NSW GOVERNMENT | Planning

MAJOR PROJECT ASSESSMENT
Port Kembla Outer Harbour Development
Port Kembla
(08_0249)

Director-General's
Environmental Assessment Report
Section 75I of the
Environmental Planning and Assessment Act 1979

February 2011

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EXECUTIVE SUMMARY

Port Kembla Port Corporation (the Proponent) proposes to develop additional portside and landside facilities in the Outer Harbour of Port Kembla to attract new trades as well as increase the volume of existing cargoes.

Development of the Port is anticipated to occur over a relatively long timeframe (up to 2037). Consequently, the Proponent seeks planning approval for a Concept Plan, involving development in three distinct stages, and project approval for Stage 1.

On 10 October 2008, the Director-General formed the opinion pursuant to *State Environmental Planning Policy (Major Development) 2005*, that the project is a development of a kind to which Part 3A of the *Environmental Planning and Assessment Act 1979* (the Act) applies. On 7 January 2009, the Minister authorised the lodgement of a concept plan for the project.

The Concept Plan comprises the following components:

- 42 hectares of land reclamation and associated dredging;
- Demolition of existing No. 3 Jetty and No. 4 Jetty;
- Demolition or refurbishment of No. 6 Jetty (Port Kembla Gateway);
- Construction and Operation of 3 Multi-purpose Terminals and Berths and 4 Container Terminals and Berths;
- Construction/upgrade of road and rail infrastructure; and
- Extension of Salty Creek and Darcy Road drain under the reclamation footprint.

Stage 1 would be developed in three substages (Stages 1A, 1B and 1C). The majority of the dredging and reclamation activities would occur during this stage. Also to be undertaken under this stage are construction and operation of one new multi-purpose berth and terminal (central part), road and rail infrastructure upgrades, demolition of existing No. 3 and No. 4 Jetties and extension of the Salty Creek and Darcy Road drain through the reclamation area to the Outer Harbour

The Concept Plan has a capital cost of $700 million, with Stage 1 estimated at $313 million. The entire project would employ 380 full-time staff during construction and 200 full-time staff during operation. The following timeframes are proposed for the construction of the three stages in the Concept Plan:

- Stage 1: 2011 – 2018
- Stage 2: 2014 – 2025
- Stage 3: 2026 – 2037

The Department received 18 submissions during the exhibition of the project. Seven of these were from public authorities, four from local businesses and stakeholders and seven from community interest groups and private individuals. The key issues raised in submissions are traffic and transport, noise and vibration, air quality, aquatic and terrestrial ecology, heritage, hydrology and water quality, and potential sediment and land contamination.

The Proponent prepared a Submissions Report for both the Concept Plan and Stage 1 Project in response to the submissions received. In response to further issues raised by the Department of Environment, Climate Change and Water and the Department of Planning, the Proponent undertook revised assessments of noise and air quality and consequently updated the Submissions Report.

Transport impacts, including traffic generation and existing transport infrastructure capacity, are considered to be the principal issue in relation to the Concept Plan in view of the proposed high modal split towards rail for container movement, which currently is not supported by the necessary rail infrastructure. While the Department strongly supports rail transport in the Port's operation, progression to future stages would be restricted until the required rail capacity and supporting intermodal infrastructure is in place, or will be available in a timely manner to accommodate the movement of container goods which are proposed to occur in Stages 2 and 3. This restriction is reflected in the recommended terms of approval.

The Department has undertaken a comprehensive assessment of the Concept Plan and Stage 1 project and considers that the plan and project are consistent with key strategic plans and policies, including the State Plan, Illawarra Regional Strategy and the Three Ports Site under *State Environmental Planning Policy (Major Development) 2005*) and is in the public interest. The Department also considers that environmental issues

associated with the construction and operation of the Outer Harbour development have been adequately addressed and can be managed to acceptable levels, subject to the Proponent's Statement of Commitments and the Department's recommended terms and/or conditions of approval. The Department, therefore, recommends that the project be approved, subject to these terms and conditions.

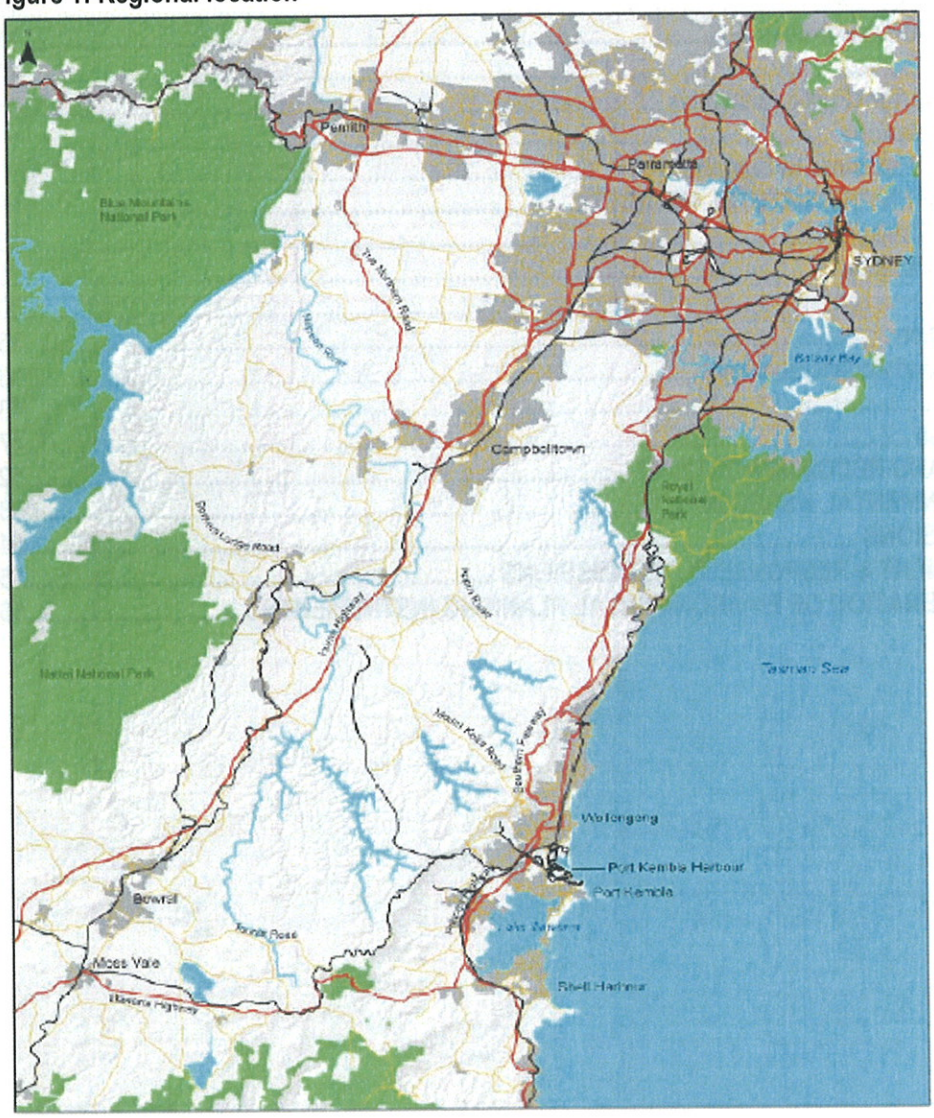
CONTENTS

1. BACKGROUND

Port Kembla Port Corporation (PKPC, the Proponent) proposes to develop the Outer Harbour of Port Kembla to attract new trades, increase the volume of existing cargoes, and position itself for future growth and development. The Inner Harbour of the Port is almost fully occupied and growth of trade is constrained by lack of suitable port facilities. Consequently, the Proponent has identified that the Outer Harbour is the only remaining area where new port facilities can be accommodated.

Port Kembla is located within the Wollongong local government area. It is approximately 3 km south of the Wollongong central business district (CBD), 80 km south of Sydney CBD and 60km from Sydney's south western suburbs. The location of the Port in the Metropolitan Sydney context is shown in **Figure 1.**

Figure 1: Regional location



Source: Figure 2-1 of the Port Kembla Outer Harbour Development Environmental Assessment (Volume 1)

There are two distinct areas within the port – the Inner Harbour where most development since 1960 has been concentrated, and the Outer Harbour, which was at its peak of activity in 1960 and has experienced a general decline in activity since then. The Outer Harbour is located in the south eastern extent of the port.

A number of commercial and industrial operations are adjacent to the Outer Harbour including Brick and Block (manufacturing masonry products), Morgan Cement, PKPC headquarters, PKPC Training and Conference Centre, BlueScope Steel, Orica and BHP Billiton. Other land uses in proximity are:

- commercial and residential properties at Port Kembla village to the south and south west of the Outer Harbour, the closest being properties along Wentworth Road; and

- a network of arterial roads including Five Island Road and Masters Road which connect with the Southern Freeway and Princess Highway.

The Port Kembla area is recognised as the major industrial precinct within the Illawarra Region and is a key employment precinct.

The Port of Port Kembla is one of three main international trade ports in NSW, the others being Port Botany in Sydney and the Port of Newcastle. Historically, the Port was primarily a bulk commodities port servicing coal, grain and other mineral exports, steel production and export and smaller volumes of bulk solids and liquids.

In recent years, the Port has received a portion of shipping, general cargo and car import activities previously handled through Port Jackson in Sydney Harbour as part of the State Government's *NSW Ports Growth Plan.* The relocated trades have been accommodated at the Port Kembla Inner Harbour within a newly built general cargo handling facility.

