-level briefing on the project. On 20 June 2025, the Port Authority sought additional clarification as to what consultation on this modification has occurred with the Harbour Master to date, as a key stakeholder.	NSW Ports noted the details of the bridge simulation activities to the Port Authority in response to their correspondence of 20 June 2025.
NSW State Emergency Services (SES)	On 18 June 2025, SES noted that they had received the consultation letter but did not provide additional comment.	N/A
Transport for NSW (TfNSW) – Maritime Division	On 23 June 2025, TfNSW Maritime responded with the below key considerations: • Acknowledged that the expansion of the Port is required to meet changing needs and demands of the port facility	NSW Ports noted that the approved project included the removal of the Maritime and Police ‘pontoon’ (Berth 206). The proposed modification would still result in the removal of the Maritime and Police ‘pontoon’. Given the removal of Berth 206, the original mitigation measures identified for this impact

Government agency	Response received	How this has been addressed
	• Reiterated the importance of maintaining public access to the Port, including mooring licenses and the public boat ramp. Further investigation into impacts from the proposed modification on access to these areas was recommended • Noted that consideration and consultation should occur to ensure the continued and uninterrupted delivery of safe harbour vessel operators, including emergency moorings for the NSW Police Force - Marine Area Command and Marine Rescue NSW.	during the environmental assessment for the approved project would still apply. All private moorings would be retained under this proposed modification.
TfNSW – Roads Division	On 18 June 2025, TfNSW noted that they had received the consultation letter but did not provide additional comment.	N/A
Wollongong City Council	On 17 June 2025, the Wollongong City Council noted that they had received the consultation letter but did not provide additional comment.	N/A

6.1.2 Aboriginal community consultation

Native Title claim by the South Coast People (NC2017/003)

As of 26 May 2025, the proposed modification site is subject to an active Native Title claim by the South Coast People (NC2017/003), with no determination yet made. This Native Title claim covers a large area along the NSW coastline from Sutherland in the north to Boydtown in the south towards the NSW/Victoria border. As this claim is yet to be determined, only steps 4.1.2 to 4.1.7 of the Consultation Requirements are applicable, and the South Coast People will be contacted as part of ongoing community engagement.

The Archaeological Technical Report for the proposed modification has been prepared in accordance with the requirements set forth by the Code of Practice. As the report complies with these standards, consultation is not necessary for the archaeological assessment.

Illawarra Local Aboriginal Land Council (LALC)

In line with Requirement 4.1.2 of the Consultation Requirements, the Illawarra Local Aboriginal Land Council (LALC) and Registrar will also be contacted to provide the details of any Aboriginal peoples with potential knowledge relevant to assessing the significance of any identified Aboriginal places or objects if such a need arises.

Since no Aboriginal objects have been identified in the study area, and the area has been assessed as not possessing any potential for Aboriginal archaeological significance, this consultation is not necessary.

6.1.3 Affected tenants/businesses

NSW Ports have consulted with tenants within the Outer Harbour within the proposed modification footprint (specifically Svitzer and Port Kembla Gateway) to keep them informed of the proposed reconfigured footprint for the reclamation area. Tenants will continue being informed throughout the application process.

6.1.4 Community

A Stakeholder Engagement Plan was developed for the proposed modification. This included the identification of key community engagement and consultation activities. This includes updates to the NSW Ports website and any targeted consultation.

The following specific engagement activities are also planned for business and industry stakeholders such as the existing tenants of the NSW Ports Outer Harbour area during the planning approval stage of this proposed modification application and during construction:

- Briefing sessions
- Letters and/or emails providing project status updates
- Project newsletters.

NSW Ports consulted with both the Port Kembla Harbour Master and current tenants of the Outer Harbour area about the proposed modification throughout its development. This started in 2023 and has continued throughout the development of the project.

6.2 Engagement to be carried out

Future engagement activities planned as part of the proposed modification include:

- Ongoing briefing meetings with key stakeholders to identify and resolve potential issues during the planning assessment and construction phases
- Establishment of a feedback and complaints management procedure to respond to stakeholder questions and complaints for the lifetime of the project
- Sending updates to key stakeholders with status updates to inform them on key project activities during the planning approval and construction phases
- Notifying the fishing community of any public access areas which might be impacted during the proposed dredging works.

This modification report will also be on public exhibition which would allow key stakeholders and members of the public to provide comment.

Post approval consultation

Further consultation will be undertaken during both construction and operational phases of the project. The consultation will include the establishment of a Community Liaison Group.

7. Assessment of impacts

This chapter provides an overview of the potential impacts associated with the proposed modification.

7.1 Overview and environmental scoping

The existing environment of Port Kembla is characterised by its coastal location in the Wollongong LGA. The area is primarily industrial, with significant activities including steelworks, coal loading, car terminals, and agricultural fertilising transport. The Outer Harbour is specifically situated in the southern part of the Port area.

As part of the modification process, and building on the information above, an integrated environmental scoping assessment was undertaken to determine whether the proposed changes would alter the impacts assessed for the approved project. Accordingly, Table 7-1 identifies where additional assessment is required or where the existing assessment remains valid. Where further assessment is needed, this is provided in Section 7.2 to Section 7.8, along with any new or revised environmental management measures.

For matters where the assessment for the approved project remains applicable, no further assessment has been carried out in this modification report and potential impacts would be managed in accordance with the conditions of approval and relevant environmental management measures included in Appendix B.

Table 7-1: Scoping assessment for the proposed modification

Assessment matter	Comparison of modified project against the approved project	Further assessment required?
Aquatic biodiversity	**Stage 1** The proposed modification would alter the area being reclaimed and dredged, with some of these areas extending beyond the approved project footprint. This means that there may be additional habitat areas impacted that were not previously considered during the original environmental assessment. The existing aquatic environment may also have changed slightly between 2010 when the original assessment was carried out and 2025. **Concept** The modified reclamation footprint may result in different impacts to the aquatic environment once operational and would therefore need to be assessed.	● Yes (Section 7.2)
Contamination	**Stage 1** The proposed modification would alter the area being reclaimed and dredged, with some of these areas extending beyond the approved project footprint which would require further assessment. The time between when the original environmental assessment was carried out in 2010 and now (2025), may also mean that new contaminated sites/operating industries in the surrounding area would need to be considered. **Concept** The increased flexibility in potential future uses of the Port expansion may have additional contamination impacts. However, as the future uses are not yet fully determined, the assessment of these impacts would be limited at this stage.	● Yes (Section 7.3)

Assessment matter	Comparison of modified project against the approved project	Further assessment required?
Surface and groundwater	**Stage 1** The proposed modification may require the reconfigured layout of existing creek and drain structures to extent across a new reclamation footprint towards the Harbour compared to those assessed as part of the approved project. As a result, the flow-on impacts to water quality from changed contamination conditions may also be different to those assessed as part of the approved project. **Concept** The increased flexibility in potential future uses of the Port expansion may have additional water quality impacts. However, as the future uses are not yet fully determined, the assessment of these impacts would be limited at this stage.	● Yes (Section 7.4)
Hydrodynamics	**Stage 1** The proposed modification would alter the reclamation footprint. This would likely alter the hydrodynamic conditions experienced in the Outer Harbour area from what was assessed for the approved project. **Concept** The proposed modification would allow a variety of vessels to berth in the Outer Harbour which would not have been previously considered for the original assessment.	● Yes (Section 7.5)
Terrestrial biodiversity	**Stage 1** The proposed modification would not extend into any areas of existing terrestrial ecological significance and construction activities for Stage 1 are unlikely to result in any significant changes to terrestrial ecology compared to those already assessed for the approved project. **Concept** As above, the proposed modification would not extend into any areas of existing terrestrial ecological significance during future stage and once operational.	● No (briefly discussed in Section 7.7)
Traffic and transport	**Stage 1** The proposed modification would not require a change to access arrangements and transport upgrades compared to those assessed for the approved project. The modification is also unlikely to generate significant changes to traffic volumes for Stage 1 compared to those previously assessed for the approved project and MOD1 as the construction methodology and number of construction staff would stay the same. **Concept** While Stage 2 and Stage 3 of the Concept Plan foresee changes to vessel traffic in terms of the scale, nature, size and frequency of vessels, this would only be known once specific uses and operational requirements of the terminal are defined. Therefore, it is not currently possible to undertake a detailed	● No (briefly discussed in Section 7.7)

Assessment matter	Comparison of modified project against the approved project	Further assessment required?
	assessment of vessel traffic impacts. These will be addressed in future applications once sufficient design and operational detail is available. This approach ensures that potential impacts are appropriately considered at the right stage of planning and approval, in line with the intent of a Concept-level assessment.	
Socio-economic	**Stage 1** The proposed modification would not alter the potential number of job opportunities identified for Stage 1. Construction methodologies would also remain the same and within an operating port, so amenity impacts would likely remain the same during Stage 1. **Concept** Potential job opportunities for future stages as part of the Concept phase would need to be identified in future assessments once the preferred use of the terminal is determined. As such, the overall potential economic impact is likely to remain the same. However, an update on socio-economic baseline conditions would be required.	● No (briefly discussed in Section 7.7)
Noise and vibration	**Stage 1** The proposed modification would not materially alter the construction method in terms of the type and duration of noise-generating activities, and the fact that they would occur broadly in the same location within an operating port with limited surrounding sensitive receivers. As such, the potential impact from the proposed modification is likely to be similar to those previously assessed. **Concept** The proposed modification would allow a variety of vessels to berth at the new reclamation area, however, as the type of uses are not yet fully determined, the impact of this would need to be assessed at a later date.	● No (briefly discussed in Section 7.7)
Air quality	**Stage 1** The proposed modification would not materially alter the construction method in terms of the type and duration of emission-generating activities, and the fact that they would occur within an operating port with limited surrounding sensitive receivers. As such, the potential impact from the proposed modification is likely to be similar to those previously assessed. **Concept** For the Concept phases (Stage 2 and Stage 3) of the proposed modification, it is anticipated that any emission-generating activities would occur within the existing operational port environment, which is characterised by limited number of sensitive receivers in proximity to the site. This context is likely to mitigate broader impacts to local air quality.	● No (briefly discussed in Section 7.7)

Assessment matter	Comparison of modified project against the approved project	Further assessment required?
	The anticipated air quality impacts from Stages 2 and 3 are expected to be broadly consistent with those previously assessed for this operational port environment, given the location and limited nearby sensitive receptors. However, further assessment will be necessary as Concept Plans are further developed.	
Landscape and visual	**Stage 1** While the proposed modification would alter the layout of the reclamation area, other impacts to visual amenity during construction under Stage 1 would likely remain the same as the approved project, given these works only enable reclamation. **Concept** Impacts from the built form of the infrastructure that would be introduced under Stage 2 and Stage 3 would need to be assessed in the future once the preferred land use for the terminal is determined. The proposed modification is also within an operating port with limited surrounding sensitive receivers.	● No (briefly discussed in Section 7.7)
Environmental heritage	**Stage 1** The approved project did not identify any potential non-Aboriginal heritage items near the site, including within the additional areas identified for the proposed modification. Further, the heritage record is well understood locally, and it has not changed since the time of the previous assessment in 2010-2011. Therefore, potential additional impacts to non-Aboriginal heritage because of the proposed are unlikely. **Concept** During the development of Stage 2 and Stage 3, the potential for non-Aboriginal heritage impacts remains low. Existing heritage records, which have been locally well established and maintained since previous assessments in 2010–2011, do not indicate the presence of non-Aboriginal heritage items within the proposed modification areas. As such, the introduction of new infrastructure or changes in land use under future stages are unlikely to affect non-Aboriginal heritage values.	● No (briefly discussed in Section 7.7)
Aboriginal heritage	**Stage 1** The approved project did not identify any potential Aboriginal heritage items near the site, including within the additional areas identified for the proposed modification. Further, the heritage record is well understood locally, and it has not changed since the time of the previous assessment in 2010-2011. Therefore, potential additional impacts to Aboriginal heritage because of the proposed are unlikely. **Concept** During the development of Stage 2 and Stage 3, the potential for impacts to Aboriginal heritage remains minimal. Existing heritage records, which have been locally well established and maintained since previous assessments in 2010–2011, do not	● No (briefly discussed in Section 7.7)

Assessment matter	Comparison of modified project against the approved project	Further assessment required?
	indicate the presence of Aboriginal heritage items within the proposed modification areas. As such, the introduction of new infrastructure or changes in land use under these future stages are unlikely to affect Aboriginal heritage values.	
Climate change	**Stage 1** While climate change is unlikely to have a material impact as a result of the proposed modification, it is important to note that both the assessment of climate change impacts and relevant regulatory frameworks have evolved since the Stage 1 project in 2011. This includes emphasis on identifying potential vulnerabilities and require closer alignment with updated policies and best practices for greenhouse gas emissions and climate resilience. Nonetheless, as construction methods remain largely unchanged, significant new climate-related risks are not anticipated. **Concept** During the development of Stage 2 and Stage 3, the potential impacts of climate change remain limited in scope. The proposed modification is not expected to substantially alter construction methods or materials, and existing site assessments indicate that the local environment is unlikely to experience significant new vulnerabilities due to these changes. While climate change considerations and regulatory frameworks have evolved since 2011, the anticipated activities under the Concept stages do not introduce risks that would materially affect greenhouse gas emissions or increase sensitivity to climate-related events. Ongoing monitoring and adherence to updated policy will ensure that any emerging climate risks are appropriately managed as the project progresses.	● No (briefly discussed in Section 7.7)
Waste	**Stage 1** The types and quantities of waste generated are expected to remain largely consistent with the approved project, primarily consisting of dredged and reclaimed material. **Concept** While the types and volumes of waste generated during Stage 2 and Stage 3 are anticipated to remain consistent with those previously established, it is important to acknowledge that future uses of the site, such as the potential development of an offshore wind terminal, may alter waste profiles. New activities could introduce different waste streams or increased volumes, depending on the operational requirements of emerging industries. Ongoing adherence to updated waste management policies, with a focus on circular economy principles, will be crucial in ensuring that materials are reused or recycled where feasible, minimising landfill disposal and effectively managing any new or changing waste streams.	● No (briefly discussed in Section 7.7)

7.2 Aquatic biodiversity

An aquatic assessment was carried out to assess the potential impact of the proposed modification. The assessment included a review of publicly available information and identified threatened, migratory, or protected aquatic species, populations, and ecological communities listed under the EPBC Act, BC Act, or FM Act with potential to occur within 10 km of the study area (Port Kembla Outer Harbour). A field survey of the aquatic habitat within the study area was also carried out on 19 to 20 June 2025. This included both a visual survey and use of a remotely operated vehicle from a vessel.

The full assessment is provided in Appendix F.

7.2.1 Existing environment and background

Port Kembla is located within the Hawksbury Shelf marine bioregion and has undergone significant anthropogenic (caused or produced by humans) modification since the late 19th Century. Given the industrial nature of the land uses surrounding the Port, this has had an impact on the existing water and sediment quality (refer to Section 7.3) with past contamination monitoring (refer to Section 7.3.1) indicating exceedances for several metals and organic compounds.

However, more recent water quality data in the Outer Harbour indicates that key harmful pollutant concentrations are below the ANZECC (2000) *Guidelines for Fresh and Marine Water Quality* trigger values, which are conservative screening thresholds for protecting marine ecosystems. These values act as conservative screening thresholds to protect marine ecosystems, with further investigation only required if they are exceeded. Elutriate testing, which simulates the release of contaminants during sediment disturbance, showed low contaminant mobilisation, indicating minimal environmental risk from resuspension. Together, these findings indicate a low risk of environmental harm from sediment resuspension in the Outer Harbour.

Aquatic habitat

The main aquatic habitat within the Outer Harbour comprises sandy and silty soft sediments, rock revetment, and other artificial structures and estuarine waters. The soft sediments are the most prevalent, making up 111.6 ha of the study area. These sediments provide habitat for benthic invertebrates (including infauna and epifauna such as burrowing organisms like polychaete worms, amphipod crustaceans, etc.), macrophytes, and some macroalgae species. Sparce macroalgal growth (i.e. seaweed species) was also found to be present close to rock revetment structures shown in Figure 7-1 (around 11.6ha of the study area), which are classed as Type 2 moderately sensitive fish habitat[4]. These habitats are shown in Figure 7-1.

Common species of seaweeds and algae found in Australian coastal waters were observed onsite. They include brown algae like *Ecklonia radiata*, a type of kelp that forms underwater forests, *Sargassum*, *Zonaria*, and *Dictyota*, which are bushy or leafy seaweeds, as well as green algae such as *Ulva*, also known as sea lettuce, and, which has a spongy texture. *Corallina officinalis* was also found onsite. This is a red algae with a hard, coral-like structure due to calcium in its tissues. The seaweeds and the algae provide food and shelter for marine animals and help support healthy coastal ecosystems.

A small area of *Halophila* seagrass was also identified along the eastern breakwater near the Port Kembla Outer Harbour boat ramp (around 3.7 m^2). *Halophila* is a is a small, fast-growing seagrass that provides

[4] Type 2 moderately sensitive fish habitat refers to areas that support important fishery resources or ecological functions—such as seagrass beds, mangroves, or rocky reefs—but are not considered critical to the survival of threatened species or key spawning grounds

shelter and feeding areas for fish and invertebrates. Even in small patches, it plays an important role in supporting marine biodiversity, which is why it's identified as moderately sensitive key fish habitat.

No naturally occurring hard substrata (e.g. rocky reefs and shores) were recorded within the study area, however artificial rock from revetment structures provides a similar ecological function by offering surfaces for algae to grow and creating shelter and habitat complexity for fish and invertebrates, thereby supporting local marine biodiversity. This rock revetment accounted for about 10.4 ha of the study area. It too is classified as Type 2 moderately sensitive key fish habitat.

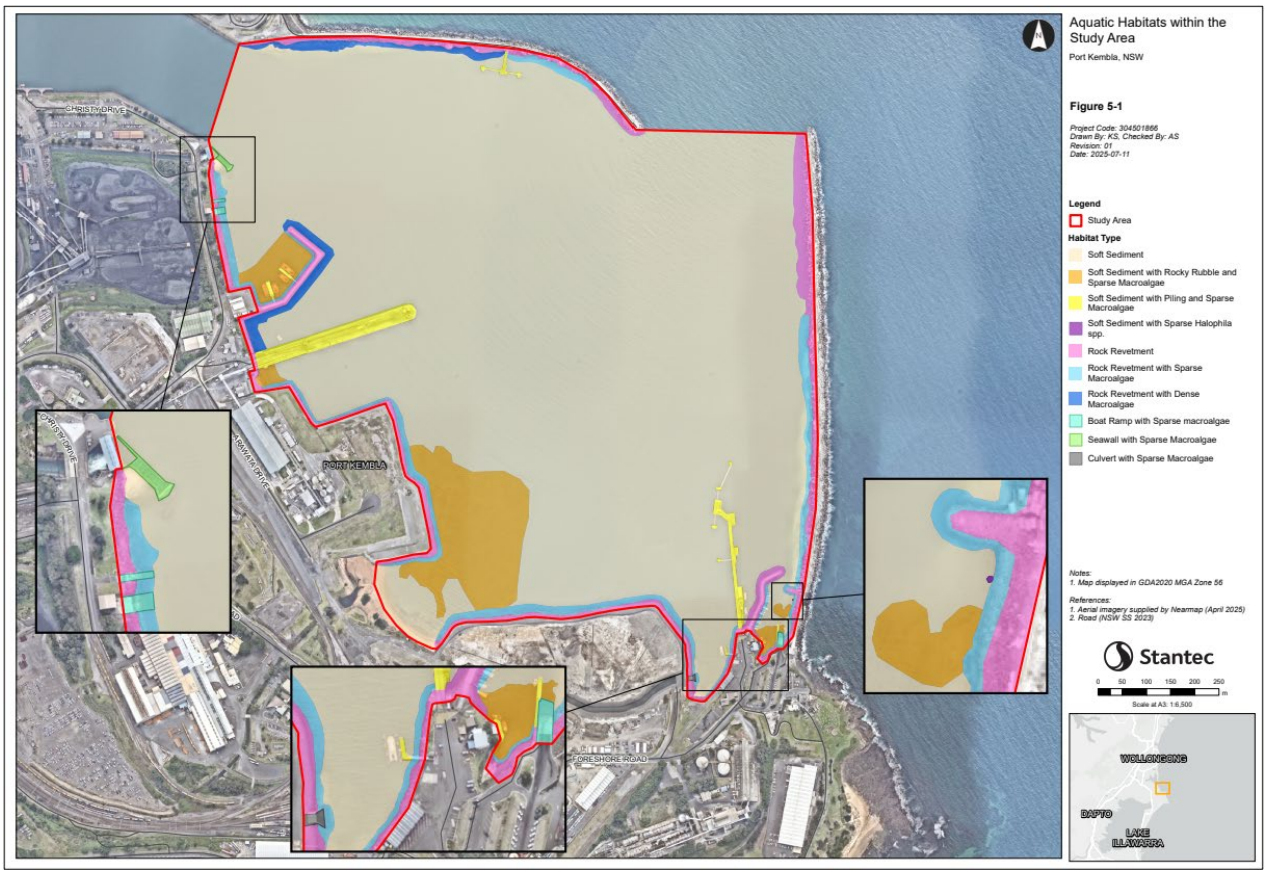

Figure 7-1: Aquatic habitats within the study area

Aquatic fauna

A diverse range of 48 marine and coastal species, comprising fish, marine mammals, reptiles, and bird, are known or considered likely to occur within the Port Kembla Outer Harbour study area as observed in the field. This includes several species listed as threatened, migratory, marine, or protected under the NSW *Biodiversity Conservation Act 2016*, *Fisheries Management Act 1994*, and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. While most species have a moderate likelihood of occurrence, some, such as the Australian fur seal, little penguin, and several seabirds, are either known or highly likely to be present based on field observations and previous studies.

A summary of the key relevant species, conservation listings, and likelihood of occurrence is provided in Table 7-2 below.

In summary, 16 species of birds and marine mammals are either known or considered highly likely to occur within the study area:

- Six bird species are known to occur, comprising three seabirds (two cormorant species and the white-bellied sea-eagle) and three shorebirds (the silver gull, sooty oystercatcher, and Australian pelican)
- An additional eight bird species (seven seabirds and one shorebird) have a high likelihood of occurring locally, five of which are also migratory
- Among marine mammals, the Australian fur seal is known to occur in the area, while the New Zealand fur seal is considered likely to be present.

No threatened species of fish were observed during the survey; however, a targeted fish survey was not carried out as part of this modification.

The approved project EIS identified 12 additional species of fish not observed during the current field survey. While this may suggest potential changes in species presence over time, the absence of a targeted fish survey limits any firm conclusions above a shift in species diversity.

Nonetheless, previous studies and publicly available data continue to indicate the likely presence of a broader range of fish species and marine reptiles present in the area. As such, a precautionary approach has been adopted, and these species have been considered in the assessment despite not being observed during the current survey.

It is also noted that when the approved project EIS was carried out, the White's seahorse was not formally listed under the EPBC Act or FM Act. Its status as endangered has subsequently been formalised and an assessment of potential impact to this species under the approved project and proposed modification has therefore been carried out.

Table 7-2: Threatened, migratory, marine and protected species within the study area

Scientific Name	Common Name	State Listing (BC Act* / FM Act^{+})	Commonwealth Listing (EPBC Act)	Likelihood of Occurrence
Fish				
Anampses elegans	Elegant wrasse	P^{+}	-	Moderate
Carcharias taurus	Grey nurse shark	CE^{+}	M	Moderate
Carcharodon carcharias	White shark	V^{+}	V, M	Moderate
Epinephelus daemelii	Black rockcod	V^{+}	V	Moderate
Festucalex cinctus	Girdled pipefish	P^{+}	Ma	Moderate
Filicampus tigris	Tiger pipefish	P^{+}	Ma	Moderate
Heraldia nocturna	Upside-down pipefish	P^{+}	Ma	Moderate
Hippocampus abdominalis	Big-belly seahorse	P^{+}	Ma	Moderate
Hippocampus whitei	White's seahorse	E^{+}	E, Ma	Moderate
Histiogamphelus briggsii	Crested pipefish	P^{+}	Ma	Moderate
Lissocampus runa	Javelin pipefish	P^{+}	Ma	Moderate
Maroubra perserrata	Sawtooth pipefish	P^{+}	Ma	Moderate
Paraplesiops bleekeri	Eastern blue devil	P^{+}	-	Moderate
Phyllopteryx taeniolatus	Common seadragon	P^{+}	Ma	Moderate
Seriolella brama	Blue warehou	-	CD	Moderate
Solegnathus spinosissimus	Spiny pipehorse	P^{+}	Ma	Moderate
Stigmatopora argus	Spotted pipefish	P^{+}	Ma	Moderate
Stigmatopora nigra	Widebody pipefish	P^{+}	Ma	Moderate
Urocampus carinirostris	Hairy pipefish	P^{+}	Ma	Moderate
Vanacampus margaritifer	Mother-of-pearl pipefish	P^{+}	Ma	Moderate

Scientific Name	Common Name	State Listing (BC Act* / FM Act+)	Commonwealth Listing (EPBC Act)	Likelihood of Occurrence
Mammals				
Arctocephalus forsteri	New Zealand fur-seal	V*, P*	Ma	l High
Arctocephalus pusillus	Australian fur-seal	V*, P*	Ma	l Known
Eubalaena australis	Southern right whale	E*, P*	E, M, C	l Moderate
Megaptera novaeangliae	Humpback whale	P*	M, C	l Moderate
Neophoca cinerea	Australian sea-lion	P*	E, Ma	l Moderate
Reptiles				
Caretta caretta	Loggerhead turtle	E*, P*	E, M, Ma	l Moderate
Chelonia mydas	Green turtle	V*, P*	V, M, Ma	l Moderate
Dermochelys coriacea	Leatherback turtle	E*, P*	E, M, Ma	l Moderate
Eretmochelys imbricata	Hawksbill turtle	P*	V, M, Ma	l Moderate
Natator depressus	Flatback turtle	P*	V, M, Ma	l Moderate
Birds				
Actitis hypoleucos	Common sandpiper	P*	M, Ma	l Moderate
Anous stolidus	Common noddy	P*	M, Ma	l Moderate
Ardenna grisea	Sooty shearwater	P*	V, M, Ma	l High
Ardenna pacifica	Wedge-tailed shearwater	P*	M, Ma	l High
Ardenna tenuirostris	Short-tailed shearwater	P*	M, Ma	l High
Arenaria interpres	Ruddy turnstone	P*	V, M, Ma	l Moderate
Calidris acuminata	Sharp-tailed sandpiper	P*	V, M, Ma	l Moderate
Calidris alba	Sanderling	V*, P*	M, Ma	l Moderate
Calidris canutus	Red knot, knot	P*	V, M, Ma	l Moderate
Calidris ruficollis	Red-necked stint	P*	M, Ma	l Moderate
Calonectris leucomelas	Streaked shearwater	P*	M, Ma	l Moderate
Charadrius bicinctus	Double-banded plover	P*	M, Ma	l Moderate
Charadrius leschenaultii	Greater sand plover	V*, P*	V, M, Ma	l Moderate
Charadrius mongolus	Lesser sand plover	V*, P*	E, M, Ma	l Moderate
Charadrius ruficapillus	Red-capped plover	P*	Ma	l Moderate
Chroicocephalus novaehollandiae	Silver gull	P*	Ma	l Known
Diomedea antipodensis	Antipodean albatross	V*, P*	V, M, Ma	l Moderate
Diomedea antipodensis gibsoni	Gibson's albatross	V*, P*	V, Ma	l Moderate
Diomedea epomophora	Southern royal albatross	P*	V, M, Ma	l Moderate
Diomedea exulans	Wandering albatross	E*, P*	V, M, Ma	l Moderate
Diomedea sanfordi	Northern royal albatross	P*	E, M, Ma	l Moderate
Egretta garzetta	Little egret	P*	Ma	l Moderate
Eudyptula minor	Little penguin	P*	Ma	l High
Fregata ariel	Lesser frigatebird	P*	M, Ma	l Moderate
Gallinago hardwickii	Latham's snipe	V*, P*	V, M, Ma	l Moderate
Haematopus fuliginosus	Sooty oystercatcher	V*, P*	-	l Known
Haliaeetus leucogaster	White-bellied sea-eagle	V*, P*	Ma	l Known
Himantopus himantopus	Black-winged stilt	P*	Ma	l Moderate
Hirundapus caudacutus	White-throated needletail	V*	V, M, Ma	l Moderate
Hydroprogne caspia	Caspian tern	P*	M, Ma	l Moderate
Larus dominicanus	Kelp gull	P*	Ma	l Moderate
Larus pacificus	Pacific gull	P*	Ma	l Moderate

Scientific Name	Common Name	State Listing (BC Act* / FM Act+)	Commonwealth Listing (EPBC Act)	Likelihood of Occurrence
Limosa lapponica	Bar-tailed godwit	P*	M, Ma	Moderate
Limosa limosa	Black-tailed godwit	V*, P*	E, M, Ma	Moderate
Macronectes giganteus	Southern giant-petrel	E*, P*	E, M, Ma	Moderate
Macronectes halli	Northern giant-petrel	V*, P*	V, M, Ma	Moderate
Morus serrator	Australasian gannet	P*	Ma	High
Numenius madagascariensis	Eastern curlew	CE*, P*	CE, M, Ma	Moderate
Numenius minutus	Little curlew	P*	M, Ma	Moderate
Numenius phaeopus	Whimbrel	P*	M, Ma	Moderate
Pachyptila turtur	Fairy prion	P*	Ma	Moderate
Pandion haliaetus	Osprey	P*	M, Ma	Moderate
Pelagodroma marina	White-faced storm-petrel	P*	Ma	High
Pelecanus conspicillatus	Australian pelican	P*	Ma	Known
Phaethon lepturus	White-tailed tropicbird	-	M, Ma	Moderate
Phalacrocorax carbo	Great cormorant	P*	Ma	Known
Phalacrocorax sulcirostris	Little black cormorant	P*	Ma	Known
Phoebetria fusca	Sooty albatross	V*, P*	V, M, Ma	Moderate
Pluvialis fulva	Pacific golden plover	P*	M, Ma	Moderate
Pluvialis squatarola	Grey plover	P*	V, M, Ma	Moderate
Pterodroma cervicalis	White-necked petrel	P*	Ma	Moderate
Pterodroma macroptera	Great-winged petrel	P*	Ma	Moderate
Puffinus gavia	Fluttering shearwater	P*	Ma	High
Stercorarius antarcticus	Brown skua	P*	Ma	Moderate
Sterna striata	White-fronted tern	P*	Ma	Moderate
Sternula albifrons	Little tern	E*, P*	M, Ma	Moderate
Thalassarche bulleri	Buller's albatross	P*	V, M, Ma	Moderate
Thalassarche bulleri platei	Northern Buller's albatross	P*	V, Ma	Moderate
Thalassarche carteri	Indian, yellow-nosed albatross	P*	V, M, Ma	Moderate
Thalassarche cauta	Shy albatross	E*, P*	E, M, Ma	Moderate
Thalassarche eremita	Chatham albatross	P*	E, M, Ma	Moderate
Thalassarche impavida	Campbell albatross	P*	V, M, Ma	Moderate
Thalassarche melanophris	Black-browed albatross	V*, P*	V, M, Ma	Moderate
Thalassarche salvini	Salvin's albatross	P*	V, M, Ma	Moderate
Thalassarche steadi	White-capped albatross	P*	V, M, Ma	Moderate
Thalasseus bergii	Crested tern	P*	M, Ma	High
Thinornis cucullatus cucullatus	Eastern hooded dotterel	CE*, P*	V, Ma	Moderate
Threskiornis moluccus	Australian white ibis	P*	Ma	High
Tringa brevipes	Grey-tailed tattler	P*	M, Ma	Moderate

Note: Critically endangered (CE); Endangered (E); Vulnerable (V); Conservation dependent (CD); Migratory (M); Marine (Ma); Cetacean (C); and Protected (P).

