Appendix B - Updated environmental management measures

The approved project identified a range environmental management measures that were required to avoid or reduce the environmental impacts. After consideration of the potential impacts from the proposed modification, the environmental management measures for the project have been updated.

Should the modified project be approved, the updated environmental management measures would apply. **Blue** bold text has been used to identify measures, or parts of measures, that are additional and/or revised from those provided for the approved project. ~~Blue~~ strikethrough text has been used to identify measures, or parts of measures, that are no longer required.

The below list and associated coloured text identify the source of updates to the environmental management measures table:

- Aquatic Ecology Assessment (2025)
- Preliminary Site Investigation Report (2025)
- Surface and Groundwater Assessment (2025)
- This Modification Report (2025).

Table B-1: Updated compilation of environmental management measures for the modified project – Stage 1

Ref	Issue	Environmental Management Measure	Timing
G1	Major Project - General	The proposed Outer Harbour development will be constructed and operated generally as described in the ~~Port Kembla Outer Harbour Development, Environmental Assessment, prepared by AECOM and dated February 2010 and portrayed in Figure 5-3 (Concept Plan) and in Figure 5-5 (Major Project)~~ **MOD 5 – SSI Modification report**. The proponent will prepare and implement a suite of Environmental Management Plan (EMP) Framework documents that will be developed for construction (including dredging and reclamation) and operation for Stage 1. Each discrete phase of construction activity will have its own **Construction Environmental Management Plan (**CEMP**)**. Similarly, discrete operating units (e.g. terminals) will each have their own **Operation Environmental Management Plan (**OEMP**)**. All CEMPs and OEMPs will include appropriate strategies and management measures to control and manage environmental risks, assess environmental performance and comply with relevant statutory requirements that are applicable to that part of Stage 1. A number of sub-plans will be included in relevant CEMPs and OEMPs and will include the following, where relevant: • Soils and Water Management Plan (SWMP) • Stormwater Management Plan (STMP)	**Pre-construction**

Ref	Issue	Environmental Management Measure	Timing
		• Acid Sulfate Soil Management Plan (ASSMP) • Spoil Management Plan (SPMP) • Dredging Environment Management Plan (DEMP) • Site Management Plan (SMP) • Hazardous Substance Management Plan (HSMP) • Emergency Response Plan (EMP) • Green and Golden Frog Management Plan (GGFMP) • Traffic Management Plan (TMP) • Noise and Vibration Management Plan (NVMP) • Construction Noise and Vibration Management Plan (CNVMP) • Operational Noise and Vibration Management Plan (ONVMP) • Air Quality Management Plan (AQMP) • Safety Management Plan (SFMP) • Landscape Management Plan (LMP) • Conservation Management Plan (CMP) • Waste Management Plan (WMP) • Demolition Management Plan (DMP) • Refuelling Management Plan (RMP) • **Syngnathiformes Management Plan (SMP).**	
SW1	**Soil and water management**	*Soils and Water Management Plan*	**Pre-construction / Construction**

Ref	Issue	Environmental Management Measure	Timing
		SWMPs will be prepared by **NSW Ports** ~~PKPC~~ prior to commencement of construction of Stage 1 and will be included where relevant in the CEMPs for that stage. The SWMPs will be prepared in accordance with Landcom's Managing Urban Stormwater; Soils and Construction Manual 2004.	
SW2	**Erosion and sedimentation impacts**	*Erosion and Sedimentation Controls* Management controls aimed at containing, redirecting, and stabilising soils that are unavoidably disturbed by construction activities will include: • Installing water diversion structures to ensure surface water runoff does not enter zones of exposed soils during construction, particularly in the vicinity of the new road link from Christy Drive, and rail infrastructure upgrade in the South Yard. • Installation of erosion and sedimentation control devices prior to excavation at the site, that will remain in place until the bare soils and surfaces are stabilised temporarily or permanently (by suitable surface materials, revegetation or other means) and removed when redundant. • Installing sediment traps around areas of soils that will be exposed as a result of construction activities to protect downstream water quality. Sediment traps will be maintained and will remain in place until all works are finalised and surfaces are stabilised. • Installing buffers to the riparian zone, for example sediment fences, to prevent sediment laden water from entering Salty Creek, Darcy Road Drain, and the Outer Harbour. • Installing filter rolls at stormwater drain locations to minimise potential for sedimentation of drains and subsequent flooding during heavy rainfall. • Implementation of site management procedures including watering or covering of unsecured stockpiles of reclamation material (if stockpiles contain fines) anticipated to be exposed and unused for a period longer than two continuous weeks. • Limiting the area of disturbance to those locations necessary to construct the new roads, reclamation area and rail infrastructure upgrade. • Disturbed areas will be restored (sealed or covered with pebbles/gravel or vegetated, as appropriate) upon the completion of the works in that area to ensure that soils are exposed for as short a time as possible. • Daily visual inspections of erosion and sediment control devices to determine the condition and effectiveness of control measures. Immediate action will be taken to repair any control devices that have failed to work adequately. • Emergency procedures will be detailed for high rainfall events that could increase soil erosion during construction.	**Pre-construction / Construction**

Ref	Issue	Environmental Management Measure	Timing
SW3	**Dredging and fill material management**	*Fill Materials, Dredging and Reclamation* • Environmentally suitable fill materials will be used for reclamation only. • Appropriate soil enhancement procedures and treatments will be implemented, as required, to facilitate consolidation of soft material and minimise slumping. • Soils confirmed to be Actual ASS will be handled in accordance with the Acid Sulfate Soil Management Plan (ASSMP). • **NSW Ports** ~~PKPC~~ will carefully consider the disposal/placement of potential ASS and preference will be given to disposal/placement of Potential ASS in locations beneath the water to avoid exposure to oxygen. • Where feasible, reclamation will be undertaken with a material which will allow for a similar groundwater flow to the current flow regime into the Outer Harbour.	**Pre-construction / Construction**
SW4	**Erosion impacts**	*Terminal Hardstand and Temporary Unpaved Surfaces* • The surface material of reclaimed areas that are to remain unpaved until Stage 2 will be selected and prepared to minimise potential erosion. If surface fill material is susceptible to erosion a suitable surface layer with low erosive qualities will be laid.	**Pre-construction / Construction**
W1	Hydrology and Stormwater Design	*Soil and Water Management Plan* A SWMP will be prepared to document mitigation measures to manage hydrology and water quality impacts associated with construction of Stage 1. The SWMP will include the following measures: • A control system to ensure that bulk material stockpiles and materials within handling areas are contained onsite, through the use of containment walls, bunding, stormwater and dust controls. Any excess sediment laden runoff will either be contained within the bunded storage areas or directed to a land based treatment area. A program of regular monitoring and maintenance of the storage and handling of bulk materials will be implemented. • Measures to minimise excess materials being deposited offsite during loading and transportation of bulk materials from the material handling area. Controls such as vehicle shaker pad, use of vacuum road sweepers, covering loads during transport and dust suppression. • Emergency spill response procedures will also be included in the Emergency Response Plan (ERP).	**Pre-construction / Construction**
	Management of dredging activities	*Dredging Environment Management Plan* A DEMP will be prepared and implemented for all stages of Stage 1, incorporating:	**Pre-construction / Construction**

Ref	Issue	Environmental Management Measure	Timing
		• Description of extraction methodology and machinery to be employed. • Identification of dredge areas. • Identification of disposal areas. • Turbidity control devices (floating booms, silt curtains). • Erosion and sediment control measures. • Water and air quality monitoring locations.	
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**
W3	**Management of accidental spills**	*Potential Pollutants Handling* The handling of oils and fuels, washing of all equipment, (including all concreting equipment) will be undertaken within bunded areas or containers and pollutants trapped in bunded areas will be disposed of in accordance with the waste management section of the CEMP. Any fuel spillage will be reported, documented and immediately remediated. Collected contaminated material will	**Construction**