The Port is connected with Sydney and regional NSW by an established road and rail network. Key features of the Inner Harbour and the Outer Harbour are illustrated in **Figures 2** and **3.**

Figure 2: Inner and Outer Harbour of the Port of Port Kembla

Source: Figure 2-2 of the Port Kembla Outer Harbour Development Environmental Assessment (Volume 1)

Figure 3: Key features of the Outer Harbour

Source: Figure 2-3 of the Port Kembla Outer Harbour Development Environmental Assessment (Volume 1)

2. PROPOSED PROJECT

2.1 Project Description

The Proponent is seeking concept approval for the entire development of the Outer Harbour to be undertaken in three discrete stages over a 27 year period. It is also seeking concurrent project approval for Stage 1 of this development.

The Concept Plan includes the following components:

- Dredging and reclamation for total Concept Plan – the majority of these activities will occur during Stage 1. An estimated 5,300,000 m^3 of fill would be required for the reclamation works for the Concept Plan. Approximately 3,410,800 m^3 of this is required for Stage1, and the remainder would be required during Stages 2 and 3;
- Demolition of existing No. 3 Jetty and No.4 Jetty (Stage 1);
- Demolition or refurbishment of No.6 Jetty (Stage 3);
- Construction and Operation of 3 Multi-purpose Terminals and Berths and 4 Container Terminals and Berths (Stages 1-3);
- Construction/upgrade of road and rail infrastructure – these include a new road link from Christy Drive to the Multi-Purpose Terminal (Stages 1 and 2), rail infrastructure upgrade in South Yard (Stage 1), new road link from Darcy Road to the recreational boat harbour (Stage 2), and new rail overbridge across Foreshore Road (Stage 2); and
- Extension of Salty Creek and Darcy Road drain under the reclamation footprint (Stage 1).

The project components of each of the three stages are outlined in **Table 1** below. The Concept Plan and Stage 1 Project activities are illustrated in **Figures 4** and **5.** Stage 1 would be constructed in three stages (Stage 1A, 1B and 1C) and would require a total of approximately 4.6 million m^3 of fill to be sourced from the dredging area and external locations (see **Figure 6** and **Table 2**).

Table 1: Stages and Components of the Concept Plan

Stage 1 Project Application	Stage 2	Stage 3
Stage 1a: present - 2014 • reclamation and dredging for the central portion of the multi-purpose terminals • civil works for construction of terminal facilities including services • operation of central multi-purpose berth • new road links • relocation of sulphuric acid pipeline to central multi-purpose berth	**2014 – 2025** • land reclamation for the northern area of the multi-purpose terminals • construction and operation of second multi-purpose terminal • operation of first container berth • construction and operation of second container berth • new road link • new rail link and siding (including rail overbridge)	**2026 – 2037** • reclamation and dredging for northern proton of the multi-purpose terminals and berth • dredging to widen swing basin in northern Outer Harbour • construction and operation of the second and third multi-purpose berths and terminals • construction and operation of the eastern container terminals • construction of the container terminal northern piled structure
Stage 1b: present – 2015 • demolition of No.3 Jetty • reclamation and dredging for the western container facility • wharf construction for the first container berth		
Stage 1c: 2014 – 2018 • demolition of No.4 Jetty • reclamation and dredging for the eastern container facility • reclamation and dredging for the southern portion of the multi-purpose terminals • extension of Salty Creek and Darcy Road Drain • road upgrades		

The Outer Harbour development has been specifically designed to accommodate a high modal split to rail in the transport of container goods (10%/90% road/rail) which is programmed for Stages 2 and 3. This is primarily due to the limited landside area available to support the more extensive container storage areas required for truck transport and limitations of the road network.

It is noted that a cement facility is proposed to be located within the multi-purpose terminal area upon its completion. This proposal is subject to a separate project application under Part 3A of the Act and does not form part of the Concept Plan application.

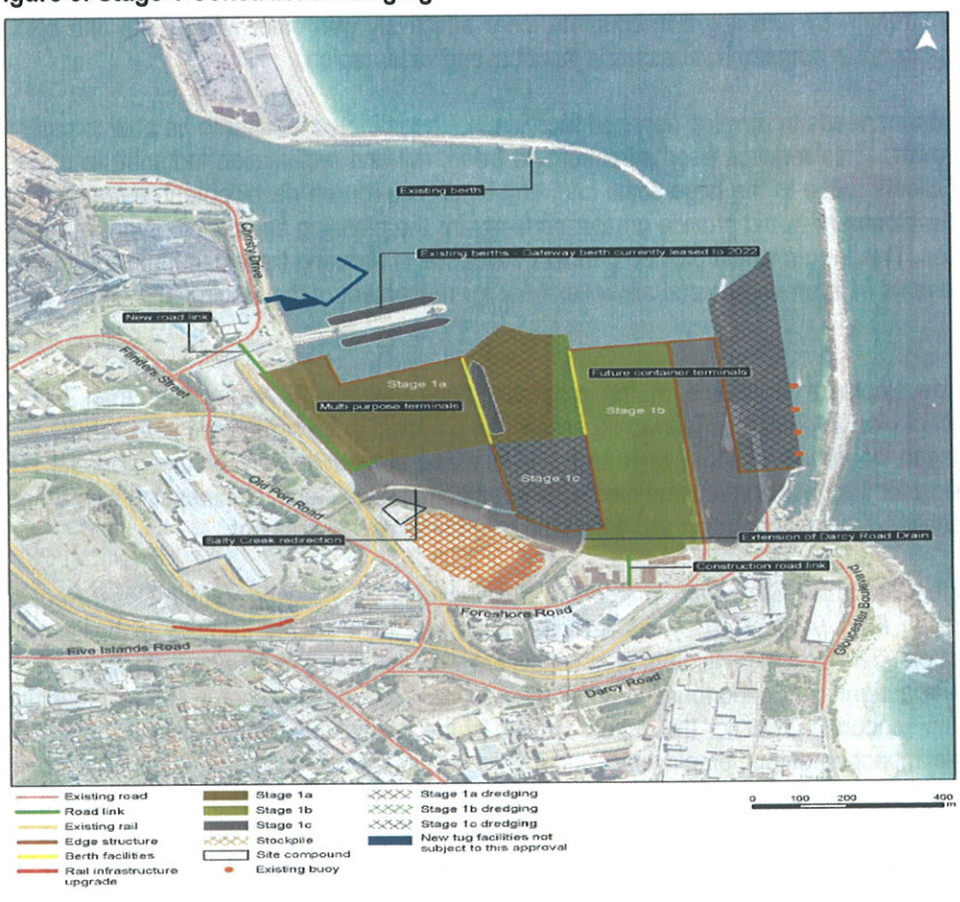
Figure 4: Concept Plan

Source: Figure 5-3 of the Port Kembla Outer Harbour Development Environmental Assessment (Volume 1)

Figure 5: Stage 1 Project

Source: Figure 5-5 of the Port Kembla Outer Harbour Development Environmental Assessment (Volume 1)

Figure 6: Stage 1 Construction Staging



Source: Figure 6-10 the Port Kembla Outer Harbour Development Environmental Assessment (Volume 1)

Table 2: Reclamation and Dredging Volume for Stage 1

Sub-Stage	Reclamation Area Volume (m^3)	Dredging Area		Balance of fill required to be sourced and transported from external locations (m^3)
		Volume of rock to be dredged (m^3)	Volume of soft sediments to be dredged (m^3)	
1a	798,398 Areas 1 & 2	89,225* Area 3	293,150* Area 3	798,398 (blast furnace slag and coal wash)
1b	2,016,000 Area 5	0 Area 6	60,000 Area 6	1,573,625
1c	1,813,651 Area 9	294,350 Area 8	480,525 Area 8	1,038,776
Totals	**4,628,049**	**383,575**	**833,675**	**3,410,799**

*Dredged material will be used in the Stage 1b reclamation area

Source: Table 6.3 of the Port Kembla Outer Harbour Development Environmental Assessment (Volume 1)

2.2 Project Need and Justification

The proposed development of the Outer Harbour is driven by the Proponent's need to accommodate future growth. Growth in trade is constrained by lack of suitable port facilities as land within the Inner Harbour is almost fully occupied, and the Outer Harbour is the only remaining area within the Port where this growth can be accommodated. Under the *NSW Ports Growth Plan (2003),* a proportion of shipping and cargo previously handled through Port Jackson has been transferred to Port Kembla's Inner Harbour. This shift allows the port to build on its competitive strength by enabling it to compete more effectively with other NSW ports and also to better service the needs of a wide range of businesses in the local and wider region.

Consequently, the Proponent needs to develop new port facilities in a coordinated manner to be able to cater for imminent and future growth. This requires seed infrastructure (road, rail and reclamation footprint) in place to attract new trades and clients. Due to the large scale and long timeframe for the development, a concept plan approval for a staged development would provide greater certainty for the planning and development of the site for the intended purposes. This in turn would provide greater confidence in securing trades and future customers for development components in later stages; and allow flexibility for refinement of the staging and design of the development.

Given the scale and development timeframe of the proposal (approximately 27 years), the then Minister concurred with the concept plan approach as this would enable the proposal to be considered in its totality while providing a flexible staged approvals scheme to reflect the intended staged delivery of the proposal. This approach would also allow for the development and functional operation of each stage, commencing with Stage 1 which is currently subject to a project application and a detailed environmental assessment.