Areas of conservation significance

There are no areas of critical habitat, biodiversity value, or protected areas in the study area. There are also no Matters of National Environmental Significance (MNES) apart from the threatened and protected species, populations and ecological communities discussed above. This context helps frame the presence of listed species within a broader ecological setting, confirming that while individual protected species may be present, the area does not represent a site of heightened ecological sensitivity or national environmental significance overall.

Groundwater dependent ecosystems

Groundwater dependent ecosystems (GDEs) are defined as ecosystems that need access to groundwater to meet all or some of their water requirements to maintain their communities of plants and animals, ecological processes and ecosystem services. However, there are no GDEs mapped within the proposed modification footprint. The closest GDE is around 1km south-west of the modification footprint (the South Coast Sands Bangalay Forest ecological community) which is identified as a moderate potential GDE. Other nearby GDE's include:

- The Coomaditchy Lagoon Reserve identified as a high potential GDE (located around 1.4km south of the modification footprint)
- An area considered to be a low potential GDE located around 1.2km southeast of the modification footprint
- The Coomaditchy Lagoon which is considered a low potential GDE (located around 1.3km south of the modification footprint).

Fisheries and aquaculture resources

Port Kembla is popular for recreational fishing with common species such as Australasian snapper (*Pagrus auratus*), Australian salmon (*Arripis trutta*), bluefish (*Pomatomus saltatrix*), dusky flathead (*Platycephalus fuscus*) and yellowfin bream (*Acanthopagrus australis*) found in the Outer Harbour.

While fishing is prohibited in the Inner Harbour area, all methods of recreational fishing, apart from netting and trapping, are permitted from publicly accessible locations in the Outer Harbour from shore or vessels. This means recreational fishing is permitted within the waterside areas of the modification footprint (if publicly accessible).

As netting and trapping are prohibited within the Outer Harbour (extending to the limits of the breakwater), commercial fishing is generally restricted within the Outer Harbour area.

Introduced species

Port Kembla is vulnerable to colonisation by marine pests introduced from vessels operating in the port. Previous marine pest surveys have identified several introduced and cryptogenic species in Port Kembla (Pollard & Pethebridge, 2002; Johnston, 2006; UNSW Subtidal Ecology and Ecotoxicology Laboratory, 2009). In particular, Alexandrium spp. dinoflagellates were previously identified and are listed as High National Priority Marine Pests while the *ascidians Ciona intestinalis*, *Styela clava*, and *bryozoan Schizoporella errata* species identified are classified as Medium National Priority Marine Pests (Hayes et al., 2005). Introduced species accounted for half of the hard substrate assemblages within the Port (Johnston, 2006).

However, no marine pests were observed during the aquatic ecology assessment carried out for the approved project.

7.2.2 Assessment of potential impacts – Stage 1

Construction

Habitat and indicator species

Habitat removal | reclamation works

Accounting for the areas already reclaimed the revised total area would decrease from 28.9 ha to 27.2 ha under the proposed modification. This reduction represents a positive refinement, lowering the extent of new disturbance and supporting the objective of minimising environmental impacts where feasible. Table 7-3 summarises the resulting net habitat loss.

Table 7-3: Change in habitat removal by reclamation works

Habitat type	Approved project	Proposed modification (revised totals)	Proposed modification (relative change)
Soft sediment	26.4 ha	23.9 ha	- 2.5 ha removed
Rock revetment	2.5 ha	3.3 ha	+ 0.8 ha removed
Total	28.9 ha	27.2 ha	- 1.7 ha removed

Under the proposed modification, the total area of macrophyte habitat affected by reclamation would increase from 3.7 ha to 10.1 ha, representing a net increase of 6.4 ha of removal. This includes an increase in the loss of sparse macroalgae (+5.8 ha) and the introduction of a new impact on dense macroalgae (+0.6 ha), which was not previously affected. This change represents an increase in ecological disturbance to macrophyte communities with the proposed modification.

Table 7-4: Change in macrophytes removal by reclamation works

Macrophyte assemblages	Approved project	Proposed modification (revised totals)	Proposed modification (relative change)
Sparse macroalgae	3.7 ha	9.5 ha	+ 5.8 ha removed
Dense macroalgae	0.0 ha	0.6 ha	+ 0.6 ha removed
Total	3.7 ha	10.1 ha	+ 6.4 ha removed

Habitat removal | dredging works

Table 7-5 shows that the proposed dredging works would result in an additional 7.4 ha of soft sediment disturbance and a reduction of 3.4 ha of sparse macroalgae disturbance compared to the approved project. While this represents a net increase in total disturbance area, the shift is primarily within soft sediment habitat, which is common and widespread in the surrounding environment (see Section 7.2.1). Nonetheless, this change would result in different volumes of soft sediment, invertebrates, and macroalgal assemblages being disturbed, which may temporarily affect habitat structure and species composition within the dredging footprint. However, these habitat types are generally recoverable over time, with natural recolonisation expected to occur once dredging ceases and environmental conditions stabilise.

Sufficient soft sediment habitat would remain in the Outer Harbour to support natural recolonisation and recruitment into the disturbed areas. As such, the additional impacts on benthic infauna from the proposed modification would be localised, temporary, and reversible, with no long-term effect on the ecological functioning of the broader marine environment.

Table 7-5: Change in habitat disturbance by dredging works

Macrophyte assemblages	Approved project	Proposed modification (revised totals)	Proposed modification (relative change)
Soft sediment	26.3 ha	33.7 ha	+ 7.4 ha disturbed
Sparse macroalgae	4.2 ha	0.8 ha	- 3.4 ha disturbed

Mobile species

Most mobile species associated with these habitat areas would disperse during reclamation activities to nearby undisturbed habitats in Port Kembla. This natural avoidance behaviour reduces the likelihood of direct mortality and supports the resilience of local populations. From an impact assessment perspective, this means the proposed modification is less likely to result in significant or lasting effects on the abundance or viability of mobile marine fauna, including those species of ecological or legislative concern. The availability of nearby suitable habitat also reinforces the effectiveness of proposed mitigation measures and contributes to the conclusion that the modification would not result in a significant impact on marine biodiversity.

Immobile species

Syngnathiformes (including seahorses, pipefish, and seadragons) and sessile invertebrates are highlighted in Appendix F due to their limited mobility, strong reliance on structured habitats such as seagrass beds and macroalgae, and, where applicable, their protected status under the FM Act and EPBC Act. Unlike more mobile marine fauna, these species are unable to readily avoid disturbance and are therefore particularly vulnerable to impacts from reclamation or dredging. Some, such as White's Seahorse, are listed as threatened and serve as indicators of habitat condition. Even for other species of Syngnathiformes not formally listed, these species may be locally significant due to their restricted ranges or specialised habitat requirements. While not explicitly addressed in the original EIS, their consideration in this modification ensures consistency with current legislative expectations and strengthens the environmental due diligence of the project.

Conclusion

With the implementation of proven and effective mitigation, including targeted pre-construction relocation of Syngnathiformes where present, along with standard construction controls to manage turbidity and underwater noise/shockwaves, the potential impacts to at-risk species can be effectively reduced. These measures have been successfully applied in similar marine infrastructure projects in NSW and are considered appropriate to the scale and nature of the proposed works. As a result, any residual impacts are expected to be minor and highly localised.

It is therefore unlikely that the proposed modification would result in a significant impact on marine fauna, including species protected under the FM Act, BC Act, or EPBC Act.

Sediment suspension and deposition

Turbidity

As noted below in Section 7.5, dredging activities associated with the proposed modification would generate temporary turbid sediment plumes within the Outer Harbour, which can disperse away from the immediate area of disturbance. Elevated turbidity levels can have a detrimental effect on aquatic flora and fauna when they exceed the natural range species cab tolerate, reducing light availability and interfering with feeding or respiration (Nieuwaal, 2001; SPC, 2007).

While Port Kembla is routinely subject to elevated turbidity from natural estuarine processes, vessel movement, and maintenance dredging, recent site-specific turbidity data are unavailable. In the absence of current monitoring, the assessment draws on both historical data and recognised guideline thresholds to evaluate potential impacts.

Previous water quality monitoring in the Outer Harbour (AECOM, 2010) recorded background total suspended solids (TSS, an indicator of turbidity) concentrations ranging from 2 mg/L to 20 mg/L, indicating that natural turbidity levels are typically well below the commonly adopted 50 mg/L threshold used in NSW for managing short-term, construction-related turbidity. This threshold is generally considered protective of aquatic biota when exposure is localised and temporary.

As required under the SEARs, and in the absence of updated monitoring data, the assessment relies on sediment dispersion modelling to estimate the extent and duration of turbidity associated with the proposed works. The modelling (see Section 7.5) predicts that TSS concentrations would be consistently higher near the seabed, with a maximum of 50 mg/L in the immediate vicinity of dredging and reclamation activities. These results represent a conservative estimate of potential impacts within an operational port environment where elevated turbidity already occurs intermittently under existing conditions.

Macroalgae

The predictive modelling (see Section 7.5) confirms that habitats exposed to elevated TSS resulting from the dredging and reclamation works associated with the proposed modification would include soft sediment and rock revetment, as well as small areas of existing artificial structures (i.e. seawall and boat ramps) all of which have little to no macroalgal coverage.

While increased turbidity can reduce light availability and affect photosynthetic organisms such as macroalgae, these effects are typically reversible once conditions normalise (Denley and Dayton, 1985).

Given the low macroalgal presence in the additional areas exposed to elevated TSS, the proposed modification is unlikely to result in significant impacts to macroalgal communities or associated aquatic fauna.

Mobile species

While elevated turbidity can temporarily reduce water clarity and affect visual foraging or gill function in some aquatic species, such impacts are typically short-term and localised. Mobile fauna, including fish and invertebrates, are generally capable of avoiding areas of elevated turbidity and are expected to disperse to nearby undisturbed habitats.

Given the transient nature of dredging-related turbidity and the availability of similar habitat in the surrounding area, significant or lasting impacts on mobile aquatic fauna are unlikely

Immobile species

Sessile invertebrates that occupy habitat areas near the tug berth and eastern breakwater would also be at risk from increased turbidity levels compared to the approved project. This could result in impacts to respiration, feeding capacity and settlement for these species. Changes to the availability of light could also affect the photosynthetic capacity of symbionts in invertebrates such as sponges (Roberts et al., 2006b). Dredging activities may lead to a temporary reduction in sessile invertebrate abundance in these areas for the reasons described above in Section 7.2.2. However, as turbidity levels normalise, recolonisation is expected over time given the resilience of these assemblages.

Sedimentation

The predicted sediment deposition associated with the proposed modification ranges from 10 mm to 70 mm in areas adjacent to dredging activities. While these values represent the upper range of modelled outcomes, they reflect short-term, worst-case scenarios under calm water conditions and do not account for the dynamic resuspension processes typical of coastal, port, and estuarine environments. In naturally energetic settings such as Port Kembla, regular wave action, vessel movements, and tidal currents contribute to frequent sediment redistribution, meaning background exposure to variable turbidity and minor sedimentation is common.

Some areas predicted to receive sedimentation may have already experienced prior deposition and could subsequently be subject to dredging, further supporting the conclusion that modelled sedimentation depths represent conservative, instantaneous impacts rather than persistent accumulation.

From an ecological perspective, short-term deposition of up to 70 mm around the tug berth area during dredging activities (see Section 7.2.2) is unlikely to cause significant or lasting impacts to benthic communities, particularly where organisms are adapted to naturally variable conditions or where recolonisation potential is high, as is the case in Port Kembla. Sedimentation levels of 10 to 60 mm are generally considered within the tolerance range for many soft sediment and rocky reef assemblages in NSW, particularly if deposition occurs gradually or is followed by natural recovery. As such, the proposed modification is not expected to result in material ecological harm due to sediment deposition.

While this modelling does not include natural turbidity fluctuations, conditions in the Outer Harbour can be influenced by wind-driven resuspension, tidal currents, and vessel traffic, which may cause turbidity levels to temporarily exceed both background and dredging-related concentrations. In such periods, dredging-induced turbidity may be less distinguishable from background levels, reducing its incremental ecological effect.

A short-term turbidity increase of up to 5 mg/L above background at the harbour entrance is also predicted, which is within commonly adopted NSW thresholds for avoiding short-term adverse effects on most marine species. At the predicted deposition thicknesses (0.05–0.15 m on average, with occasional mounding up to ~0.25 m near placement points), burial of benthic infauna is likely within the immediate reclamation footprint. Species adapted to stable sediments at these depths may be smothered, while more mobile or opportunistic species may recolonise over time. Although not quantified in this assessment, natural sedimentation events in the Outer Harbour (e.g. from storms or vessel propeller wash) may at times result in comparable or greater deposition depths, potentially reducing the incremental ecological effect of dredging-related smothering.

The Outer Harbour experiences natural sediment resuspension from wind-driven waves, vessel activity, and tidal movements. These processes can mobilise and redistribute contaminated sediments independently of dredging. If incorporated into modelling, these background processes would likely show gradual mixing and dispersion of a small proportion of contaminants across the harbour over time, with concentrations periodically exceeding dredging-related contributions in some locations. However, due to the lack of contaminant dose or speciation modelling, the relative magnitude and ecological significance of dredging-related contaminant mobilisation compared with natural variability cannot be quantified.

Contaminants

Given Port Kembla’s long history as an operational port, there is a recognised potential for disturbance of contaminated sediments, including the resuspension of metals such as copper and arsenic, during dredging activities. Contaminants released into the water column may be taken up by aquatic organisms and

bioaccumulate through the food chain, potentially affecting the macroalgae, invertebrates, fish, and marine mammals described above in Section 7.2.1.

Elevated background concentrations of certain contaminants have previously been recorded in the Port, as noted in Section 7.3. As part of the approved project's original assessment, elutriate testing was undertaken to simulate the release of contaminants from sediments under disturbance conditions (AECOM, 2010). The testing carried out for the original assessment for the approved project indicated that, while the environmental risk from sediment resuspension was generally low, concentrations of copper and arsenic were sufficiently elevated to exceed the ANZECC (2000) *Guidelines for Fresh and Marine Water Quality* trigger values for protection of marine waters (AECOM, 2010).

Although this testing was undertaken in 2010, the results remain relevant as the key sources of contamination, namely historic industrial activities and port operations, have not fundamentally changed. In addition, metals such as copper and arsenic are persistent in marine sediments. Accordingly, the findings continue to provide a reasonable basis for assessing the potential for contaminant release associated with the proposed modification.

Accordingly, the findings continue to provide a reasonable basis for assessing the potential for contaminant release associated with the proposed modification. Based on these results, it is likely that dredging associated with the proposed modification could result in localised, short-term exceedances of guideline values for copper and arsenic in the water column. However, these exceedances are expected to be spatially limited and transient, consistent with the outcomes of the 2010 elutriate testing and the relatively confined nature of sediment disturbance proposed.

Macroalgae

The expansion of dredging and reclamation areas under the proposed modification may result in additional localised zones of contaminant resuspension, particularly in areas with known background concentrations of copper and arsenic (see Section 7.3.2). However, the area most likely to be affected are largely devoid of macroalgal cover (as discussed above in Section 7.2.1), which limits the potential for significant ecological effects on photosynthetic communities. Where temporary turbidity or contaminant exposure would occur, any shifts in macroalgal assemblages are expected to be minor and reversible, consistent with natural recovery patterns observed in similar disturbed marine environments.

Mobile species

Mobile aquatic fauna, including most fish and motile (mobile) invertebrates, are generally able to detect and avoid areas of elevated turbidity or contamination (Wilber & Clarke, 2001), thereby reducing their exposure risk. This behavioural avoidance acts as a natural protective mechanism, particularly in open or semi-enclosed environments such as Port Kembla, where alternative habitat areas are available nearby. As a result, the potential for significant toxicological (poisoning or chemical-related harm) or physiological (disruption to normal bodily functions like breathing or feeding) effects on mobile species is assessed as low.

Immobile species

Sessile invertebrates within areas subject to potential contaminant resuspension may be affected by impaired respiration, feeding, or larval settlement, particularly if exposed to elevated concentrations of metals. Species with limited mobility and strong site fidelity, such as Syngnathiformes, may also be more susceptible to short-term disturbance, as their ability to avoid impacted areas is limited. However, with the implementation of mitigation measures established under the approved project, including best practice dredging methods, real-time water quality monitoring, and adaptive environmental management, the risk of significant ecological effects from contaminant resuspension is predicted to remain low and localised.

Harmful algal blooms (toxic microalgae)

Disturbance of sediments during dredging has the potential, under certain conditions, to contribute to the formation of harmful algal blooms (HABs), which can reduce dissolved oxygen levels and, in rare cases, release toxins harmful to aquatic organisms. However, there have been no recorded instances of toxic algal blooms occurring in Port Kembla because of previous dredging activities.

The additional dredging proposed under the modification would not materially change the risk profile in this regard. The approved project EIS recommended the preparation of a Dredging Environmental Management Plan (DEMP), including measures such as silt curtains to minimise sediment dispersion, and the development of an Algal Bloom Contingency Plan (ABCP) to monitor environmental conditions known to favour algal bloom formation.

Provided these mitigation measures are implemented and adaptively managed, the proposed modification is not expected to increase the risk of harmful algal blooms beyond that already assessed and accepted under the approved project. Consequently, the potential for adverse impacts to aquatic biodiversity from algal bloom formation remains low.

Noise and vibration

The proposed increase in dredging area is predicted to enlarge the spatial extent of underwater noise and vibration exposure. Dredging generates continuous noise and low-frequency vibration transmitted through the water column and benthic substrates. That can affect a range of aquatic fauna, including the mammals, reptiles, fish, birds, and some invertebrates that are known or likely to occur in the area (see Section 7.7.2). Documented effects include displacement, changes to foraging and communication, behavioural disruption, and, in extreme cases, physical injury (Keevin & Hempen, 1997; Popper & Hastings, 2009a,b; Popper *et al*., 2014).

Port Kembla, as an operational harbour, is already characterised by elevated baseline noise levels from vessel traffic and marine construction. Aquatic fauna in the area are therefore likely to exhibit some degree of habituation to continuous artificial noise. However, impulsive sources such as blasting, where required to assist with dredging, pose a significantly higher risk due to the intensity and suddenness of the pressure waves. These can result in barotrauma (injury caused by sudden changes in pressure, such as damage to internal organs or swim bladders), hearing damage, or mortality in sensitive species (Pearson *et al.,* 1992; Stephenson *et al.,* 2010; Halvorsen *et al.,* 2011, 2012).

Blasting is predicted to be confined to the Outer Harbour, where energy may be partially absorbed by surrounding hard substrates (e.g. rock revetment) or dissipated in soft sediment. However, such substrates can also amplify acoustic energy, creating localised areas of increased risk. Species with strong site fidelity (i.e. stay in the same area most of the time) and limited mobility, such as Syngnathiformes and invertebrates, are unlikely to evade such disturbances and may be at risk of physical injury or mortality.

While macroalgal cover in the affected areas is generally sparse, structurally complex features such as rock revetment and submerged infrastructure may still provide localised refuge for sensitive species (see Section 7.2.1), particularly where patchy macroalgae or invertebrate growth is present. In these microhabitats, species with limited mobility and strong site fidelity (i.e. tend to stay in or return to the same place), such as Syngnathiformes and sessile invertebrates, may be more susceptible to underwater noise and vibration impacts, particularly from blasting. These effects are expected to be transient and temporary but occur within areas already subject to disturbance from dredging and potential habitat modification. As such, while the overall ecological sensitivity of the area remains low, the combination of physical and acoustic disturbance may increase localised risk for some species. Nonetheless, recovery of invertebrate assemblages is likely

over time where habitat conditions are reinstated and any associated generated underwater noise from the modification would have ended.

Other threatened or protected fish species potentially present in the study area (see Section 7.2.1) may be susceptible to high-intensity underwater noise, particularly if located near blasting zones. Marine mammals such as the New Zealand and Australian fur seal, and migratory whales (e.g. humpback and southern right whale), could also be disturbed by impulsive noise if present in the area during blasting. However, given the spatial confinement of blasting to the Outer Harbour and the typically transient use of the area by these species, the likelihood of significant impacts is considered low.

Given the potential severity of these effects, especially for protected and slow-moving species, targeted mitigation measures (e.g. soft-start procedures, exclusion zones, marine fauna observers), as identified in the mitigation measures, would continue to be essential to minimise risk.

Key fish habitat

Key fish habitat areas are classified into the following types:

- Type 1 – highly sensitive key fish habitat
- Type 2 – moderately sensitive key fish habitat
- Type 3 – minimally sensitive key fish habitat.

Impacts to habitat areas would also lead to impacts on key fish habitat. Table 7-6 below summarises the extent of these impacts in relation to sensitivity types.

Table 7-6: Summary of impact to key fish habitat

Key fish habitat	Type and sensitivity rating	Area of removal or disturbance and relative different to the approved project
Soft substrata	Type 3 minimally sensitive	• 23.9 ha (-2.5 ha) removed through reclamation • 33.7 ha (+7.4 ha) disturbed through dredging.
Intertidal and subtidal rock revetment	Type 2 moderately sensitive	• 3.3 ha (+0.8 ha) removed through reclamation.
Dense and sparse Macroalgae		• 10.1 ha (+6.4) removed through reclamation • 0.8 ha (-3.4 ha) disturbed through dredging.

The proposed modification would result in changes to the area of key fish habitat removed or disturbed relative to the approved project. These changes include additional disturbance of soft sediments, increased removal of macroalgal habitat through reclamation, and a minor increase in removal of moderately sensitive rocky reef habitat (revetment). No seagrass habitat would be affected.

- Soft sediment habitat (Type 3, minimally sensitive) is the most extensive fish habitat affected, with a net increase in dredging disturbance (+7.4 ha) and a reduction in reclamation (-2.5 ha). These habitats are common and widespread throughout Port Kembla and the surrounding region and are readily recolonised following disturbance. As such, the ecological impact from changes to soft sediment areas is predicted to be *low*.
- Intertidal and subtidal revetment (Type 2, moderately sensitive) would be subject to an additional 0.8 ha of removal through reclamation. While this habitat supports some sessile invertebrates and fish species of conservation interest (e.g. Syngnathiformes), the overall area affected is small, and similar habitat is

available nearby. Impacts are therefore assessed as localised and *low-to-moderate* in significance, with potential for partial recovery where structural habitat is reinstated.

- Macroalgal habitat would be affected primarily through reclamation (+6.4 ha), with a reduction in dredging disturbance (-3.4 ha). However, previous site surveys confirm that macroalgal coverage in these areas is generally sparse, reducing the potential for ecological impact. Given the low density of these habitats and their ability to regenerate under suitable conditions, the overall risk to macroalgal communities and associated fauna is considered *low*.

Recreational fishing

The proposed modification retains all existing publicly accessible areas of the harbour for recreational fishing. However, we note that these fishing areas may be temporarily affected during Stage 1. Dredging activities near the eastern breakwater could temporarily disperse fish from the area. These effects are expected to be minor and temporary, with fish likely to return once dredging ceases. NSW Ports will notify the community of which areas might be temporarily affected to minimise disruption to recreational users.

Operation

Habitat creation and recovery

The approved project included the creation of about 2.7 km of new hard substrate around the perimeter of the reclamation area comprising of rock revetment, seawall, and piling. This hard substrate would provide artificial habitat once operational. With the proposed modification to this reclamation area, this area of hard substrate would be reduced to around 1.4 km, a net decrease of 1.3 km compared to the approved design. While this represents a reduction in overall artificial habitat creation, the remaining 1.4 km still provides opportunity for habitat recovery and recolonisation over time. Given that similar habitat is available elsewhere in the harbour, and that the species reliant on such structures are already adapted to fragmented and artificial environments, the reduction is not predicted to result in significant ecological impact.

Overall, while the habitat benefit from new hard substrate would be lower than originally anticipated, the functional value of the remaining structures remains important, particularly for post-construction recovery of fish and invertebrate assemblages. These areas would provide new areas of artificial habitat over existing conditions, but the overall surface area compared to the approved project would be slightly reduced.

Soft sediment areas within the dredging footprint support invertebrate infaunal communities, organisms that live within the seabed and contribute to sediment health, nutrient cycling, and as a food source for fish and other species known or likely to occur in the study area. Invertebrate infaunal assemblages have been found to recover after dredging occurs, with recolonisation of dredged areas occurring within a few months and a return to pre-dredged community structures taking several years (Wilson, 1998). However, the rate of recovery is generally slower in highly disturbed environments like Port Kembla, which has low species diversity invertebrate infaunal assemblages (Newell et al., 1998; Wilson, 1998; NSW Subtidal Ecology and Ecotoxicology Laboratory, 2009). Microalgal communities on rocky rubble covering soft sediments are also predicted to recover after dredging across similar timeframes (Hammond *et al.,* 2020). This suggests that while biological recovery is expected, it may be delayed in this setting due to cumulative disturbance and limited biological richness.

This suggests that while biological recovery is expected, it may be delayed in this setting due to cumulative disturbance and limited biological richness. However, given the low sensitivity rating of soft sediment habitats (Type 3), the widespread availability of similar habitat within the harbour, and the capacity for natural recolonisation, the overall ecological impact from infaunal disturbance is assessed as low.

Altered hydrodynamics

The completion of reclamation works once Stage 1 is complete, would permanently alter the hydrodynamics characteristics of the Port Kembla Outer Harbour area as discussed in Section 7.5.2. These changes include alterations to water circulation patterns and tidal flows, primarily due to the reshaping of the harbour perimeter and potential changes in boundary roughness.

Hydrodynamic modelling predicts the changes to be minor and localised, with no significant reduction in overall water movement. If less reflective quay wall materials are incorporated into the final design, local turbulence and scouring effects may also be reduced. Only minor changes to seawater temperature are predicted, and the proposed modification may slightly improve flushing characteristics in some parts of the harbour.

Given the limited scale of these changes, the absence of sensitive water-dependent habitats such as seagrass or saltmarsh, and the already modified nature of the Outer Harbour, the overall risk to aquatic biodiversity from hydrodynamic alteration is assessed as low.

7.2.3 Assessment of potential impacts - Concept

Construction

The proposed modification to the Concept layout is considered ecologically acceptable, as it does not introduce any new marine-based construction elements or materially increase the extent of aquatic disturbance beyond what was previously assessed, due to the limited scale and sensitivity of additional impacts to marine ecology envisaged under the modified Concept, within already disturbed areas.

While the specific design and construction methods for later stages are not yet defined, this is consistent with the intent of concept-level approvals under NSW planning policy, which permit detailed impacts to be addressed in subsequent applications, provided the overall concept does not give rise to unacceptable environmental risks.

Operation

Key threatening processes

Potential key threatening processes (KTPs, i.e. activities known to harm biodiversity) that could be triggered or exacerbated by the operation of the proposed modification are:

- Introduction of non-indigenous fish and marine vegetation to the coastal waters of New South Wales (FM Act)
- Novel biota and their impact on biodiversity (EPBC Act)
- Injury and fatality to vertebrate marine life caused by ingestion of, or entanglement in, harmful marine debris (EPBC Act).

The movement of vessels associated with the proposed modification has the potential to introduce or spread non-indigenous flora and fauna in the study area (marine pest species and novel biota), which could have detrimental effects on aquatic biodiversity. However, as this is an operational port, several non-indigenous species are already established in the area as confirmed as noted in Section 7.2.1. The proposed modification is unlikely to increase the risk of introducing and spreading non-indigenous species above those already accounted for in the approved project as the nature of the activities are consistent.

Debris could also enter the aquatic environment through activities such as fishing, shipping, and stormwater runoff associated with the modified Concept. This which could harm the aquatic fauna through ingestion and entanglement. However, the proposed modification is unlikely to increase this risk over that already accounted for in the approved project. As such, the proposed modification is not expected to trigger or exacerbate any KTPs.