Ref	Issue	Environmental Management Measure	Timing
		be disposed of as per the management section of the CEMP and in accordance with the NSW Waste Classification Guidelines **2014** ~~2008~~.	
W4	Water quality management	*Water Quality and Biological Monitoring Programs* **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.**	**Pre-construction / Construction / Operation**
C1	~~Contaminated Sediments~~ **Acid sulfate soil impacts**	*Acid Sulfate Soils* An ASSMP will be prepared prior to the dredging and reclamation works. Measures for the appropriate management of Acid Sulfate Soils, in line with the ASSMAC. These measures will either ensure that future works avoid exposing Potential Acid Sulfate Soils (PASS) to air or provide for appropriate management of the PASS.	**Pre-construction / Construction**
C2	**Potential contamination from dredging activities**	*Dredging Environmental Management Plan* A DEMP will be prepared based on the measures recommended by the AECOM Sediment Investigation, 2010 and will include: • Procedures for sediments to be dredged and emplaced in the reclamation area at essentially the same time (to avoid the need for land storage and wastewater management, and avoid the exposure of PASS). • Dredged sediments deposited as part of the proposed reclamation will be contained and effectively encapsulated and confined in an engineered containment structure which will be constructed of clean imported fill. • Dredged sediments will be placed at depth, below the depth of wave action at the base of the reclamation fill. • Dredging and reclamation will be undertaken within the protection of parallel silt curtains encompassing the dredging and placement areas.	**Pre-construction / Construction**

Ref	Issue	Environmental Management Measure	Timing
		• Dredging technologies will be selected in consideration of their ability to minimise the generation of turbidity. • Turbidity monitoring will be employed in conjunction with twice daily observations by personnel undertaking the dredging and reclamation activities to assist in early identification of problems and proactive implementation of mitigation measures. • Regular monthly flyovers will be undertaken to assess the presence of potential sediment plumes and algal blooms from the dredging or placement areas. • Contingency measures will be implemented immediately in the event visible turbidity and harbour water quality impacts are identified during routine monitoring. The DEMP will refer to the ASSMP and will include appropriate management measures for: • Handling and transportation of PASS below water. • Any PASS dredged material will be encapsulated and confined within an engineered containment structure (bunded area) at a lower harbour depth within the reclamation. • The removal of PASS from dredged material to land (if encapsulating and confining the material underwater is not possible). • Any mobilisation of disturbed soils that are confirmed to be AASS. Twice-daily manual measurements of turbidity will be carried out in conjunction with observations by personnel undertaking the dredging and reclamation activities to assist in early identification of problems and proactive implementation of mitigation measures.	
C3	**Potential contamination risk to human health**	*Human Health Risk Assessment* The risk to human health and the environment associated with the contaminated sediment (in particular the identified sediment contamination hotspots) should be evaluated by a further qualitative risk assessment. If the risk assessment concludes that the contamination hotspots present an unacceptable risk to the environment, a Remedial Action Plan will be prepared to appropriately manage the identified materials of concern.	**Detailed Design**
C4	**Potential contamination impact to groundwater**	*Groundwater Considerations* The reclamation will be designed to ensure that the existing groundwater flow regimes are not significantly altered and that there is no increased risk of harm associated with groundwater contamination.	**Detailed design**
C5	**Potential interaction with unidentified**	• **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**	**Pre-construction / Construction**

Ref	Issue	Environmental Management Measure	Timing
	contaminated material	**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.**	
C6	Contaminated Soils and Groundwater	*Site Management Plan* **NSW Ports** ~~PKPC~~ will prepare a SMP prior to the commencement of construction to manage excavation works and to address the following: Contamination 'hotspots' based on visual observations and through detailed soil sample analysis if required. Appropriate management of contamination including selective excavation (to minimise quantities), stockpiling, characterisation and disposal (likely to an off-site soil remediation facility) assuming that the material is not suitable for inclusion within the reclamation area. Develop a groundwater monitoring program to be conducted at the site prior to the commencement of the works and annually thereafter. This program will be designed and undertaken so as not to impede construction or operation of the development. In developing the groundwater monitoring program **NSW Ports** ~~PKPC~~ will review and utilise the results for the existing groundwater monitoring program being undertaken for the Outer Harbour.	**Pre-construction / Construction**
C7	**Potential contamination surrounding the South Yard**	*South Yard* A Limited Phase Two Environmental Site Investigation will be undertaken prior to the commencement of works at the proposed site for the extension of the railway siding at the South Yard, to assess potential contamination issues in this area.	**Pre-construction**
HR1	Human Health and Ecological Risk **during dredging activities**	*Dredging Environment Management Plan* Prior to commencing dredging a further qualitative assessment will be undertaken to address potential risks to ecological receptors associated with contaminated sediment dispersal. The assessment will consider the following: • Potential indirect effects or risks to marine ecosystem or communities outside the heavily impacted PKOH area.	**Pre-construction / Construction /**

Ref	Issue	Environmental Management Measure	Timing
		• Potential indirect risks to human health due to toxic dinoflagellate blooms or bioaccumulation of contaminants into edible fish or shellfish. • The extent to which protected or recreationally important species are present within the PKOH. This assessment should be based on detailed design of the dredging works and specific environmental management safeguards aimed at minimising and containing contaminated sediment dispersal. Recommendations and mitigation measures that arise from the additional assessment will be incorporated into the DEMP.	

HR2	**Human Health and Ecological Risk associated with hazardous materials**	**NSW Ports** ~~PKPC~~ will prepare a HSMP for construction of Stage 1 that will address the following:
		• Handling of oils and fuels and the washing of all equipment, including all concreting equipment, in accordance with the following DECCW Bunding and Spill Management Guideline documents:
		  ○ Storing and Handling Liquids: Environmental Protection - Participants Manual; and
		  ○ Environmental Compliance Report: Liquid Chemical Storage, Handling and Spill Management - Part B Review of Best Practice and Regulation.
		• Disposal of any pollutants trapped in bunded areas in accordance with the waste management section of the CEMP and DECCW waste guidelines.
		• Any fuel spillage will be reported, documented and immediately remediated.
			Pre-construction / Construction / Operation

HR3	**Human Health and Ecological Risk associated with refuelling**	*Refuelling Management Plan* **NSW Ports** ~~PKPC~~ will prepare a Refuelling Management Plan (RMP) which will address on site refuelling if required and which will identify appropriate refuelling locations, proximity to infrastructure, bunding required, location, use of spill kits and monitoring.	**Pre-construction / Construction / Operation**
B1	~~Flora and Fauna~~ **Habitat disturbance impacts**	*Compensatory Measures* Compensatory measures to offset the loss of soft substrate habitat in the Outer Harbour and the sandy beach area of Red Beach are proposed for Stage 1. A summary of these measures is presented below: • Hard substrate habitat in the form of new berth faces, pile-supported desk areas and rock revetments will be increased as a result of the development. Habitat features that will be incorporated into the design of the hard structures will include: ○ Boulder-sized rocks placed without cement to offer crevices in the inter-tidal and sub-tidal zones for the use of fish and invertebrates.	**Pre-construction / Construction**