The project has been identified in the *State Plan: Supporting Business and Jobs Illawarra/South Coast Region – Regional Business Growth Plan (August 2010),* as a high impact and high priority initiative in building key employment growth sectors. The port expansion is also consistent with the *Illawarra Regional Strategy 2006 – 2031,* as it would provide a significant opportunity to support investment and employment in the manufacturing sector, which is the main economic driver for the region. Growth of the port would entail a multiplier effect that would have an economic impact on output, employment and earnings to the region and NSW. A recent economic study undertaken for the Port, estimated that each ship call contributes $434,000 to the Illawarra Region and $511,000 to the NSW economy in a representative year (EconSearch 2009). In the short and long term, the port expansion would act as both a short term and long term stimulus to the local and regional economy during both construction and operational phases.

3. STATUTORY CONTEXT

3.1 Major Project

The proposal is a major project under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) *2005* because it is development for the purpose of shipping berths or terminals or wharf-side facilities (and related infrastructure) that has a capital investment value of more than $30 million under clause 22 of Schedule 1 of *State Environmental Planning Policy (Major Development) 2005* (MD SEPP). Therefore, the Minister for Planning is the approval authority.

On 10 October 2008, the Director-General, as delegate of the Minister for Planning, formed the opinion that the project was development as described in Schedule 1 of the MD SEPP and therefore the project is declared to be subject to Part 3A of the EP&A Act under section 75B of that Act. On 7 January 2009, the Minister for Planning authorised the submission of a concept plan for the proposal pursuant to section 75M of the Act.

3.2 Permissibility

The site is subject to the provisions of Schedule 3 - Part 20 (Three Ports Site) of the *State Environmental Planning Policy (Major Development) 2005* and is permissible with development consent within the SP1 Special Activities and IN3 Heavy Industrial zones. The objectives of the SP1 zone include: to enable the efficient movement and operation of commercial shipping, and to provide for the efficient handling and distribution of freight from port areas through the provision of transport infrastructure and to facilitate development that by its nature or scale requires separation from residential areas and other sensitive land uses. The objectives of the IN3 zone include: to provide suitable areas for those industries that need to be separated from other land uses, to minimise any adverse effect of heavy industries on other land uses, and to provide transport infrastructure and intermodal facilities. The project is consistent with the objectives of these zones.

3.3 Environmental Planning Instruments

Under Sections 75I(2)(d) and 75I(2)(e) of the EP&A Act, the Director-General's report for a project is required to include a copy of, or reference to, the provisions of any State Environmental Planning Policy (SEPP) that substantially governs the carrying out of the project, and the provisions of any environmental planning instruments (EPI) that would (except for the application of Part 3A) substantially govern the carrying out of the project and that have been taken into consideration in the assessment of the project.

The Department's consideration of relevant SEPPs and EPIs is provided in Appendix D.

3.4 Objects of the EP&A Act

Decisions made under the EP&A Act must have regard to the objects of the Act, as set out in Section 5 of the Act. The relevant objects are:

(a) to encourage:
- *(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*
- *(ii) the promotion and co-ordination of the orderly and economic use and development of land,*
- *(iii) the protection, provision and co-ordination of communication and utility services,*
- *(iv) the provision of land for public purposes,*
- *(v) the provision and co-ordination of community services and facilities, and*
- *(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*
- *(vii) ecologically sustainable development, and*
- *(viii) the provision and maintenance of affordable housing, and*

(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and

(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

Of particular relevance to the environmental assessment and eventual determination of the concept plan and Stage 1 project application are those objects specified under Section 5(a). Relevantly, the objects specified under (i), (ii), (iii), (vi) and (vii) are significant factors informing the determination of the proposal (noting that the proposal does not raise significant issues relating to land for public purposes, community services and facilities or affordable housing). With respect to ecologically sustainable development, the EP&A Act adopts the definition in the *Protection of the Environment Administration Act 1991,* and is discussed further in Section 3.5.

In addition to the above, the agency and community consultation undertaken as part of the assessment process (see Section 4 of this report) address objects 5(b) and (c) of the Act.

3.5 Ecologically Sustainable Development

The EP&A Act adopts the definition of Ecologically Sustainable Development (ESD) found in the *Protection of the Environment Administration Act 1991.* Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes and that ESD can be achieved through the implementation of:

(a) the precautionary principle,
(b) inter-generational equity,
(c) conservation of biological diversity and ecological integrity,
(d) improved valuation, pricing and incentive mechanisms.

The principles of ESD have been addressed in the Environmental Assessment prepared by the Proponent for the project. The Department considers that the Concept Plan and Stage 1 project generally promote the principles of ESD as they are proposed to be undertaken in a manner that minimises environmental impacts, and considers inter-generational equity through expansion of Port operations, which would benefit future generations through provision of employment and attracting investment in the Wollongong LGA and the Illawarra Region. It also considers that the proposed development is able to be constructed without any significant impact on the biological diversity and ecological integrity of the locality through the implementation of management and mitigation measures. Additionally, a range of environmental factors has been considered in the valuation of assets and services such as a transport modal split favouring rail and use of recycled spoil, slag and interburden rock for reclamation.

3.6 Statement of Compliance

In accordance with section 75I of the EP&A Act, the Department is satisfied that the Director-General's environmental assessment requirements have been complied with.

4. CONSULTATION AND SUBMISSIONS

4.1 Exhibition

Under section 75H(3) of the EP&A Act, the Director-General is required to make the environmental assessment of an application publicly available for at least 30 days. After accepting the Environmental Assessment, the Department publicly exhibited it from Thursday 25 March until Friday 7 May 2010 on the Department's website, and at the following exhibition locations:

- Department of Planning's head office in Sydney;
- Wollongong City Library;
- Warrawong District Library; and
- Nature Conservation Council.

The Department also advertised the public exhibition in the *Illawarra Mercury* newspaper on two occasions – Thursday, 25 March 2010 and again on Wednesday, 7 April 2010, and notified relevant State and local government authorities in writing.

The Department received a total of 18 submissions on the project – 7 submissions from public authorities, 4 submissions from local businesses and stakeholders and 7 from community interest groups and private individuals. While there were no objections to the project as such, the submissions raised a range of issues associated with the project. These issues relate to traffic and transport, noise and vibration, air quality, aquatic and terrestrial ecology, hydrology and water quality and heritage. The Department has considered the issues raised in its assessment of the Concept Plan and Stage 1 project, and are discussed in Section 5 of this report.

A late submission was received from Transport NSW. Comments from this agency relate to road and rail modal split and the need to involve the ARTC and Railcorp regarding confirmation of the feasibility of achieving the proposed split.

4.2 Submissions from Public Authorities

Seven submissions were received from public authorities as follows:

- NSW Department of Environment, Climate Change and Water
- NSW Office of Water
- Industry and Investment NSW
- NSW Roads and Traffic Authority
- Rail Corp
- Heritage Branch of the Department of Planning
- Wollongong City Council

The key issues raised by each of the above-listed authorities are outlined below:

Department of Environment, Climate Change and Water (DECCW)

Noise

- identified a number of omissions/inaccuracies/deficiencies relating to the following aspects of the noise impact assessment:
  - ⇒ methodology for establishing the construction noise criteria;
  - ⇒ identification and coverage of sensitive land uses other than residential (eg schools, churches);
  - ⇒ identification of feasible and reasonable mitigation measures for implementation; and
  - ⇒ application of operational noise limits to entire development, not just to Stage 1.
- recommended a number of actions required of the Proponent in relation to:
  - ⇒ assessment of the cumulative construction noise levels for all construction activities operating at the same time;
  - ⇒ restriction on night time construction unless supported by a more detailed assessment through a Construction and Noise Vibration Management Plan;
  - ⇒ alternatives to train horns to minimise noise impact;
  - ⇒ representation of the worst case scenario with all operational activities included;

- ⇒ need for an overarching Noise and Vibration Management Plan due to the long timeframe involved in the implementation of the Concept Plan; and
- ⇒ recommended that the Department, in consultation with DECCW, include a condition requiring the Proponent to only use a rail service provider who will contract 'Best Practice' rolling stock.

Air quality

- noted that the Air Quality Impact Assessment (AQIA) reports an exceedance of particulate matter (PM_{10}) Ground level Concentration (GLC) criteria across a large area of Port Kembla and an exceedance of nitrogen oxides (NOx) GLC at one sensitive receiver location. DECCW sought a range of information on the AQIA to better understand the reported impacts and the practical measures that can be implemented to minimise air quality impacts.

Terrestrial Ecology

- recommended the preparation of a Green and Golden Bell Frog (GGBF) Master Plan which provides a strategic framework on how the Proponent will manage GGBF and its habitat across the Outer Harbour area over the next 30 years. Recommended that Proponent consult with DECCW in the development of the Master Plan.
- considered that the proposed access road from Darcy Road to the boat harbour along the disused rail corridor is a very significant GGBF habitat for the Port Kembla GGBF population. Alternative locations for the access road should be identified to avoid habitat loss and/or fragmentation of the GGBF habitat.
- noted that options to mitigate loss and/or fragmentation of habitat have been deferred to the detailed design phase of the proposed access road, and requested the Proponent identify mitigation measures to avoid habitat loss associated with the access road proposal as part of the Concept Plan. The response should also contain justification of the preferred option based on the key thresholds outlined in Step 5 of the draft *Guideline for Threatened Species Assessment.*

NSW Office of Water (NOW)

Surface and groundwater

- recommended the carrying out of both a background groundwater monitoring program and operational groundwater monitoring program to the satisfaction of this agency and DECCW. The reclamation should be designed such that existing groundwater flow regimes are not significantly altered and there is no increased risk of harm associated with groundwater contamination.
- supported the proposed mitigation and compensatory measures associated with the modification of Salty Creek from an open system to a permanently enclosed culverted system.
- considered the need for mitigation measures (eg sediment fences) to be installed prior to works commencing and to be adequately maintained throughout the construction phase and until works are completed and site is stable.
- supported in principle the provision of water sensitive urban design measures which focus on stormwater runoff capture and onsite reuse.