7.2.4 Assessment of significance

An assessment of significance (under the EPBC Act) or test of significance (under the FM Act or BC Act), collectively known as 'assessments of significance', was carried out for threatened species, populations and ecological communities, migratory species and MNES assessed as 'known' or 'likely' to occur in the study area. Assessments of significance for those species, populations, ecological communities and/or MNES were conducted using significant impact criteria outlined in relevant guidelines (DE, 2013; NSW DPI, 2008; NSW OEH, 2018).

As impacts on Syngnathiformes (White's seahorse) was not carried out for the original assessment, an assessment of significance was therefore conducted for this species for the proposed modification. This species is considered 'likely' to occur within the Port Kembla Outer Harbour area. While they have not been recorded within the Outer Harbour, they are known to occur in nearby Lake Illawarra (about 2.5 km south of the proposed modification). It is known to occur at depths up to 15 m and can be found in a wide range of habitat types, both natural and artificial.

Data collected on breeding pairs found that White's seahorses display life-long monogamy, with three pairs observed remaining bonded over three consecutive breeding years (Harasti et al., 2012). The breeding season for White's seahorses is between October and April (Kuiter, 2001).

Provided a Syngnathid Management Plan (SMP) is developed for the proposed modification in consultation with NSW DPIRD – Fisheries, the proposed modification would not have any significant long-term direct or indirect impacts on the habitat critical to the survival of the species, nor would it cause mortality to individuals that would be sufficient to cause risk to the viability of the local population. The proposed modification is not expected to significantly impact White's seahorses and a Referral is therefore not recommended.

7.2.5 Environmental management measures

Stage 1

Updates have been made to the environmental management measures for the approved project. The updates are presented in bold **blue** text (for new text) or ~~blue~~ strikethrough (for deleted text).

A compilation of updated environmental management measures is provided in Appendix B.

Table 7-7: Updated environmental management measures – Aquatic ecology (Stage 1)

Ref	Impact/ uncertainty	Environmental management measure	Timing
B4	**Potential impact to Syngnathiformes**	***Syngnathiformes Management Plan (SMP)*** **Undertake pre-clearance surveys in areas of potential Syngnathiformes habitat within the reclamation area, dredging plume area, and noise blasting radius and relocate the impacted species individuals to nearby unaffected habitat if found.**	**Pre-construction / Construction**
W4	Water quality management	*Water Quality and Biological Monitoring Programs*	**Pre-construction / Construction / Operation**

Ref	Impact/ uncertainty	Environmental management measure	Timing
		NSW Ports ~~PKPC~~ will develop water quality and biological monitoring programs, in consultation with the Port Kembla Harbour Environmental Group and DECCW, during construction and operation **in line with the latest ANZG guidance material**. The water quality and biological monitoring programs will form part of the CEMP and will: • Identify monitoring parameters. • Identify representative monitoring locations and frequency of monitoring. • Identify testing procedures (ensuring chemical testing is undertaken by NATA accredited laboratory). • Outline the framework and format for reporting monitoring results. • **Outline procedures for conducting visual and physio-chemical sampling before and during dredging activities.** • **Outline procedures for monitoring the effects of dredging and spoil placement on recruitment of sessile invertebrates.**	
N4	**Potential underwater noise impact**	*Underwater Noise* • **Utilise a slow-start process for the blasting / piling works that would last for 10 minutes.** • **Underwater noise monitoring may be carried out before the main construction works starts. This will be used to define three zones in accordance with Section 5.2 of the Underwater Piling Noise Guidelines (Government of South Australia, 2012):** ○ **Zone 1: stop work** ○ **Zone 2: introduce work restrictions** ○ **Zone 3: use marine spotters.** **A specialist marine spotter will be responsible for observing and implementing the three zones during piling activities.**	**Construction**

Concept

No additional measures over those already identified for the approved project are recommended at the Concept stage for the proposed modification.

7.3 Contamination

A Preliminary Site Investigation (PSI) was carried out in accordance with guidance set out in the *National Environment Protection (Assessment of Site Contamination) Measure 1999*, as amended 2013 ('the ASC NEPM'), Consultants Reporting on Contaminated Land, Contaminated Land Guidelines (NSW EPA, 2020) and other relevant guidance prepared or endorsed by the NSW EPA (including Section 105 of the CLM Act). It included a review of background information related to the modification footprint namely:

- Information relating to the proposed modification
- Information relating to geological, hydrogeological, and environmental conditions within the modification footprint and surrounding area
- Previous investigations relating to contamination of the modification footprint area
- Historical aerial photographs
- Groundwater bore information
- Relevant government databases
- Licenced active and non-active environmentally relevant activities and per- and polyfluoroalkyl substances (PFAS) investigation programs onsite and within the surrounding area
- Published soil, geology, and topographic maps.

A site visit was also carried out to ground truth the information collected during the desktop assessment. This information was then used to develop a preliminary Conceptual Site Model (CSM) and risk evaluation. Preliminary sampling was not specifically carried out for this proposed modification, but a Sampling and Analysis Quality Plan (SAQP) is also recommended before the detailed site investigation is carried out.

The PSI was also reviewed by a Site Auditor in September 2025 in line with the SEARs requirement which found it to include a suitable approach to the assessment. The PSI, including the full statement by the Site Auditor is provided in Appendix G1 and Appendix G2.

7.3.1 Existing environment and background

Areas of environmental concern

The PSI study area included an assessment of both the waterside (around 64 ha in size) and landside (around 24 ha in size) components to the modification footprint. A total of five Areas of Environmental Concern (AECs) were identified within this footprint:

- **Reclaimed land** | Constructed as part of Stage 1 under the original approval and a separate overlapping SSI project for the Cement Australia Grinding Mill (ref: MP10_0102):
  - This area has a known impact from historical fill of reclamation material, which included bonded asbestos containing material (ACM) in the form of cement sheeting, asbestos fibre bundles within fill material, hydrocarbon soil contamination surrounding a former above ground storage tank, and metals contamination in the soil. However, a previous site audit statement carried out for this location concluded that it is unlikely that a risk to human health currently exists on this site.
  - *Summary of potential COPCs: Asbestos; TRH; Benzene, toluene, ethylbenzene, xylenes (BTEX); Semi-volatile organic compounds (SVOCs); VOCs; Heavy metals; PAHs; Phenols; Organochlorine*

pesticides (OCPs) / organophosphorus pesticides (OPP); Polychlorinated biphenols (PCBs); Cyanide; Nutrients; TBT; Microbial contaminants; PFAS; and Dioxins and furans.

- **Vacant land** | Leased long term by NSW Ports which includes:
  - Historical investigations identified contaminants of potential concern (COPCs) within soils and groundwater of the vacant land. This included elevated heavy metals in the groundwater, and elevated polycyclic aromatic hydrocarbons (PAH), petroleum hydrocarbons, and heavy metals in soils, including asbestos. These heavy metals were noted to be widespread. In terms of the health and groundwater investigation levels set out under the NEPM, the various COPCs (including elevated heavy metals in groundwater and soils as well as elevated PAH and petroleum hydrocarbons in soils, in addition to asbestos). Particular areas of concern include the eastern side of the Emplacement Cell, northern side of Foreshore Road northwest of the current Hitek Steel lease area, southeast of the Hitek Steel lease area, north of the current Ixom site, the area between the existing rail line and Old Port Road, and along Darcy Road. While exceedance of these screening levels does not necessarily indicate an unacceptable health risk, further consideration might be required during construction as there is a narrow area at Red Beach which requires cut and fill to connect existing land to reclamation area.
  - *Summary of potential COPCs: Asbestos; TRH; BTEX; SVOCs; VOCs; Heavy metals; PAHs; Phenols; OCP/OPP; PCBs; Cyanide; Nutrients; TBT; Microbial contaminants; PFAS; and Dioxins and furans.*
- **The Emplacement Cell** | A portion of reclaimed land, which was the deposition site for dredged spoil sourced from the Inner Harbour, encapsulates sediment to mitigate its potential remobilisation. The Emplacement Cell contains a mix of uncontaminated sandy materials, clay and weathered rock with potential acid sulfate soil properties and relatively small volumes of contaminated harbour muds and silts plus some asbestos containing materials placed in discrete zones within the cell. COPCs within the dredged areas and emplacement cell materials included heavy metals, total recoverable hydrocarbons (TRH), PAH, dioxins and furans, tributyltin (TBT), asbestos, and potential acid sulfate soils (PASS).
  - *Summary of potential COPCs: Asbestos; TRH; BTEX; SVOCs; VOCs; Heavy metals; PAHs; Phenols; OCP/OPP; PCBs; Cyanide; Nutrients; TBT; Microbial contaminants; PFAS; and Dioxins and furans.*
- **Surrounding industries** | There are several surrounding industries that have the potential to have resulted in soil, groundwater, and surface water contamination from product leaks/spills, sulfuric acid regeneration/manufacturing, sodium bisulfite manufacturing, sulfuric acid import, storage and dispatch, contaminants associated with cement works, and steel truss manufacturing. These industries are:
  - Ixom Operations Pty Ltd – listed on the NSW EPA POEO public register for licensed activity for general chemicals storage and shipping in bulk. It is also listed on the National Pollution Inventory (NPI) for industrial emissions associated with sulfuric acid regeneration/manufacture, sodium bisulfite manufacture, sulfuric acid import, storage, and dispatch.
  - Former Port Kembla Orica (Historical) – prior to the Ixom Operations site, this area of land was operated by the Port Kembla Orica, which was a chemical manufacturing facility
  - Brick & Block Company Pty Ltd C/Mcgrath Nicol – was previously listed on the NSW EPA POEO public register for the surrendered licenced activity of concrete works

  - Cement grinding mill (Morgan Cement) – identified as a potentially contaminating activity associated with steel truss manufacturing.
  - There are also several other surrounding industries and land uses such as:
    - Copper smelting
    - Steel works and manufacturing
    - Railway industry and rail sidings
    - Cement milling and manufacturing
    - Electrical infrastructure (including substations)
    - Service stations
    - Liquid waste facilities
    - Ethanol plants
    - Chemical storage and manufacturing facilities.
  - *Summary of potential COPCs: TRH; BTEX; SVOCs; VOCs; Heavy metals; PAHs; Phenols; OCP/OPP; PCBs; Cyanide; pH; PFAS; and Nutrients.*
- **Waterside areas** | There may have been potential impacts to the Outer Harbour area from past dredging activities associated with following extractive activities:
  - Boskalis Australia Pty Ltd – previously listed on the NSW EPA POEO public register for the surrendered licenced activity of water-based extractive activity
  - Australian Industrial Energy Pty Ltd – currently on the NSW EPA POEO public register for the licenced activity of water-based extractive activity
  - Cleary Bros (BOMBO) Pty Ltd SMC Marine Pty Ltd – previously listed on the NSW EPA POEO public register for the surrendered licenced activity of "other activities"
  - *Summary of potential COPCs: TRH; BTEX; SVOCs; VOCs; Heavy metals; PAHs; Phenols; OCP/OPP; PCBs; Cyanide; Nutrients; TBT; PFAS; Microbial contaminants; and Dioxins and furans.*

In summary, the existing environment assessed above, is generally in line with the existing environment assessed as part of the approved project.

Figure 7-2 below shows the extent and location of these existing land uses of potential concern.

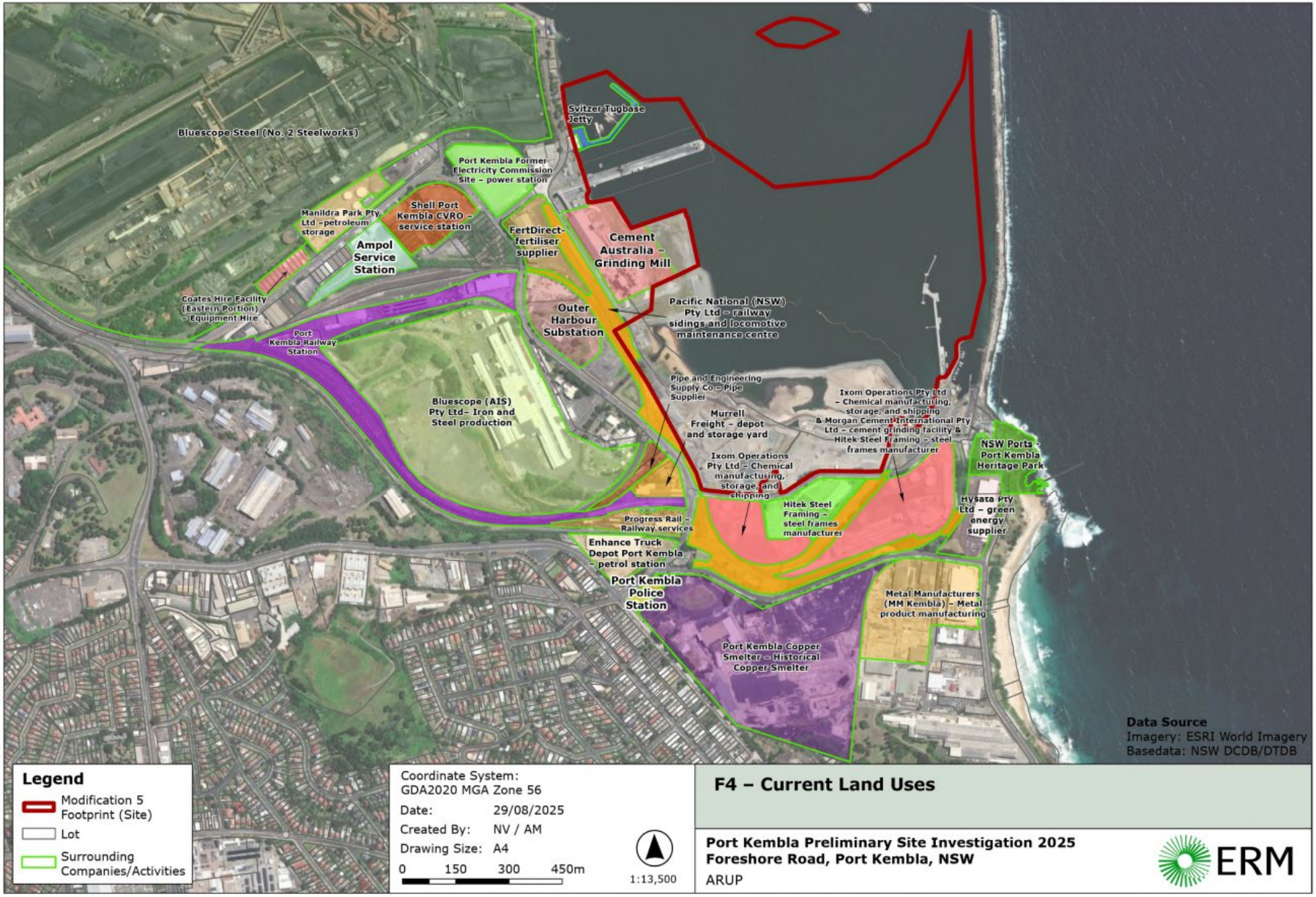

Figure 7-2: Existing land uses with potential contaminants

Land uses
The above areas are linked to historical and current industrial activities that have resulted in or have the potential to result in, the presence of COPCs, including asbestos, heavy metals (lead, cadmium, copper, zinc), hydrocarbons, PAHs, (semi) volatile organic compounds (VOCs/SVOCs), pesticides, phenols, nutrients, TBT, dioxins, furans, PFAS, and microbial contaminants. Historical aerial imagery from 1938 to 2025 confirms progressive industrial development and land reclamation in the area, reinforcing the likelihood that such activities have contributed to legacy contamination.

Topography and soil profile
Environmental setting data reveals flat topography, disturbed terrain soils, Quaternary geology, and potential acid sulfate soils, particularly near the Darcy Road drain and the Emplacement Cell. These conditions are significant because they indicate historical land disturbance and filling, which are often associated with the presence and mobilisation of contaminants. Quaternary sediments, typically comprising sands, silts, and clays, can facilitate the lateral movement of contaminants, particularly in areas with low relief and shallow groundwater.

The presence of potential acid sulfate soils poses an additional environmental risk, as ground disturbance (e.g. excavation or dewatering) may trigger acid generation and the subsequent release of metals into surrounding soils and waters. This is particularly relevant in low-lying coastal settings and reclaimed areas.

Groundwater in the area is tidally influenced and highly saline, which suggests hydraulic connectivity with nearby surface waters and the potential for contaminant dispersion beyond the modification footprint. Documented contamination from heavy metals in groundwater reinforces the need for careful management during any construction or dewatering works to prevent further mobilisation and offsite migration.

This information was factored into the development of the CSM.

Ground gas
Former gasworks sites were not identified within 2km of the modification footprint.

Sensitive receptors
Key sensitive receptors to potentially disturbed contaminated material within and surrounding the modification footprint include:

- Current and future commercial/industrial onsite workers
- Intrusive maintenance workers undertaking subsurface work both within and surrounding the modification footprint
- Current and future residents/visitors in nearby residential premises (located approximately 300 m south and south-west of the modification footprint)
- Users of abstracted water (i.e. for drinking water, industrial or irrigation purposes) surrounding the modification footprint. Note: that no uses of groundwater within the modification footprint were identified during the review of data.
- Terrestrial ecosystems/organisms within and surrounding the modification footprint.
- Marine ecosystems including both ecological receptors and recreational human health receptors surrounding the modification footprint.

7.3.2 Assessment of potential impacts – Stage 1

Construction

Contaminants present within the project area may be mobilised through two primary pathways: water-based activities, such as dredging and reclamation, that disturb sediment in aquatic environments, and land-based activities, namely excavation, earthworks, and trenching, that disrupt soil and groundwater.

Overview

The dredging and reclamation activities proposed in Stage 1 are scheduled to start in 2026 and continue throughout concept development; however, these works would occur periodically rather than continuously. The supporting hydrodynamic modelling predicts this would result in the localised (re)suspension and deposition of fine sediments (see Section 7.5.2). This process may increase turbidity and mobilise COPC, such as TBT, heavy metals, PFAS, and PAHs, into the water column, where they can be transported beyond the project footprint by tidal currents or wave action. Such dispersion poses risks to aquatic ecology, water quality, and downstream recreational and ecological receptors.

The land-based excavation, earthworks, and installation of services activities also have the potential to disturb COPC through the physical movement of soil, generation of dust, and mobilisation of contaminants via runoff or groundwater pathways. These are scheduled to start in 2026 and continue throughout Concept development in intermittent stages. Risks include the offsite migration of contaminants to receiving environments and direct exposure of site workers to hazardous substances, such as asbestos fibres and VOCs, if not appropriately controlled.

The table below summarises the likely COPC by activity type, the associated exposure pathways, and the potential environmental and human receptors prior to the implementation of management measures. A traffic light rating has been used to shows the risk of forming the identified source-pathway-receptor linkages from carrying out the associated activities in each of the AECs. This traffic light rating is based on the risk level for the severity of impact of contamination prior to the application of mitigation measures and includes the following:

- Very high (●)
- High (●)
- Medium (●).

Following the implementation of mitigation measures (both those already identified as part of the approved project and additional measures identified for this proposed modification), the potential risk of contamination is expected to be reduced.

Table 7-8: Site conceptual model

Activity	Affected AEC and COPC	Pathway	Potential receptors
Water based			
Dredging and reclamation	AEC: ● Waterside area – Very high risk ● Emplacement cell – High risk ● Reclaimed land – Medium risk High mobilisation potential in sediment and marine water	Resuspension of sediments during dredging (sediment to surface water)	Aquatic ecology (benthic fauna, fish, seagrass) Water quality in receiving bodies
		Dispersion via tidal flow or wave action (surface water)	Downstream ecological areas Recreational water users Adjacent aquatic habitats
		Released of dissolved COPC into the water column (surface water)	Aquatic organisms Bioaccumulation in food chain Sensitive marine habitats

Activity	Affected AEC and COPC	Pathway	Potential receptors
	• *Hydrophobic organics* (e.g. PAHs, SVOCs, TBT) due to their strong sediment binding but remobilisation during resuspension • *Heavy metals* | often associated with fine sediments and remobilised during dredging • *Microbial contaminants* | may be released during disturbance of organic-rich sediment • *TBT and PFAS* | persistent and may disperse widely in water • *Nutrients* | can be released into the water column, potentially triggering eutrophication • *Dioxins/furans* | if present, can adsorb to disturbed fine particulates.	Vapour emissions from disturbed sediments (air, vapour pathway)	Onsite workers (e.g. VOCs, TBT) Potential nearby residents if close to shore
		Contaminant migration through porewater (sediment to groundwater)	Subsurface ecosystems (if groundwater / surface water interact)
Land based			
Excavation, earthworks, and trenching	AEC: ● Vacant land – High risk ● Reclaimed land – Medium risk ● Adjacent industries – High risk ● Surrounding area – High risk High mobilisation potential in soils and shallow groundwater • *Asbestos* | disturbance of fill or building remnants (especially in Reclaimed Land or Emplacement Cell) • *TRH and BTEX* | particularly mobile in unsaturated soils and can volatilise or leach to groundwater • *VOCs* | volatile and mobile, often associated with fuel or solvent use (e.g. near former industrial sites) • *Phenols and PAHs* | semi-volatile, can leach or be absorbed onto dust particles • *PFAS* | highly mobile in groundwater; can migrate during dewatering or infiltration • *Heavy metals* | released as dust or mobilised in runoff.	Physical disturbance of fill and soils (soils)	Construction workers (dermal/inhalation, e.g. asbestos, PAHs) Nearby receptors via dust
		Runoff during rainfall or dewatering (soil to surface water)	Downstream aquatic habitats Onsite drainage channels or stormwater systems
		Leaching of soluble contaminants (e.g. PFAS, nutrients, soils and groundwater)	Groundwater-dependent ecosystems Potential lateral migration to surface water
		Dust generation from earthworks and vehicle movement (air, dust pathway)	Construction workers Adjacent land users and vegetation
		Vapour intrusion or emissions (e.g. VOCs, BTEX, air, vapour pathway)	Construction workers Users of nearby buildings (if close to sources)
		Contaminant mobilisation through service trenching (soils and groundwater)	Utilities and workers Potential vapour or groundwater migration

Water based impacts

The modification would increase the total dredging footprint by approximately 7.4 ha, bringing the combined area subject to dredging and reclamation disturbance to 33.7 ha, greater than that approved under the approved project. The increase in seabed disturbance has the potential to temporarily resuspend and mobilise COPCs from sediments in locations not previously targeted for disturbance. This includes the eastern portion of the Emplacement Cell which would also be excavated and relocated to allow for the new configuration of the reclamation footprint. This disturbance therefore has the potential to release contaminants into the surrounding area during dredging and reclamation activities. While there is an existing Long Term Environmental Management Plan (LTEMP) for the Emplacement Cell, this is only for ongoing maintenance and specifies that additional management measures be identified for any intensive construction activities that could impact the Emplacement Cell.

The modification would also increase removal of macrophyte-associated habitat (from 3.7 ha to 10.1 ha), including sparse and dense macroalgae. These habitats may stabilise sediments and can be associated with fine depositional areas that accumulate contaminants. Disturbance in these areas could therefore elevate mobilisation risks for certain COPCs despite the overall reduction in reclamation footprint.

The net effect is therefore mixed: a modest reduction in reclamation-related disturbance is offset by an increased dredging footprint and a shift in disturbance towards habitat types and sediment zones that may

present a higher mobilisation potential for some contaminants. On balance, this change could either maintain or increase the overall contamination risk depending on the contaminant types, concentrations, and sediment characteristics within the revised dredging and reclamation areas. Further site-specific sediment quality data from these zones would be required to confirm whether the net risk is neutral, reduced, or elevated. This would be carried out as part of the Detailed Site Investigation (DSI) which is already identified as a mitigation measure from the original assessment and condition B22 for the approved project, specifically, prior to the commencement of construction works and in conjunction with finalised design details.

Land based impacts

The proposed modification would not materially change the extent, location, duration, or intensity of the key land-based construction activities described in the approved project. Core activities, including bulk earthworks and hardstand installation, site grading and earthworks, trenching for utilities, access road construction, and associated rail and pavement works which would occur in the same locations and be undertaken using the same construction methods as confirmed above in Chapter 5.

As such, the potential for disturbance within land-based AECs, such as reclaimed land, vacant industrial land, and foreshore fill zones remains consistent with the approved project, and the overall risk profile for mobilisation of COPC such as asbestos, TRH, BTEX, VOCs, and PFAS is not expected to change. Any localised reconfiguration of works (e.g. deeper trenching through known fill zones) may still present site-specific contamination risks, which would continue to be managed under the existing mitigation framework, including the CEMP, SWMP, and relevant contamination controls.

Operation

Despite some minor adjustments to the project footprint, the type, frequency, and extent of operational activities under the proposed modification would remain consistent with those in the approved project. As such, there would be no material change in the nature or scale of operational impacts, including those related to maintenance activities. Similarly, there is no substantive difference in the types or intensity of maintenance required under the modified works when compared to the approved project.

While no material change in operational impacts is predicted, the following summarises the residual contamination risks associated with overwater and landside maintenance activities to support a complete understanding of those impacts.

In comparing overwater and landside impacts, the construction-phase reclamation and dredging activities would involve disturbance across a relatively large and spatially distributed area, primarily affecting surface sediments. These works would remove or rework the surficial material that may contain COPC, thereby reducing the likelihood of subsequent disturbance during routine overwater maintenance. In the longer term, the placement of contaminated sediment within a stable, contained reclamation area would reduce the potential for disturbance and mobilisation of sediments due to port operations and severe weather events.

In contrast, on land, the spatial footprint of the excavation, earthworks, and trenching during construction is smaller and more targeted, meaning that not all COPC-affected materials within land-based AECs, such as reclaimed land, vacant land, or the Emplacement Cell, would be excavated or disturbed during initial works. As a result, intrusive maintenance activities in these areas (e.g. subgrade repairs or service trenching) presents an inherently higher risk in terms of potentially intersecting previously undisturbed contaminated soils or fill, mobilising COPC if not appropriately managed. The risk would also vary depending on where the maintenance works take place. While the same COPCs, pathways, and receptors would be consistent with those listed above in Table 7-8, the associated risk would across the AECs would be largely unaffected.

7.3.3 Assessment of potential impacts - Concept

Construction

Future stages of the project (Stages 2 and 3) would involve both water-based and land-based activities that have the potential to disturb contaminated material within identified AECs. As described in Section 7.3.1, COPCs across these AECs include asbestos, heavy metals, hydrocarbons, PAHs, VOCs, TBT, PFAS, PCBs, Cyanide, dioxins/furans, and nutrients. Disturbance could lead to mobilisation of these COPCs via pathways such as sediment resuspension, dust generation, contaminated runoff, or leaching to groundwater, consistent with the Stage 1 works.

At the Concept Plan modification stage, the objective is to demonstrate that, despite these contamination sources, the proposed modification is theoretically feasible to construct in a way that manages contamination risks to an acceptable level. This is achieved by:

- Confirming that the known contamination profile is broadly consistent with that considered in the approved Concept Plan
- Identifying that no new high-risk AECs have been introduced within the modified footprint
- Recognising that the proposed footprint changes (e.g. altered terrestrial disturbance zones) are not expected to introduce insurmountable contamination constraints
- Confirming that standard industry approaches exist to manage and mitigate disturbance of the identified COPCs in line with NSW EPA guidelines and the ASC NEPM framework.

It is both appropriate and consistent with NSW staged approval practice for the detailed design of contamination management measures to be addressed in subsequent staged planning applications. At that later stage, when exact construction footprints, excavation depths, and dewatering methods are confirmed, further site investigations, including targeted intrusive sampling, would be undertaken, as provided for in the existing approved mitigation measures and conditions of approval (see Section 7.3.4) to refine the CSM, confirm contaminant concentrations and distributions, and develop detailed contamination management plans to include:

- Sediment and soil disturbance protocols
- Asbestos and hazardous materials management
- Dewatering and water treatment measures
- Contaminant containment, transport, and disposal strategies
- Monitoring requirements to verify control effectiveness.

By reserving the detailed contamination mitigation design for the staged application phase, the assessment process ensures proportionality, focusing current approvals on confirming strategic feasibility, while enabling later applications to be informed by the most current site-specific data and construction methods.

Operation

In operation, potential contamination risks primarily arise from intrusive maintenance activities, such as repair of subgrades, replacement of buried services, or seabed maintenance in waterside areas. These activities can disturb residual contamination in undisturbed soils, sediments, or fill within both terrestrial and marine AECs. In marine environments, prior Stage 1 reclamation and dredging works will have already disturbed the surficial sediment layer, thereby reducing the likelihood of encountering contamination during

routine maintenance. Conversely, on land, some contaminated soils may remain in situ beneath undisturbed areas following construction, meaning operational disturbance (e.g. service trenching in reclaimed land) could intersect these materials.

At the Concept Plan stage, the contamination-related operational feasibility of the modification is confirmed on the basis that:

- The operational disturbance types and frequency are consistent with those already approved
- No new contamination sources are introduced
- Proven operational contamination controls, such as safe work method statements (SWMS) for hazardous materials, spoil classification protocols, and sediment disturbance minimisation, can be applied as standard practice
- Future staged applications for operational works will include site-specific contamination risk assessments and CMPs where disturbance of contaminated materials is anticipated.

This approach ensures that the modification can be delivered without unacceptable contamination risk, while retaining the flexibility to tailor controls to the specific scope, location, and method of future works.

7.3.4 Environmental management measures

Stage 1

Updates have been made to the environmental management measures for the approved project. The updates are presented in bold **blue** text (for new text) or ~~blue~~ strikethrough (for deleted text).

A compilation of updated environmental management measures is provided in Appendix B.