Ref	Issue	Environmental Management Measure	Timing
		○ Artificial rock pools in revetments to provide habitat for species such as seahares, sea urchins and octopus. ○ Objects such as concrete knobs, or similar, attached to vertical wall structures to add texture and form for the benefit of colonising organisms. • Soft substrate habitat measures will be implemented as part of habitat improvement projects proposed for Tom Thumb Lagoon and Garungaty Waterway (refer Section 16 and Appendix G of the EA for additional detail). The measures proposed are intended to complement the existing restoration programs in these areas by increasing fish passage, tidal exchange and promoting estuarine communities such as saltmarsh, mangroves and seagrass. The measures are consistent with Wollongong Council's Estuary Management Plan (2007) and the Plan of Management prepared for Conservation Volunteers Australia in 2006. The habitat improvement projects will be undertaken over the next 10 years and will include ongoing monitoring and maintenance to ensure that effective habitat outcomes are achieved and sustained on the site.	
B2	**Potential impact to aquatic environment from dredging activities**	*Dredging Environment Management Plan* The DEMP will address the following: • Ways in which the generation of shockwaves through the water column associated with underwater rock blasting can be reduced as far as it is practicably achievable. • Measures to reduce or minimise negative impacts on marine mammals will be included in the DEMP and will be based on available and relevant guidelines. • Protection of migratory marine mammals. Specific mitigation measures may include a marine mammal observer program to be implemented and stop blasting provisions if **marine mammals** ~~whales~~ are sighted within specified distances from the development area.	**Pre-construction / Construction**
B3	**Potential impact to Green and Golden Bell Frog**	*Green and Golden Bell Frog Management Plan* Prior to any works which involve the clearing of vegetation and debris within the development area of Stage 1, a suitable and targeted survey will be undertaken by an ecologist in order to allow for the detection of any GGBF. If GGBF are detected, no clearing works will commence until the GGBF response provisions in the GGBFMP have been implemented. A comprehensive GGBFMP will be prepared prior to the commencement of construction works for Stage 1. The GGBFMP will be prepared by a suitably qualified ecologist and in consultation with DECCW and will be in accordance with the following plans and previous studies: • *Draft Recovery Plan: Green and Golden Bell Frog* (Lesson 1829) *Recovery Plan* (DECCW, 2005) • *Best Practice Guidelines: Green and Golden Bell Frog Habitat* (DECCW, 2008)	**Pre-construction / Construction**

Ref	Issue	Environmental Management Measure	Timing

		• *The Green and Golden Bell Frog Key Population at Port Kembla Management Plan* (DECCW, 2007)
		• *Assessment of Habitat, Dispersal Corridors and Management Actions to Conserve the Port Kembla Key Population of Green and Golden Bell Frog 2007-2008* (Gaia Research, 2008).
		The GGBFMP will include the following as a minimum:
		• Program of works and timeline for all key components of Stage 1.
		• Undertake a conservation assessment ranking for any known or likely GGBF habitats in the study area, including but not limited to, identification and assessment of breeding, shelter, foraging, and movement habitat components.
		• Identify any actual or potential threats from construction and operations, including but not limited to:
		  ○ Habitat loss, modification and disturbance
		  ○ Fragmentation and isolation of habitat
		  ○ Water quality and pollutant issues
		  ○ Road mortality
		  ○ Exotic weed control and application of herbicides containing glyphosate
		  ○ Slashing and mowing
		  ○ Invasion by *Chrysanthemoides monilifera*
		  ○ Predation and disease (refer detailed mitigation measures below).
		• Identify appropriate actions to present or minimise these actual or potential threats, including, but not necessarily limited to:
		  ○ Scheduling works to coincide with activity cycles where practicable
		  ○ Construction of any compensatory habitat prior to proposed habitat loss
		  ○ Frog fencing
		  ○ Engaging a suitably qualified ecological consultant to be onsite during construction
		  ○ Development of response protocols in the event that frogs are found in the active construction areas
		  ○ Signage	

Ref	Issue	Environmental Management Measure	Timing
		○ Measures outlined in the frog hygiene protocol. • Include details of how the proponent will monitor and report on the ongoing effectiveness of the GGBFMP including, but not necessarily limited to: ○ Including the objectives of the monitoring program ○ Method of monitoring ○ Data return to DECCW ○ Licensing ○ Reporting framework ○ Duration ○ Frequency. • A program of works and timeline for planting and landscaping in appropriate areas with vegetation suitable for GGBF foraging and shelter as well as installing structures (such as logs and concrete pieces) to facilitate movement and over wintering habitat. Mitigation measures to minimise the spread of deadly pathogens and disease to the GGBF include the following: • Frog exclusion fencing will be installed around construction sites in close proximity to known or potential GGBF breeding habitats. • The construction works site and any open trenches within the development area should be checked each morning during construction for the presence of any Frogs which should be released into nearby ground cover. Handling the species should be minimised. **Hygiene Guidelines (NSW Department of Planning, Housing and Infrastructure [DPHI], 2020)** ~~Frog Hygiene Protocol (NPWS, 2001)~~ should be followed to avoid the spread of chytrid spores or other pathogens between aquatic habitats and frog sites. • If necessary, earth-working equipment and vehicles will be cleaned of excess soil by brushing or hosing when they enter and exit the site in order to minimise the likelihood of the spread of weed seeds and plant pathogens. • If it is likely that vehicle tyres will result in mud and water being transferred to other bodies of water or frog sites, they should be sprayed with a disinfecting solution as per the **Hygiene Guidelines (DPHI, 2020)** ~~Frog Hygiene Protocol (NPWS,~~	

Ref	Issue	Environmental Management Measure	Timing
		~~2001)~~. This should be carried out at a safe distance from water bodies, so the disinfecting solution can infiltrate the soil instead. • The importation of water should avoid known areas of breeding habitat in close proximity to construction activities (such as Site 18). • The use of imported mulch or compost should be avoided in any rehabilitation works in the vicinity of known breeding areas and associated dispersal avenues.	
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**
T1	Rail	During reclamation activities, **NSW Ports** ~~PKPC~~ will review the need to install a material handling system to unload fill from trains at the area dedicated to stockpiling imported fill material. **NSW Ports** ~~PKPC~~ will provide **DPHI** ~~Department of Planning~~ with updates regarding the demand for rail freight to/from the port and the progress of planned regional rail infrastructure upgrades prior to commencing the later stages ~~(i.e. Stage 1b and 1c)~~ of the dredging and reclamation works.	**Construction**
T2	**Traffic impacts**	*Traffic Management Plan* **NSW Ports** ~~PKPC~~ will prepare a TMP in accordance with Traffic Control at Worksites **(TfNSW, 2022)** ~~(RTA, 2003)~~, prior to construction and operation of Stage 1 in order to minimise impact on pedestrian and vehicle movements. The TMP will outline and manage the transportation routes to the site for heavy vehicles during construction of Stage~~s~~ 1~~a, 1b and 1c of the Major Project~~. The TMP will also include: • Access arrangements for heavy vehicle to the site. • Procedures for the delivery and dispatch of products. • Preference for the use of larger trucks in order to minimise vehicular movements. • Haulage routes to and from the site. • Driver protocols including a Code of Conduct to encourage safe driving practices. • Use of truck turnaround areas. • Financial penalties.	**Pre-construction / Construction**

Ref	Issue	Environmental Management Measure	Timing
		• Truck movement hour restrictions. Car park facilities will be established within dedicated construction areas internal to the site. Car parks will be designed to cater for the number of construction vehicles to reduce or avoid potential overflow impacts on the local road network, such as Foreshore Road. All roads constructed as part of the development would be designed to accommodate the number and type of vehicle movements projected and would satisfy relevant design standards and would consider local guidance publications including the Wollongong City Council's Subdivision Policy for Road Construction.	
T3	**Potential impact from transporting fill material**	*Sources of Fill Material* Prior to the commencement of filling operations for Stage~~s~~ 1~~b and 1c~~, **NSW Ports** ~~PKPC~~ will provide detail of the sources of the fill material which is to be imported to the site for the reclamation, including the method of transport, for approval by **DPHI** ~~the Department of Planning~~.	**Pre-construction / Construction**
N1	**Noise impacts**	*Construction Noise and Vibration Management Plan* A Construction Noise and Vibration Management Plan (CNVMP) will be prepared by **NSW Ports** ~~PKPC~~ prior to the commencement of construction of Stage 1 in line with DECCW "Interim Construction Noise Guidelines'" in order to minimise the noise impact at sensitive receivers. The CNVMP will include: • Notification of and maintaining regular contact with noise-affected neighbours. • Maintaining a complaints register and complaints handling. • Operating plant in a quiet and efficient manner. • Adoption where practicable of alternative work practices which generate less noise. For example, the use of hydraulic rock splitters instead of rockbreakers, or electric equipment instead of diesel or petrol powered equipment, amongst other management measures. **NSW Ports** ~~PKPC~~ is committed to the selection of acoustically considerate plant where possible and the use of noise reducing measures such as silencers, multi-frequency reversing alarms, visual system reversing warnings, enclosures and shrouds. The construction noise level emission and the potential annoyance to sensitive receptors will depend on the final selection of equipment, type of operation, activity duration and the time of day at which works are conducted. Additional noise impact assessment will be carried out if the construction plant to be used on site differs significantly from that assumed for modelling purposes in the revised Noise and Vibration Impact Assessment prepared by AECOM and dated 20 September 2010).	**Pre-construction / Construction**