Industry and Investment NSW (I&I NSW)

Aquatic ecology

- concurred with the following proposals in the Environmental Assessment and recommended their implementation:
  - ⇒ aquatic ecology mitigation measures, as described in section 16.4 and Appendix G of the Environmental Assessment.
  - ⇒ incorporation of marine habitat friendly structures and aquatic habitat improvement features in new hard substrate surfaces of the development.
  - ⇒ provision of v-shaped recess in the floor of the Salty Creek culverts to facilitate movement of aquatic species during periods of low flow.
  - ⇒ inclusion of Water Sensitive Urban Design measures in the detailed design of Stage 1 development.
  - ⇒ installation of pollution control devices in the extensions of Salty Creek and Darcy Road Drain and in the drainage management of future paved surfaces.
  - ⇒ mitigation measures for soils and sediments (section 9.4), contaminated sediments (section 10.4), contaminated soil and groundwater (section 11.4) and hydrology and water quality (section 14.6).
- recommended the inclusion of specific approval conditions that require the Proponent to implement the following:

- ⇒ all the proposed habitat improvement projects at Tom Thumb Lagoon and Garungaty Waterway listed in Appendix G to the Environmental Assessment to the satisfaction of I & I NSW.
- ⇒ consultation with I &I NSW regarding the proposed biological monitoring program and provision of annual reports to this agency.
- ⇒ provision of various management plans (soil and water, dredging, stormwater, acid sulfate soil, spoil and demolition) for its comments at the draft stage (Stage 1). Also, the stormwater management plan in the OEMP.

Roads and Traffic Authority (RTA)

Traffic generation and modal split

- considered that whilst the predicted traffic volumes are unlikely to have a significant impact on the surrounding State road network, they rely on a number of assumptions, in particular, on a high rate of transportation by rail.
- is concerned that if the predicted rail mode share cannot be achieved, the impact to the road network would be considerably more. Given the high percentage of heavy vehicles that would be associated with the road transportation of goods from the Outer Harbour, departure from predicted traffic volumes is likely to lead to unacceptable impacts to road safety and traffic efficiency.
- does not support the proposal in its current form. It would reconsider its position if annual transportation of goods from Outer Harbour were restricted by the conditions of approval to the levels shown in Table 4.4 of the Traffic and Transport Report. To demonstrate compliance with such restrictions, it expects that an annual report would be sent to the RTA detailing the annual transportation for bulk trade, general cargo and containers by road.

RailCorp

Rail capacity and modal split

- considered that the Environmental Assessment for rail traffic is heavily focused on the short term (Stage 1) and lacks detailed analysis of medium to long term impacts on rail capacity and competing future interests.
- noted that the traffic assessment considers capacity on the Unanderra-Moss Vale line, but overlooks the fact that the additional trains will require capacity on the Port Kembla branch line and the single track Allan's Creek Triangle loop which connects the branch line to the Illawarra line.
- recommended consultation with RailCorp regarding upgrading of the junction between the Port Kembla branch and the PKPC sidings during development of the design.
- noted that assessment of rail capacity is based only on train sizes capable of operating on the Moss Vale to Unanderra Line.
- considered that mode split of cargo by rail is based on PKPC advice and lacks demand and supply analysis. Existing rail infrastructure upgrades will be required based on the proposed rail transport of majority of the trade at the Outer Harbour to and from the Port.
- required further consultation regarding the preparation of the Rail Master Plan as referred to in the Environmental Assessment.
- considered that transport of container freight needs further assessment as no infrastructure is in place to accommodate container freight movement, given the proposed modal split of 90% rail and 10% road.
- considered that the Environmental Assessment is short on design and modelling to determine the best design of infrastructure to provide efficient movements of freight.
- pointed out that there will be no spoil material to be sourced from White Bay given the Government decision not to pursue the CBD Metro proposal.

Heritage Branch – Department of Planning

Heritage items

- stated that a number of heritage items (including two potential shipwrecks – the Adele and the Clio) are located in the works area – Jetties No. 3, 4 and 6, Breakwater Battery, Historical Military Museum, Tank Barriers, and the Mobile Setting Steam Crane. At least five of these items will be impacted by the proposed works.
- considered that the separation of the Historical Military Museum from its companion Pillbox structure by a new port access road is not a desirable outcome and should be interpreted and viewed together as any separation will affect their significance. Recommended that the Proponent provide funding for the restoration of the Pillbox which is deteriorating.

- supported the proposed relocation of the Mobile Block Setting Crane should the proposed new road link from Darcy Road to the public recreation area proceed. Considers that the crane needs to undergo restoration prior to being moved and recommends the preparation of a Conservation Management Plan for the crane.
- advised that the Proponent is bound by the requirements of the *Commonwealth Shipwrecks Act 1976* and must abide by the provisions of this Act in relation to notification of the discovery of a wreck, lodging an Application for Disturbance, and the submission of an Incident Report should a wreck be damaged by the works.
- recommended the inclusion of a mitigation strategy in the Final Statement of Commitments to be used in the event of an unexpected discovery of shipwrecks; also provisions regarding potential encounters during construction of previously unidentified European heritage items and/or archaeological relics.

Wollongong City Council

Traffic and transport

- is concerned that the proposal may accelerate the road network capacity and impact on local amenity. Recommends that the foreshadowed road improvements in the Environmental Assessment be identified and a commitment obtained from the Proponent to complete these works prior to granting any consent.
- considered that it is in the public interest to ensure that sufficient infrastructure is in place to support the port expansion. Reliance on road transport should be discouraged and greater use of rail encouraged.
- traffic modelling does not address traffic impacts on either Picton or Appin Roads (including potential safety impacts) and must be given further consideration prior to consent being granted.
- encourages, where possible, the transport of reclamation material to the site either by barge of rail to reduce truck movements on the local and regional road networks.

Security

- considered that security is a major concern as there are a number of unsafe areas within the development site. Recommends that conditions be imposed in relation to providing security systems on the site.

Hydrology and water quality

- recommended the provision of a Site Environmental Management Plan that addresses water pollution that may result from the use of blast furnace slag and coal wash.

Terrestrial ecology

- recommended that further studies be undertaken to assess the likely impact on fauna species (i.e. Eastern Quoll, Sooty Oystercatcher, migratory bird species, Dugong, Australian Fur-seal, and Syngnathiforms) that utilise the site for resting, shelter or foraging.
- recommended the preparation and submission of a GGBF Management Plan for both the construction and operational stages of the project.

Visual amenity

- required the planting of *Cupaniopsis anavardivides* and *Arautaria heterophylla* in the proposed road construction, and for tree planting to be undertaken to the satisfaction of the Council Manager City Works.
- recommended that the Landscape Management Plan incorporate suitable screening of the storage areas viewed from any road frontage or residential areas to the south and west of the Outer Harbour.

Detailed design

- civil design, stormwater and flooding were considered to be satisfactory subject to consultation with Council and the RTA prior to undertaking any works within the public reserve, and to Council's requirements such as its Subdivision Policy for road construction.

Heritage

- recommended the imposition of conditions relating to the archival and photographic recording of the affected areas, particularly in the vicinity of Red Beach and where previous structures were located.

Transport NSW

- expressed support for the Proponent's plan to achieve a high rail mode split and endorsed the RTA's position regarding restriction of road traffic generation to the forecast levels.
- recommended obtaining the ARTC and RailCorp's confirmation regarding rail capacity servicing the port during Stage 1.
- considered that before either options (i.e. upgrade the Unanderra-Moss Vale Line or complete the Maldon-Dumbarton Line) can be certain to satisfy the capacity requirements of the full 3 stages of the Concept Plan, continued work is required in consultation with Railcorp.

4.3 Public Submissions

Eleven submissions were received from local businesses, community interest groups and individuals. The key issues raised in these submissions are summarised below:

- **Traffic, transport and property access** – existing constraints on the road and rail network; road and rail infrastructure upgrades required to support the full expansion of the Outer Harbour; cumulative impacts of car carriers, coal trucks and population growth; capacity of Old Port Road and Foreshore Road and impact on access and operations of adjacent businesses particularly during construction; impact of proposed infrastructure on adjacent development (i.e. new road bridge over the rail line at Foreshore Road, new road along the disused rail corridor extending north from Darcy Road); and concerns about availability of car parking for employees during construction.
- **Noise and vibration** – concerns raised by one company (Adelaide Brighton Cement Ltd) regarding potential vibration impacts on its structures and machinery.
- **Need for consultation** – perceived lack of consultation and requests by affected businesses to be consulted (including provision of specific mitigation measures), prior to any construction works occurring.
- **Hazards and risks** – concerns about on site storage of many hazardous substances as the Outer Harbour development increases its throughput capacity.
- **Hydrology and flooding** – concerns on how Salty Creek will discharge and drain to the harbour, including potential flooding risks, if the creek is obstructed; and potential effect of the proposed development on water circulation in the inner harbour.
- **Navigation** – comment from BlueScope Steel that the swing basin needs to cater for current and future vessels, especially cape size ships, and that it should not increase the number of tugs required to manoeuvre the vessels.

4.4 Proponent's Response to Submissions

Upon review of the submissions received, the Department directed the Proponent to respond to all issued raised in the relevant submissions. A report containing the response to submissions was received by the Department on 21 June 2010. This report was subsequently revised by the Proponent to reflect the changes made to the assessment as a consequence of additional air quality and noise and vibration assessment undertaken in response to submissions. The Revised Submissions Report (contained in Appendix C) was received by the Department on 27 October 2010.