Table 7-9: Updated environmental management measures – Contamination (Stage 1)

Ref	Impact/uncertainty	Environmental management measure	Timing
C5	**Potential interaction with unidentified contaminated material**	• **An unexpected finds procedure (UFP) will be developed as part of the CEMP and implemented during construction of the project to manage hotspots and contamination during excavation (including groundwater, surface water and sediment where relevant). The UFP will include requirements for cessation of works within the affected area until after:** ○ **Inspection of the suspected contamination by a qualified contaminated lands specialist** ○ **Collection of soil samples for analysis based on observations** ○ **Assessment of results against applicable land use or waste classification criteria in accordance with applicable statutory guidelines** ○ **Management of the contamination in accordance with applicable statutory guidelines.** • **The UFP will be prepared to comply with CoA Sch.3 and SoC SMP approvals.**	**Pre-construction / Construction**

Concept

No additional measures over those already identified for the approved project are recommended at the Concept stage for the proposed modification.

7.4 Surface and groundwater

This section covers water – hydrology (ground and surface) and water – quality assessment requirements. To support this, surface and groundwater hydrology and water quality assessments were undertaken to determine the potential impact the changes may have on the water resources in Port Kembla and the surrounding areas. These assessments were performed in accordance with the *Protection of the Environment Operations Act 1997*, NSW Aquifer Interference Policy, Australia and New Zealand Guidelines for Fresh and Marine Water Quality, NSW Water Quality Governance Roadmap, and other relevant guidelines. The assessments comprised:

- A qualitative assessment of how the proposed modification would comply with the current relevant legislation, guidelines, and waterway objectives
- An evaluation of the environmental changes and planning implications introduced under the proposed management relative to the approved project
- An assessment of whether the modified proposal remains consistent with the strategic intent of the approval framework of the approved project, focusing on instances where mitigation measures need revising or supplementing in instances of inconsistency.

Appendix H includes a full report detailing the assessments.

7.4.1 Existing environment and background

Features

Surface water hydrology in the area includes two main channels: Salty Creek and Darcy Road Drain. Salty Creek is approximately 1.4 km long, draining an area of about 125 hectares; while Darcy Road Drain is smaller, with a catchment area of approximately 80 hectares. Both channels are in areas with predominantly industrial land uses, characterised by high levels of impervious surfaces. These surfaces generate significant runoff, which is mainly captured through kerbs and gutters before being drained via the formal drainage system into the Outer Harbour. The hydrology of these channels has not changed substantially since 2010, at the time of preparing the approved project EIS, although there have been minor changes namely, the discharge point of the Darcy Road Drain has moved, while it has been extended adjacent to the Emplacement Cell.

Surface water quality

Surface water quality in the Outer Harbour and contributing waterways has been impacted by urban and industrial runoff, leading to the presence of COPC in the form of heavy metals and hydrocarbons as confirmed above in Section 7.3.1. The persistence of contaminants and pollutants meant that in 2020 (the most recent available data) the surface water quality was deemed by the NSW Government's under water quality program to be relatively poor compared with regional baseline conditions and the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG). This classification reflects exceedances of guideline values for key indicators, suggesting potential impacts on aquatic ecosystems under existing conditions.

Water quality objectives

The NSW Water Quality and River Flow Objectives (WQOs) serve as guiding principles to protect and enhance the ecological health, social values, and economic uses of waterways. These objectives establish clear benchmarks for water quality, aiming to ensure that aquatic ecosystems are resilient, that water is safe for recreation, and that industrial and urban activities do not compromise environmental values.

For Port Kembla, the key water quality objectives include:

- Protecting aquatic ecosystem health: Maintaining water quality at levels that support healthy populations of native aquatic plants and animals, minimising toxic contaminant concentrations such as heavy metals (e.g. copper, zinc, cadmium, lead) to meet or exceed ANZG values for slightly to moderately disturbed marine ecosystems.
- Ensuring water is safe for recreation: Managing microbial and chemical contaminants so that water remains suitable for swimming, boating, and other recreational uses, as defined by relevant health and safety guidelines.
- Supporting visual and aesthetic values: Maintaining clarity and appearance of water bodies to support community connection and enjoyment, including control of turbidity and visible pollutants.
- Sustaining secondary uses: Providing water quality suitable for secondary purposes such as industrial water supply or irrigation, without causing adverse impacts downstream or to the marine environment.
- Maintaining river flow regimes: Supporting natural flow variability to the greatest extent possible, to preserve ecological processes, sediment transport, and habitat connectivity.

Periodic monitoring in Port Kembla, particularly in the Outer Harbour and tributaries like the Darcy Road Drain, has reflected these objectives, with ongoing evaluation against specific indicators such as dissolved oxygen, pH, nutrients (nitrate, phosphate), and heavy metals.

Flood risk and climate change

Flooding in the area is influenced by the relatively flat topography (with elevation landside ranging from approximately 2 – 6 metres AHD) and heavy industrial disturbance, with tidal influences and sediment build-up at the mouth of Salty Creek at Red Beach making conditions worse. In the case of major floods, the railway loop embankment to the north of the proposal footprint acts as a dam meaning it blocks the natural flow of floodwaters and can cause water to back up and flood surrounding areas for longer.

A flood study covering the catchment area upstream of the site, the Allan Creek Flood Study (ARR 2019 Revision), was commissioned by Wollongong Council and undertaken by Rhelm Pty Ltd in 2024 and have confirmed these findings. The study includes updated data indicating that flood depths and hazards remain consistent with previous assessments undertaken for the approved project in 2010, despite flood levels across the proposed modification footprint would range between 0.6 and 1.6 metres during the 1% annual exceedance probability (AEP, i.e. a flood that has a 1-in-100 chance of occurring in any given year).

While climate change impacts are predicted to increase flood depths at the site based on the above flood study (0.10 m and 0.25 m respectively for Salty Creek and Darcy Road Drain by 2090), the extent and nature of flooding will not be substantially altered from the existing conditions.

Groundwater

The site's underlying geology and groundwater environment comprises fill, Quaternary alluvium, and bedrock units from the Shoalhaven Group.

A total of 11 boreholes in the approved project EIS were advanced to a depth of 1.5 m below ground level (bgl) adjacent to the railway corridor, in line with the maximum anticipated excavation depth for the adjacent road development. No groundwater sampling was undertaken according to the approved project EIS, due to the depth of groundwater estimated at approximately 4.2 m bgl.

Groundwater levels in the area are likely to be influenced by sea level, which is a strong hydraulic control in the area. Similarly, in 2025 the sea level is likely to influence groundwater levels around the site.

Groundwater quality has been impacted by the presence COPCs in the form of heavy metals, particularly between Darcy Road Drain and No. 3 Jetty, which is consistent with poor surface water quality noted above and within the contamination assessment (see Section 7.3.1).

There are no registered groundwater bores or groundwater-dependent ecosystems (refer to Section 7.2.1) within one kilometre of the modification footprint. This indicates that there are no licensed water users or ecologically sensitive groundwater-dependent habitats near the proposed works, reducing the potential for adverse impacts to groundwater receptors from changes in groundwater levels, quality, or flow arising from the modification.

Overall, the existing environment of the site remains consistent with that described in the approved project EIS, characterised predominantly by its industrial nature. The activities and land uses surrounding the modification footprint have changed little over the past 15 years, meaning that the environmental baseline, including key receptors and prevailing conditions, is largely unchanged. As such, most of the findings and assumptions from the approved project EIS remain applicable to the current conditions at Port Kembla, with the modification needing only to confirm and, where necessary, update mitigation measures to reflect current best practice.

7.4.2 Assessment of potential impacts – Stage 1

Construction

Water hydrology

Water-based impacts

Accounting for the updated modification footprint layout, the proposed modification would slightly alter the hydrodynamic characteristics of the Outer Harbour as described in Section 7.5. The proposed modification would also increase the dredging footprint by approximately 7.4 ha, resulting in a combined dredging and reclamation disturbance area of 33.7 ha, greater than that approved under Stage 1. While this increase is not predicted to cause large-scale changes to harbour-wide tidal flows, it could alter localised current velocities and sediment transport during construction, particularly in areas with more complex bathymetry or existing structures as discussed in detail in Section 7.5.2.

Land-based impacts

The proposed modification would not materially change the extent, location, duration, or intensity of the key land-based construction activities relevant to hydrology, namely bulk earthworks and hardstand installation, site grading, trenching for utilities, access road construction, and associated rail and pavement works. These activities would occur in the same locations and be undertaken using the same construction methods as confirmed above in Chapter 5.

Accordingly, the potential for disturbance to fill materials, natural soils, and local drainage features, and the resulting short-term changes to overland flow paths and surface water drainage patterns, would remain consistent with the approved project. As identified in the EIS, potential construction-phase impacts include:

- Sediment accumulation in stormwater drains, drainage lines, and natural depressions
- Mobilisation of contaminated soils within surface water runoff, potentially affecting Darcy Road Drain, Salty Creek, or the Outer Harbour

- Minor changes to groundwater flow if reclamation or imported fill has a different hydraulic conductivity to existing shoreline soils (although such changes were assessed as unlikely to be significant).

These risks would continue to be managed under the same mitigation framework as the approved project, including the CEMP, Soil and Water Management Plan (SWMP), and relevant erosion and sediment control measures.

Water quality

Water-based impacts

The reduction in reclamation footprint would slightly lower sediment disturbance in some nearshore areas; however, the increased dredging footprint introduces disturbance to additional seabed zones, including macrophyte-associated habitats (from 3.7 ha to 10.1 ha). As noted above in Section 7.2.1, these habitats can stabilise fine sediments and are often associated with depositional areas where contaminants may accumulate. Disturbance in these areas could elevate turbidity and increase the mobilisation potential for contaminants during dredging. Accordingly, the overall, the water quality risk profile is mixed, lower in some reclamation areas but potentially higher in newly dredged locations.

The criteria identified under the WQOs provide benchmarks against which changes in water quality can be measured. Implementation of the SWMP and DEMP will include monitoring programs designed to detect any exceedances of these trigger values. Mitigation measures such as silt curtains, staged works, and timely sediment removal will be applied to minimise potential water quality impacts during construction.

Given the similarity of the modification to the previously approved project, and the continued application of the same management plans and controls, it is anticipated that water quality impacts will remain consistent with the ambient NSW WQOs for the relevant environmental values. Ongoing monitoring and adaptive management during construction will ensure that trigger values are not exceeded and that the environmental values of the receiving waters are protected.

Land-based impacts

Given that the proposed modification does not materially change the extent, location, or nature of land-based construction activities (see Chapter 5 above), the potential surface water quality impacts from these works would be consistent with those assessed in the approved project EIS. Construction-phase risks such as sediment-laden runoff, mobilisation of contaminants, and temporary changes to drainage patterns remain but are expected to occur at similar magnitude and duration to the approved project. These would continue to be managed under the existing mitigation framework, including staged erosion and sediment controls, stormwater management, and contamination controls as outlined in the CEMP and SWMP.

Flooding

Water-based impacts

Dredging and reclamation occur entirely within the harbour basin and do not interact with upstream floodplains or catchment flood conveyance. As such, neither the activity would affect tidal flood behaviour or storage capacity at a meaningful scale, either during construction or operation.

Land-based impacts

Flood risk from land-based works would remain consistent with that assessed in the approved Stage 1 design, as the proposed modification does not materially change the extent, location, or nature of these activities. Potential construction-phase effects are limited to local drainage within the site, where temporary obstruction of overland flow paths, concentration of works in low-lying areas, or alterations to existing drains could

cause localised ponding or short-term changes to stormwater retention. These risks are already addressed in the approved project through standard construction-phase flood controls, such as temporary drainage diversions, staged filling, and maintaining conveyance in existing channels, which will be applied and adapted to the final design.

The original 2010 assessment was undertaken prior to the release of the current *Australian Rainfall and Runoff* (ARR) 4th edition (2019, Version 4.2 – August 2024 update) and therefore relied on the prevailing ARR 1987/1999 guidance. Since that time, ARR has been comprehensively updated to incorporate advances in hydrological science, high-resolution design rainfall data, revised methods for design flood estimation, and explicit consideration of climate change impacts on extreme rainfall (Book 1, Chapter 6).

As the modification does not materially change the extent, location, or nature of land-based or harbour-based works, the change in guideline version is not expected to alter the original conclusion that the works would have negligible impact on flood behaviour. Compliance with ARR 2019 v4.2 will be documented to ensure the final design meets current best-practice flood estimation and stormwater management standards.

Operation

Water hydrology

The proposed modification does not introduce any new or materially different operational impacts on surface water hydrology compared to those assessed for Stage 1 in the approved project. The configuration and function of the Darcy Road Drain and Salty Creek diversions remain unchanged, with both channels continuing as open watercourses during the operational phase of Stage 1. As in the approved design, these diversions will maintain connectivity between the existing catchments and the Outer Harbour, with flows managed through engineered channels and culverts designed to convey the 1-in-100 average return interval event (ARI, i.e. rainfall, flood, or storm event that has a one percent chance of happening in any given year) in accordance with *ARR 2019 v4.2*.

Under the modification, the total drainage length for all channels would increase slightly due to the extended alignment, but the overall drainage function and flow paths would be consistent with those assessed in the approved project EIS. During detailed design, longitudinal grading will be confirmed to ensure effective conveyance from the existing watercourses to the new outfalls. Where changes in contributing catchment area occur, culvert or channel sizing will be reviewed and adjusted as required to maintain the approved hydraulic performance and avoid any increase in upstream flood risk. If these checks identify that the approved design cannot achieve the required performance, contingency measures would include upsizing culverts, widening or re-profiling channels, or adding supplementary drainage infrastructure.

Water quality

During Stage 1 operation, the open-channel extensions for Darcy Road Drain and Salty Creek are expected to function in the same manner as assessed in the approved project, with no material change to the water quality impact profile. As identified in the approved project EIS, operational runoff from landside activities can carry hydrocarbons from vehicles and machinery, sediments and contaminants from material handling and storage, washdown residues, and dust or particulates deposited on hardstand areas and this risk would remain under the proposed modification but can be effectively managed by adopting standard mitigation measures which are proven effective in their application as already provided for in the conditions of approval.

The operational water quality impacts arising from the proposed modification have also been assessed with reference to the NSW Water Quality Objectives (NSW WQO), which are designed to protect the

environmental values and uses of receiving waters. The focus of this assessment is on the key watercourses affected by the modification to Salty Creek and Darcy Road Drain and their connectivity to downstream ecosystems. The assessment of Stage 1 operational impacts from the modification has involved comparison of predicted pollutant loads and concentrations against the above indicators and their criteria, both for current and post-modification conditions. The analysis indicates:

- The predicted incremental increase in pollutant loads (TSS, nutrients, metals) from expanded catchment drainage is negligible relative to existing loads, and concentrations are not expected to exceed NSW WQO trigger values for the relevant environmental values.
- Existing and proposed stormwater treatment and management measures (grade, sizing, sediment basins, oil/water separators) are designed to target these indicators and reduce concentrations to levels consistent with or below trigger values.
- For Darcy Road Drain, monitoring has identified elevated heavy metals as a concern; the modification commits to further water quality improvements specifically targeting these pollutants to help achieve ambient NSW WQO.
- Mitigation measures are designed to avoid observable oil/grease films, manage pH, and maintain dissolved oxygen and turbidity within relevant guideline ranges.

The proposed modification maintains consistency with the ambient NSW WQOs and their associated environmental values and indicators for the receiving waters. All operational impacts have been assessed against ANZG (2018) and NSW WQO criteria, with management and monitoring strategies in place to ensure ongoing compliance and protection of the identified values for Salty Creek, Darcy Road Drain, and downstream environments.

Groundwater would remain undisturbed by Stage 1 operational activities. Maintaining effective channel grading and capacity in line with updated design guidance and implementing the treatment and maintenance measures committed to in the approved project (e.g. gross pollutant traps, sediment basins, and regular cleaning), would ensure these risks remain low and manageable. As the modification would not alter the source or nature of operational discharges, the mitigation measures outlined in the approved EIS remain relevant and sufficient.

Flooding

The proposed modification to the Stage 1 reclamation area is not predicted to cause any material change to operational flood behaviour compared to the approved project due to the reclamation footprint being slightly reduced, drainage alignments and culvert arrangements remaining as approved, and the modified works not altering upstream catchment inflows or the hydraulic connectivity between the channels and the harbour.

The extended open channels for Darcy Road Drain and Salty Creek would continue to be designed to convey existing and future upstream flows to the harbour, consistent with the approach assessed in the EIS. The additional culvert on the northern side of the modified footprint would be extended through the reclaimed land to maintain connectivity and allow upstream flows to drain unimpeded. With appropriate grading and capacity design, the works would not increase upstream flood risk or impede conveyance. Detailed design will confirm compliance with ARR 2019 v4.2 to meet current flood risk management standards, and Port Kembla's Proactive Crisis Management Strategy should be reviewed to confirm it addresses the modification and reflects the latest guidance. If either assessment identifies gaps, the contingency would be to implement targeted design refinements, such as upsizing culverts, adjusting channel grading, or adding supplementary drainage infrastructure, and/or update the Crisis Management Strategy to incorporate revised flood scenarios, operational triggers, and response procedures, ensuring full compliance and preparedness prior to operation.

7.4.3 Assessment of potential impacts - Concept

Construction

Water hydrology

Development of the multi-purpose and container terminal would require modifications to the approved Concept Plan, including further extensions and upgrades to the existing drainage systems. Based on the approved project EIS, the modifications would involve the same core construction activities, such as bulk earthworks, grading, installation of drainage infrastructure, and utility connections, using similar methods in the same locations as previously assessed. Consequently, hydrological impacts are expected to remain consistent with those already considered in the approved EIS. Approved EIS mitigation measures, including staged drainage installation, temporary diversions, and erosion/sediment controls, would continue be implemented to minimise disruption to site hydrology.

Water quality

While the detail remains unconfirmed, the works associated with constructing the multi-purpose and container terminal have the potential to affect both surface water and shallow groundwater quality in the vicinity of Port Kembla, primarily through sediment-laden runoff, mobilisation of contaminants in fill or soils, and accidental spills. The approved EIS mitigation framework, including an updated Water Quality Management Plan, erosion and sediment controls, spill prevention, and water quality monitoring, remains relevant and would be applied throughout all stages.

For Stage 2 and Stage 3, additional early-stage risk assessments will be undertaken during the development of detailed designs to identify any new pollutant sources or constraints specific to these later phases. These stages may involve further expansions or modifications to drainage and terminal operations, potentially increasing the volume or diversity of pollutants entering the local system if not carefully managed. To address this, the updated Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018) will guide water quality objectives, ensuring consistency with relevant standards for Port Kembla Outer Harbour.

Opportunities for improving water quality, such as treatment system upgrades, targeted source control measures, or adaptive operational procedures, will be considered as part of detailed design and planning for Stages 2 and 3. If risk assessments during these stages identify potential impacts beyond those anticipated in the approved concept, these issues will be addressed through subsequent detailed planning applications, supported by targeted investigations and refinement of mitigation measures.

Overall, the approach to Stages 2 and 3 will be to ensure that water quality objectives for Port Kembla Outer Harbour are not compromised. This will involve proactive management, compliance monitoring, and, where necessary, the adoption of enhanced controls to safeguard receiving water environments throughout all phases of the project.

Flooding

Construction activities under the modification of the Concept Plan are not expected to cause any material change to flood behaviour compared with the approved concept. This is because the drainage alignments, upstream catchment inflows, and overall reclamation footprint remain essentially unchanged, and the works would employ similar methods, staging, and temporary flow management measures to those assessed in the approved project EIS. Updated flood risk management standards would be applied during detailed design to ensure risks remain effectively managed. If the detailed design identifies a need for additional capacity,

contingency measures may include upsizing culverts, widening channels, or incorporating supplementary detention to maintain or improve hydraulic performance.

Operation

Water hydrology

Operationally, the revised Concept Plan maintains the same overall drainage strategy as the approved concept, with extensions to the Darcy Road Drain and Salty Creek diversions to preserve connectivity between existing catchments and the harbour. As in the approved design, these channels may be enclosed as part of future stages of the Concept Plan, but would be designed to convey the 1-in-100 ARI event in accordance with ARR 2019 v4.2.

While the extension of the channel under the modification would marginally increase the total drainage length for all channels, it would not alter the overall flow paths or drainage function assessed in the Stage 1 EIS because the alignment and outlet locations of the extended channels remain consistent with those assessed in Stage 1, the grading will be designed to preserve hydraulic connectivity to the harbour, and no changes are proposed to upstream catchment inflows or the overall drainage network configuration.

During detailed design, longitudinal grading would be confirmed to ensure effective conveyance to the new outfalls, and culvert or channel sizing will be reviewed, and, if necessary, increased, to account for changes in contributing catchment area.

Water quality

Consistent with Stage 1, operational activities in associated with the future stages of the modified Concept have the potential to introduce pollutants into the drainage systems, including hydrocarbons, sediment, and contaminants from material handling and storage.

No changes are proposed that would affect groundwater quality. The ANZG 2018 will continue to inform water quality objectives, and the mitigation measures outlined in the approved EIS remain applicable. If operational monitoring or review identifies pollutant loads or discharge quality outside expected ranges, adaptive management measures, such as treatment system upgrades or additional source controls, will be implemented to ensure compliance with the relevant objectives.

Flooding

Operational flooding impacts under the modified Concept Plan are expected to remain consistent with those assessed for the approved Concept. The extended drainage systems would need designing to accommodate current and projected future flows in accordance with ARR 2019 v4.2 and updated flood risk management standards. The additional culvert identified on the northern side of the modified footprint would also need extending through the reclaimed land to maintain connectivity and allow upstream flows to discharge into the harbour. With appropriate grading and design, this extension would not increase upstream flood risk or impede flow. If detailed design or modelling indicates that additional conveyance capacity is required, contingency measures such as widening channels, adding secondary flow paths, or installing supplementary detention would be incorporated to maintain or improve current performance.

7.4.4 Environmental management measures

The following section establishes environmental management measures that should be considered for the modification specifically.

Stage 1

Updates have been made to the environmental management measures for the approved project. The updates are presented in bold **blue** text (for new text) or ~~blue~~ strikethrough (for deleted text).

A compilation of updated environmental management measures is provided in Appendix B.

Table 7-10: Updated environmental management measures – Surface and groundwater (Stage 1)

Ref	Impact/uncertainty	Environmental management measure	Timing
W2	**Design of Salty Creek and Darcy Road Drain**	*Salty Creek and Darcy Road Drain* **NSW Ports** ~~PKPC~~ will design and size channel structures or culverts to convey flows from Salty Creek and Darcy Road Drain through the reclamation area for **a two exceedances per year (2EY) Average Recurrence Interval (ARI) rainfall** ~~flood events up to the 100 year ARI design storm~~ event. The design of these structures will consider: • Potential climate change impacts due to increasing sea levels and rainfall intensities. • Possible hydraulic impacts due to flows greater than the 100 year ARI storm and up to the Probable Maximum Flood and/or due to blockage of the structure. • Fish passage. Consideration should be given for the incorporation of a V-shaped recess in the floor of the culverts to facilitate movement of fish and other mobile aquatic species during periods of low flow. • Water sensitive urban design (WSUD) will be utilised where ever practicable to reduce the volume, velocity and contaminants associated with stormwater runoff. • **Longitudinal grading will be confirmed during detailed design to ensure that flows are conveyed effectively from the existing watercourse through to the new outfall.** • **Final sizing of the drains will reflect current NSW Flood Risk Management Manual and ARR v4.2 guidance.**	**Detailed design**
HR4	~~Potential Hazards~~ **Emergency response management**	*Emergency Response Plan* **NSW Ports** ~~PKPC~~ will prepare an ERP in accordance with the HIPAP No.1 Emergency Planning Guidelines as part of the OEMP of the multi-purpose terminal. **This plan will be reviewed in consultation with DPHI and will align with a Flood Emergency Response Plan, based on the most recent policy and guidance.**	**Pre-operation / Operation**

Concept

The majority of the mitigation measures outlined in Table 7-10 above, would still be relevant and apply for the Concept stage.

7.5 Hydrodynamics

A Hydrodynamics Assessment report was prepared to assess the impacts of the modification on the hydrodynamic conditions in Port Kembla and its surrounding environment. This was carried out using a range of numerical modelling tools such as:

- Existing and possible future wave conditions were predicted using computer models:
  - The SWAN model, part of the Delft3D system, combined with Extreme Value Analysis, a statistical method to estimate rare, extreme wave events
  - The MIKE21 Boussinesq Wave model, a tool that simulates how complex wave patterns form, move, and break in shallow and coastal waters.
- Thermal plume modelling (predicting how warm water released into the sea will spread and mix) was carried out using the 3D Delft3D-FLOW model, a program that simulates water movement in three dimensions. This model also considers wave and sediment transport modules, water cooling and quality descriptions.

Appendix I includes the investigation report.

7.5.1 Existing environment and background

Overview

The hydrodynamic and coastal processes within and around Port Kembla Outer Harbour are shaped by the interaction of wind, waves, tides, and currents, collectively referred to as metocean conditions. These factors operate over different spatial and temporal scales (i.e. across different areas and time periods), influencing water movement, sediment transport, and coastal morphology (the shape and features of the coastline and seabed). Wind drives local waves and circulation patterns; offshore swells generated by distant weather systems shape the nearshore wave climate; and tides, storm surges, and currents govern water level variations and the exchange of water between the harbour and the open coast. Understanding these interconnected processes is critical to assessing the potential impacts of the proposed modification on wave climate, sediment dynamics, and water quality.

Wind environment

The Port Kembla region experiences a temperate maritime climate with wind patterns influenced by seasonal changes. In summer, prevailing winds are mainly from the north-east, frequently associated with afternoon sea breezes generated by onshore heating. During winter, winds shift to predominantly westerly and south-westerly directions due to the passage of cold fronts and the influence of high-pressure systems moving across south-eastern Australia. Strong southerly and south-easterly winds, often exceeding 15 to 20 metres per second (m/s), occur during storm events such as east coast lows. These can generate large waves on the open coast.

Wave environment

Offshore wave conditions near Port Kembla are mainly driven by swell (large, rolling waves formed by distant storms) generated in the Southern Ocean and Tasman Sea. The most common wave direction is from the south-east, accounting for the highest proportion of annual wave energy, followed by smaller contributions from the east and south. Significant wave heights on the open coast typically range from 1.5 to 2.5 metres under average conditions but can exceed five metres during major storm events.

The Outer Harbour is sheltered by the northern and eastern breakwaters, which significantly reduce incoming wave energy. Within the harbour, significant wave heights are typically less than 0.3 to 0.5 metres, and wave conditions are more influenced by local wind events and reflections from port infrastructure than by distant ocean swell. This sheltered wave climate reduces the likelihood of sediment re-suspension once dredging ceases.

Ocean currents and tidal regime

The coastal waters off Port Kembla are influenced by the East Australian Current, which flows southward along the continental shelf and can introduce warmer, less turbid waters into the region. On the open coast, nearshore currents are mainly driven by wave action and wind stress, with speeds typically less than 0.5 m/s. Inside the Outer Harbour, current speeds are even lower, generally less than 0.05 to 0.10 m/s, due to the restricted entrance and protective breakwaters.

The harbour experiences a microtidal regime, with a mean tidal range of approximately 1.2 metres and a maximum spring tidal range (the highest range between low and high tide) of around 1.8 metres. Tides and wind are the primary drivers of circulation, and suspended sediments from dredging are more likely to settle locally rather than disperse offshore.

Water levels and storm surge

Sea levels in the region are mainly controlled by astronomical tides but can be temporarily elevated by storm surge during low-pressure weather systems, particularly east coast lows and tropical systems that track southward. Storm surge events on the open coast can raise water levels by up to 0.3 to 0.5 metres above the predicted tide, occasionally coinciding with large swell to produce elevated coastal water levels and wave run-up (how far waves wash up a shore or structure after breaking). Within the Outer Harbour, the effects of storm surge are reduced due to the breakwaters but can still contribute to temporary increases in water level during severe weather events.

Sediment characteristics and seabed morphology

Sediments within the Outer Harbour are predominantly fine-grained, comprising silts and clays with a minor proportion of very fine sands. In some parts of the proposed dredging footprint, particularly in deeper pockets, the silt and clay fraction exceeds 80–90 percent by mass. This contrasts with the coarser sandy sediments found outside the harbour in more open coastal areas. The difference is due to the sheltered, low-energy conditions within the harbour, where limited wave action and weak currents allow fine particles to settle and accumulate over time, unlike the higher-energy open coast where finer materials are continually dispersed, leaving coarser sands behind. The high fine-material content increases the potential for turbidity plumes when sediments are disturbed and affects settling behaviour, as finer particles can remain suspended in the water column for longer periods before depositing. There is also the potential to disturb potentially toxic dinoflagellates within the dredging footprint as they have been intermittently detected in the Outer Harbour.

The harbour bed is relatively flat and uniform in depth, with dredged pockets along berths and navigation channels maintained through periodic maintenance dredging. Outside the harbour, the seabed transitions to sandier sediments and steeper gradients, but these areas are largely disconnected from harbour hydrodynamics due to the breakwaters.

Water quality baseline

Background turbidity levels in the Outer Harbour are generally low, with suspended sediment concentrations often less than 5 milligrams per litre (mg/L) under calm conditions. These values can rise temporarily during

maintenance dredging or storm events, but turbidity plumes are typically confined to the harbour basin due to the limited exchange with offshore waters. Section 7.4.1 also outlines the existing water quality of the modification footprint against the NSW Water Quality Objectives.

Sediment contamination potential

Previous site investigations have identified that some harbour sediments contain various contaminants as discussed above in Sections 7.3.2 and 7.3.3. This is an important consideration for both water quality and spoil management during dredging and reclamation works.

Conclusion

Overall, the Outer Harbour is a sheltered, low-energy environment where metocean conditions, fine-grained sediment composition, and weak tidal and current regimes combine to limit large-scale sediment transport and resuspension. Potential development impacts are more likely to arise from changes to local circulation or sediment disturbance during dredging and reclamation than from broader coastal erosion or offshore sediment redistribution.