Ref	Issue	Environmental Management Measure	Timing
N2	**Potential noise impact from rock blasting**	*Rock Blasting* **NSW Ports** ~~**PKPC**~~ will ensure that site specific data gathered during trial blasts (to refine and determine methods for the blasting of bedrock) is used to refine and calibrate the calculations prior to any blasting taking place.	**Pre-construction / Construction**
N3	**Potential noise impact associated with the South Yard**	*South Yard* The need for mitigation measures to address construction noise associated with the South Yard rail siding upgrade will be carefully considered at the construction planning stage. Potential mitigation measures may include review of the construction schedule, working hours, type of plant used and the use of temporary noise barriers.	**Pre-construction / Construction**

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

AQ1	Air Quality	*Air Quality Management Plan* **NSW Ports** ~~**PKPC**~~ will prepare an AQMP and mitigation measures will include but not be limited to: • Transport loads and materials will be covered to avoid generating wind-blown dust. • Site surfaces will be wetted down during dry weather including excavation sites, haul roads, spoil stockpiles and other exposed areas. • Vehicular access will be confined to designated access roads. • Shaker pad facilities will be provided for construction trucks and machinery leaving site. • Instantaneous dust monitoring will be undertaken at the site boundary. Regular checks on exhaust emissions from construction equipment, trucks, plant and machinery will be undertaken.	**Pre-construction / Construction**

Ref	Issue	Environmental Management Measure	Timing
		• Construction site speed limits will be implemented. The AQMP will include a dust monitoring program designed to assess the impact of particulate emissions from construction works undertaken as part of the project. Monitoring will be undertaken in accordance with Approved Methods for the Sampling and Analysis of *Air Pollutants in New South Wales*.	
LV1	Landscape and Visual Amenity	*Landscape Management Plan* **NSW Ports** ~~PKPC~~ will prepare a LMP for construction of Stage 1 which includes site specific measures and controls including: • Projection of lighting used for evening and night time work will be downward and toward site works to minimise light spill on adjacent areas. • Clear definition of materials storage areas, compounds and construction areas and boundaries. Construction timing will be programmed to minimise period of disturbance.	**Pre-construction / Construction**
H1	~~Heritage~~ **Potential impact from demolition**	*Archival Photographic Recording* An archival photographic recording will be prepared prior to demolition of No. 3 and No. 4 Jetties (part of Stage 1) and a comprehensive history of the jetty prepared.	**Pre-construction**
H2	**Potential to encounter underwater heritage during dredging activities**	*Historical Shipwrecks* Should any evidence of shipwreck material be encountered during dredging or other activities during Stage 1, works in the immediate vicinity will cease, the Heritage Branch will be contacted immediately and a suitably qualified maritime archaeologist will be contacted to assess the discovery and provide advice on mitigation and recording.	**Construction**
H3	**Potential impact to unidentified heritage items**	*Other Heritage Items or Archaeological Relics* Should unidentified European heritage items and/or archaeological relics be encountered during Stage 1 construction, works in the immediate vicinity will cease, the Heritage Branch will be contacted immediately and a suitably qualified heritage consultant will be contacted to assess the discovery and provide advice on mitigation and recording.	**Construction**
WA1	~~Waste~~ **Management of construction waste**	*Waste Management Plan* **NSW Ports** ~~PKPC~~ will ensure that appropriate general and hazardous waste identification, handling, storage, transportation, disposal and monitoring measures, to be followed on-site during construction for Stage 1 are included in a WMP which is to form part of all relevant CEMPs. **NSW Ports** ~~PKPC~~ will ensure these management measures as well as on site waste management activities are undertaken in accordance with the relevant NSW and Commonwealth Regulations and Guidelines.	**Pre-construction / Construction**

Ref	Issue	Environmental Management Measure	Timing
WA2	**Management of demolition waste**	*Demolition Management Plan* The DMP for Stage 1 will include appropriate management measures for the dismantling, removal and disposal of structures and materials from No. 3 and No. 4 Jetties.	**Pre-construction / Construction**
Operation			
W5	~~Hydrology and Water Quality~~ **Management of hydrology and water quality once operational**	*Operation Environment Management Plan* The OEMP will include the following measures to ensure the appropriate management of materials handled at the **terminal** ~~first multi-purpose berth~~: • A control system to ensure that bulk material stockpiles and materials within handling areas are contained onsite, through the use of containment walls, bunding, stormwater and dust controls. • Any excess sediment laden runoff will either be contained within the bunded storage areas or directed to a land based treatment area. • Implementation of a program of regular monitoring and maintenance of the storage and handling of bulk materials will be implemented. • Measures to minimise excess materials being deposited offsite during loading and transportation of bulk materials from the material handling area. • Implementation of controls such as vehicle shaker pads, use of vacuum road sweepers, covering loads during transport and dust suppression. • Inclusion of emergency spill response procedures in the ERP. • Inclusion of pollution control devices on the future paved surfaces of the development.	**Pre-operation / Operation**
W6	**Implementation of Water Sensitive Urban Design (WSUD)**	*Water Sensitive Urban Design* WSUD will be utilised where ever possible to reduce the volume, velocity and contaminants associated with stormwater runoff.	**Pre-operation / Operation**
W7	**Management of stormwater impacts**	*Stormwater Management Plan* A STMP will be prepared to appropriately manage the accumulation of surface water from rainfall, storm events and stockpile watering. The STMP will outline the management of surface water for operation of Stage 1 ~~(central portion of the multi-purpose terminals)~~ and measures for treatment such as a first flush stormwater capture system. Management of surface water will be	**Pre-operation / Operation**

Ref	Issue	Environmental Management Measure	Timing
		considered and confirmed during detailed design but is likely to include harvesting of water from roofs of buildings and other roofed structures.	
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**
HR5	**Management of hazardous substances during operation**	*Hazardous Substance Management Plan* **NSW Ports** ~~PKPC~~ will prepare a HSMP as part of the OEMP that will be implemented during the operation of the first berth including as a minimum, the following measures to prevent and respond to spills: • A system to ensure that all staff involved in the handling of chemicals are suitably qualified and trained in emergency spill response procedures. • Diagrams and descriptions of access and unloading locations and procedures for drivers of vehicles delivering chemicals. • A program of regular monitoring and maintenance of equipment used in the transportation and handling of chemicals. • A register of equipment, responsibilities and procedures for responding to spills. • A program of monitoring of the condition of bunding. • Procedures for maintenance activities for the Sulphuric acid pipeline that will be relocated from Berth 206.	**Pre-operation / Operation**
B6	Flora and Fauna	*Green and Golden Bell Frog Master Plan* A GGBF Master Plan will be prepared to provide a strategic framework on how GGBF and its habitat will be managed across the Port Kembla Outer Harbour area. The GGBF Master Plan will be prepared prior to commencement of operations of Stage 1. **NSW Ports** ~~PKPC~~ will consult with DECCW during preparation of the GGBF master plan.	**Pre-operation / Operation**
T4	Traffic	*Traffic Management Plan* A TMP will be included in the site OEMP. The Plan will address work practices on site, designated haulage routes to and from the site, driver protocols (including a Code of Conduct to encourage safe driving practices), financial penalties and hours of operation amongst other measures.	**Pre-operation / Operation**
T5	Rail	Recommendations for rail infrastructure upgrade and arrangements for network paths for construction and operation of Stage 1 are as follows:	**Pre-operation / Operation**