5. ASSESSMENT OF ENVIRONMENTAL IMPACTS

After consideration of the Environmental Assessment, submissions received, Submissions Report and Statement of Commitments, the Department has identified the following key environmental issues associated with the proposal:

- Traffic and transport;
- Noise and Vibration;
- Air Quality;
- Contamination;
- Aquatic and Terrestrial Ecology; and
- Heritage.

The Proponent has also assessed the potential impacts of the project on other issues considered to be of relatively minor impact such as coastal hydrodynamic processes, landscape and visual amenity, climate change and waste. These issues are considered to be adequately assessed in the Environmental Assessment, and have been addressed as part of the Proponent's Statement of Commitments. These issues are briefly outlined in section 5.7.

5.1 Traffic and Transport

Issues

The adequacy of surface access to the Outer Harbour through both road and rail modes is a crucial consideration for the proposed expansion of the Port to ensure overall transport logistic efficiency and to minimise impacts on the broader regional transport network.

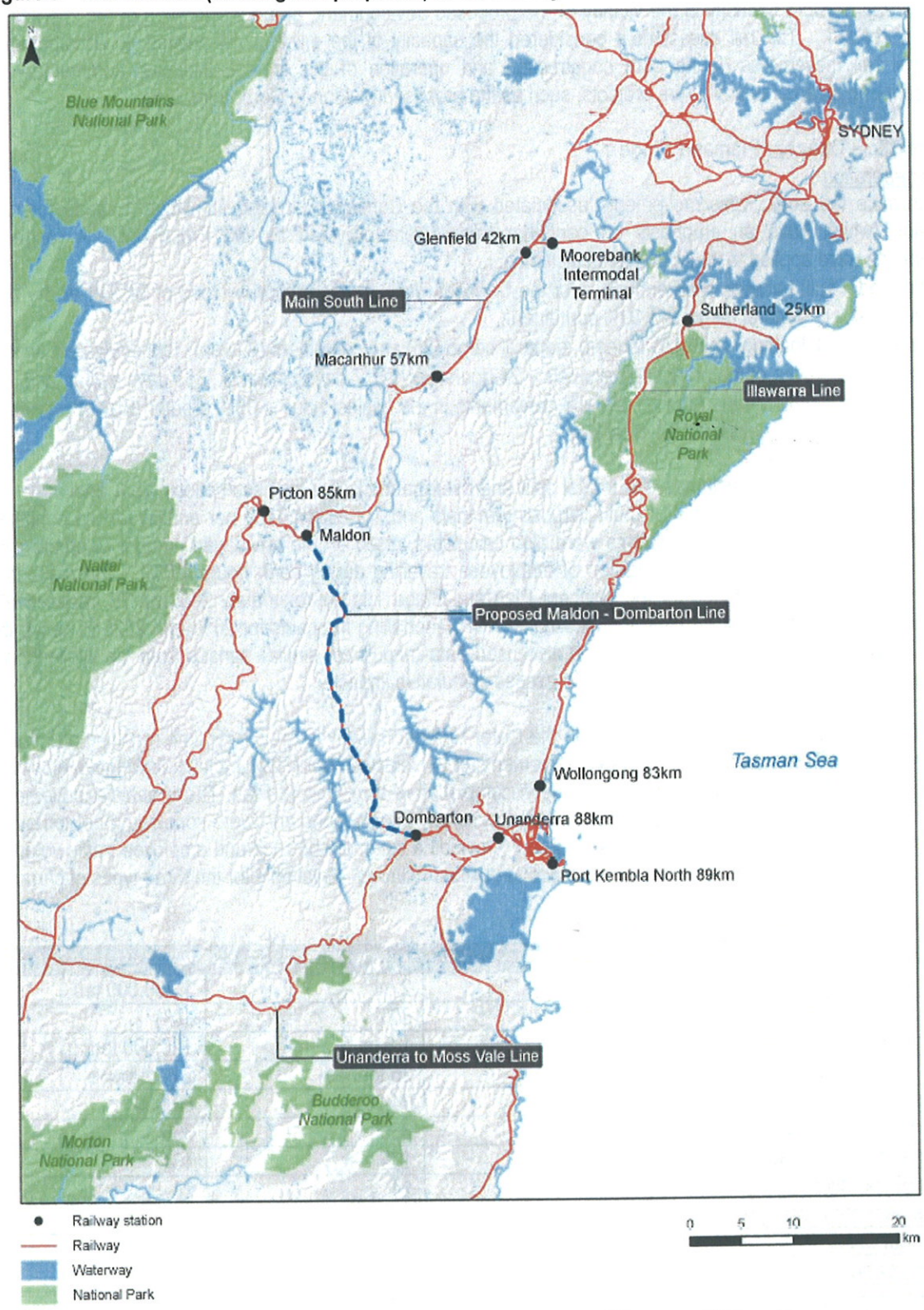
The Concept Plan is based on trade forecast scenarios and a modal split that favours rail (90%/10% rail/road) in the container cargo operation which is programmed for Stages 2 and 3. Traffic and transport impacts have been assessed based on this mode split and the Department notes that the project has been designed to accommodate such a mode split due to the limited landside area available to support the more extensive container storage areas required for truck transport and the limitations of the road network.

The primary road link between Sydney and Wollongong is the Southern Freeway, with a number of east-west transport links, such as Mount Ousley Road, Picton Road and Appin Road providing access to the Sydney metropolitan area and wider areas. The main access and haulage route to the Outer Harbour from the Southern Freeway is via Five Islands Road. From this road, the most direct access to the Outer Harbour would be via Flinders Street and Old Port Road with local connections via Christy Drive and Foreshore Road. The existing haulage route to the Outer Harbour is proposed to be the primary haulage route to the project site, as shown in **Figure 7.**

Figure 7 - Proposed primary haulage route

Source: Figure 18-1 of the Port Kembla Outer Harbour Development Environmental Assessment (Volume 1)

Figure 8 – Rail network (existing and proposed) in the vicinity of Port Kembla



Source: Figure 19-1 of the Port Kembla Outer Harbour Development Environmental Assessment (Volume 1)

Two main railway lines serve Wollongong – the Illawarra to South Coast Line and the Moss Vale to Unanderra Line. The former links Sydney with the NSW South Coast, whilst the latter provides an east-west connection from Wollongong to the Southern Highlands and the Main South Line. The railway lines within Port Kembla are owned and operated by the Proponent, RailCorp and Pacific National. **Figure 8** shows the rail network in the vicinity of Port Kembla.

The focus of the traffic assessment was on the level of traffic generation associated with the project, review of the existing road network capacity in the vicinity of the proposed development, and consideration of the impacts on the road network. The rail assessment considered the capacity of the existing rail network to accommodate additional rail movements during both construction and operation of the project, including commentary on necessary enhancements and future projects, such as the proposed Maldon to Dombarton Line.

Road traffic – Concept Plan and Stage 1

Traffic generation

To determine the peak traffic movements associated with the Concept Plan and for Stage 1, trade forecast scenarios (which have an emphasis on container trade) were provided by the Proponent. A range of assumptions were applied to these forecasts including:

- the modal split between road and rail – for the Concept Plan, transportation by road of 50% of all dry bulk trade, 80% of general cargo and 10% containers;
- average truck loading – bulk (35 tonnes), general cargo (25) and containers (2 twenty foot equivalent units);
- hours of operation of the proposed terminals – 24 hours per day, 7 days per week, 365 days a year; and
- peak hour situation – the number of truck movements in the busiest hour is 50% greater than the average hour during the remainder of a typical day.

To derive the annual truck volumes, the modal split and average truck loading assumptions were applied to the port capacity volumes (6.25 Mtpa for multi-purpose terminals and 1.2 million TEU per annum for the container terminals). Employee vehicle movements were also calculated based on the envisaged number of employees, work shift patterns and assumed proportion of employees travelling during peak hours (10%). The respective number of employees estimated for the Concept Plan and Stage 1 is approximately 200 and 75, respectively. The calculation of traffic volumes used the existing TRACKS modelling forecasts for 2016 and 2026 to derive the annual growth factors for the road network. It also used data outputs for similar periods from the Wollongong-Shellharbour (WOLSH) Transportation model to assess cumulative impacts.

The traffic analysis indicated that truck traffic to the Outer Harbour is likely to grow over time reaching 505 trucks per day by 2036. This equates to peak traffic movements of 29 vehicles/hour (72% trucks) following development of Stage 1; and 84 vehicles/hour (76% trucks) upon completion of the Concept Plan. These vehicle movements will comprise a minor (1%) proportion of the total trips at nearby intersections and were considered not to have a significant impact on the local road network. **Table 3** provides a summary of truck and employee traffic volumes in peak hour for the Concept Plan based on the above outlined rail/road modal split for the three types of cargo.

Table 3: Predicted peak hour traffic generation

Element	Bulk	General	Containers
Volume per year	4.25 mt	2 mt	1,200,000 teu
Proportion by road	50%	80%	10%
Volume by road per year	2.125 mt	1.6 mt	120,000 teu
Truck loading (per truck)	35 tonnes	25 tonnes	2 containers
Trucks per year	60,714	64,000	60,000
Working days per year	365	365	365
Trucks per day (average)	166	175	164
Hours of operation	24	24	24
Trucks per hour (average)	7	7	7
Peak hour factor	1.5	1.5	1.5
Trucks per hour (peak)	10	11	10
Two-way peak hour truck movements	21	22	21
Total for Stage 1 (2016)	**29 vehicles per hour (bulk only + 8 employee vehicles)**		
Total for Concept Plan (2036)	**84 vehicles per hour (bulk, general cargo and containers + 20 employee vehicles)**		

Note: Traffic generation from Stage 1 would come from bulk trade alone, where the predicted two-way peak hour truck movements are 21, and a total of 29 vehicle movements, with the inclusion of employee vehicle movements. When the entire Concept Plan is fully operational, the peak hour figures would increase to a total of 84 vehicle movements, including the contribution of 20 employee vehicles.