7.5.2 Assessment of potential impacts – Stage 1

Construction

As outlined in Section 1.4, the modification reduces the approved reclamation footprint but increases the dredging footprint, resulting in a slightly larger overall disturbance area than the approved Stage 1 works. The following assessment focuses on whether this change affects the magnitude or distribution of potential impacts on suspended sediments, sediment deposition, hydrodynamics, or wave climate, compared with the previously approved works. Table 7-11 compares the approved and modified works for key parameters and provides a basis for understanding the relative scale of predicted impact, as discussed below.

Table 7-11: Comparison of approved Stage 1 works and proposed modification, disturbance footprint and predicted impacts

Approved Stage 1 works	Proposed modification	Change in footprint	Relative scale of impact compared to approved works
Suspended sediment concentrations			
Max increase 5 mg/L above background; confined within harbour	Max increase remains 5 mg/L above background; confined within harbour	No change in predicted concentration at harbour entrance	Impact scale unchanged; temporary turbidity increases still within NSW conservative threshold for avoiding short-term effects on most marine species.
Sediment deposition			
Deposition concentrated in reclamation area; no measurable accumulation outside breakwaters	Same deposition pattern and rates; concentrated in reclamation area, no measurable accumulation outside breakwaters	No measurable change in extent or thickness	Impact scale unchanged; duration and deposition footprint consistent with Stage 1.
Hydrodynamics			
No measurable change to tidal range, water levels, or circulation	No measurable change to tidal range, water levels, or circulation	No change	Impact scale unchanged; weak baseline currents and small dredge volume relative to harbour volume.
Wave climate			
Significant wave heights <0.5 m inside harbour under typical and storm conditions; wave energy dissipated by breakwaters,	Same predicted conditions	No change	Impact scale unchanged; no mechanism for increased wave-induced resuspension risk.

Impacts to aquatic environments from these hydrodynamic changes, are anticipated to be minimal, as discussed in Section 7.2.2. Spoil from Stage 1 works would be placed on land. The relocation of spoil will be either on the reclamation area or the south of the reclamation footprint within the stockpile area as noted in Section 5.1.2.

Suspended sediment concentrations

Dredging would disturb fine-grained sediments within the Outer Harbour, which in some dredge pockets contain 80 percent to 90 precent silts and clays. These particles are easily suspended when disturbed, but in the harbour's sheltered, low-energy conditions they tend to settle within two to six hours, much faster than in higher-energy open coastal areas, where stronger waves and currents can keep sediments suspended for days and disperse them over greater distances.

Consistent with this behaviour and based on field observations by Barnard (1978), around 10 percent of the total sediment mass disturbed during dredging is predicted to become suspended. Applying this proportion to the estimated dredge volume of about 1.1 million m³ indicates that roughly 110,000 m³ of material could be temporarily mobilised in the water column before settling.

The concentration of these suspended sediments is predicted to remain largely confined to the harbour, with maximum turbidity increases at the entrance of 5 mg/L above background (which is typically <5 mg/L). This level of increase is commonly adopted in NSW dredging assessments as a conservative threshold for avoiding short-term adverse effects on most marine species. It should be noted that these modelled concentrations do not account for the natural variability in turbidity within the harbour, which can fluctuate due to wind-driven resuspension, tidal movements, vessel traffic, and other artificial activities. As a result, short-term turbidity levels from dredging may be less distinguishable from background conditions during periods of naturally elevated turbidity.

Under the modified proposal, the increased dredging footprint means a greater volume of sediment would be temporarily disturbed compared to the approved Stage 1 works, but modelling indicates that concentrations at the harbour entrance would remain the same and within the same conservative threshold.

Although hydrodynamic modelling predicts short-term sediment suspension and localised deposition patterns, it does not simulate the mobilisation, dispersion, or bioavailability of contaminants of potential concern (COPCs) bound to disturbed sediments. Given the known presence of contaminants such as heavy metals, PAHs, TBT, and PFAS in the Outer Harbour, resuspended sediments could act as a way to transport these contaminants. Without contaminant-specific modelling, it is not possible to quantify potential exposure concentrations or dispersion extents, and the assessment therefore adopts a precautionary assumption that any such mobilisation would follow the same physical transport pathways as fine sediments. In practice, this means there is potential for short-term, localised increases in dissolved or bioavailable contaminants during dredging, particularly in areas with higher contaminant loadings, before rapid dilution and settling occur.

The likelihood of this causing measurable ecological or water quality impacts is predicted to be low where works are undertaken in lower-risk sediment zones and with mitigation measures in place (e.g. silt curtains, controlled placement), but may be elevated during disturbance of known contaminant "hotspots". The absence of contaminant-specific modelling therefore represents an assessment uncertainty that should be managed through targeted sediment testing, real-time monitoring, and adaptive management during works.

Sediment deposition

Most suspended material would settle within two to six hours of disturbance, with deposition concentrated in the reclamation area where dredged material is placed (see Figure 7-3). The average thickness of deposited material in this area is predicted to be 0.05 m to 0.15 m per dredging episode, with occasional mounding up to about 0.25 m near placement points. Model outputs show deposition tapering off rapidly beyond this area,

with no measurable build-up predicted at the harbour entrance or outside the breakwaters. These results were generated using a conservative approach that did not include the effects of proposed mitigation measures such as silt curtains, meaning actual deposition may be lower.

In reality, once sediment from dredging is suspended and subsequently deposited, much of it would be expected to fall back close to the dredge area, including in zones that may be re-disturbed and removed by subsequent dredging passes. Any material settling outside the immediate dredging zone would likely be incorporated into the harbour's natural hydrodynamic processes, which involve slow redistribution by tidal flows, wind-driven circulation, and vessel movements. This secondary redistribution was not explicitly modelled, as the modelling aimed to conservatively capture the primary deposition pattern from active dredging rather than longer-term background movement. If this process were included, results would likely show gradual dispersion of a small proportion of material across the broader harbour basin over time, but without measurable accumulation outside the breakwaters or any change to the overall impact conclusions.

The increased dredging footprint under the modification does not change the predicted location or pattern of deposition, it remains concentrated in the reclamation area. but may slightly increase the total volume deposited within that zone. No measurable deposition is still predicted outside the breakwaters.

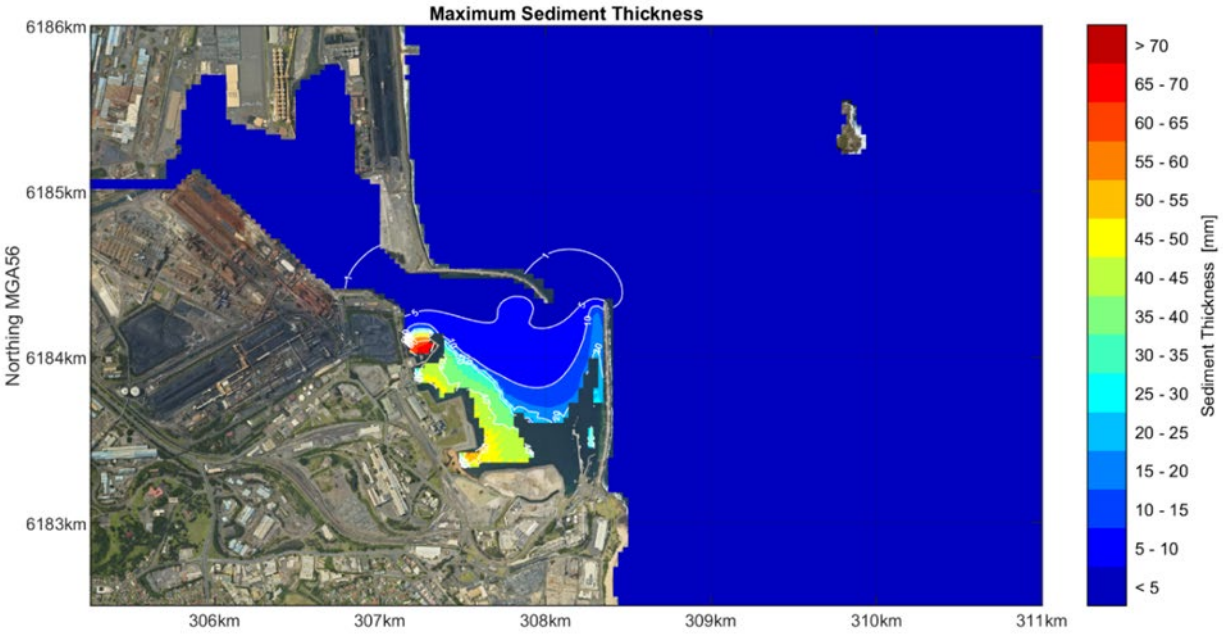

Figure 7-3: Modelled deposition thickness during dredging – Stage 1

Hydrodynamics

The Outer Harbour's microtidal regime (mean tidal range approximately 1.2 m, spring range approximately 1.8 m) and very low current speeds (<0.05 m/s to 0.10 m/s) mean dredging would have negligible influence on tidal flows or water levels. This is because tides in the harbour are governed almost entirely by the predictable rise and fall of the ocean, rather than by seabed shape or current strength, and the scale of dredging relative to the overall harbour volume is too small to measurably alter water movement. Similarly, the existing weak currents mean that removing or reshaping seabed material would not change circulation patterns in a way that would affect tidal range or water level fluctuations. Circulation would continue to be driven by tides and wind, with suspended sediments more likely to settle within the harbour than be transported offshore.

The modification does not change this conclusion, with the expanded dredging footprint remaining too small relative to harbour volume to cause measurable changes in hydrodynamics.

Wave climate

The breakwaters would continue to substantially attenuate offshore wave energy under both typical and storm conditions, with modelling showing that significant wave heights inside the Outer Harbour would remain below 0.5 m even during large swell events. This low-energy environment means construction activities, including dredging and reclamation, would not measurably alter the internal wave climate. This is because the limited fetch within the harbour (i.e. the short distance that wind can blow over the water inside the harbour), combined with the orientation and length of the breakwaters, would prevent the generation of larger locally driven wind waves.

Modelling also predicts no change to the diffraction and refraction patterns that currently dissipate wave energy along the berths and reclamation areas (i.e. the way waves bend and spread out when they pass structures or shallow areas, which helps weaken their energy before they reach the berths and reclamation areas). As a result, there would be no mechanism by which construction works could increase wave-induced sediment resuspension risk, and post-dredging wave conditions are predicted to remain comparable to baseline conditions.

The modification does not alter this prediction, with wave attenuation and patterns of energy dissipation remain unchanged.

Conclusion

Overall, the modelling indicates that while the proposed modification increases the dredging footprint compared to the approved Stage 1 works, the resulting sediment disturbance would still be short-lived, highly localised, and largely contained within the Outer Harbour. The sheltered, low-energy conditions would limit the spread of suspended material, with most deposition occurring in the reclamation area and no measurable effects predicted outside the breakwaters. Hydrodynamic and wave conditions would remain effectively unchanged, meaning no significant alteration to sediment transport patterns or coastal processes is predicted.

Operation

Suspended sediment and deposition

Appendix I provides comparative modelling of the impact of changing the berth alignment and reclamation geometry under the modification compared to the approved project. This found that the modification would not materially alter predicted sediment transport behaviour, as the harbour's low-energy wave and current conditions mean suspended sediments settle rapidly and remain close to their source regardless of the precise alignment of dredging and reclamation.

Deposition would remain confined to the immediate construction footprint, with no measurable accumulation predicted at the harbour entrance or beyond the breakwaters, because tidal flows are insufficient to transport fine material over such distances before it settles, and any minor changes in reclamation geometry do not alter these prevailing hydrodynamic constraints. Overall, any deposited material is predicted to remain stable under the harbour's low-energy conditions, with little potential for re-suspension once dredging ceases. Notably, operational hydrodynamic conditions would not promote further redistribution, and suspended sediment levels are predicted to return rapidly to baseline following completion of dredging.

Hydrodynamics

Based on hydrodynamic modelling (see Section 8 of Appendix I), the modification is predicted to result in operational conditions with no discernible change in tidal flows, water levels, or circulation patterns once construction ceases. Any minor variations would remain within the natural variability of the harbour's low-

energy system and within model uncertainty. This reflects that the modified berth alignment and reclamation geometry would not introduce new flow pathways or obstructions capable of materially altering long-term circulation, harbour flushing rates, or sediment stability.

Wave climate

The modification is predicted to reduce wave activity for the new Outer Harbour berths compared to the approved project. However, there will be a slight increase in wave activity near the northern breakwaters due to reflections from the new quay walls during rare and severe storm events from the north-northeast. These impacts are expected to be minor. The proposed modification is also expected to have similar impacts to long-period wave heights as the approved project, indicating the modification would not worsen long-wave induced vessel motions or mooring loads. There are negligible temperature shifts, and marginal improvements in tidal flushing. As outlined below, these effects are not expected to result in operational or ecological impacts.

Short-period waves

Under the modification, the sheltered wave conditions in the Outer Harbour would largely be maintained and the model predicts a reduced wave activity for the new Outer Harbour berths compared to the new berths in the approved project. However, modelling indicates a slight increase in wave activity compared to the approved project at the northern breakwater location. This is mainly due to wave reflections from the new quay walls, which would generate slightly larger waves.

This represents a shift from calm or barely rippled water to small, gentle waves that may cause some additional vessel movement but remain well below levels that could affect navigational safety. These changes would be most evident for waves arriving from the east-north-east (Figure 7-4 and Figure 7-5) but remain small in absolute terms and well within conditions that can be safely managed for navigation, berthing, and sediment stability.

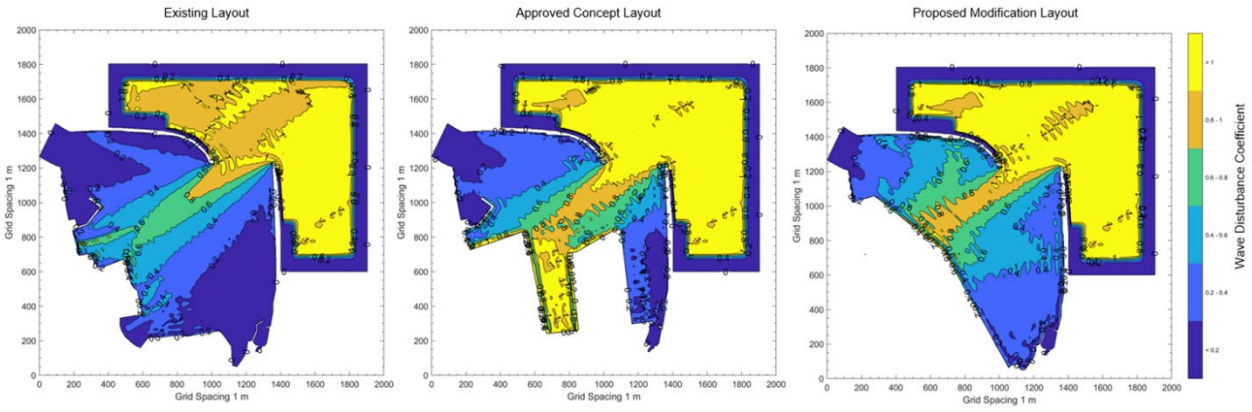

Figure 7-4: Modelled swell wave disturbance coefficient – waves from the East-North-East

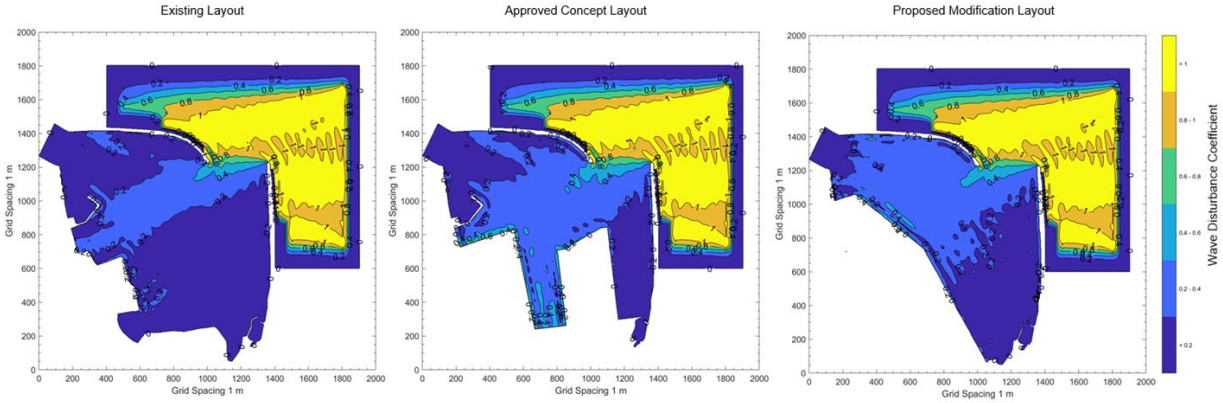

Figure 7-5: Modelled Swell Wave Disturbance Coefficient – Waves from the East

Long-period waves

The proposed modification is also predicted to have a similar impact on long-period wave heights (including swell and infra-gravity waves, which are slower, rolling waves with long gaps between crests that can gently rock vessels even in sheltered waters) within the Outer Harbour compared to the approved project. These waves are discussed separately because their longer period means they affect vessel motion differently from short-period waves, particularly when vessels are moored.

Shore morphology and stability

The shoreline within Port Kembla once developed would consist of either quay wall or revetment which is the same as the approved project. No changes to hydrodynamics are predicted outside of the Port and therefore changes to shoreline morphology or stability as a result of the proposed modification are not expected.

Temperature effects

Modelling was used to predict summer and winter water temperature changes from the modification, considering tides, winds and operational discharges. The results show that any changes would be small and limited to the dredged and reclamation areas and nearby quay wall.

In summer, the approved project was predicted to slightly warm the surface water by about 0.1 °C and cool the water near the seabed by up to 0.3 °C. Under the proposed modification, there would be no surface warming, and near-bed cooling could be up to 0.6 °C in a small area near the eastern breakwater. In the winter, the approved project was predicted to cool the water near the seabed by up to 0.2 °C but not change the temperature at the surface. Under the proposed modification, there is expected to be a small increase in temperature at the surface (0.1 °C) in the Outer Harbour but remain unchanged for the seabed. Overall, the temperature changes are small and unlikely to result in ecologically or operationally significant effects.

Table 7-12 summarises the modelled seasonal changes relative to the approved project.

Table 7-12: Change in temperature comparison with approved project

Season	Location	Approved project	Proposed modification	Difference
Summer	Surface	+ 0.1 °C Modification footprint	0.0 °C Modification footprint	- 0.1 °C
	Near-bed	- 0.3 °C Modification footprint	- 0.6 °C Near coastline between modification layout and eastern breakwater	- 0.3 °C

Season	Location	Approved project	Proposed modification	Difference
Winter	Surface	0.0 °C Modification footprint	0.1 °C Outer harbour	+ 0.1 °C
	Near-bed	- 0.2 °C Dock area modification footprint	Unchanged	0.0 °C

These predicted temperature changes are both small in magnitude (⩽0.6 °C) and highly localised, occurring only within the immediate dredged/reclamation footprint or along adjacent quay lines. Such limited changes are unlikely to exceed the natural daily or seasonal temperature variability already experienced in the harbour, meaning that marine organisms are adapted to similar fluctuations. Furthermore, the affected areas are within an operational port environment where benthic and pelagic communities are already tolerant of variable physical conditions. From an operational perspective, the magnitude and extent of change are too minor to influence vessel performance, port infrastructure, or water quality processes such as flushing or stratification.

Tidal flushing

According to hydrodynamic modelling (Section 10 of Appendix I), both the approved project and the proposed modification would improve the harbour's tidal flushing compared to existing conditions. Tidal flushing refers to how effectively tidal movements replace and replenish water in the harbour, helping to disperse heat, nutrients, and any pollutants.

Under the modification, flushing performance is predicted to be slightly better than under the approved layout, particularly in the more open parts of the harbour. This improvement is due to subtle changes in water circulation around the modified berth alignment and reclamation geometry. However, tidal exchange would still be slower in more enclosed basin areas, consistent with both the approved project and current conditions.

The modelling by Stantec shows that the proposed modification would result in very small changes to tidal flushing times compared to the approved project, generally a slight improvement in the more open parts of the harbour, with little or no change in more enclosed areas. These changes are within the model's accuracy limits and are not large enough to measurably alter overall harbour circulation.

Because flushing rates remain effective across the harbour, there is no reduction in the capacity of tidal movements to disperse heat, nutrients, or potential contaminants. This means there is no pathway for water quality to deteriorate because of the modification. In practical terms, the modification maintains good water exchange, avoids stagnant conditions, and supports the continued dispersal of materials in a way that prevents ecological or operational issues.

Climate change

Watson (2022) provides recent estimates of sea levels for a range of planning periods up to 2100 and across a range of postulated industrial scenarios based on analyses of long-term water level data at Fort Denison in Sydney Harbour. These estimates may therefore be the most appropriate for Port Kembla and include the following estimates for 2075:

- 100-years ARI | 1.88m AHD
- 500-years ARI | 1.92 AHD.

These future levels would not have an identifiable effect on wave penetration to Port Kembla as the entrance depths are relatively high. Therefore, there is unlikely to be any change in refraction or diffraction of waves in the Outer Harbour. However, there is no definitive information that describes future offshore wave

conditions. Past investigations do not indicate any present-day increases in peak event wave heights or an increase in the frequency of east-northeast waves which are the most sensitive for the Outer Harbour.

7.5.3 Assessment of potential impacts – Concept

Construction

The highest hydrodynamic impacts would occur during Stage 1, when dredging and reclamation in the Outer Harbour are undertaken. Under the modified Concept, Stage 2 and Stage 3, like in the approved Concept, would mainly involve landside works such as quay wall extensions, paving, and services installation. In both cases, these activities would take place largely on reclaimed land rather than in the harbour itself, meaning they would not significantly alter tidal flows, wave patterns, or sediment transport beyond what is already established in Stage 1.

Although the staging of works may not necessarily follow a sequential order, with certain aspects of Stage 1 potentially overlapping with impacts anticipated under the Concept Plan stage, the hydrodynamic modelling assumes that all Stage 1 activities are complete at the Concept stage. Condition 2.19 of the approved project specifies that "each stage of the project shall be designed and constructed to minimise increases in infragravity (long) wave and gravity (ocean swell) wave parameters within both the inner and outer harbours and not to have a detrimental effect on harbour tidal flushing." This condition is intended to mitigate any potential interim hydrodynamic impacts.

Because the modified Concept does not introduce any additional large-scale dredging or new in-water structures beyond those already included in Stage 1, the hydrodynamic effects during construction of Stage 2 and Stage 3 would be similar in nature and magnitude to those of the approved Concept: temporary, highly localised, and far less than Stage 1. Any minor effects would remain confined to work areas, with no measurable change to overall harbour circulation or tidal flushing.

The mitigation measures established for Stage 1 in the approved Concept, such as staged works, sediment controls, and water quality monitoring, would continue to apply under the modified Concept and would be updated during detailed design to reflect the exact construction methods proposed.

Operation

Once Stages 2 and 3 are complete, the harbour will be in its final berth alignment, the same configuration already modelled in Appendix I. This means that operational hydrodynamic conditions after Stage 2 and Stage 3 are expected to be essentially the same as those predicted for the Stage 1 operational phase.

- Tidal flows, water levels, and circulation patterns would remain within natural variability, with no additional changes from later stages.
- Wave climate in the Outer Harbour would continue to reflect the outcomes of Stage 1, with sheltered conditions maintained and only small increases in wave heights near the northern and eastern breakwaters due to quay wall reflections.
- Sediment stability would not be affected, as operational current speeds would remain too low to mobilise settled material.
- Tidal flushing would remain slightly improved over existing conditions, as predicted for Stage 1, ensuring effective water exchange and dispersal of heat, nutrients, and any contaminants.

Some minor hydrodynamic effects from vessel movements (e.g. propeller wash) may occur in the Outer Harbour once larger ships begin operating. The scale of these effects would depend on the types of vessels

and berthing arrangements, which will be confirmed in future design stages. If required, these would be assessed in later approvals supported by targeted hydrodynamic checks.

Separately from the modification, routine dredging to maintain declared depths occurs under NSW Ports' existing approvals and standard controls. NSW Ports notes that Port Kembla generally requires minimal maintenance dredging, owing to its deep-water setting and exposure to ocean conditions that limit siltation, with campaigns undertaken on an as-needed basis at specific berths or approaches rather than to a fixed annual program. While Stage 2 and Stage 3 may require maintenance dredging of some newly developed berth pockets or approach areas, these activities would be small-scale, infrequent, and comparable to existing campaigns. Any localised hydrodynamic effects from such dredging would be temporary and negligible in the context of the broader Outer Harbour system.

Overall, because the key driver of hydrodynamic change, the berth alignment and reclamation geometry, was already completed in Stage 1, the modification for Stages 2 and 3 is not expected to introduce any new or greater impacts.

7.5.4 Environmental management measures

Stage 1

No additional measures over those already identified for the approved project are recommended for Stage 1 of the proposed modification.

Concept

No additional measures over those already identified for the approved project are recommended at the Concept stage for the proposed modification.

7.6 Hazards and risk

A high-level comparative assessment / preliminary risk screening has been undertaken in line with Chapter 3 of the SEPP (Resilience and Hazards) 2021 to identify and evaluate potential hazards and risks arising from the proposed modification, with reference to the nature, scale, and operational context of the approved project. This assessment considers whether the modification introduces any new hazard pathways, alters the likelihood or consequence of existing risks, or changes the overall risk profile relative to that previously approved.

7.6.1 Existing environment and background

Preliminary hazard analysis

Consistent with Chapter 13 of the approved project EIS, which applied the State Environmental Planning Policy No 33 – Hazardous and Offensive Development (SEPP 33), its associated assessment guidelines, and the Hazardous Industry Planning Advisory Paper No. 6 – Hazard Analysis (HIPAP 6) to identify hazardous events and assess off-site risks, the proposed modification does not introduce any new dangerous goods types or sensitive land uses beyond those already considered. Its hazard profile remains limited to sulphuric acid transfer to the existing Ixom Operations facility (and former Orica facility), with risks managed to As Low as Reasonably Practicable (ALARP), meaning reduced as far as reasonable without disproportionate cost or effort, through established safeguards. The nearest residential receptors remain approximately 600 metres away.

Cement Australia's Grinding Mill and the Emplacement Cell have both started operating since the original assessment was done in 2011. They are both located within the existing industrial area. As they do not store dangerous goods in amounts above the limits set by SEPP 33, they do not significantly change the types of hazard pathways or potential incident scenarios already identified in the Preliminary Hazard Analysis, such as chlorine, ammonium nitrate, or flammable liquids. These hazards remain managed through the location and design of facilities so that any impacts at the site boundary stay within SEPP 33 safety limits.

Should the Grinding Mill store dangerous goods above SEPP 33 thresholds or introduce credible escalation pathways, an Addendum PHA would need to be prepared to confirm individual and societal risk against relevant criteria and to update separation/mitigation requirements alongside the Stage 2 and Stage 3 process already flagged in Chapter 13.

Land use safety study

In 2023, a Land Use Safety Study (LUSS) for Port Kembla was undertaken (Arriscar, 2023) to assess potential cumulative risk from all industrial facilities and operations, existing, approved, or proposed, to inform the suitability of bulk liquid storage tank development. The study covered all NSW Ports land in both the Inner and Outer Harbour and identified key Outer Harbour land uses including:

- Bulk liquid facilities
- Vacant land
- Dry bulk facilities
- General cargo use
- Port services and other infrastructure
- Shipping channel.

Key risks included the storage and transport of hazardous materials (including flammable liquids) via road, rail, or pipeline. The LUSS concluded that cumulative and societal risks for all facilities and operations complied with the Department of Planning, Housing and Infrastructure's quantitative risk criteria for land use safety planning, and that existing risk management controls were proportionate to the level of risk. This

study also confirmed that the risk profile for the surrounding area is considered to generally comply with the qualitative risk criteria outlined in the Hazardous Industry Planning Advisory Paper No. 4 (HIPAP No. 4).

Relationship between the PHA and LUSS

The 2023 LUSS complements the approved project's PHA by providing a broader, port-wide view of risk that considers cumulative and societal impacts from all Outer Harbour operations. While the PHA focuses on the specific hazard scenarios associated with the proposed modification, the LUSS confirms that, even when combined with other port activities, risks remain within NSW planning tolerability criteria and are managed appropriately.

The findings of the LUSS therefore reinforce the PHA conclusion that the proposed modification, including the operation of the Grinding Mill and Emplacement Cell, does not materially change the Outer Harbour's overall hazard profile or risk levels, and that the current suite of risk controls remains suitable.

7.6.2 Assessment of potential impacts – Stage 1

Construction

Chapter 13 of the approved project Environmental Impact Statement (EIS) identified that potential risks to human and ecological health would occur primarily during dredging and other intrusive marine construction activities. The PHA assessed both direct and indirect exposure pathways, with overall risk to most human receptors considered *low-to-moderate* depending on the activity and location, and one pathway (seafood ingestion) assessed as *high-risk* during dredging.

Key hazards and pathways included:

- Direct contact with surface water by recreational users and dredging workers, with potential short-term exposure to contaminants resuspended during dredging
- Direct contact with groundwater by construction workers during intrusive works, a less likely pathway but possible if excavation intersected contaminated aquifers
- Indirect impacts on marine ecosystems within and outside the Outer Harbour from disturbed contaminated sediment or the release of dinoflagellate cysts, which could germinate and cause harmful algal blooms affecting water quality, shellfish safety, and fish populations
- Ingestion of contaminated seafood due to bioaccumulation of mobilised contaminants, particularly in fish and shellfish caught in affected areas from recreational fishing, assessed as *high-risk* during dredging
- Hazards from construction materials, equipment, and vehicles, such as fuel handling, chemical storage, and spill potential.