Ref	Issue	Environmental Management Measure	Timing
		• Rail infrastructure upgrade in the South Yard required for operation of Stage 1 will comprise extension of siding No. 13 by 120m to 780m and turnout installation and removal. Agreement will be sought from ARTC to allow the use of five train paths per day (one train for transport of fill material and four trains for the multi-purpose berth), in each direction on the Unanderra Line. **NSW Ports** ~~PKPC~~ will provide **DPHI** ~~Department of Planning~~ with updates regarding the demand for rail freight to/from the port and the progress of planned regional rail infrastructure upgrades prior to commencing the later stages ~~(i.e. Stage 1b and 1c)~~ of the dredging and reclamation works.	
N5	Noise	*Operational Noise and Vibration Management Plan* **NSW Ports** ~~PKPC~~ will prepare an ONVMP as part of the OEMP, prior to the commencement of operation of Stage 1 of the proposed development. The ONVMP should be prepared in accordance with the relevant DECCW guidelines and should incorporate best practice mitigation measures, The ONVMP will recommend noise mitigation measures required to address operational noise and sleep disturbance impacts arising from increased rail movements associated with Stage 1 of the project. To mitigate the potential sleep disturbance impacts associated with the use of train horns in Stage 1, **NSW Ports** ~~PKPC~~ will commit to use shorter train horn toots rather than standard longer train horn blasts. **NSW Ports** ~~PKPC~~ will carry out an additional noise impact assessment, if it is found, after detailed design and operations planning, that the finalised operational scenario differs significantly from that used for modelling purposes in the revised Noise and Vibration Impact Assessment prepared by AECOM and dated 20 September 2010).	**Pre-operation / Operation**
AQ2	Air Quality	*Air Quality Management Plan* **NSW Ports** ~~PKPC~~ will ensure that the AQMP includes appropriate site specific best practice mitigation measures for the management of particulate emissions during the operation of the proposed development such as: • Sealing roads and areas susceptible to windblown dust impacts. • Covering of transport loads. • Watering and/or using surfactants on stockpiles. • Covering of bulk cargo stockpiles (where necessary practicable). • Instantaneous dust monitoring at the boundary of the site most affected by dust impacts.	**Pre-operation / Operation**

Ref	Issue	Environmental Management Measure	Timing
		• Reclaimed areas for future terminal development to be covered with suitable compacted materials to ensure fugitive dust emissions are minimised. Site specific mitigation measures for the management of particulate emissions during the operation of the proposed development's night time operation.	
LV2	Landscape and Visual Amenity	*Landscape Management Plan* **NSW Ports** ~~PKPC~~ will ensure that the LMP includes appropriate site specific measures and controls to mitigate potential visual impacts on the immediate, local, and regional landscape including: Lighting for the portion of the ~~dry bulk/multi-purpose~~ terminal that will be operational as part of Stage 1 and other operational areas, including the new road link, will be carefully selected to minimise light spill on surrounding areas outside the terminal boundaries and minimise visual impact when viewed from adjacent premises. Selection of suitable colours and materials for the terminal pavement, buildings and other structures to minimise reflectivity and contrast.	**Pre-operation / Operation**
S1	Sustainability	As per Concept Plan	**Pre-operation / Operation**
CC1	Climate Change	As per Concept Plan	**Pre-operation / Operation**
WA3	Waste	*Waste Management Plan* **NSW Ports** ~~PKPC~~ will ensure that appropriate general and hazardous waste identification, handling, storage, transportation, disposal and monitoring measures, to be followed on-site during operation of the proposed development, are included in a WMP which is to form part of the OEMP. **NSW Ports** ~~PKPC~~ will ensure these management measures as well as on site waste management activities are undertaken in accordance with the relevant NSW and Commonwealth Regulations and Guidelines. The following measures will be included as a minimum in the WMP: Incoming vessels to the Port will be subjected to assessment in accordance with the Quarantine Act 1908. Australian Quarantine Inspection Service (AQIS) manages quarantine controls at our borders to minimise the risk of exotic pests and diseases entering the country. Incoming vessels will have to apply to the AQIS: form s20AA Permission to Enter an Australian Non-Proclaimed First Port of Entry and/or Application for s33 Permission to Enter Subsequent Ports of Call. The OEMP should incorporate requirements as in the National Ballast Water Management Arrangements under the Australian National System for the Prevention and Management of Marine Pest Incursions.	**Pre-operation / Operation**

Ref	Issue	Environmental Management Measure	Timing
SE1	Socio-Economic	**NSW Ports** ~~PKPC~~ will ensure that access to the existing small boat harbour and associated facilities is not affected during either the construction or operational phase of Stage 1. **NSW Ports** ~~PKPC~~ will include appropriate measures in a SFMP for Stage 1 to ensure that safe access is provided for recreational boaters entering and exiting the small boat harbour, particularly during reclamation and dredging activities. **NSW Ports** ~~PKPC~~ will continue to liaise with affected businesses and local community groups during Stage 1 to inform them about project status and timing for construction key project components.	**Pre-operation / Operation**

Table B-2: Updated compilation of environmental management measures for the modified project - Concept

Ref	Issue	Environmental Management Measure	Timing
C-G1	Environmental Management	The proposed Outer Harbour development will be constructed and operated generally as described in the ~~*Port Kembla Outer Harbour Development, Environmental Assessment*, prepared by AECOM and dated February 2010~~ **MOD5 report**~~.~~ ~~portrayed in Figure 5-3 (Concept Plan) and in Figure 5-5 (Major Project).~~ The proponent will prepare and implement a suite of Environmental Management Plan (EMP) Framework documents that will be developed for construction (including dredging and reclamation) and operation for Stages 1, 2 and 3 of the Concept Plan. Each discrete phase of construction activity will have its own **Construction Environmental Management Plan (**CEMP**)**. Similarly, discrete operating units (e.g. terminals) will each have their own **Operational Environmental Management Plan (**OEMP**)**. All CEMPs and OEMPs will include appropriate strategies and management measures to control and manage environmental risks, assess environmental performance and comply with relevant statutory requirements that are applicable to activities to be undertaken within that stage of the Concept Plan. Sub-plans will be included in the CEMP and OEMP Framework and will be included in each relevant stage of the project as appropriate. Sub-plans that will be required to be prepared for either construction or operation of at least one of the stages of the project will include the following: • Soils and Water Management Plan (SWMP). • Stormwater Management Plan (STMP). • Acid Sulfate Soil Management Plan (ASSMP). • Spoil Management Plan (SPMP). • Dredging Environment Management Plan (DEMP). • Site Management Plan (SMP). • Hazardous Substance Management Plan (HSMP). • Emergency Response Plan (ERP). • Green and Golden Bell Frog Management Plan (GGBFMP). • Traffic Management Plan (TMP).	**Pre-construction**