Operation Road network performance

To consider the future road network performance, the traffic assessment reviewed the capacities on key links associated with the Southern Freeway and assessed the performance of individual intersections on the adjacent network. Network performance was assessed for scenarios **with development** and **without development** so that the level of impact could be confirmed. The following links/intersections were assessed:

- Southern Freeway on/off ramps;
- Five Islands Road/King Street/Wattle Street;
- Five Islands Road/Flinders Street;
- Five Islands Road/Springhill Road; and
- Springhill Road/Masters Road

Without the inclusion of traffic generated from the Outer Harbour development, the analysis found that:

- for the 2016 scenario (Stage 1 operation) – each of the intersections report satisfactory levels of service. However, the degree of saturation results indicates that Five Islands Road/Springhill Road is operating near capacity in the PM peak hour. There is also a high degree of saturation on the Southern Freeway, but not at intersections; and
- for the 2036 scenario (Concept Plan) – the on/off ramps associated with the Southern Freeway would have sufficient capacity to accommodate the forecast 2036 traffic volumes. All of the intersections, except for the Springhill Road/Masters Road intersection, report satisfactory level of service, with capacity issues (degree of saturation) evident for the Five Islands Road/Springhill Road. It is also noted that the modelling includes additional through lanes (to three lanes in each direction) on the Southern Freeway. This change to the modelled network has been included as the modelled volumes far exceed the capacity of a two-lane freeway. Without the inclusion of additional lanes on the Southern Freeway, high volumes of traffic would redistribute to other corridors, resulting in congestion on lower order roads.

In relation to the existing and future road constraints without the project, the Proponent has stated that it is likely that these matters will need to be addressed at some time in the future, with potential solutions being:

- grade separation of the right-turn movement from Five Islands Road into Springhill Road; and
- grade separation of the Springhill Road / Masters Road intersection.

With the inclusion of traffic generated from Stage 1, the analysis found that intersection performance remained generally unaffected, reflecting the minor percentage of vehicles attributed to the project as a percentage of total traffic movements. With the inclusion of traffic generated from the Concept Plan, the analysis also found that there would be negligible impact on intersections with increases in the degree of saturation and average delay per vehicle being minimal and no change to the level of service results.

Road network performance - Construction impacts

The majority of the Concept Plan reclamation and dredging activities will occur during Stage 1. Approximately 3,410, 800 m^3 of fill is required for reclamation for Stage1 works and would be sourced as follows:

- 650,000 m^3 of blast furnace slag sourced locally from Mt Prosser;
- 150,000 m^3 of coal wash sourced locally from BlueScope Steel or from West Cliff Colliery on Appin Road;
- potential for a further 1,000,000 m^3 of coal wash from local sources including BlueScope Steel and West Cliff Colliery; and
- 1,610,000 m^3 from major infrastructure projects such as Sydney Metropolitan Transport Plan projects and other infrastructure projects within Sydney and the greater Sydney region.

53% of the total fill required was assumed to be transported by road, and the remainder by rail and barge (ie the material from the greater Sydney Region).

The traffic assessment indicated that the highest volume of construction related vehicles would be generated early in Stage 1, with 23 trucks and eight other workforce vehicles expected per average weekday hour. These volumes are comparable to the vehicle generation for the operational phase of the development in 2016 (ie 29 vehicles, consisting of 21 trucks and 8 employee vehicles) and therefore similar impacts to the operational scenario are expected. Assessment of cumulative traffic impacts (construction and operation) for an interim year between 2016 and 2036 was not considered warranted as operational vehicle movements for the Concept Plan effectively represents the worst case traffic generation scenario.

Rail – Concept Plan

Existing rail network capacity

The assessment identified that it is not feasible to rely on the Illawarra Line to service the project as train paths on this line will be used for existing and future passenger services and coal traffic from the Western Coalfields to Port Kembla, as well as container services from the South Coast to Sydney. The alternative existing route between Sydney and Wollongong and Port Kembla is the Moss Vale to Unanderra Line, which connects to the main South Line. This line is currently dedicated to freight but has a number of operational constraints, including steep grades, curves, short passing loops and rolling stock issues, which influences the size, weight, speed and economic viability of trains using this route. The assessment for rail capacity is therefore based on train sizes capable of operating on this line and a practical maximum train length of 749m has been assumed for the Unanderra Line, as this is consistent with longest possible train that can fit onto the Mount Murray Loop. The freight forecast for the Concept Plan is outlined in **Table 4** below.

Table 4: Freight forecast for Concept Plan

Berth type	No. of berths	Freight task per berth	Modal split	Train load per wagon	Train consist	Freight load per train	Trains per day
Bulk /Dry Goods	1	4.25 Mtpa	35% road/65% rail	55 T	2 loco 37 wagon	2035 T	4.3
General Cargo	2	1 Mtpa	80% road/20% rail	37.5 T	2 loco 37 wagon	1362 T	1.0
Container	4	300,000 TEU	10% road/90% rail	3 TEU	2 loco 37 wagon	126 TEU	16.4
Total	**7**	**N/A**	**N/A**	**N/A**		**N/A**	**21.2**

Note: The road assessment has assumed a road/rail modal split for dry bulk of 50/50 to adopt a worst case scenario. By comparison, the rail assessment has assumed a modal split for dry bulk of 35/65 which represents a conservative scenario for rail.

Based on preliminary rail studies conducted during the Outer Harbour Master Planning process, the assessment concluded that rail capacity was adequate in the short term (next 10 years) to handle the expected cargo volumes of the first multi-purpose berth (Stage 1). The Moss Vale to Unanderra Line, a dedicated freight line, has 16 train paths available to service the estimated 4.3 trains per day required during the Stage 1 operation. However, additional capacity is required post 2020, when Stages 2 and 3 are constructed. During the operation of Stage 1, rail movement of dry bulk would be in the direction of the Port only, providing an advantage as only empty units would need to return back up the hill, thus overcoming grade restrictions.

The Environmental Assessment identified the following infrastructure requirements for the Concept Plan based on the transport requirements of the three types of cargo and existing loading/unloading facilities on site (rail sidings, rail yards):

- **bulk freight** – no infrastructure changes would be required, however, the addition of general cargo (increasing the number of trains from 4.3 to 5.3), would require an increase in the holding trains in the South Yard.
- **general cargo** – loading and unloading would most likely be done in the South Yard, requiring an extension of the Yard to accommodate the train length.
- **container freight** – would require four roads for loading and unloading, plus two roads in and out of the Port, four sidings on the wharf and two sidings in between.
- **enhancement of Port connections** – two options were considered to support the predicted number of train services: Option 1 – Upgrade of the Unanderra Line; and Option 2 – completion of the Maldon-Dombarton Link. Comparative cost estimates are $100 million for Option 1 and $550 million for Option 2. These enhancements do not form part of the Concept Plan and would be required to be undertaken by third parties. Also, whichever rail option is pursued, it would need to be supported by the development of an intermodal facility at the other end of the line from the Port.

Upgrade of the Unanderra Line

For the Concept Plan there are four proposed container berths, each moving 300,000 TEU per annum. Unlike trains accessing the multi-purpose berths, trains in this instance leave Port Kembla loaded. The majority of container throughout the Port would be imports thus resulting in loaded trains that would be operating against the gradient on the Moss Vale to Unanderra Line. A typical container train would require one locomotive per 11

wagons, a very inefficient ratio. A four locomotive 42 wagon train might be the longest practical length of train at 1016m. Each berth would require 4.1 of these trains per day to move the goods from the Port (16.4 trains per day in total). One option would be to upgrade the existing Moss Vale line to Unanderra line to provide additional capacity which might include infrastructure improvements to reduce track gradients, lengthening passing loops or double tracking.

This option has a longer travel time to Sydney compared with the Dombarton Link, discussed below, therefore train cycle times would be lower, and more rolling stock would be required to service the Port. It is estimated that the cost for the additional rolling stock required for using the Unanderra Line is likely to be in the order of $50M and upgrade of the Unanderra Line is also likely to be $50M. This is in contrast to the cost for completion of the Maldon Dombarton link which is around $500M.

Completion of the Maldon – Dombarton Link

The alternative, and vastly more complex and expensive option, would be to provide a new dedicated rail freight access to the Port through the completion of the Maldon and Dombarton rail link. This link would bypass much of the existing rail freight network and provide direct access to South West Sydney. The Maldon - Dombarton link was commenced by the NSW Government in 1983 to improve access for coal trains to Port Kembla. However, the contract for construction of the Avon tunnel was cancelled by the NSW Government in mid-1988 on the basis that the line was not economically viable.

The Australian Government has committed $3 million to undertake a feasibility study of the link, which is intended to assess existing infrastructure, detailed planning and engineering work requirements and provide economic and financial modelling to determine the viability of this project. This study will examine the long term economic viability of the Maldon-Dombarton rail line in the context of the growth in coal export demand, the growth of Southern Sydney as a freight and business hub and the expansion of Port Kembla. The study's outcomes will be incorporated into the comprehensive national port and freight strategies being developed by Infrastructure Australia. The feasibility study for the Maldon to Dombarton Rail Link is expected to be completed by mid 2011.