For the proposed modification:

- Dredging footprint and methods remain consistent with the scope assessed in the approved EIS. However, the modified reclamation footprint would require intrusive works within the Emplacement Cell which increases the risk of potential disturbance to contaminated material entering the Outer Harbour if not managed appropriately
- Dangerous goods profile is unchanged, with no increase in quantity or change in class beyond those already considered under the corresponding guidelines

- Sediment quality profile remains comparable to that assessed in the approved project, with no newly identified contamination hotspots
- Dinoflagellate cyst disturbance risk is unchanged, as dredging methods, spoil placement, and environmental controls are consistent with those modelled in the original EIS (see Section 7.2.2)
- No new sensitive receptors have been introduced, and hydrodynamic conditions are not altered in a way that would increase off-site contaminant transport.

Given these factors, the proposed modification does not materially change the hazard pathways, consequence scenarios, or overall risk profile established in Chapter 13. The original PHA findings and associated mitigation measures remain valid, and no amendment to the PHA is required.

Operation

The key risks to human and ecological health once Stage 1 is operational remain primarily associated with increased vessel movements to and from the newly reclaimed area. These movements could generate propeller wash, vessel wake, and occasional accidental discharges, which have the potential to resuspend sediments or affect water quality. Some vessels using the new berth areas may also transport dangerous goods (including LNG). However, as noted in the original assessment prepared for the approved project, Port Kembla is an established operational port with existing systems in place to manage these risks, including spill response procedures, vessel traffic management, grounding risks, and established environmental controls.

Additional considerations for the modified Stage 1 include the proximity of vessel berths to the Emplacement Cell and the potential for disturbance of adjacent sediments if vessel manoeuvring or berth maintenance dredging occurs in these areas. While such activities are not expected to materially alter the overall hazard profile established in EIS prepared for the approved project, they may warrant targeted sediment management measures to ensure contaminants of potential concern are not mobilised.

It is also noted that ongoing construction works for later stages would occur alongside Stage 1 operations. These concurrent activities may create cumulative risk scenarios, such as simultaneous vessel and dredging operations, which should be managed through coordinated scheduling, hazard communication, and adherence to existing port safety protocols.

7.6.3 Assessment of potential impacts - Concept

Construction

Future stages of the project would involve ongoing intrusive construction activities, particularly the installation of road and rail infrastructure and relocation of existing facilities. These activities present potential risks to human and ecological health, primarily through:

- Direct contact with contaminated groundwater by construction workers during excavation. As assessed in the approved project, this risk remains low due to the limited extent of proposed earthworks and the depth at which groundwater occurs
- Disturbance of contaminated soils or sediments, particularly if works intersect areas such as the Emplacement Cell. Disturbance of this cell could mobilise contaminants of potential concern and may require targeted investigation, management plans, and additional controls beyond those in the original PHA. As noted in Section 7.3.4, the majority of potential contamination impacts from the proposed modification can be managed through existing mitigation measures and conditions of approval, an

additional Unexpected Finds Procedure is also recommended to manage contamination during excavation (e.g. the Emplacement Cell)

- Concurrent hazards where construction activities coincide with operational vessel movements, creating cumulative risk scenarios (e.g. shared access routes, overlapping work zones).

As the proposed modification does not change the overall construction method for the future Stages or the approved road and rail layout, most construction-related risks remain consistent with those previously assessed. However, any works involving excavation within or adjacent to the Emplacement Cell would introduce a potential new hazard pathway and should be addressed through targeted risk assessment and mitigation.

Operation

Once operational, the primary risks to human and ecological health remain linked to vessel movements to and from the reclaimed area. These risks include:

- Physical hazards such as vessel collision or allision, and propeller wash that can disturb sediments or marine habitats
- Accidental spills or discharges from vessels, with potential water quality impacts.

Relative to the approved project, the proposed modification reduces the number of berths but increases berth length. This change is not expected to alter the overall risk profile for routine port operations, as Port Kembla has established systems to manage these hazards, including vessel traffic management and spill response procedures.

If the modified reclamation area is used for offshore wind infrastructure assembly or handling, additional hazards may arise, such as:

- Movement of oversized and heavy-lift components through the port
- Use of specialised lifting and transport equipment
- Potential for different cargo-related dangerous goods profiles (e.g. lubricants, hydraulic fluids, large battery systems).

These risks would require assessment once a specific land use is confirmed, to ensure compliance with the relevant guidelines.

7.6.4 Hazard and risk profile and pathways

To confirm whether the proposed modification alters the hazard profile or risk ratings established in the approved project's PHA, a comparison has been undertaken of key hazard pathways, their original assessed risk ratings, and the anticipated risk ratings under the modified project.

This side-by-side analysis demonstrates that, for most hazard pathways, the risk profile remains unchanged, as the proposed modification does not introduce new dangerous goods classes, sensitive receptors, or substantial changes to the construction methodology.

The only scenario that could result in a potential increase in hazard rating relates to excavation within or disturbance of the Emplacement Cell, which was not anticipated in the original assessment.

The table below summarises each hazard pathway, comparing the 2011 EIS findings with the 2025 proposed modification, and identifying where controls or further assessment may be required.

Table 7-13: Comparison of key hazard pathways – Approved project vs proposed modification

Hazard pathway	Risk profile		Change assessment	Notes
	Approved project	Proposed modification		
Stage 1				
Direct contact with surface water (recreational users, dredging workers)	● Low–Moderate: Short-term exposure possible during dredging; managed via exclusion zones and water quality monitoring.	Same risk level dredging methods and controls unchanged.	No material change.	Continue exclusion zones and monitoring during dredging.
Direct contact with groundwater (construction workers)	● Low: Depth and limited excavation reduce likelihood; personal protective equipment and safe work procedures in place.	Same risk level method and footprint unchanged.	No material change.	Maintain personal protective equipment and excavation safety protocols.
Disturbance of contaminated sediments (marine)	● Low–Moderate: Managed via sediment quality testing, targeted dredging, and spoil management.	High, given disturbance of Emplacement Cell. This risk can be reduced through the application of mitigation measures	Minor change, provided mitigation measures are implemented.	Implement an Unexpected Finds Procedure for the proposed modification.
Release of dinoflagellate cysts	● Low: Controlled via dredging methods and spoil disposal procedures.	Same risk level methods unchanged.	No material change.	Maintain existing controls.
Ingestion of contaminated seafood	● High (during dredging): Mobilised contaminants may bioaccumulate; managed via temporary fishing bans.	Same risk level footprint and contamination profile unchanged.	No material change.	Maintain temporary fishing restrictions during dredging.
Hazards from construction equipment, fuel, chemicals	● Low–Moderate: Managed via spill response plans, designated storage areas, and training.	Same risk level controls unchanged.	No material change.	Maintain current port and contractor safety management systems.
Concept				
Vessel movements – operational	● Low–Moderate: Managed via vessel traffic management, navigation aids, and port procedures.	Same risk level fewer berths but larger vessels; existing controls effective.	No material change.	Continue vessel traffic management and emergency response protocols.
Potential offshore wind infrastructure operations (if pursued)	● Not assessed.	Potential for new hazards from heavy-lift ops, oversized cargo, and related dangerous goods.	New scenario: requires assessment if confirmed.	Prepare Addendum PHA if offshore wind assembly proceeds.
Cumulative risks from concurrent construction and operations	● Not specifically quantified; managed operationally.	Similar profile potential minor increase with concurrent Stage 1 ops and future stage works.	Minor change.	Coordinate scheduling, hazard communication, and access control.

7.6.5 Environmental management measures

Stage 1

No additional measures over those already identified for the approved project are recommended for Stage 1 of the proposed modification.

Concept

No additional measures over those already identified for the approved project are recommended at the Concept stage for the proposed modification.

7.7 Other issues

In addition to the principal impact assessments outlined previously, a range of other issues of lower potential significance were also evaluated in relation to the proposed modification of the Port Kembla Outer Harbour. These matters were already addressed in the approved project EIS. The level of assessment of the likely modification impacts has been proportionate to the significance of, or degree of impact on, each issue, taking into account the context of changes to the approved project and the surrounding environment, in line with the SEARs desired performance outcome for other issues. Accordingly, the purpose of this section is to assess whether the previously provided information remains relevant and sufficiently robust in light of the proposed modification, and whether any further detailed investigation is warranted. Further assessments were undertaken for Aboriginal Heritage, non-Aboriginal Heritage, and Flooding, with the findings provided in the respective appendices: Appendix J (Aboriginal Heritage), Appendix K (Non-Aboriginal Heritage), and Appendix H (Flooding). Further assessments were specifically undertaken for Aboriginal Heritage, non-Aboriginal Heritage, and Flooding due to the sensitive nature and regulatory requirements associated with these matters.

7.7.1 Existing environment and background

Table 7-14 below summarises of the existing environment of each of the identified other issues. The table also establishes key differences between the approved project's baseline conditions and those of the proposed modified project, offering a clear comparison to highlight any notable changes or impacts.

Table 7-14: Other issues - existing environment

Category	Summary of change in the existing environment since 2011	Discussion
Biodiversity - Terrestrial	The terrestrial biodiversity around Port Kembla Outer Harbour is significantly constrained due to extensive industrial development and land modification. Native vegetation mainly consists of small pockets of Grassy Woodlands and Heathlands; however, within the proposed modification site boundaries and its immediately surrounding area, very limited vegetation remains. This is because it has previously been cleared to support road and rail networks, industrial sites, commercial buildings, parking, and port facilities. Other types of vegetation (such as Wet and Dry Sclerophyll Forests) exist in other areas of Port Kembla, although much further from the project site (NSW Gov & NSW DCCEEW, 2020). Aside from the mostly cleared vegetation on the immediate outskirts of the site's boundaries, the nearest notable vegetated area is over 750 metres away. Previous assessments of the area undertaken as part of the approved project EIS dictate that the terrestrial ecological value near the harbour is limited, with minimal connectivity to large natural habitats and few features supporting significant biodiversity. Both fauna and flora diversity are expected to be low, and it was concluded that no threatened ecological communities, notable breeding sites, or survival habitats are present. Fauna in Port Kembla mainly consists of seabirds (such as the Silver Gull) and small mammals, none of which are likely to be found in the modified Outer Harbour development area itself.	• Since 2011, the terrestrial environment adjacent to Port Kembla Outer Harbour has undergone minimal change, with the area continuing to be dominated by industrial and commercial activities. As a result, there has been no natural regeneration or improvement in environmental values. • Since 2011, more land clearing has taken place meaning that trees and shrubbery, located close to the project site's boundary, have been cleared. This has further reduced the extent of terrestrial vegetation and associated habitat values in the immediate area.

Category	Summary of change in the existing environment since 2011	Discussion
	For example, Green and Golden Bell Frog, are sometimes observed near the site; however, the revised footprint does not intersect with shelter or foraging habitats, ensuring that these key areas remain unaffected by the proposed development.	
Air quality	The site is situated on a narrow coastal strip with a steep escarpment located about eight kilometres west of the Port. This escarpment significantly impacts local meteorology and air quality by altering wind direction, causing wind decoupling, and restricting pollutant dispersion in the Illawarra region. Existing air pollutants mainly comprise point source (e.g. stacks), ground level (e.g. construction), fugitive emissions (e.g. petroleum storage tanks), and vehicles. Significant contributors to air pollution in the area mostly consist of local light and heavy industrial facilities. The nearest real-time air quality monitoring station in the NSW Air Quality Monitoring Network, operated by DPHI, is at Kembla Grange Race Course on Princes Highway. This site is in a residential area northwest of Lake Illawarra. The Kembla Grange air quality monitoring station is located approximately 7 kilometres west of Port Kembla. The pollutant concentrations are well below the relevant NEPM standard, posing little or no risk to health, with $PM_{2.5}$ concentrations typically around 4–5 µg/m³, well below both the WHO Guideline and NEPM thresholds. Similarly, concentrations of nitrogen dioxide and ozone are below the NEPM thresholds. There are currently no documented exceedances of NEPM criteria in the publicly available ambient air quality data. Historically, the region experienced elevated NO_2 levels and associated respiratory concerns in the 1990s. However, by 2014, NO_2 concentrations at nearby Kembla Grange had halved, indicating significant air quality improvements over time. Air quality assessments for recent or planned infrastructure developments, such as the Port Kembla Gas Terminal, have predicted no exceedances of particulate criteria, and only minor exceedances of formaldehyde under extremely unlikely worst-case scenarios, which would occur over water and not impact human health.	• Air quality is unlikely to have changed substantially from the approved project's EIS and the site's current conditions, as the surrounding land use, industrial activity profile, and regional meteorological patterns have remained consistent, and no significant new emission sources have been introduced since the original assessment. • In 2014, Wollongong's average ambient air quality daily concentrations for $PM_{2.5}$ was 7.0 µg/m³ (GHD, 2018). At present (July 2025), the air quality for $PM_{2.5}$ sits at 4 µg/m³ (NSW DCCEEW, 2025). Both values are well below the NEPM advisory reporting standard of 25 µg/m³ (24-hour average) and the World Health Organization (WHO) guideline of 15 µg/m³, indicating that particulate matter concentrations are not of concern in this context. While the data show a modest reduction over time, the comparison is based on a limited snapshot of current conditions and may not represent long-term trends. • According to the Wollongong monitoring station, the air is considered 'good' (NSW DCCEEW, 2025) aside from bushfires and other events.
Climate change	Since the design of the approved project (2011), climatic conditions in the Illawarra region have shown measurable deterioration in both current observations and updated future projections, with global and national greenhouse gas emissions continuing to rise. Port Kembla, located about 80 km south of Sydney on Australia's east coast, has a cool temperate climate with an average annual rainfall of approximately 1100 mm. Observed data from the Bureau of Meteorology's 2024 State of the Environment Report, indicate that the Illawarra has experienced more very hot days, increasing sea levels, and greater rainfall intensity over the past decade. Nationally, Australia's climate has warmed by around 0.9 °C since the early 1900s, with an average rainfall decline of 50 mm per decade and a mean sea-level rise of approximately 17 cm, changes that are assumed to be broadly consistent with those experienced at Port Kembla. Australia's land	• The Illawarra has warmed, with more very hot days and continuing sea-level rise over the past decade. NSW/CSIRO reporting shows Australia's land temperature is about 1.5 °C above 1910 levels and heavy-rainfall intensity is increasing; regionally, sea level on the Illawarra coast is rising and driving more frequent coastal inundation. • Since the approved project design, NSW climate projections have been updated from NARCliM 1.0 (2014) to NARCliM 2.0 (2024), which offers higher-resolution modelling and refined hazard estimates. These updates show increased

Category	Summary of change in the existing environment since 2011	Discussion
	temperature is now approximately 1.5 °C above the 1910 average, heavy-rainfall events have become more intense, and coastal tide-gauge records confirm ongoing sea-level rise along the Illawarra coast, contributing to more frequent coastal inundation events. Since 2011, climate projections for NSW have been updated from the NARCliM 1.0 (2014) dataset to the NARCliM 2.0 (2024) modelling suite, providing higher-resolution outputs and refined hazard ranges. For Port Kembla specifically, projected sea-level rise by approximately 2050 is now estimated at approximately 11 cm to 24 cm under low-emissions scenarios and 16 cm to 28 cm under high-emissions scenarios, relative to 1995 to 2014 baselines, with further acceleration expected by 2100. Projections also anticipate an increase in the number of hot days, shifts in rainfall patterns, and more frequent severe fire-weather conditions across the Illawarra region. That said, the Outer Harbour is shielded from ocean currents and waves by breakwaters, while the Inner Harbour is naturally protected by its location and the Outer Harbour structures. However, like all coastal environments, the site remains vulnerable to climate-change-related hazards, including extreme weather, rising sea levels, and changes in temperature and rainfall.	projections for sea-level rise, more frequent hot days, changes in rainfall patterns, and greater severe fire-weather risk for the Illawarra compared with the earlier modelling.
Design and place	In NSW planning policy, 'design and place' refers to how a location's physical form, function, and relationship to its surroundings shape its character, performance, and identity. This includes aspects such as land use, industrial character, built form, landscape setting, and connectivity. These elements provide the basis for comparing the current (2025) environment with that described in the approved project's EIS (2011). Between 2011 and 2025, the key 'design and place' elements for Port Kembla's Outer Harbour have remained broadly stable. Land use zoning continues to prioritise port, industrial, and maritime functions, and the area retains its heavy industrial character, dominated by steelmaking, bulk cargo handling, and energy-related activities. The built form, comprising large-scale infrastructure such as berths, breakwaters, hardstand areas, grain silos, the coal terminal, and the 198 m smokestack, remains visually prominent and functionally similar to 2011. Connectivity via road and rail networks has been maintained, with only incremental operational improvements rather than major reconfigurations. The surrounding coastal landscape, escarpment backdrop, and adjacent open space areas have also experienced little change, aside from minor vegetation clearance and small-scale operational upgrades within the port precinct. The site's visual envelope is typical of an active port environment, with the Outer Harbour development occupying the southeastern portion of the harbour. This industrial and commercial landscape contrasts sharply with the natural surroundings of open water, sandy beaches, riparian vegetation, and the Illawarra Escarpment, which provides a striking natural backdrop. The Outer Harbour remains visible from coastal vantage points to the north and south, including Wollongong beaches and elevated lookouts such as Mt	• From a design and place perspective, the overall character and function of Port Kembla's Outer Harbour have changed little since 2011. The port remains a mainly industrial and commercial zone, with large-scale infrastructure and operations broadly consistent with those described in the approved project's EIS. • The surrounding areas are still characterised by natural landscapes, coastal views, and established residential neighbourhoods. • The most notable change since 2011 has been continued housing development in nearby suburbs, contributing to increased population density; however, this has not altered the industrial character or functional role of the port precinct.

Category	Summary of change in the existing environment since 2011	Discussion
	Keira, Mt Bulli, and Hill 60, consistent with the views and visual relationships described in the approved project's EIS.	
Economic impacts	Between 2011 and 2025, the socioeconomic role of Port Kembla's Outer Harbour within the Illawarra region has remained significant and largely consistent, with some changes in scale and focus reflecting broader economic trends. Manufacturing continues to be the region's largest economic driver, and Port Kembla remains a critical enabler of this sector. The wider Port Kembla industrial area, supported by the harbour's infrastructure, is the largest of its kind in the southern hemisphere. The port has maintained its position as a major gateway for imports and exports, particularly as one of Australia's leading vehicle-import terminals and a key grain export hub. Current estimates indicate that port operations contribute around $760 million annually to the economy, providing direct and indirect employment and sustaining trade-dependent industries across the Illawarra and beyond. While the port's industrial base and trade profile have remained stable since 2011, incremental changes in global trade patterns, population growth, and regional infrastructure have modestly increased throughput and reinforced the Outer Harbour's role as a cornerstone of the regional economy. The harbour continues to support significant local employment opportunities, both directly within port operations and indirectly through associated logistics, manufacturing, and service sectors.	• Since 2011, only limited changes have occurred in the local economic profile. Manufacturing remains the largest economic driver in the Illawarra, and the area surrounding the site continues to operate as a busy industrial and commercial zone. • Population growth has been moderate. Wollongong's population increased from 192,418 in 2011 to 214,564 in 2021 (ABS, 2011; ABS, 2021). • Economic output has expanded. The Gross Regional Product (GRP) for Wollongong rose from $14.7 billion in 2011 to $17.6 billion in 2024 (.id, 2024).
Flood risk	Since 2011, the Outer Harbour's flood risk profile has remained broadly consistent with that assessed in the approved project's EIS. The harbour continues to receive flows from two main industrial catchments, Salty Creek and Darcy Road Drain, together with stormwater runoff and licensed industrial discharges. Adjacent land uses remain mainly heavy industrial, with some commercial and residential properties located to the southwest along Wentworth Road and west of Five Islands Road. Salty Creek was extensively modified prior to 2011 to maximise land use, drainage capacity, through-flow, and flood protection, and no major reconfigurations have occurred since. As a result, the fundamental flood pathways and protection measures remain similar to those previously assessed. Any differences in projected flood risk are primarily linked to updated climate modelling, which indicates potential increases in rainfall intensity over the project's design life. Further technical detail on the existing flood environment, hydrological characteristics, and updated flood modelling is provided in Appendix H.	• The extent, nature, and overall behaviour of flooding within the Outer Harbour has not changed substantially since 2010 conditions, with catchment configurations, drainage infrastructure, and land use remaining largely the same. • The most notable change relates to updated climate projections, which indicate potential increases in flood depths over the project's design life due to sea-level rise and higher rainfall intensities. Further detail is provided in Appendix H.
Heritage - Aboriginal	The Illawarra region has a long history of occupation and utilisation by First Nations groups, namely the Wodi Wodi and wider Dharawal peoples. Archaeological evidence suggests that Aboriginal people arrived in this region around 20,000 years prior to European colonisation. Previous archaeological investigations and AHIMS data indicate a widespread and enduring connection between Aboriginal people and the	• No substantive changes have occurred to the Aboriginal heritage context of the Outer Harbour since 2011, with the existing environment and heritage sensitivities remaining

Category	Summary of change in the existing environment since 2011	Discussion
	Illawarra region, with many Aboriginal sites distributed across the coastline. However, the study area is considered 'Disturbed Terrain', meaning that it has been substantially altered by human activity, reducing the potential for Aboriginal objects to be found. Since 2011, there has been no substantive change in the Aboriginal heritage context for the Outer Harbour. The study area remains classified as 'Disturbed Terrain', having been substantially altered by historical and ongoing industrial activity. As a result, the potential for Aboriginal objects to be present is considered low, consistent with the findings of the approved project's EIS. No new recorded Aboriginal sites have been identified within the Outer Harbour footprint during this period. Further detail on the Aboriginal Heritage technical assessment is provided in Appendix J.	consistent with those described in the approved project's EIS. • The potential for new Aboriginal sites, objects, or areas of archaeological potential to be identified remains low, due to the ongoing and historical disturbance of terrain within the study area.
Heritage – Environmental	Port Kembla has a long, rich history of development, and has been (and remains as) a key industrial area of the City of Wollongong and the wider Illawarra region. The Outer Harbour development began in the late 1800s, driven by the Mount Kembla Coal and Oil Company, which built a private jetty and rail link. The Port Kembla Harbour Act of 1898 formally established the area as a port, allocating funds for breakwater construction, which was completed by 1937. Since then, extensive development (including the construction of jetties) has taken place to support the increasing demand of the region. Since 2011, there has been no substantive change in the non-Aboriginal heritage context of the Outer Harbour. The key heritage elements, such as the historic breakwaters, jetties, and port infrastructure, remain in place and continue to function within the operational port environment. No new heritage listings or identified items of non-Aboriginal heritage significance have been recorded within the Outer Harbour footprint during this period. Further detail on the non-Aboriginal heritage technical assessment is provided in Appendix K.	• No substantive changes have been noted to non-Aboriginal heritage items or values within the Outer Harbour since 2011, with the existing environment remaining consistent with the approved project's EIS. • No additional heritage sites or objects have been identified within the study area during this period.
Noise and vibration	Port Kembla is a busy industrial hub in relative proximity to urban, residential, and commercial areas. The development site and its immediate surrounds are dominated by manufacturing, construction, trade, and transport facilities, with regular noise generated by ongoing port operations, ship movements, cargo handling, rail activity, and heavy vehicle traffic. The nearby train station and railway line also contribute to the existing noise environment. Sensitive receivers, representative of nearby residential populations, are located at least 500 m from the modified site's boundary. In 2011, the approved project's EIS and associated technical studies established the baseline noise and vibration environment for the Outer Harbour. Ambient noise at that time was dominated by industrial activity and transport sources, with modelling confirming that predicted operational levels would comply	• Although there has been an increase in population and residential housing across Port Kembla since 2011, this growth has occurred in areas further away from the Outer Harbour. No significant housing development has taken place closer to the site than what existed at the time of the approved project's EIS, meaning no new sensitive receivers have been introduced within 500 metres of the proposed modification. As a result, the noise and vibration impacts, dominant sources, and required mitigation measures remain consistent with those previously assessed.

Category	Summary of change in the existing environment since 2011	Discussion
	with relevant criteria at identified sensitive receivers. Vibration from both construction and operations was not expected to cause exceedances or structural impacts. By 2025, the overall noise and vibration profile of the Outer Harbour remains consistent with the 2011 baseline. Recent environmental assessments, including the Port Kembla Gas Terminal EIS, Appendix L: Noise and Vibration (Squadron Energy, 2018; updated 2020) and the Port Kembla Gas Terminal Modification 1 Noise and Vibration Assessment (GHD, 2019), recorded ambient noise levels dominated by port operations, transport activity, and surrounding industrial uses, mirroring the dominant sources identified in 2011. These studies confirm no significant changes in source characteristics and no exceedances of applicable criteria. Long-term monitoring and updated modelling undertaken for the above assessments indicate that ambient noise levels remain within management levels for sensitive receivers, and no new exceedances have been recorded since the original EIS. Vibration from construction and operational activities continues to remain within acceptable limits, with mitigation measures such as equipment maintenance, use of silencers, and operational scheduling applied where necessary. Overall, there have been no substantive changes to the nature, extent, or dominant sources of noise and vibration in the Outer Harbour since 2011. The combination of substantial separation distances to sensitive receivers and the enduring industrial character of the area continues to limit the potential for significant noise or vibration impacts.	
Transport and traffic	*Road* | The Southern Freeway and Illawarra Rail Line remain the principal north–south freight and passenger corridors between Sydney and Wollongong. Picton Road and Appin Road continue to provide important east–west connections and have potential for further freight capacity and efficiency improvements, linking the Outer Harbour to the Sydney metropolitan area and other regional destinations. Primary road access to the Outer Harbour is via Five Islands Road, which connects to Flinders Street and Old Port Road, then via Christy Drive and Foreshore Road directly to port facilities. Adjacent local roads are designed for industrial access, with wide lanes, limited parking, few intersections, and good visibility. Since 2011, traffic volumes on the roads immediately surrounding the Outer Harbour have generally reduced, reflecting decreased operational activity at the Outer Harbour jetties. As a result, adjacent local roads are now used primarily for industrial traffic associated with other port operations, and for some recreational visits to the foreshore area, rather than heavy, continuous freight flows. A key operational consideration remains the at-grade rail crossing on Old Port Road, along with additional crossings on Foreshore Road. These crossings are still in place, though the rail spur to No. 3 Jetty is not currently operational.	• No major changes to transport or traffic have occurred since 2011 that would adversely impact the proposed modification. The dominant freight and access routes for the Outer Harbour remain the Southern Freeway, Picton Road, Appin Road, Five Islands Road, and Foreshore Road, with local industrial roads continuing to provide direct access to port facilities. Traffic volumes on the roads immediately surrounding the Outer Harbour have generally reduced due to lower activity at the Outer Harbour jetties, while the separation distance to sensitive receptors remains unchanged. New road links and temporary construction access have been added to Darcy Road, Christy Drive, and Foreshore Road, improving connectivity for the project. • Rail connections remain in place via the Illawarra Line and the Moss Vale–Unanderra freight route, with no increase in

Category	Summary of change in the existing environment since 2011	Discussion
	Rail | The Illawarra Rail Line continues to serve as the main north–south rail connection between Sydney and Wollongong, supporting both freight and passenger services. The Moss Vale–Unanderra line remains an important inland freight route, moving bulk commodities such as coal, grain, and steel to and from the port. Since 2011, rail freight movements directly serving the Outer Harbour have reduced due to lower activity at the Outer Harbour jetties. However, rail traffic to other parts of Port Kembla has remained steady**,** with efficiency gains from upgrades such as the Mount Murray crossing-loop extension, allowing longer trains and more reliable scheduling. The South-West Illawarra Rail Link (SWIRL) continues to be investigated as a long-term infrastructure project to improve freight capacity between Port Kembla and Western Sydney, but no major new rail alignments have been built since 2011. *Shipping* | Port Kembla Outer Harbour remains part of a major state and national gateway for bulk and RoRo (roll-on/roll-off) trades. In 2011, the port handled around 1,000 vessel visits and 33.6 million revenue tonnes of cargo, with major trades in coal, iron ore, grain, and motor vehicles. By 2025, the port continues to be NSW's largest motor-vehicle import hub and a key grain export facility, with FY25 YTD RoRo imports of around 374,000 units and strong dry-bulk volumes. However, shipping activity at the Outer Harbour jetties has reduced compared with 2011, largely due to changes in operational demand and shipping patterns, while activity in other parts of the port precinct remains strong. The overall mix of trades remains broadly similar, with fluctuations in volumes reflecting market conditions rather than fundamental changes in port role.	rail movements directly serving the Outer Harbour since 2011. Capacity improvements, such as the Mount Murray crossing-loop extension, have enhanced overall network efficiency, but the rail spur to No. 3 Jetty remains non-operational. • Shipping activity in the Outer Harbour has reduced compared with 2011 levels, largely due to changes in operational demand, while other parts of Port Kembla continue to handle high volumes of bulk and RoRo trades. The port retains its role as NSW's largest motor-vehicle import hub and a key grain export facility.
Waste and utilities	The existing state of waste and utility services at Port Kembla reflects its industrial character and port-related operations. The precinct is dominated by heavy industry, with a high proportion of impervious surfaces and formal drainage systems that channel runoff into two main catchments, Salty Creek and Darcy Road Drain. These catchments receive both stormwater and licensed industrial discharges. Current port activities, including the handling and movement of dry bulk and bulk liquids, do not generate large volumes of waste. General solid waste that is produced is managed under established Waste Management Plans, ensuring segregation, reuse where possible, and compliant off-site disposal. Since 2011, waste management at the Outer Harbour has become more structured and technically advanced through new project approvals and infrastructure upgrades. Notably, the early works for the Port Kembla Gas Terminal involved the removal and safe disposal of hazardous materials, installation of a Chemically Enhanced Dual Media Water Treatment Plant to treat contaminated water (including heavy metals and PFAS) to very low levels, and the implementation of a detailed Waste Management Plan for construction activities (SSI-9471 and SSI-9973). These initiatives reflect a higher level of environmental control and monitoring than at the time of the original EIS.	• Policy update: Prior to modification, the approved project considered the NSW Waste and Resource Recovery Strategy 2007, which is now outdated. More recent strategic documents guiding waste management include the *Wollongong Waste and Resource Recovery Strategy 2024–2034* and the *NSW Waste and Sustainable Materials Strategy 2041*. • Operational changes since 2011: Waste management in the Outer Harbour has advanced through updated planning frameworks, project-specific Waste Management Plans, and improved operational controls for general solid waste handling. • Infrastructure upgrades: Recent developments, such as the Port Kembla Gas Terminal works, have included the safe removal and disposal of hazardous materials and the installation of a Chemically Enhanced Dual Media Water

Category	Summary of change in the existing environment since 2011	Discussion
	Utility services, including potable and recycled water, continue to be supplied by Sydney Water through infrastructure managed in coordination with NSW Ports. Capacity assessments undertaken in 2023 confirmed that existing networks can adequately service the Outer Harbour's Southern Area, including industrial land and port facilities, without major augmentation. Overall, while the fundamental waste and utility framework in the Outer Harbour has remained consistent since 2011, the period to 2025 has seen incremental improvements in waste treatment capability, hazardous material handling, and water quality management systems, maintaining compliance and reducing environmental risk	Treatment Plant to treat contaminated water (including heavy metals and PFAS) to very low levels, representing a higher standard of environmental control than at the time of the original EIS.