Ref	Issue	Environmental Management Measure	Timing
		• Noise and Vibration Management Plan (NVMP). • Air Quality Management Plan (AQMP). • Safety Management Plan (SFMP). • Landscape Management Plan (LMP). • Conservation Management Plan (CMP). • Waste Management Plan (WMP). • Demolition Management Plan (DMP). • Refuelling Management Plan (RMP).	
C-SW1	Soil Erosion and Sedimentation	Controls and measures to mitigate soil erosion and sedimentation construction and operation impacts as a result of Stage 1 of the Concept Plan are detailed within the **approved project (MP08_0249)** ~~Major Project~~ SoC (Table 1-2). A Soils and Water Management Plan (SWMP) would be prepared prior to the commencement of construction activities and will be included as a sub-plan in the relevant CEMP for that stage. The SWMP will be prepared in accordance with Landcom's Managing Urban Stormwater; Soils and Construction Manual 2004 and will be maintained for the duration of the construction process and operational period. A Stormwater Management Plan (STMP) would be prepared prior to the commencement of operation of activities. Potential impacts to soil erosion and sedimentation as a result of Stages 2 and 3 of the Concept Plan will be identified during environmental assessments undertaken to support project applications for those stages. Controls and measures to mitigate impacts will be incorporated into SWMPs and STMPs to be implemented during construction and operation phases for Stages 2 and 3, respectively.	
C-W1	Hydrology and Water Quality	A SWMP would be prepared prior to the commencement of key project components and will outline specific measures to ensure impacts to water quality and hydrology during construction of each stage of the Concept Plan are minimised. Monitoring programs for water quality and biology will be developed, in consultation with DECCW and the Port Kembla Harbour Environment Group, and implemented for each stage of the Concept Plan. These monitoring programs will outline monitoring frequencies and testing procedures and results will be used to identify emerging trends or problems, provide data for measuring the impact of operational activities, determine whether pollution controls are working and provide a basis for efficient response to emergencies such as spills.	**Pre-construction and Construction**

Ref	Issue	Environmental Management Measure	Timing
		NSW Ports ~~PKPC~~ will ensure that hydrological and ecological considerations are taken into account in the stormwater design for terminals for all stages of terminal construction. Water sensitive urban design (WSUD) will be utilised where ever practicable to reduce the volume, velocity and contaminants associated with stormwater runoff. Inclusion of pollution control devices on the future paved surfaces of the development.	
~~**C-C1**~~	~~Contaminated Sediments~~	~~Mitigation measures proposed to manage contaminated sediment impacts associated with Stage 1 will be included within a DEMP and are presented in the Major Project SoC (Table 1-2).~~ ~~A DEMP will also be prepared prior to dredging activities for Stage 3 and will broadly include the following:~~ ~~• Description of extraction methodology and machinery to be employed.~~ ~~• Identification of dredge areas.~~ ~~• Identification of disposal (reclamation) areas.~~ ~~• Turbidity control devices (floating booms, silt curtains).~~ ~~• Erosion and sediment control measures.~~ ~~• Water and air quality monitoring locations.~~ ~~Additional Contaminated Sediment Investigations will be undertaken as part of subsequent project applications for Stage 3. The additional investigations will assess potential contaminated sediment impacts associated with the following:~~ ~~Area to be dredged north of Port Kembla Gateway to accommodate the third multipurpose berth.~~ ~~• Dredging for expansion of the existing ship turning circle located south of the northern breakwater.~~ ~~Reclamation for northern portion of the multi-purpose terminals.~~ ~~Mitigation measures that are proposed to manage contaminated sediments that are located in these areas will be included in the SMPs for those stages.~~	~~**Pre-construction / Construction**~~
C-C1	Contaminated Soils and Groundwater	Mitigation measures proposed to manage contaminated soil and groundwater impacts associated with Stage 1 will be included within a SMP and are presented in the **approved project (MP08_0249)** ~~Major Project~~ SoC (Table 1-2). Additional Contaminated Land Investigations will be undertaken as part of subsequent project applications for Stages 2 and 3. The additional investigations will assess potential contaminated soil and groundwater impacts associated with the following:	**Pre-construction / Construction**

Ref	Issue	Environmental Management Measure	Timing
		• An extension of the road link from Christy Drive to connect with the container terminals. • Reconfiguration of rail in the South Yard to enable efficient operation of the western and eastern container facilities (this is in addition to the rail infrastructure upgrade required as part of Stage 1). • An extension of an existing rail siding into and along the length of the container terminals. • New road link from Darcy Road to boat harbour. • Hard stand of landward extent of development west to existing rail lines and south to Foreshore Road. Any contamination 'hot spots' that are identified during subsequent investigations for Stages 2 and 3 will be included within SMPs for those stages. Develop a groundwater monitoring program to be conducted at the site prior to the commencement of the works and regularly thereafter. This program will be designed and undertaken so as not to impede construction or operation of the development. In developing the groundwater monitoring program **NSW Ports** ~~PKPC~~ will review and utilise the results for the existing groundwater monitoring program being undertaken for the Outer Harbour.	
C-HR1	Human Health and Ecological Risk	Measures proposed to mitigate potential risks for Stage 1 are presented in the **approved project (MP08_0249)** ~~Major Project~~ SoC. Where applicable, these measures will also be applied to Stages 2 and 3 of the Concept Plan. *Site Management Plan* **NSW Ports** ~~PKPC~~ will prepare a SMP for each stage of the Concept Plan which will set our procedures to manage potential risks identified to human receptors and ecological receptors during land based construction works. ~~*Dredging Environment Management Plan*~~ ~~PKPC will prepare a DEMP prior to dredging activities for Stage 3.~~ •	**Pre-construction / Construction / Operation**
C-HR2	**Human Health and Ecological Risk from hazardous substances**	*Hazardous Substance Management Plan* An HSMP will be prepared for each Stage of the Concept Plan and will contain the following information where it is relevant to the proposed activities: • Work methods to safeguard against hazards such as spills. Any fuel spillage will be reported, documented and immediately remediated.	**Pre-construction / Construction / Operation**

Ref	Issue	Environmental Management Measure	Timing
		• Appropriate methyl bromide management procedures for the container terminals. • Separation of the flammable solids and flammable liquids storage areas. • Ammonium Nitrate (AN) storages at the container terminal will be sited and designed to comply with the relevant Australian Standard (AS) in respect to both storage quantities and siting (distance separation). • Transport risk assessment studies which will be conducted for future development at each facility will include an assessment of the transport requirements and risks associated with the transport of Dangerous Goods. • Appropriate training and qualifications for staff involved in the handling of chemicals and in emergency spill response procedures. • Diagrams and descriptions of access and unloading locations will be developed as well as procedures for drivers of vehicles delivering chemicals. • A program of regular monitoring and maintenance of equipment used in the transportation and handling of chemicals. • A register of equipment, responsibilities and procedures for responding to spills. • A program of monitoring of the condition of bunding.	
C-HR3	**Emergency response management**	*Emergency Response Plan* An Emergency Response Plan (ERP) will be prepared as part of the OEMP for each of the ~~general cargo~~ terminals and container terminals. The ERP will be prepared in accordance with the HIPAP No.1 Emergency Planning Guidelines.	**Pre-operation / Operation**
C-HR4	**Additional hazard assessments required**	*Additional Assessments* A further qualitative risk assessment will be undertaken once dredging methodology has been confirmed, prior to the commencement of dredging tasks in Stage 1 and Stage 3, and will include: • A further qualitative risk assessment of contaminated sediment dispersal to assess potential risks to ecological receptors. • Recommendations and mitigation measures that arise from these additional assessments will be incorporated into the DEMP.	
C-HR2	Potential Hazard	*Hazardous Substance Management Plan*	**Pre-construction / Construction / Operation**