Rail – Stage 1

Construction

The majority of the Concept Plan reclamation and dredging activities would take place during Stage 1, with approximately 3.4 million m^3 of fill required for stage 1, which would be sourced as follows:

- 650,000m^3 of blast furnace slag sourced locally from Mt Prosser (100% transported by road);
- 150,000m^3 of coal wash sourced locally from BlueScope Steel or from West Cliff Colliery on Appin Road, approximately 30km north west of the Outer Harbour (100% transported by road);
- 1,612,401m^3 from major infrastructure projects such as Sydney Metropolitan Transport Plan projects and other infrastructure projects within Sydney and the greater Sydney region (0% transported by road);
- Potential for a further 1,000,000m^3 of coal wash from local sources including BlueScope Steel and West Cliff Colliery etc) (100% transported by road).

Of the total fill required, it is assumed that 53% (650,000 $m^3$of blast furnace slag and 1,150,000 m^3 of coal wash) would be transported by road. The remaining fill would be transported by rail and barge. An unloading area near the Outer Harbour foreshore has been identified to facilitate fill delivery by rail.

Operation

Rail freight generated by the first multi-purpose berth is estimated to be in the order of 2.75 Mtpa (which equates to 4.3 trains per day) by 2016. The Environmental Assessment indicated that there is currently capacity on the Moss Vale-Unanderra line to accommodate the construction and operation of Stage 1, including fill that needs to be brought to the Port via the Unanderra Line.

There are two existing rail sidings at the Port Kembla Gateway (adjacent to the first multi-purpose berth) which are currently used by the Gateway operator for copper export (2 trains per week). The Proponent would need to share use of these sidings with this operator. The multi-purpose berth would be loaded according to cargo type:

- general freight would be loaded from these sidings and transferred to the multi-purpose berth; and
- dry bulk freight will be loaded onto ships via a train dumper (to be placed within the Port Kembla rail loop) and system of conveyors from stockpiles at the multi-purpose berth.

As there are other users of the Port Kembla Loop (BlueScope steel trains and copper concentrate export trains), the South Yard is proposed to be extended by 120 m (to a total length of 780 m) to support holding trains.

Consideration

Concept Plan and Stage 1

Traffic and transport was the principal and most frequently raised issue in the submissions and is a key concern for the Department. The key issues relate mainly to the operational phase, including the proposed modal split, lack of detailed traffic and rail assessment beyond Stage 1, safety and existing constraints on the existing road network, and cumulative impacts. Construction issues refer largely to restrictions to property access and implications of potential road infrastructure works on nearby businesses and development.

Modal split

The Department notes that the Proponent's assessment has been based on a substantial use of rail in the transport of container goods (10%/90% towards rail) and to a lesser extent, for bulk cargo (35%/65%). The Proponent argues that the project has been specifically designed to accommodate a high modal split to rail. This is primarily due to the limited landside area available to support the more extensive container storage areas required for truck transport. If road transport was to operate efficiently, then significantly wider terminal areas would be required thereby restricting ship access and the capacity of the port. Consequently, the Proponent advised that the efficiency of the container terminal operations would be significantly impacted if not supported by rail freight services as proposed and has committed to prepare a Rail Master Plan to identify rail infrastructure upgrades necessary for future stages.

While the Department supports the greater use of rail over road transport for the proposed development, it considers that the proposed high rate of rail transport of container goods needs to be carefully considered for the following reasons:

- the 90% rail modal share for container movements is noted to be significantly higher than other NSW ports;
- there is currently insufficient rail infrastructure and capacity to support Stages 2 and 3 of the Concept Plan;
- provision of the rail links, upgrades and intermodal terminals required to support Stages 2 and 3 are not within the Proponent's control and are contingent on decisions and actions of other parties;
- the economic feasibility of using the Unanderra to Moss Vale line, noting the physical constraints of that line, including its distance, grade, curves and short passing loops; and
- lack of information regarding future access to rail paths, including the main Southern Line and Southern Sydney Freight Line.

The Department considers that failure to achieve the proposed rail transport for container operations would have serious implications on the efficiency of the local and regional road network without significant road infrastructure upgrades, which are not proposed as part of this project and which have not been assessed as part of this project. The Proponent considers that there is ample time for the necessary upgrades to be identified and implemented based on their staging plan wherein the first container berth will not be operational until 2019. However, the Department does not believe the Proponent has provided adequate information to provide an appropriate level of certainty to support progression to Stage 2 and 3 of the project. Notwithstanding, the Department is satisfied that there is adequate rail capacity for Stage 1.

To ensure that the Proponent adheres to the Environmental Assessment proposal in terms of road traffic generation and use of a high rail mode share for container transport during the operation phases, the Department considers that future construction and operation of Stages 2 and 3 should be restricted until there is greater certainty that the proposed mode split can be achieved. The Department has therefore recommended as part of the Concept Approval, a requirement that future Project Applications for the construction and operation of Stages 2 and 3 must demonstrate the following:

- adequate rail infrastructure capacity is in place or will be provided in a timely manner to support the development of these stages, including the ability to achieve the proposed transport modal split; and
- road traffic generation is generally consistent with the forecast levels contained in the Environmental Assessment.

Furthermore, the Proponent is required to prepare a Rail Master Plan to support future stages of the Concept Plan. This Plan is to be developed in consultation with Transport NSW, RailCorp, ARTC, and other relevant bodies and will require the consideration of the Director-General prior to commencement of construction of Stage 1B and Stage 1C, as these stages involve reclamation of land for use as terminals in Stages 2 and 3. The Department considers it prudent to require the completion of the Rail Master Plan prior to the construction of Stages 1B and 1C to ensure that reclamation activity only proceeds once there is sufficient certainty that rail infrastructure upgrades required to support the operations of Stages 2 and 3 will proceed. It is also noted that the proposed reclamation activity for all stages has been assessed by the Department as having an acceptable level of environmental impact (see sections 5.2, 5.5, 5.6, 5.7 and 5.4 of this report).

The Rail Master Plan must address a range of matters including:

- the demand for freight movement, including a demand and supply analysis and description of the freight supply chain for the concept plan for a range of growth scenarios;
- consideration of national and state freight and port strategies, including the Maldon to Dombarton Feasibility Study;
- identification and alignment of freight movement volumes with required rail infrastructure upgrades, access paths, intermodal terminals and any other infrastructure or servicing requirements required to meet desired modal splits and the road volume limits;
- the economic feasibility, viability and performance of port freight movements utilising existing and identified infrastructure and service provision measures for the proposal;
- identification of how and when the required infrastructure improvements will be delivered, including bodies responsible for the funding and implementation of the works; and
- a contingency plan in the event that the necessary rail and intermodal infrastructure and capacity for Stages 2 and 3 are not delivered in a timely manner.

Rail Traffic

In relation to the rail assessment, the Department has concerns with the uncertainties associated with rail transport beyond Stage 1, as discussed above. However, it is noted that the proposed operation of the initial two container berths is not programmed until 2019. Demonstration of the availability of rail capacity through the Rail Master Plan will be crucial in allowing the progression of the development to Stages 2 and 3. The Proponent advised that it will also consider the rail network within the port area, specifically between the Outer Harbour and the RailCorp line at Coniston Junction and will outline a staged development and investment strategy for the provision of the required rail infrastructure to support Stages 2 and 3 of the Concept Plan.

RailCorp drew attention to the need to increase capacity on the Port Kembla branch and the single track Allan's Creek Triangle loop, which connects the branch line to the Illawarra Line, and through the Unanderra junction. It emphasised the need for it to be consulted on rail freight transport, including access to train paths and any issues related to the current rail operating patterns. In response, the Proponent indicated that the Unanderra junction will not be an issue for the operation of Stage 1 (limited to four trains a day), but will be considered as the number of trains increase in Stages 2 and 3 of the development. The Proponent has committed to consult with RailCorp and all other relevant stakeholders during the development of the Rail Master Plan. A requirement for the Proponent to establish ongoing consultation with RailCorp regarding rail access, connections, and necessary upgrades to the local and regional rail network is included in the requirements for Concept Approval.

In summary, the Department considers that its issues regarding the attainment of the proposed modal split for operation of the Concept Plan can be realistically addressed with the recommended terms of approval. In relation to Stage 1 construction and operation, the Department accepts that rail transport associated with this stage can be accommodated within the existing rail network.

Road Traffic

In relation to the road traffic assessment, the Department considers that given the very long timeframe for the Concept Plan, a reasonable assessment has been undertaken for Stage 1 and the total development, with predicted traffic generation assessed to 2036. The assessment demonstrated that affected intersections are capable of supporting the predicted traffic volumes that would result from the activities associated with the three stages of development (i.e. if the mode assumptions are correct and that regional road network enhancements are undertaken).

The assessment also identified that Old Port Road and Flinders Street may require enhancement (improvements to pavement strength and turning radii) during Stages 2 and 3 to cater for increased levels of heavy traffic accessing the Outer Harbour, which would be assessed further during Stages 2 and 3 project approvals. During Stage 2, the Proponent would also consider the need to close Foreshore Road at the existing level crossing and the provision of a new access road extending from Darcy Road and rail overbridge over Foreshore Road, which may impact on property access. In response, the Department has recommended the inclusion of assessment requirements for these developments.