Conclusion

Between 2011 and 2025, the existing environmental and social conditions at Port Kembla Outer Harbour have remained broadly consistent with those described in the approved project's EIS, with most factors (areas), such as terrestrial biodiversity, air quality, design and place, flood risk, heritage, and noise/vibration, showing no substantive change. Notable differences include refined climate change projections (NARCliM 2.0) indicating higher-resolution hazard estimates, a reduction in road, rail, and shipping activity directly serving the Outer Harbour jetties, and incremental improvements in waste management and utility infrastructure through updated planning frameworks and advanced treatment systems. These changes do not introduce new impact pathways or materially alter the risk profile but have been reflected in the updated impact assessment to ensure alignment with current operational, environmental, and policy contexts.

7.7.2 Assessment of potential impacts – Stage 1

The following table presents a comparative assessment of potential impacts from the proposed Stage 1 works, comprising dredging, reclamation, and associated land-based activities such as excavation, earthworks, and trenching, against the impacts identified in the approved project's Environmental Impact Statement (EIS, 2011). For each environmental category, the table recaps the 2011 baseline assessment, considers changes in environmental conditions or regulatory context since that time, and evaluates whether Stage 1 is likely to result in materially different construction or operational impacts. Where relevant, recent studies, updated environmental data, and contextual changes (e.g. infrastructure upgrades, population shifts, climate projections) have been used to inform the comparison.

Table 7-15: Other issues potential impacts | Stage 1

Category	Potential construction impacts	Potential operation impacts
Terrestrial biodiversity	There are no material changes in potential construction impacts since the 2011 approved project EIS. The EIS found that terrestrial ecological value in the Outer Harbour precinct was already low due to extensive historic land clearing and industrial development. Impacts were limited to small patches of shrub removal and reclamation affecting marginal habitat near Red Beach and drainage channels	No material change in operational impacts is expected relative to 2011. The EIS predicted possible impacts on nocturnal birds and mammals from lighting, fauna injury risk from traffic, and disturbance from noise and vibration, though these were considered unlikely in the highly modified industrial setting. The modified Stage 1

Category	Potential construction impacts	Potential operation impacts
	(Salty Creek and Darcy Road Drain) potentially used by Green and Golden Bell Frogs, though use was considered unlikely. These waterways lack emergent aquatic vegetation, and their edges have been heavily modified by previous disturbances. Stage 1 reclamation and dredging, along with land-based excavation, earthworks, and trenching, would occur entirely on disturbed ground and would not remove or fragment higher-value terrestrial habitat.	operations are consistent in scale, footprint, and activity type with the approved project, and would not introduce new terrestrial biodiversity pressures.
Air quality	Construction-phase air quality impacts remain consistent with 2011 predictions. The EIS identified short-term localised increases in PM_{10} and NO_2 from vehicle movements, stockpiling, and dredging/construction plant, with exceedances at sensitive receptors unlikely to breach thresholds. Stage 1 activities (dredging, reclamation, and associated land-based works) are similar in scale to those previously assessed, within the same industrial buffer. No new sensitive receptors have been introduced within the impact range since 2011.	Operational air quality impacts will remain consistent with the 2011 EIS, which identified emissions from ship loading/unloading, stockpiling, and vehicle/train movements as the dominant sources. Ambient conditions are still governed by the same industrial and port activities, with no significant change in receptor proximity. The modified Stage 1 operational scope is smaller than full build-out scenarios assessed in 2011, so pollutant generation would be no greater.
Climate change	No material change in construction impacts is expected. This is because the modified Stage 1 activities are similar in scale, location, and method to those assessed in 2011, occur within a robustly engineered port environment, and would be managed using established mitigation practices. Climate change projections were assessed in detail in 2011 and have since been updated (NARCliM 2.0), confirming trends of rising sea levels, higher temperatures, and more intense rainfall. These changes do not alter the type or magnitude of climate-related construction risks for the modified Stage 1, as the works would be of short duration, undertaken within a highly modified and engineered port environment, and supported by existing drainage, flood protection, and operational management systems. The scale and footprint of Stage 1 activities are not sufficient to introduce new or more severe climate-related hazards, and any weather-related risks (such as heavy rainfall or extreme heat) can be managed through standard environmental management procedures already applied to similar port construction works.	No material change in operational impacts is expected. The EIS considered climate adaptation for infrastructure resilience, incorporating finished surface levels, drainage capacity, and structural design standards with allowances for projected sea-level rise, increased rainfall intensity, and storm surges. While updated NARCliM 2.0 projections indicate slightly higher sea-level rise and temperature increases by 2050 to 2100 compared to NARCliM 1.0, these remain within the design tolerances adopted for the approved project. This is because: the approved design already factored in freeboard and drainage capacity to accommodate such increases; the difference between earlier and updated projections is marginal, e.g. sea-level rise projections for 2050 have increased by only approximately 1–2 cm; and the Outer Harbour's sheltered location, enclosed by breakwaters, reduces exposure to extreme wave and surge conditions. The modified Stage 1 operations would not materially increase greenhouse gas emissions above licensed premises thresholds. Additionally, the modified Stage 1 operations would not involve significant changes in throughput or activity type that could materially increase greenhouse gas emissions above the NSW Large Emitters thresholds for licensed premises. This is because the operational profile of Stage 1 remains consistent with the approved project, it will use similar equipment, handling processes, and vessel types, and will not introduce new energy-intensive facilities or continuous high-emission processes. The NSW Guide for Large Emitters sets a threshold of an additional 25,000 tCO_2-e of Scope 1 and Scope 2 emissions per year for modifications. Based on the nature of modified Stage 1 works

Category	Potential construction impacts	Potential operation impacts
		and operational estimates, the expected emissions increase is negligible compared to both the approved project baseline and the current licensed premises emissions profile, and therefore no further greenhouse gas assessment is triggered.
Design and place	Construction impacts remain consistent with the 2011 EIS findings. At that time, the area was characterised by a predominantly industrial land use zoning and function, with heavy industry, large-scale port facilities, and supporting infrastructure dominating the built form. The surrounding areas featured the established natural backdrop of the Illawarra Escarpment, coastal waters, and beaches, interspersed with residential areas set back from the Port. Connectivity was primarily through established industrial access roads and freight rail links, with no high-sensitivity pedestrian or community spaces in immediate proximity to the Outer Harbour. Since 2011, these elements have remained largely unchanged: the land use zoning remains industrial; the port's built-form and architectural character are consistent with large-scale maritime infrastructure; and the landscape setting continues to contrast the industrial foreshore with the natural escarpment backdrop. The modified Stage 1 land-based works, including construction plant, dredging vessels, reclamation works, and temporary traffic increases, would be visually and functionally compatible with this setting, and temporary visual impacts would be consistent with those assessed in 2011.	Operational impacts also remain consistent with 2011. The approved EIS anticipated permanent visual and character changes from new port infrastructure, increased lighting, and a higher vessel presence, all within the existing industrial context. The land use zoning, industrial character, and connectivity patterns have not materially changed since that time, and the landscape setting still presents the same juxtaposition of industrial and natural elements. The modified Stage 1 operational scope is less extensive than the full build-out considered in 2011 and would introduce changes well within the existing industrial visual envelope. Built form additions, operational lighting, and vessel movements would not extend beyond what the existing port precinct already accommodates, and the physical and visual relationship between the port and its surrounding areas would remain unchanged.
Economic impacts	Construction impacts would remain mainly positive and consistent with 2011 findings. The EIS identified significant regional and state economic benefits from Outer Harbour development, including direct and indirect job creation, supply chain stimulus, and increased trade-handling capacity. In 2011, Wollongong's population was 192,418, with a GRP of $14.7 billion; by 2024, this had grown to 214,564 and $17.6 billion (ABS, 2011; ABS, 2021; .id, 2024), reflecting broader economic growth in which the port continues to play a central role. The modified Stage 1 would provide similar benefits proportionate to its reduced scale compared to the full build-out, including construction-related expenditure, regional employment, and local procurement opportunities. No new adverse economic effects are expected, as works would be undertaken within an established industrial precinct with minimal disruption to existing commercial	Operational impacts would remain consistent with 2011 projections but scaled to the capacity of the modified Stage 1. The EIS anticipated substantial contributions to gross regional product and employment from expanded import and export activities. Port Kembla remains the largest industrial area in the Southern Hemisphere and a major manufacturing and trade hub, contributing approximately $760 million annually to the Illawarra economy through vehicle imports, grain exports, and other cargo handling. These benefits remain relevant, with manufacturing still the region's largest economic driver. While operational output for modified Stage 1 would be lower than the ultimate development scenario considered in 2011, the proportionate uplift in trade capacity and the associated long-term economic gains would still be significant, supporting both regional economic resilience and state-level trade competitiveness

Category	Potential construction impacts	Potential operation impacts
	activity. Amenity impacts to surrounding sensitive receivers (including businesses) would likely remain the same as those noted in the original assessment. The proposed modification works would occur in land owned by NSW Ports so no additional land acquisition would be required.	
Flood risk	The approved project's EIS identified that port infrastructure in the Outer Harbour is vulnerable to flooding from Salty Creek and Darcy Road Drain, but that Stage 1 works would not increase flood extent or hazard. Since 2011, updated hydrodynamic modelling (Appendix H) and NARCliM 2.0 climate projections confirm a small increase in extreme flood depths, attributable to sea-level rise and more intense rainfall events. However, these increases are modest, typically in the order of tens of millimetres for extreme events, and do not materially change the predicted hazard categories in the approved project's flood modelling. The original design tolerances accounted for freeboard above the 1% AEP flood level, with allowances for climate change over the asset life, meaning the updated projections still fall within the adopted safety margins. The modified Stage 1 works would apply the same drainage strategy and flood-mitigation principles as the approved project, including set-back development from flow paths, finished surface levels designed to maintain freeboard, and culvert capacity sized for peak flows. Potential refinements, such as an additional culvert to improve upstream flow drainage, could further reduce localised flood ponding and maintain efficient conveyance during extreme events.	The approved project's EIS (Appendix H) modelled the full build-out scenario and found no increase in flood extent or downstream flood hazard, even with the complete reclamation and infrastructure footprint. The modified Stage 1 is a smaller-scale subset of these works, meaning its hydrological and drainage effects are proportionally less than those already assessed. Since 2011, updated flood modelling and climate projections (including NARCliM 2.0 data) indicate small increases in extreme-event flood depths driven by sea-level rise and more intense rainfall. However, these increases are modest and remain within the design tolerances adopted for the approved project. The Stage 1 operational footprint is confined to areas already reclaimed, disturbed, or impervious, with no significant change to catchment boundaries or impervious surface connectivity. Drainage from the industrial catchments (Salty Creek and Darcy Road Drain) would continue to be managed via the existing engineered channels, which discharge into the Outer Harbour. The proposed works would not alter these flow paths or increase peak discharges, meaning no additional downstream flood risk. The Stage 1 operational drainage strategy mirrors that of the approved project, maintaining set-back development from drainage lines, finished surface level controls, and culvert conveyance capacity. Any refinements, such as additional culvert provision to improve upstream flow drainage, would further reduce localised flooding potential. As such, the modified Stage 1 operations would not alter site hydrology, increase impervious surface connectivity, or exacerbate downstream flooding.
Heritage - Aboriginal	No change in Aboriginal heritage impacts is expected compared to 2011. The approved project's EIS and updated Aboriginal Heritage technical assessment (Appendix J) confirm no additional AHIMS sites, Aboriginal objects, or areas of archaeological potential within the Outer Harbour's disturbed industrial footprint. This area has been extensively modified through historic port development, land reclamation, and industrial activities, which has removed or buried natural landforms that could contain intact archaeological deposits. The modified Stage 1 works are entirely contained within this same footprint, meaning there is no	No change in operational impacts is anticipated because both the 2011 EIS and the updated Aboriginal Heritage technical assessment (Appendix J) have confirmed that the Outer Harbour site comprises entirely disturbed industrial terrain with no identified Aboriginal heritage sites, objects, or areas of archaeological potential. This conclusion has been supported by repeated site inspections and historical land use mapping showing long-term modification of the landform through reclamation, infrastructure installation, and heavy industrial activity.

Category	Potential construction impacts	Potential operation impacts
	potential to disturb undisturbed terrain. As a result, the risk profile remains unchanged, and no further Aboriginal consultation is required.	No indirect operational impacts are expected because the modified Stage 1 activities would occur wholly within the existing operational footprint, would not introduce new access points to undisturbed land, and would not involve land use changes that could increase public or construction access to adjacent areas with potential archaeological value. As such, there is no plausible pathway for operational changes to create new physical or indirect heritage impacts.
Heritage – Environmental	Construction-phase heritage impacts remain consistent with the 2011 EIS. That assessment identified nil–low potential for archaeological relics of historical significance within the study area, minor indirect visual impacts to heritage sites located outside the port boundary, and demolition of low-significance structures such as the non-listed No. 3 and No. 4 Jetties. The modified Stage 1 works would occur entirely within the same reclaimed and heavily modified industrial footprint, where previous investigations confirmed no archaeological potential and no physical heritage items of significance. There have been no changes in land use, surrounding landscape setting, or proximity to heritage items since 2011 that would introduce new impact pathways. As such, no new physical or indirect impacts to heritage items are expected, and visual relationships between the works area and offsite heritage places would remain unchanged.	Operational impacts remain consistent with the 2011 findings. No new heritage items or values have been identified in or around the Outer Harbour since the approved project's EIS. The surrounding environment remains dominated by large-scale industrial infrastructure, port operations, and associated transport corridors, which continue to define the visual and functional character of the area. The modified Stage 1 operations would take place entirely within this established setting and would not introduce additional vertical structures, lighting, or activity types that could alter the visibility, setting, or appreciation of heritage places in the wider area. The separation distance to known heritage items remains unchanged, and there are no new indirect pathways, such as increased public access, changes to land use, or modification of adjacent undisturbed land, that could affect their cultural significance. Given this unchanged context and the absence of newly identified heritage constraints, operational heritage impacts are assessed as being the same as those outlined in 2011.
Noise and vibration	The approved project EIS assessed dredging, reclamation, and associated land-based works against relevant day, evening, and night noise criteria at the nearest sensitive receivers, located approximately 500 m from the site boundary, and found that predicted noise and vibration levels would comply with applicable limits. Since 2011, no new sensitive receivers have been introduced within this buffer. The modified Stage 1 works involve the same activity types (dredging, reclamation, excavation, earthworks, trenching) in the same locations, with comparable construction plant and work methods. This means that key acoustic factors, propagation distances, shielding effects from existing terrain and infrastructure, and the absence of direct line-of-sight to receptors, remain unchanged. Dredging activities may be conducted at all times in accordance with the noise limits specified in condition C6. For vibration, the 2011 EIS determined that the safe working distances to avoid cosmetic damage or human discomfort would be comfortably achieved for all	The EIS identified port operations, particularly vessel loading/unloading, on-site machinery, and associated road and rail freight movements, as the dominant contributors to the Outer Harbour's ambient noise environment, with predicted compliance at the nearest sensitive receivers. This prediction was supported by detailed noise modelling and receptor mapping in 2011. Since then, more recent environmental assessments for nearby port projects, such as the Port Kembla Gas Terminal EIS Appendix L: Noise and Vibration (Squadron Energy, 2018; updated 2020) and the Port Kembla Gas Terminal Modification 1 Noise and Vibration Assessment (GHD, 2019), have confirmed that measured ambient noise levels remain consistent with those documented in 2011, continuing to be dominated by industrial and transport sources. These assessments also confirmed ongoing compliance at the same sensitive receptor locations identified in the approved project EIS, with no new exceedances recorded.

Category	Potential construction impacts	Potential operation impacts
	receptors, given the separation between heavy plant and any buildings or sensitive uses. The modified Stage 1 works would maintain these separation distances and use similar plant, meaning vibration impacts remain well within acceptable limits. Because the scale, duration, and intensity of works are not increased relative to the approved project, the underlying noise and vibration modelling assumptions from 2011 remain valid. On this basis, construction noise and vibration levels are expected to remain within the same compliance range as modelled in the EIS, without introducing new exceedances or sensitive receiver impacts.	The modified Stage 1 operational profile, comprising container handling, vessel berthing, and associated freight movements, would be of a similar type and scale to activities assessed in 2011. It would not introduce new dominant sources, alter propagation pathways, or significantly increase operational throughput beyond that modelled in the approved project. Given the absence of new sensitive receivers and the stability of the noise environment, operational noise and vibration levels are expected to remain within the originally assessed range, maintaining compliance with relevant day, evening, and night-time criteria.
Transport and traffic	*Road and traffic:* Construction transport impacts remain consistent with those assessed in 2011. The approved project EIS identified the main road access to the Outer Harbour as via Five Islands Road, connecting to Flinders Street and Old Port Road, then via Christy Drive and Foreshore Road to port facilities. These primary routes remain unchanged in alignment and function. Since 2011, minor upgrades and new links, including improvements to Darcy Road, Christy Drive, and Foreshore Road, have enhanced industrial access and construction vehicle connectivity, improving intersection capacity and heavy vehicle turning movements. The surrounding road network continues to be designed for high volumes of freight traffic, with wide lanes, limited parking, and good visibility. Construction-phase traffic impacts are expected to remain within previously modelled limits because the scale, duration, and type of construction vehicle movements for the modified Stage 1 are comparable to those modelled in the approved project EIS; the same access routes remain in use with no loss of capacity; upgrades have slightly improved flow and manoeuvrability for heavy vehicles. *Rail:* Connections to the Outer Harbour remain available but underutilised. The EIS identified the Illawarra Rail Line as the primary freight rail corridor, with spur lines to specific jetties. The spur to No. 3 Jetty remains non-operational, and no new rail alignments or crossings have been introduced. Construction materials for Stage 1 are not expected to rely on rail, meaning no change in construction rail traffic relative to 2011. *Shipping:* Access for construction remains consistent with 2011 arrangements. The Outer Harbour jetties and berths are available for receiving dredging plant, reclamation materials, or prefabricated components. Construction vessel numbers	Operational transport impacts remain consistent with those assessed in 2011. The main road, rail, and shipping corridors serving the Outer Harbour are largely unchanged, with the Southern Freeway and Illawarra Rail Line continuing as the principal north–south freight and passenger routes, and Picton Road and Appin Road providing key east–west connections to regional and metropolitan markets. Since 2011, baseline operational traffic volumes in the Outer Harbour have reduced due to lower jetty utilisation and changes in commodity handling patterns, meaning current traffic levels are generally below those used in the 2011 modelling scenarios. For *road transport*, the additional freight movements generated by the modified Stage 1 would occur against this lower baseline and within the network capacity previously assessed, avoiding capacity constraints or material changes to network performance. For *rail transport*, the spur line infrastructure remains in place but freight movements into the Outer Harbour are infrequent, reflecting reduced jetty use. The modified Stage 1 would not require capacity beyond that assessed in 2011, and any increase in rail freight could be accommodated within existing line capacity without operational impacts. For *shipping,* berth configurations and navigational access remain unchanged. While the modified Stage 1 operations would increase vessel calls relative to current levels, throughput would remain within the capacity and environmental envelope assessed in the approved project EIS. Port Kembla continues to operate under established vessel traffic management and pilotage arrangements, which were deemed adequate in 2011 and remain so today. Given the stability of the regional transport network, the absence of new physical constraints, and the fact that operational volumes would be within previously assessed

Category	Potential construction impacts	Potential operation impacts
	would be comparable with the original Stage 1 estimates, with no change in navigational risk or maritime traffic management requirements.	thresholds, the transport impacts of the modified Stage 1 would remain consistent with the approved project EIS.
Waste and utilities	Construction waste and utility impacts remain consistent with those assessed in 2011. The approved project EIS anticipated waste streams from demolition, dredging, reclamation, excavation, and earthworks, including vegetation, concrete, steel, soft sediments, and general construction refuse. These waste types remain relevant to the modified Stage 1 works, which involve the same activity types within the same industrial footprint. Since 2011, waste management policy and practice have advanced, with the NSW Waste and Sustainable Materials Strategy 2041 and the Wollongong Waste and Resource Recovery Strategy 2024–2034 providing updated frameworks for resource recovery, recycling targets, and regulated disposal pathways. The port's existing Waste Management Plans will be updated to reflect these frameworks, ensuring construction waste is minimised, segregated, and disposed of lawfully. Utility provision for the Outer Harbour, including water, sewer, stormwater, power, and communications, remains adequate for the scale of Stage 1 works, supported by the existing industrial service network and drainage systems discharging to Salty Creek and Darcy Road Drain. No new utility corridors or capacity upgrades are required for construction.	Operational waste and utility impacts also remain consistent with those assessed in 2011. Port functions in the Outer Harbour are unchanged, and the handling of dry bulk and bulk liquid cargoes generates limited operational waste, with most arising from routine maintenance, packaging, and office activities. The volumes associated with the modified Stage 1 works would be comparable to those modelled in the EIS and would continue to be managed through established Waste Management Plans and the port's licensed industrial services. Since 2011, improvements in waste segregation, recycling, and contractor management have further reduced the risk of non-compliance. Utility demands during operation would be met within the existing service capacity, with no additional infrastructure or resource draw expected beyond that already approved.

Conclusion

The comparative assessment confirms that the potential environmental impacts of the modified Stage 1 works remain consistent with those identified in the approved project's 2011 EIS, both in type and magnitude. Across all environmental categories, the assessment finds that:

- No new sensitive environmental, social, or heritage receptors have been introduced within or near the Outer Harbour footprint that would alter the impact profile
- Baseline environmental conditions for noise, vibration, air quality, climate risks, and hydrology remain within the ranges predicted in 2011. Where changes have occurred (e.g. minor increases in extreme flood depths under NARCliM 2.0), these remain within the original design tolerances and do not alter hazard classifications or require new mitigation
- Key infrastructure and access arrangements (road, rail, shipping) remain substantially unchanged, with localised upgrades improving connectivity and capacity. Lower baseline operational traffic and reduced jetty utilisation since 2011 provide additional capacity headroom for both construction and operations

- Operational activity under the modified Stage 1 is smaller in scale than the full build-out assessed in 2011, meaning throughput, vessel calls, freight volumes, and associated emissions or waste generation will be within previously assessed and approved parameters
- Policy and regulatory updates, such as newer waste and resource recovery strategies and updated climate change projections, have been incorporated into the revised assessment and confirm that impacts remain manageable under existing or already-planned mitigation frameworks
- Safe working distances for construction vibration remain comfortably achieved, with plant separation from sensitive receptors consistent with 2011 modelling and no new structures introduced within potential impact zones.

In summary, modified Stage 1 works would be delivered within the same industrial footprint, using similar methods, equipment, and operating conditions to those assessed in 2011, and against a background environment that has remained stable or improved in terms of available capacity and resilience. Any updates to baseline data, policy frameworks, or local conditions do not materially change the impact profile. Potential impacts are therefore considered proportionate, compliant with relevant criteria, and capable of being effectively managed through the same mitigation measures, environmental management plans, and monitoring frameworks identified in the approved project EIS.

7.7.3 Assessment of potential impacts – Concept

The following table presents a comparative assessment of potential impacts from the Concept Plan as modified, encompassing Stage 2 and Stage 3 of the approved Outer Harbour development. It builds on the outcomes of the approved project EIS, considering changes in project scope, environmental context, and regulatory requirements since that time.

For each environmental category, the table summarises:

- The potential construction impacts anticipated for both stages, based on current design information
- The potential operational impacts once these stages are commissioned.

Where assumptions have been made, these are explicitly stated and justified. These assumptions reflect the current level of design definition for Stages 2 and 3, the established industrial setting of Port Kembla, and the outcomes of relevant studies undertaken for the approved project. In many cases, the conclusions rely on the premise that the scope, methods, equipment types, and environmental management measures will remain consistent with those applied in Stage 1.

Given that detailed design, staging plans, and operational profiles for Stage 2 and Stage 3 are not yet finalised, this approach provides a precautionary but proportionate means of determining whether impacts are likely to materially differ from those assessed in the approved EIS. It ensures consistency with the previously endorsed environmental envelope, while recognising that some refinements, such as updated modelling or targeted impact studies, would be required at future approval stages to confirm these findings once more detailed information becomes available.

Table 7-16: Other issues potential impacts | Concept (Stage 2 and Stage 3)

Category	Potential construction impacts	Potential operation impacts
Terrestrial biodiversity	Construction would occur in an already heavily modified industrial environment with very low terrestrial ecological value, as noted above. Additional impacts are expected to be negligible because: works are largely on reclaimed or previously disturbed land; no new areas of remnant native vegetation are proposed to be cleared; and no threatened ecological communities occur within the footprint. This conclusion assumes that any construction activities including access roads, laydowns, and stockpile areas for Stage 2 and Stage 3 would remain within the Stage 1 disturbance footprint. Previously identified potential issues (e.g. temporary vegetation removal, disturbance of Green and Golden Bell Frog habitat during Stage 1 road/rail extension) are unlikely to recur at scale, as main infrastructure would already be in place. Potential impacts from construction, such as vehicle collisions, may arise during the expansion of road and rail links in Stage 2, particularly near foraging areas like the southern end of the eastern breakwater and the rail corridors. To minimise risks, mitigation strategies, including the installation of frog exclusion fencing around work areas will be implemented in accordance with the mitigation and management proposed under the approved project EIS.	Similar to Stage 1, operational activities in Stage 2 and Stage 3 are not expected to introduce new terrestrial biodiversity impacts beyond those already approved, as the operational footprint and activity types would remain within the previously assessed disturbance envelope and occur in an environment already subject to continuous industrial port operations. Artificial lighting and operational noise/vibration levels would be comparable to Stage 1 and the current operational environment, as the type, intensity, and design of lighting and operational equipment would be consistent across stages and occur within an industrial setting already subject to continuous illumination and noise, meaning negligible additional deterrent effects on nocturnal fauna. This assumes that the design and operational protocols would be consistent across all stages, with ongoing risks such as fauna vehicle strike managed under the same measures as Stage 1.
Air quality	Construction emissions for Stages 2 and 3 would be of similar nature to Stage 1, temporary and localised This is because the construction methods, equipment types, and activity locations for Stages 2 and 3 are expected to be consistent with those used in Stage 1, meaning emission rates and dispersion characteristics would be broadly similar, with differences limited to the overall duration of works rather than the scale or intensity of individual emission sources. Short-term increases in dust, particulates (PM_{10}, $PM_{2.5}$), NO_x, CO, and odour from construction activities and vessel/vehicle movements would occur. This assumes that the no significant change in emission rates per activity compared with Stage 1, but the total construction period is extended. There is no expectation that concentrations would exceed NEPM criteria at sensitive receptors given existing industrial baseline and distance buffers, as per Stage 1 findings.	Operational air emissions (ships, cargo handling, heavy vehicles) would scale with increased throughput from Stage 2 and Stage 3 but remain within the character of activities assessed in the approved EIS, as the types of vessels, cargo handling equipment, and heavy vehicle operations are predicted to be consistent with those already approved and operating in Stage 1. This means the emission profiles, fuel standards, and control measures would be the same, with increases arising only from higher activity volumes rather than new or more intensive emission sources. This assumes that the proportion of low-sulfur fuel use and vessel emission controls would match current regulatory requirements. Incremental increases in NO_2 and PM_{10} are expected to remain below criteria at sensitive receptors, as indicated in Stage 1 dispersion modelling, which showed concentrations well within NEPM limits, and confirmed by the substantial separation distances between operational sources and sensitive land uses (typically several hundred metres or more). These buffers, together with prevailing meteorological conditions that promote dispersion, would ensure that additional throughput in Stages 2 and 3 would not result in exceedances of relevant air quality criteria or introduce new impact pathways.