Ref	Issue	Environmental Management Measure	Timing
		NSW Ports ~~PKPC~~ will ensure that the risks that may be associated with potential hazards will be maintained within the permissible levels via mitigation measures included in a HSMP. Measures will include: • The container terminal will be designed with appropriate Methyl Bromide dosing and capture systems and operated in a manner that minimises the risk of release of potentially harmful gas. • The flammable solids storage area will be separated from the flammable liquids storage area by a minimum of 35m. • The risks associated with the potential storage of toxic gases will be specifically addressed in the individual environmental impact assessments conducted for the various terminal operators. Appropriate risk reduction measures that may be determined as a result of this assessment will be included in the terminal design and operational procedures, where applicable. A Final Hazard Assessment will be prepared as part of detailed project applications for operation of the ~~container~~ terminals.	
C-B1	~~Flora and Fauna~~ **Potential compensation requirements**	*Compensatory Measures* Compensatory measures to offset the loss of soft substrate habitat in the Outer Harbour and the sandy beach area of Red Beach are proposed for Stage 1 of the Concept Plan. A summary of these measures is presented in the **approved project (MP08_0249)** ~~Major Project~~ SoC. The need for additional compensatory measures for Stages 2 and 3 will be considered during environmental assessments prepared as part of project applications for those stages.	**Pre-construction / Construction**
C-B2	**Potential impact to Green and Golden Bell Frog**	*Green and Golden Bell Frog Master Plan* A GGBF Master Plan will be prepared to provide a strategic framework for how GGBF and its habitat will be managed across the Port Kembla Outer Harbour area. The GGBF Master Plan will focus upon sites with the greatest potential for GGBF habitat and connectivity, particularly freight rail corridors and associated land areas. The GGBF Master Plan will be prepared following preparation of the Rail Master Plan (so that it is compatible with the rail infrastructure requirements of the port) and prior to commencement of Stage 2 operations. **NSW Ports** ~~PKPC~~ will consult with DECCW and other relevant stakeholders during preparation of the GGBF master plan. *Green and Golden Bell Frog Management Plan* The GGBFMP framework prepared as part of this EA will be developed into a comprehensive GGBFMP in consultation with a suitably qualified ecologist and DECCW prior to the commencement of construction works for Stage 1. The	**Pre-construction / Construction**

Ref	Issue	Environmental Management Measure	Timing
		GGBFMP developed for Stage 1 construction works will be reviewed and updated in association with the environmental assessments that will be undertaken as part of project applications for Stages 2 and 3. Each GGBFMP will include the following as a minimum: • Program of works and timeline for all key components of the project. • Undertake a conservation assessment ranking for any known or likely GGBF habitats in the study area, including but not limited to, identification and assessment of breeding, shelter, foraging, and movement habitat components. • Identify any actual or potential threats from construction and operations. • Identify appropriate actions to prevent or minimise actual or potential threats. • Include details of how the proponent will monitor and report on the ongoing effectiveness of the GGBFMP. • A program of works and timeline for planting and landscaping in appropriate areas with vegetation suitable for GGBF foraging and shelter as well as installing structures (such as logs and concrete pieces) to facilitate movement and over wintering habitat. • A feasibility assessment of retaining and/or enhancing shelter, foraging and movement habitat or potential breeding habitat along the proposed road corridor off Darcy Road. Further mitigation measures that will be implemented in relation to the proposed road corridor off Darcy Road during Stage 2 include: • Pre construction frog surveys. • Careful, staged clearing of site and provision of proximate alternate habitat to encourage frogs to seek shelter. • Installation of permanent 1 metre high frog exclusion fencing. • Careful direction of surface water runoff. • Appropriate signage at entrance and exit of the proposed road alerting staff and visitors that an endangered species has been found in this area and to exercise caution. • Site inductions to educate workers. • Monitoring and regular review of performance of mitigation measures.	

Ref	Issue	Environmental Management Measure	Timing
		Mitigation measures proposed to manage impacts on GGBFs for Stage 1 construction works are detailed in the **approved project (MP08_0249)** ~~Major Project~~ SoC. The need for additional breeding ponds to be constructed to offset impacts to potential foraging habitat for populations of GGBF (particularly adjacent to Site 8) will be assessed as part of project applications for Stage 2 and Stage 3 of the Concept Plan. Ecological impacts of the Concept Plan will be reviewed as part of project applications for Stages 2 and 3 including impacts on threatened species, populations and ecological communities, and riparian and stream ecology (Salty Creek).	
C-T1	Rail	Recommendations for rail infrastructure upgrades and arrangements for Stage 1 are presented in the **approved project (MP08_0249)** ~~Major Project~~ SoC. Adequacy of the existing rail infrastructure and capacity of the regional network will need to be reassessed prior to the construction and operation of Stages 2 and 3. The following commitments are proposed to assess rail infrastructure and network capacity for Stages 2 and 3: **NSW Ports** ~~PKPC~~ will provide **DPHI** ~~Department of Planning~~ with updates regarding the demand for rail freight to/from the port and the progress of planned regional rail infrastructure upgrades prior to commencing the later ~~stages (i.e. Stage 1b and 1c)~~ of the dredging and reclamation works. **NSW Ports** ~~PKPC~~ will participate in the Maldon Dombarton Study, ensuring that the Outer Harbour is included as a main destination for goods in the Maldon - Dombarton Study. • **NSW Ports** ~~PKPC~~ will liaise with RailCorp regarding access from the Outer Harbour to the Unanderra Line (a distance of 4km). **NSW Ports** ~~PKPC~~ will prepare a rail master plan prior to the commencement of construction of Stage 2 to identify rail infrastructure requirements for Stages 2 and 3 of the Concept Plan.	**Pre-construction / Construction**
C-T2	Traffic	A Traffic Management Plan (TMP) will be prepared by **NSW Ports** ~~PKPC~~ in accordance with Traffic Control at Worksites **(TfNSW, 2022)** ~~(RTA, 2003)~~, prior to construction of Stage 1 in order to minimise impact on pedestrian and vehicle movements. The TMP will include control measures such as designated haulage routes and driver code of conduct to encourage safe driving practices. The proposed content of the TMP is detailed in the **approved project (MP08_0249)** ~~Major Project~~ SoC. Future traffic and transport assessments will be undertaken as part of project applications for Stages 2 and 3. This will include an assessment of the traffic impacts associated with the changes to the road network and to separate port related traffic and public traffic accessing the boat harbour.	**Pre-construction / Construction**

Ref	Issue	Environmental Management Measure	Timing
		NSW Ports ~~PKPC~~ will progressively assess the volume of truck movements associated with the Project applications for each stage of the Outer Harbour development to ensure that they are consistent with the volumes predicted in the EA. The assessment will take into account actual truck volumes generated from the Outer Harbour development at that point of time. If the volume of truck movements is predicted to exceed the volumes assessed in the EA then further assessment of the likely impacts associated with any additional truck traffic on the road network will be required. All roads constructed as part of the development would be designed to accommodate the number and type of vehicle movements projected and would satisfy relevant design standards and would consider local guidance publications including the Wollongong City Council's Subdivision Policy for Road Construction. **NSW Ports** ~~PKPC~~ will ensure that any new road infrastructure required for Stages 2 and 3 of the Concept Plan is planned and designed to ensure adequate access is retained for existing premises and will consult with affected businesses and the wider community in this regard. Car park facilities will be established within dedicated construction areas internal to the site. Car parks will be designed to cater for the number of construction vehicles to reduce or avoid potential overflow impacts on the local road network, such as Foreshore Road.	
C-N1	~~Noise~~ **Potential noise and vibration impacts**	*Noise and Vibration Management Plans* A Construction Noise and Vibration Management Plan (CNVMP) will be prepared by **NSW Ports** ~~PKPC~~ prior to the commencement of construction of Stage 1 in line with DECCW "Draft Construction Noise Guidelines". The content of the CNMP is detailed in the **approved project (MP08_0249)** ~~Major Project~~ SoC. **NSW Ports** ~~PKPC~~ will prepare an Operational Noise and Vibration Management Plan (ONVMP) prior to the commencement of operation of each stage of the Concept Plan. The ONVMP should be prepared in accordance with the relevant DECCW guidelines and should incorporate best practice mitigation measures,	**Pre-construction / Construction**
C-N2	**Potential noise impacts from rail activities**	*Rail Noise and Sleep Disturbance* An assessment of the acoustic impact arising from changes to the rail infrastructure associated with Stages 2 and 3 of the Concept Plan will be undertaken following completion of the Rail Master Plan when more information is known about the likely train movements in the Outer Harbour. Operational noise and sleep disturbance impacts arising from increased rail movements associated with Stages 2 and 3 of the Concept Plan will be investigated and, if required, appropriate noise mitigation measures will be recommended.	**Pre-construction / Construction / Operation**