Category	Potential construction impacts	Potential operation impacts
Climate change	Climate change risks to construction in Stage 2 and Stage 3 mirror those identified for Stage 1 but would extend over a longer build program, increasing the probability of exposure to extreme weather events such as heatwaves, storms, and flooding. While the works are anticipated to occur in the future, when NARCliM projections indicate a greater frequency and severity of these extremes, the duration of construction remains relatively short in the context of climate change timescales. This limits the cumulative effect of climate hazards, particularly as adaptive construction methods and scheduling, such as adjusting work hours during high-heat periods, storm contingency planning, and equipment/weatherproofing, would be applied consistently across all stages. Greenhouse gas emissions from construction plant, materials transport, and dredging would be proportionally higher than Stage 1 due to the larger scope of works but are expected to remain well below thresholds for classification as a major GHG facility. This expectation is based on Stage 1 intensity factors and the similarity in construction method, equipment type, and material sources. Quantification of GHG emissions for Stage 2 and Stage 3 has not been undertaken at this stage because detailed construction programming, equipment schedules, and sourcing information are not yet available. Without this level of detail, any estimates would be speculative and risk overstating or understating the actual profile. Instead, the assessment relies on Stage 1 verified emissions intensity data, applied proportionally to the additional scope, as a reasonable proxy for determining that the modification would not result in material changes to the climate change or GHG profile assessed in the approved EIS.	Operational infrastructure from Stage 2 and Stage 3 would face the same climate hazards identified in the approved project EIS, including sea level rise, storm surge, extreme wind, and high temperatures. Under the full build-out, the long-term nature of these assets means that mid to late-century climate change projections would have the greatest influence on operational risk. While works for Stage 2 and Stage 3 are likely to occur when NARCliM projections indicate more severe and frequent climate extremes, the absence of detailed final design specifications, operational profiles, and asset layouts at this stage prevents an accurate, quantitative assessment of the full-lifecycle climate impact. Instead, it is assumed that the new assets would be designed and constructed to the same climate resilience standards as Stage 1, incorporating allowances for projected conditions to 2070, including freeboard for sea level rise, structural wind load capacity, and heat-tolerant materials. This approach would ensure that operational climate change risks are not materially greater than those already assessed for the approved Concept Plan. Operational GHG emissions would also scale with increased throughput from Stage 2 and Stage 3 but are expected to remain within the bounds assessed in the approved project EIS. This is because the types of vessels, cargo handling equipment, and heavy vehicle operations are anticipated to be consistent with Stage 1, meaning that the emission factors, fuel standards (including low-sulfur fuels), and operational controls would be the same, with any increases attributable only to activity volume rather than more intensive or higher-emission processes. At present, insufficient operational detail, such as vessel schedules, equipment utilisation rates, and modal split for cargo movements, is available to produce a robust GHG inventory for the modified Concept. In the absence of these data, the Stage 1 verified emission intensity values provide the best available proxy for estimating proportional increases and confirming that operational GHG emissions from Stage 2 and Stage 3 would not materially exceed the levels anticipated in the approved project EIS.
Design and place	Given the established industrial port context, visual and amenity impacts from Stage 2 and Stage 3 construction would be consistent with Stage 1, temporary, localised, and largely screened by existing infrastructure, because the construction footprint and equipment types would be similar to those already present and operating within the port, and the surrounding built form, such as large terminal buildings, cranes, and storage facilities, provides physical screening and visual context that minimises the contrast	In operation, the visual changes from Stages 2 and 3 would be incremental to those in Stage 1, with no fundamentally new view obstruction or landscape alteration, because the additional infrastructure (e.g. berths, cranes, lighting) would match the character, height, and functional appearance of facilities already in place. The existing port skyline and industrial backdrop mean that new operational elements would blend into the established setting rather than redefine it. Overall, the design

Category	Potential construction impacts	Potential operation impacts
	between new works and the existing landscape. This assumes that the construction equipment and laydown areas would be within established industrial zones and avoid public viewpoints where practicable. Temporary impacts from lighting, stockpiles, and machinery would continue but would not introduce new visual elements of a different character from Stage 1.	and place outcomes would not materially alter the visual character or amenity of the port or its surrounds beyond what was assessed and approved in Stage 1.
Economic impacts	Construction would generate positive economic effects consistent with Stage 1, job creation, regional procurement, and indirect economic stimulus, but over a longer period. This assumes that the peak workforce demand would be staggered between stages, avoiding major displacement or supply bottlenecks. No significant negative effects on existing businesses or property access would be anticipated otherwise managed, as staging would allow operational continuity.	In operation under Stage 2 and Stage 3, the modification would increase throughput capacity and operational efficiency, enhancing the port's role as a strategic trade gateway. No adverse economic displacement effects are anticipated, as land use would remain consistent with industrial port zoning. This means there are no competing non-port land uses, such as residential or retail, within the footprint that could be displaced. Adjacent land uses are already industrial and port-related, meaning the modification would complement rather than conflict with surrounding activities. Overall, the operational phase is expected to deliver net economic benefits, including job creation, increased Gross Regional Product, and strengthened import/export capability, consistent with the economic outcomes assessed in the approved EIS. This is because the additional berths, terminal capacity, and supporting infrastructure delivered in Stage 2 and Stage 3 would enable higher volumes of cargo handling and more efficient vessel turnaround, directly supporting trade growth, supply chain resilience, and associated service industries in the region.
Flood risk	Flood behaviour modelling indicates the Stage 2 and Stage 3 works would not cause measurable changes in flood extents, depths, or velocities beyond those assessed in the approved project EIS, because the proposed works would maintain the same finished surface levels, drainage pathways, and watercourse connectivity as the approved Concept, meaning they would not introduce new obstructions or alterations to floodplain storage or conveyance capacity. This assumes that the drainage design would incorporate any additional culvert capacity required for upstream flows, using the same method as Stage 1. Construction flood risks, such as delays to works or disruption to site access, would be the same as for Stage 1, but because Stage 2 and Stage 3 would take longer to build, there is a greater chance that a flood event could occur during the works.	Operational flood risk remains consistent with the outcomes assessed in the approved project EIS because the new infrastructure in Stage 2 and Stage 3 would be constructed to the same design standards as Stage 1, including elevation above the adopted flood planning level with allowances for climate change impacts such as sea level rise and more intense rainfall events. These design measures, combined with the site's existing drainage network and protective structures, mean there is no additional risk of operational disruption beyond that already identified for Stage 1. This conclusion assumes that flood management infrastructure, such as culverts, drainage channels, and pump systems, would be maintained in good working order and that operational flood procedures, including emergency response plans, would continue to be implemented effectively.
Heritage – Aboriginal	No Aboriginal heritage sites or objects identified within Stage 2 and Stage 3 footprints. This assumes that the works remain within surveyed and assessed areas from Stage 1 and approved project EIS, and no new areas would be disturbed.	No operational impacts anticipated, as no Aboriginal heritage sites are present in operational areas and land use remains industrial port.

Category	Potential construction impacts	Potential operation impacts
Heritage – Environmental	The Stage 2 and Stage 3 works areas have nil–low potential for historical archaeological remains, as confirmed by Stage 1 and EIS assessments. Minor indirect visual impacts to nearby heritage items may occur during construction from cranes or lighting, but these would be transient. This assumes that the no direct impacts to listed items, and any demolition is confined to non-listed, low-significance structures.	No operational heritage impacts expected, as built form changes would remain within industrial context and outside significant heritage view corridors.
Noise and vibration	Construction noise and vibration for Stage 2 and Stage 3 would be of similar source, magnitude, and receptor context to Stage 1 because the types of plant, equipment, and construction methods (e.g. piling, dredging, earthworks, pavement construction) would be the same, and the works would occur within the same general footprint and distance from sensitive receivers. This means that the propagation pathways, shielding effects from intervening structures, and the prevailing background noise environment are expected to remain unchanged. Sensitive receiver locations, mainly industrial and commercial premises, with a small number of residential receptors at greater distances, are not expected to shift or be replaced by more sensitive land uses during the construction period. Although the total construction period would be longer, extending the duration of potential exposure, the peak noise levels from individual activities are not expected to exceed those modelled for Stage 1 because no higher-powered plant or more intensive activities is currently proposed. Compliance with the NSW EPA Interim Construction Noise Guideline (ICNG) limits is expected to continue with the implementation of Stage 1 mitigation measures, including equipment selection, use of temporary noise barriers where required, and scheduling of high-noise activities. For vibration impacts, the dominant sources, impact piling, vibratory compaction, and heavy vehicle movement, would remain consistent with Stage 1, and vibration propagation characteristics in the reclaimed and industrial ground conditions are not anticipated to change. Sensitive structures within the potential vibration influence zone are limited, and distances are such that compliance with DIN 4150-3 structural damage criteria and EPA human comfort criteria is expected with continued adherence to management measures such as monitoring, equipment selection, and avoiding concurrent high-vibration activities in proximity to receptors.	Operational noise and vibration for Stage 2 and Stage 3 would scale with increased terminal activity but remain within the bounds assessed for the full approved concept, because the sources, operating equipment, and layout would be consistent with those already approved and modelled in the EIS. This includes container handling equipment, ship loading/unloading, heavy vehicle movements, and rail operations, all of which were considered in the full build scenario during the original assessment. The increase in throughput would result in a higher frequency of noise events rather than new or more intense noise sources, meaning the overall character and predicted maximum noise levels at sensitive receivers would remain as per the approved modelling envelope. Train horn and shunting noise, particularly during night-time freight movements, could continue to be a potential source of disturbance for the most sensitive receptors. However, these were previously identified in the Stage 1 assessment and found to be manageable within the Noise Policy for Industry (NPfI) criteria through the application of mitigation measures such as rail scheduling adjustments, track lubrication, and ongoing community engagement. For vibration, operational activities such as rail shunting, locomotive idling, and container movement are expected to produce levels consistent with Stage 1, given the same rolling stock, track infrastructure, and operational patterns. The distance to vibration-sensitive receptors and the damping effect of intervening ground conditions means that compliance with relevant human comfort and structural vibration limits (DIN 4150-3, EPA guidelines) is expected, assuming the continuation of Stage 1 monitoring and operational controls.
Transport and traffic	Construction traffic for Stage 2 and Stage 3 would be similar in composition to Stage 1, comprising heavy vehicles for bulk material delivery/removal (e.g. earthworks, pavement materials), light vehicles for workforce transport, and occasional oversize/over mass (OSOM) loads for equipment delivery. Peak traffic periods would be planned to	Operational road traffic would increase in line with higher terminal throughput, primarily through additional heavy vehicle movements for containerised and bulk freight. These increases remain within the operational scenarios modelled in the approved project EIS for the full build, which assumed the completion of road

Category	Potential construction impacts	Potential operation impacts
	avoid coinciding with network congestion times, and haulage routes would follow those previously approved to minimise impacts on sensitive areas. For construction rail traffic, use of the existing port rail link for material and equipment movements is expected to mirror Stage 1 patterns, with only occasional rail deliveries anticipated, therefore avoiding any material impacts. Maritime construction traffic, including dredgers, barges, workboats, and survey vessels, will be of the same type, scale, and intensity as Stage 1, operating within existing navigational safety arrangements and harbour capacity. The Outer Harbour layout and vessel traffic management systems already in place would accommodate these movements without introducing new navigational risks.	upgrades such as Flinders Street pavement strengthening, improved turning radii, and intersection improvements. Operational rail traffic would also scale with throughput but remain consistent with the number and type of train paths and rolling stock assessed in the approved project EIS. This includes container shuttles and bulk freight services, which were modelled with associated noise, vibration, and safety considerations. Operational maritime traffic would increase proportionally to throughput, with additional commercial vessel calls (e.g. container ships, bulk carriers) accommodated within the approved berth and channel capacity. Navigational safety, pilotage, and berth scheduling systems assessed in the approved project EIS are designed for this full build scenario, ensuring safe and efficient vessel movements without exceeding harbour traffic management limits. This assessment assumes that no additional network constraints emerge prior to Stage 3 commissioning and that all infrastructure upgrades identified in the approved project EIS would be delivered on schedule.
Waste and utilities	Construction waste generation for Stage 2 and Stage 3 would mirror Stage 1 in type, comprising demolition waste (e.g. concrete, steel, timber), surplus excavated spoil, packaging materials, and general construction waste from site offices and workforce facilities. Volumes would be proportional to the additional scope of works, with the main variable being the extent of earthworks, dredging, and structural demolition required in each stage. No new waste streams are anticipated beyond those assessed in the approved EIS, because construction methods, materials, and onsite processes would remain consistent. Construction waste management would continue to prioritise segregation, onsite reuse (where suitable), and lawful disposal at licensed facilities. Contingency measures for unexpected waste volumes, such as surplus dredged sediment or contaminated material, would follow Stage 1's approved approach. Construction utilities demand for temporary works (e.g. electricity for site compounds, water for dust suppression, fuel for plant) is expected to remain within the existing local service capacity. This assumes staging is managed to avoid simultaneous peak demand with other major infrastructure works in the area, thereby avoiding supply constraints.	Operational waste volumes would scale proportionally with increased terminal throughput but remain consistent in type with those currently generated under Stage 1 operations. This includes packaging waste, maintenance waste (e.g., oils, lubricants, filters), and general port operational waste streams. Waste management procedures, such as separation, recycling, and licensed disposal, would remain applicable without modification. Operational utilities demand would marginally increase, for example through higher electricity use for lighting, cranes, and cargo handling equipment, and increased water use for wash-down activities. These increases would remain within the utility supply capacity confirmed for the approved concept, as the infrastructure and service connections were designed to accommodate the full build scenario.

Conclusion

In summary, the comparative assessment indicates that potential environmental impacts from Stage 2 and Stage 3 would generally be consistent in type, scale, and extent with those already assessed for the follow-on stages of the concept

Plan. While some impacts, such as construction duration, operational throughput, and associated emissions, would increase in proportion to the expanded works, these changes are predicted to remain within the environmental envelope and capacity anticipated in the approved project EIS.

The established industrial setting of Port Kembla, together with the continued application of Stage 1 environmental management measures, design standards, and mitigation controls, means that no new or unforeseen impact pathways are expected at this stage. This conclusion is contingent on the assumption that the location, methods, and operational practices for Stage 2 and Stage 3 remain consistent with those assessed for Stage 1, and that infrastructure upgrades and regulatory requirements identified in the approved EIS are implemented as planned.

Given the current level of design definition, some assessments rely on Stage 1 verified data (e.g. emissions intensity factors, noise propagation modelling) applied proportionally to the additional scope, as a reasonable proxy for predicting Stage 2 and Stage 3 outcomes. This approach is valid for determining whether the modification remains within the previously assessed envelope but will need to be confirmed through updated modelling or targeted studies once detailed construction and operational parameters are available. Should the design extend beyond the approved footprint, alter activity types, or introduce new impact pathways, further environmental assessment would be required at subsequent approval stages.

7.8 Cumulative impacts

This section provides a summary on the potential cumulative impacts associated with the proposed modification.

7.8.1 Existing environment and background

Table 7-17 below highlights the key surrounding current and future proposed projects which could overlap with the proposed modification, leading to potential cumulative impacts for the wider area. These include significant projects that have been proposed and/or approved within 2km of the modification footprint within the last five years (as shown in Figure 7-6).

Table 7-17: Cumulative projects

ID	Project name	Description	Timing	Distance to proposed modification area
Major Projects NSW				
1	Manildra - Port Kembla Bulk Liquid Terminal	Construction and operation of a bulk liquid fuel terminal, comprised of: • 6 four megalitre (ML) potable ethanol storage tanks • 2 pipelines (300mm diameter) • Admin buildings, gantry structures, landscaping, and carpark.	Approved in 2023 Construction expected to be finalised in July 2026	Within modification footprint
2	Commodity Logistics and Import Project	Upgrade of berth infrastructure to increase the throughput capacity of the berths	Approved in 2023 Construction stage 1 expected to take 28 months and stage 2 expected to take 36 months	Around 845m northwest of the modification footprint
3	Blast Furnace 6 Reline	Reline, commission and operate blast furnace no. 6 at the Port Kembla Steelworks	Approved in 2022 Construction expected to take 3 years Expected to operate 20 years	Around 1,125m northwest of the modification footprint
4	BlueScope Advanced Steel Manufacturing Precinct	The removal of two existing furnaces at the Plate Mill, the construction and installation of a new walking beam furnace and upgrades and installation of associated equipment at the Plate Mill.	Approved in 2024 Construction expected to take 39 months	Around 2,170m northwest of the modification footprint
5	Port Kembla - Cargo Facility Expansion - Port Kembla General Cargo Handling Facility Mod 1	Proposal to modify the approval to include a cap on the amount of freight moved by road and rail to 2,216,000 tonnes per year within the overall 2,770,000 tonnes per year currently permitted, and seek to maximise haulage of cargo by rail.	Approved in 2024	Around 1,780m north of the modification footprint
6	Port Kembla Bulk Liquid Terminal (Methanol)	Proposal to make operational changes to the existing bulk liquid storage and export facility to permit the import, storage and distribution of methanol and the storage and distribution of industrial grade ethanol (in addition to beverage grade). This does not include construction activities to expand the facility.	Preparing SEARs	Within and adjacent to modification footprint

ID	Project name	Description	Timing	Distance to proposed modification area
Wollongong City Council				
7	DA-2024/942 - Development Application - Five Islands Road PORT KEMBLA NSW 2505	Installation of a new 2.25MW 6.6kV Centrifugal Air Compressor at the Port Kembla Steelworks' No 2 Blower Station. This will be carried out as part of the No 29 Air Compressor (29AC) Project	Approved in 2025 Construction expected to take 8 months	Around 1,310m west of the modification footprint
8	Old Port Rd, Culvert Refurbishment (Project number 125880)	Culvert refurbishment works as part of Council's Infrastructure Delivery Program for 2025/26 to 2028/29	Part of Council's planned upgrade Construction expected to occur in 2025/26 or 2026/27	Around 100m west of the modification footprint

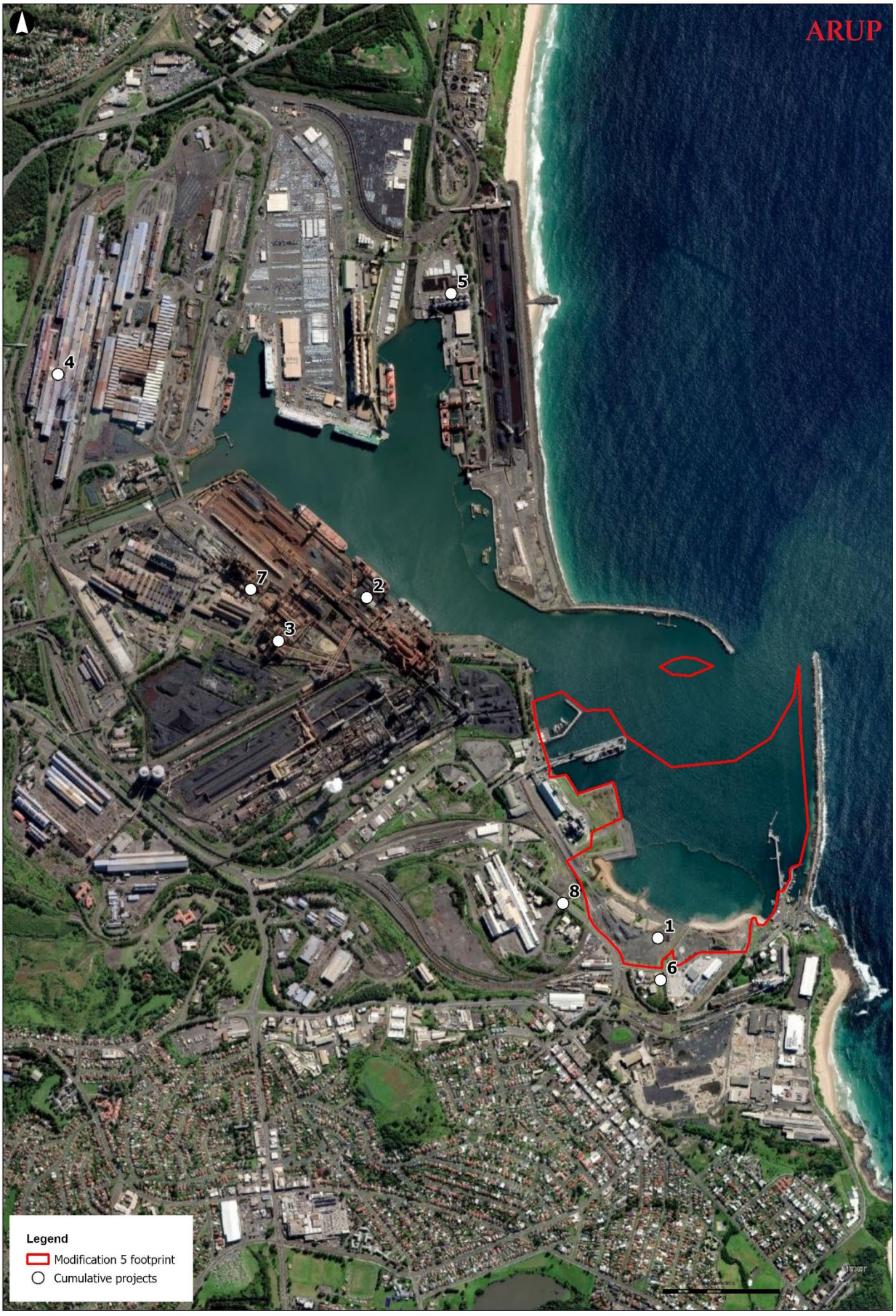

Figure 7-6: Cumulative projects

7.8.2 Assessment of potential impacts – Stage 1

Key potential cumulative impacts of the proposed modification with these other projects during Stage 1 include:

- Additional sediment suspension, turbidity, contaminant disturbance, and toxic dinoflagellate disturbance due to vessel movements, dredging, and climatic events
- Additional noise and vibration impacts on the aquatic environment due to ongoing port operations alongside construction
- Hydrodynamic disturbances (e.g. wave energy) due to natural variability
- Additional transport and access impacts if construction activities occur around the same time given the increased construction traffic volumes and changing traffic conditions
- Additional impacts to amenity for surrounding sensitive receivers due to cumulative noise and vibration impacts, and a reduction in air quality if construction activities occur simultaneously. The proposed dredging activities occurring 24/7 may also increase the length of time receivers are exposed to noise impacts. However, these activities are located the furthest from sensitive receivers.
- Potential additional constraints on the availability of construction staff, equipment, and materials if construction activities occur simultaneously.

7.8.3 Assessment of potential impacts – Concept

Similar cumulative impacts would also likely occur during the Concept phase for Stages 2 and 3. Once operational, there may also be cumulative impacts on the hydrodynamic function of the Port Kembla Outer Harbour area and vessel traffic to and from the harbour due to the establishment of the Commodity Logistics and Import project which includes the upgrade of berth facilities.

7.8.4 Environmental management measures

Stage 1

No additional measures over those already identified for the approved project are recommended for Stage 1 of the proposed modification.

Concept

No additional measures over those already identified for the approved project are recommended at the Concept stage for the proposed modification.

8. Proposed change to conditions of approval

This chapter outlines the relevant conditions of approval that would need to be revised as a result of the proposed modification

8.1 Stage 1

Table 8-1 provides the proposed changes to the conditions of approval for the previously approved Stage 1 project. The updates are presented in bold **blue** text (for new text) or ~~blue~~ strikethrough (for deleted text).

Table 8-1: Proposed changes to conditions of approval - Stage 1

Condition of approval	Proposed amendments	Reasoning
A1 – Terms of Approval	The Proponent shall carry out the project generally in accordance with: a) the Major Project Application 08_0249; b) the Port Kembla Outer Harbour Development Environmental Assessment Report, Volumes 1 to 7, prepared by AECOM Australia Pty Ltd and dated March 2010 c) the Revised Port Kembla Outer Harbour Development Submissions Report, prepared by AECOM Australia Pty Ltd and dated 27 October 2010; ~~and~~ **d) the Port Kembla Outer Harbour Reconfiguration (MOD5) – SSI Modification, prepared by Arup Australia Pty Ltd; and** ~~d~~c) the conditions of this approval.	Condition A1 is being amended to specify that the modification report will be included among the documents with which the project must comply.
B13	The Proponent shall, within six months of the start of construction, unless otherwise agreed by the Director-General, prepare and implement an Integrated Water Cycle Management Plan for the project to facilitate Water Sensitive Urban Design measures and ensure that storm water systems are designed and built to minimise pollutant discharges into receiving waterways. The Plan shall be prepared in consultation with OEH and I&I NSW and shall include, but not be limited to: (a) the identification of existing hydrology conditions**, including an investigation of the use and assessment of the flows draining through the culvert at the north of the reclaimed land**; (b) objectives and performance standards for water cycle outcomes that are to be achieved during operation of the project, including the identification and consideration of relevant design guidelines, standards and catchment management plans; (c) water management measures that may be applied so as to meet the objectives and performance standards, including but not limited to:	The additional watercourse identified to be encountered at the north of the additional reclaimed area associated with the modification requires further investigation and should be managed according to the conditions of approval for Darcy Road Drain and Salty Creek.

Condition of approval	Proposed amendments	Reasoning
	i) on-site storage for rainwater reuse; ii) storm water treatment devices to remove gross pollutants, sediments, oils and greases from first flush stormwater run-off; iii) the incorporation of pollution control devices (eg gross pollutant traps) in the extensions of Salty Creek**,** ~~and~~ Darcy Road drain**~~s~~ and the additional stormwater outlet identified at the north of the reclamation area**; iv) bioremediation swales; and (d) ongoing operation maintenance, management and monitoring measures, for the achievement of the identified objectives and performance standards. The Plan shall be prepared by a qualified practicing Civil Engineer with relevant experience in storm water and environmental engineering and shall be suitably incorporated into the Operational Environmental Management Plan.	

8.2 Concept

Table 8-2 provides the proposed changes to the conditions of approval for the previously approved Concept Plan.

Table 8-2: Proposed changes to conditions of approval – Concept Plan

Condition of approval	Proposed amendments	Reasoning
Schedule 2 – 1. Terms of Concept Plan Approval	The Proponent shall carry out the project generally in accordance with: a) the Major Project Application 08_0249; b) the Port Kembla Outer Harbour Development Environmental Assessment Report, Volumes 1 to 7, prepared by AECOM Australia Pty Ltd and dated March 2010 c) the Revised Port Kembla Outer Harbour Development Submissions Report, prepared by AECOM Australia Pty Ltd and dated 27 October 2010; ~~and~~ **d) the Port Kembla Outer Harbour Reconfiguration (MOD5) – SSI Modification, prepared by Arup Australia Pty Ltd; and** ~~d~~**e**) the conditions of this approval.	Amending Condition A1 is required to include the modification report as one of the documents that the project must be carried out in accordance with.

9. Justification of the modified project and conclusion

This chapter summarises the purpose of the proposed modification and its key potential impacts and benefits.

9.1 Strategic context and statutory considerations

The proposed modification would support the changing needs of Port Kembla to accommodate larger vessels without the constraints present within the approved Concept Plan. It also helps support emerging opportunities in the clean energy sector and aligns with key strategic plans and policies for NSW.

9.2 Environmental and socio-economic considerations

The clean energy sector is an emerging industry within NSW and other parts of Australia. This modification creates an opportunity for this emerging sector to operate in Port Kembla. This has the potential to open up more future economic opportunities for the port and NSW as a whole.

Environmental considerations

Key potential impacts from the proposed modification include:

- Slightly increased area of impact to aquatic habitat disturbance
- Slight decrease in area available for the creation of artificial habitat once operational
- Potential increase in wave activity at the northern breakwater only
- Potential to disturb contaminated material
- Potential to reduce water quality risks from improved containment of watercourses and protection from surface contaminants once all stages complete under the Concept stage.

Socio-economic considerations

Engagement with key stakeholders has been carried out on the proposed modification to understand key concerns which have been considered as part of this assessment. Main concerns included:

- Maintaining access for emergency services within the harbour
- Maintaining public access for recreational fishing.

Overall, the majority of impacts generated by the proposed modification are similar to those identified for the approved project and Concept Plan and can be managed in line with the existing management measures and conditions of approval.

Key benefits of the proposed modification include:

- Improved flexibility of reclamation area to cater to emerging industries (e.g. offshore wind)
- Improved tidal flushing characteristics of the outer harbour area (how effectively tidal movements can replace/replenish water to disperse heat, nutrients and pollutants) compared to the approved project.

A conservative approach was taken to this assessment, including a review of the mitigation measures and conditions of approval identified for the approved project to ensure they remain sufficient to mitigate potential impacts.

9.3 Uncertainties and resolution

Given the time between the original project and concept approval being granted and this proposed modification, some of the proposed works have been undertaken and changes in assessment requirements have been made. This report provides an update on these past works and includes additional assessments of some baseline conditions and potential impacts not previously identified in the original assessment (e.g. sediment plume modelling).

Given that the proposed modification includes updates to the concept approval, there remain some uncertainties for the project which would need to be assessed prior to future stages being carried out (i.e. Stages 2 and 3).

9.4 Conclusion

The reconfigured port layout will future-proof Port Kembla's operations by supporting longer berth lengths and emerging industries (offshore wind), future container logistics greater freight capacity, creating jobs, and strengthening NSW's trade resilience which addresses the project's economic and strategic objectives. The proposed modification will deliver economic and social benefits while managing environmental impacts in line with ecologically sustainable development principles. These benefits are achieved without any unacceptable environmental or social cost.

Assessment of this proposed modification confirms that any additional impacts from the modifications (such as a slightly larger dredging footprint and adjusted reclamation) are minor, localised, and can be mitigated effectively through the proposed measures. The modified design yields positive environmental outcomes (improving Outer Harbour water circulation.

On balance, the benefits outweigh the residual impacts identified in the assessment throughout this report. The residual impacts have been minimised through the proactive application of the precautionary principle and comprehensive mitigation ensuring intergenerational equity.

In conclusion, the proposed modification remains compliant with all relevant legislation, plans, and policies. It aligns with NSW Government infrastructure strategies by enabling a second container port and facilitating emerging industries (e.g. clean energy infrastructure). The Port will continue to operate within the environmental safeguards set by the Project Approval and current regulations.

This proposed modification has been assessed in accordance with the Department's State Significant Infrastructure guidelines. There are no planning or environmental barriers to approval of the modified project.

In conclusion, implementing the project as modified will achieve its economic and social aims in an environmentally responsible manner, ensuring the Port Kembla Outer Harbour Development is sustainable, compliant, and in the public interest.

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