Ref	Issue	Environmental Management Measure	Timing
		To mitigate the potential sleep disturbance impacts associated with the use of train horns, **NSW Ports** ~~PKPC~~ will commit to use shorter train horn toots rather than standard longer train horn blasts. In addition, for Stages 2 and 3 of the Concept Plan **NSW Ports** ~~PKPC~~ will investigate the feasibility of further mitigation measures such as: • The removal of the Foreshore Road rail crossing; • Grade separation at the Old Port Road rail crossing. Noise and vibration assessments will be undertaken as part of applications for project applications for Stages 2 and 3 to assess both construction and operation impacts.	
C-AQ1	Air Quality	An AQMP will be prepared for inclusion in the CEMP and OEMP for each stage of the Concept Plan. The AQMP should include a requirement for on-going dust monitoring during the construction of Stage 1 of the project (for further details refer to **approved project (MP08_0249)** ~~Major Project~~ SoC – Table 1-2). Site specific best practice mitigation measures for the management of particulate emissions during construction and operation of each of the stages of the Concept Plan will be included in AQMPs. Mitigation measures to be included in the AQMP for Stage 1 are detailed in the **approved project (MP08_0249)** ~~Major Project~~ SoC (Table 1-2). **NSW Ports** ~~PKPC~~ will assess future operations at the site on a case by case basis, for potential impacts on the local air shed, with consideration of the regional and local pollution findings of the revised Air Quality Impact Assessment prepared by AECOM dated 10 September 2010. Further analysis and atmospheric dispersion modelling will be undertaken for Stages 2 and 3 of Concept Plan. The reporting of this modelling will be included in separate project applications for Stage 2 and 3 of the Concept Plan.	**Pre-construction / Construction**
C-SE1	Socio-Economic	Throughout the progressive development of the Concept Plan **NSW Ports** ~~PKPC~~ will ensure that access to the existing small boat harbour and associated facilities is not affected during either the construction of operational activities of each stage. In addition, **NSW Ports** ~~PKPC~~ will include appropriate measures in a SFMP to ensure that safe access is provided for recreational boaters entering and exiting the small boat harbour. **NSW Ports** ~~PKPC~~ will continue to liaise with community groups to inform them about project status throughout the development of the Concept Plan.	**Pre-construction / Construction**
C-LV1	Landscape and Visual Amenity	**NSW Ports** ~~PKPC~~ will prepare a Landscape Management Plan to ensure visual impacts associated with Stage 1 are minimised. The content of the LMP is detailed in the **approved project (MP08_0249)** ~~Major Project~~ SoC. LMPs will be prepared as part of CEMPs and OEMPs for each stage of the Concept Plan and will include the following: • Lighting used for evening and night time work will be projected downward and onto the proposed works.	**Pre-construction / Construction / Operation**

Ref	Issue	Environmental Management Measure	Timing
		• Construction timing should be programmed to ensure efficiency of works and minimise period of disturbance. • Construction areas and plant/machinery and materials storage areas will be clearly designated and clearly defined. • Lighting for terminals and other operational areas, including the new road link, will be carefully selected to minimise light spill. • A Landscape Management Plan (LMP) will be prepared to guide any landscaping works that are proposed across the area of development. Suitable colours and materials will be selected for the terminal pavement, buildings and other structures to minimise reflectivity and contrast. Landscape and Visual Amenity assessments will be undertaken as part of project applications for Stages 2 and 3.	
C-H1	~~Heritage~~ **Potential impact from demolition**	*Archival Photographic Recording* An archival photographic recording will be prepared prior to demolition of No. 3 and No. 4 Jetties (part of Stage 1) and a comprehensive history of the jetties prepared. An archival photographic recording will be prepared prior to demolition of No. 6 Jetty (part of Stage 3) and a comprehensive history of the jetty prepared.	**Pre-construction / Construction**
C-H2	**Potential impact to underwater heritage**	*Historical Shipwrecks* Should any evidence of shipwreck material be encountered during dredging or other activities during Stages 1 ~~and 3~~, works in the immediate vicinity will cease, the Heritage Branch will be contacted immediately and a suitably qualified maritime archaeologist will be contacted to assess the discovery and provide advice on mitigation and recording.	**Pre-construction / Construction**
C-H3	**Potential impact to unidentified heritage items**	*Other Heritage Items or Archaeological Relics* Should unidentified European heritage items and/or archaeological relics be encountered during construction, works in the immediate vicinity will cease, the Heritage Branch will be contacted immediately and a suitably qualified heritage consultant will be contacted to assess the discovery and provide advice on mitigation and recording. The environmental assessment to be undertaken as part of a project application for Stage 2 will further consider the intrusion of the new road link connecting Darcy Road with the boat harbour on accessibility between the concrete pillbox and the Historic Military Museum. **NSW Ports** ~~PKPC~~ will ensure the design of the new road limits intrusion on the listed heritage items including consideration of the use of landscaping to ensure that any visual impact is minimised.	**Pre-construction / Construction**

Ref	Issue	Environmental Management Measure	Timing
		NSW Ports ~~PKPC~~ will prepare a Conservation Management Plan (CMP) for the Mobile Block Setting Crane prior to commencing construction activities within the proximity of the item during Stage 2. **NSW Ports** ~~PKPC~~ will restore the crane in accordance with the recommendations of the CMP, relocate the crane to a safe and prominent location nearby and provide interpretive signage for the public.	
C-WA1	~~Waste~~ **Potential impact from waste during construction**	*Waste Management Plan* WMPs will be prepared for inclusion in relevant CEMPs and OEMPs for all stages of the Concept Plan and will emphasise potential for recovery and reuse of waste, minimise waste generation, and include specific requirements for each of the waste types identified.	**Pre-construction / Construction**
C-WA2	**Potential waste impact from demolition activities**	*Demolition Management Plan* A Demolition Management Plan (DMP) will be prepared to include appropriate management measures for the dismantling, removal and disposal of structures and materials during Stages 1 ~~and 3~~. Waste assessments will be undertaken for Stages 2 and 3 as part of project applications for these stages.	**Pre-construction / Construction**
C-S1	Sustainability	Throughout all stages of the Concept Plan **NSW Ports** ~~PKPC~~ is committed to the following: • Consider the potential for incorporating local renewable power generation (e.g. from micro and large scale wind turbines) as part of future design and construction works. • Consider the potential for power generation from the sun by encouraging future tenants and lessees to install panels on structures to take advantage of the solar potential. • Investigate the potential for water capture and reuse during the detailed design of terminals. Recommendations and mitigation measures to manage sustainability issues identified during this environmental assessment will be reviewed as part of environmental assessments for Stages 2 and 3, and revised to incorporate new technological innovations that could be considered and implemented as part of the total development. The design of berths and terminal areas will include allowance for the provision of alternative marine power (AMP) for vessels while at berth to allow for possible future use of ship to shore power.	**Pre-construction / Construction**
C-CC1	Climate Change	Throughout all stages of the Concept Plan **NSW Ports** ~~PKPC~~ is committed to the management of the impacts of a variable climate and extreme weather conditions as follows:	**Pre-construction / Construction**

Ref	Issue	Environmental Management Measure	Timing
		• The proposed reclamation and pavement levels will be set above predicted extreme sea level rises (i.e. including storm surges and extreme events) for the 100 year design life, with a freeboard suitable to cater for further sea level rise beyond that time. • Risk management strategies will be in place for extremely hot days to manage potential rail buckling. • Maintenance regimes will take accelerated degradation of infrastructure into account. Assessments for Stages 2 and 3 will review the findings of this assessment in light of the latest climate change projections and statistics.	