A number of submissions raised concerns regarding cumulative traffic impacts and broader road capacity and safety issues, including consideration of the Sydney-Wollongong Corridor Strategy, and safety and traffic impacts on Mount Ousley, Picton and Appin Roads. The Department considers that these matters have been adequately addressed by the Proponent in its Environmental Assessment and Submissions Report and notes that although the Sydney-Wollongong Corridor Strategy was not referenced in the Environmental Assessment, it was considered in the preparation of the assessment. The Strategy is a statement of the shared strategic priorities of the Commonwealth and State Government for the long term (20-25 year) development of the corridor. Short-term priorities identified in the strategy include: managing increased freight on the corridor as a result of the Port Kembla expansion; improve safety and efficiency of Mount Ousley Road; improve capacity of Picton and Appin Roads; and improve competitiveness for rail on the Moss Vale-Port Kembla rail line. The Department also notes that the RTA has and continues to provide funding for safety upgrades of Picton Road.

In relation to cumulative impacts the Department notes that traffic modelling for the Concept Plan used the WOLSH transportation base model which incorporates population, employment and trade projections until 2026, hence, cumulative impacts were assessed. The traffic assessment has also used SIDRA Intersection modelling software to assess the impacts of trucks on the adjacent road network. The software recognises the speed and road space characteristics of the trucks so that their impact can be determined.

As indicated above, the Department generally accepts, based on modal split assumptions, the conclusion of the road traffic assessment that the local and regional road network can accommodate the progressive increase in predicted traffic volumes resulting from the three stages of the port development.

Stage 1 Construction

A rail-related issue for Stage 1 construction is the proposed haulage of 1.6 million m^3 tonnes of fill material by rail and/or barge. The Proponent has not clearly identified any firm source(s) of this material, nor evidence that it can practicably be transported to the Outer Harbour by rail or barge. The Proponent advised that the reclamation and dredging works are scheduled to occur progressively over an 8 year timeframe (2011-2018) and that sourcing of fill from the wider Sydney Metropolitan area is unlikely to occur until after 2013.

The Department acknowledges this advice and notes that this would allow the Proponent time to investigate prospective sources. However, if firm prospects do not materialise in time, this would mean construction traffic impacts would be far greater than expected. To ensure a level of certainty that the transport of additional fill material would not end up by road, conditions of the Stage 1 project approval are recommended to prevent this potential situation. The recommended conditions involve limiting the total construction vehicle numbers generally to 38 per hour, unless otherwise agreed by the Director-General. In the event that this number is exceeded, the Department requires that the Proponent undertakes further assessment of the receipt of fill/spoil which, among other matters, would need to determine the additional traffic movements to be generated, including its impact on local and regional road network performance and road traffic noise.

Construction traffic impacts on Foreshore Road and its intersection with Old Port Road, including restrictions to access on businesses along these roads, were of primary concern to these properties. The Proponent has committed to consult with all neighbouring landowners to address their specific concerns, and to ensure that their existing access requirements are maintained, the Department recommends conditions that require primary access routes to and from properties be kept open during the duration of construction works, or alternative access be provided. Other related conditions are also recommended relating to traffic management, including adherence to nominated haulage routes and to a Construction Vehicle Code of Conduct and all parking to be confined to the project site.

Conclusion
Overall, the Department considers that the key transportation issue relates to the current lack of rail capacity to support the proposed 90% modal share for rail transportation of container goods during operation of Stages 2 and 3 and the consequential impact of this scenario on road traffic, if this capacity is not provided in a timely manner.

The Proponent believes that there is sufficient time for the necessary rail infrastructure and upgrades to be implemented to cater for the future stages of the Concept Plan. However, the Department notes uncertainties regarding the delivery of this infrastructure, and has therefore recommended terms of approval that requires the preparation of a Rail Master Plan to ensure that development beyond Stage 1A can be supported by the necessary rail infrastructure, as well as restricting the construction and operation of Stage 2 and 3 until the Director-General is satisfied that the requisite infrastructure is in place, or would be in place on time. The Department also recommends restricting traffic movements in the Concept Plan to the assessed movements presented in the Environmental Assessment. With the recommended requirements aimed at controlling road traffic generation, the Department considers that progressive development of the Outer Harbour can occur in a controlled and orderly manner.

5.2 Noise and Vibration

Issues

Construction and operational noise and vibration impact assessments were undertaken based on plant and activities likely to be associated with the Concept Plan and Stage 1 Project. The assessments involved scenario modelling of both construction and operational noise and vibration, including road traffic and rail noise and proposed harbour rock blasting during Stages 1 and 3 under the Outer Harbour. This assessment considered relevant methodology and criteria, including that established in the *Interim Construction Noise Guidelines*, DECC, the *NSW Industrial Noise Policy* (operational noise criteria), DEC and *Assessing Vibration – A Technical Guideline*, DEC.

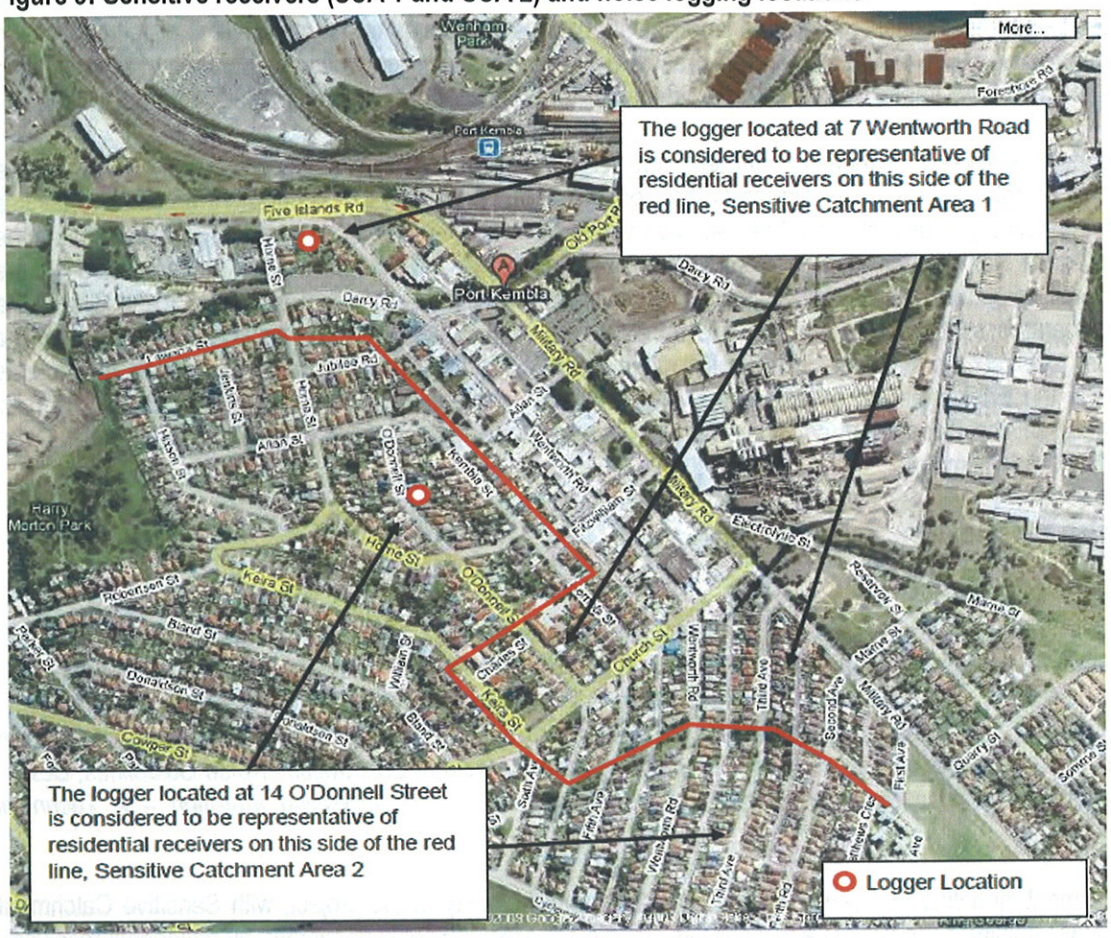
The assessment identified two sensitive catchment areas in proximity to the project, with Sensitive Catchment Area 1 (SCA1) adjoining the project and Sensitive Catchment Area 2 (SCA2) dominated by residential receivers. The assessment also considered road traffic noise impacts on those receivers most likely to be impacted by heavy vehicle movements, including at Cringilla. A map of the sensitive receivers is shown in **Figure 9.**

Concept Plan
Construction
Construction activities undertaken as part of the Concept Plan that would generate noise and vibration impacts include dredging, reclamation and blasting (Stages 1 and 3), construction of road and rail infrastructure (all stages), construction traffic movements (all stages) and piling (Stage 3). A detailed noise and vibration assessment was conducted for Stage 1 as discussed below, and further detailed assessment would be undertaken for Stages 2 and 3 as part of separate project approvals for those works in the future.

Operation
Operational noise impacts from the full development of the site would occur from the operation of the multi-purpose and container terminals and rail facilities in the South Yard. With no mitigation in place the Concept Plan operational scenario is predicted to exceed the project specific noise goals for SCA1 by up to 5dB(A) during the daytime, up to 14 dB(A) during the evening and up to 15 dB(A) during the night time. In SCA2 there are predicted exceedances of the project specific noise goals of up to 2 dB(A) during the daytime and up to 8 dB(A) during the night time.

The predicted exceedance of the project specific noise goals is, in most cases, the result of rail activities in the South Yard. The Concept Plan operational scenario was reassessed with mitigation applied in the South Yard, including a 6m high noise barrier running adjacent to the track at the southern end of the South Yard and a shed completely enclosing operations at the southern end of the South Yard. The construction of a shed at the southern end of the South Yard would considerably reduce the predicted noise impact at noise sensitive receivers, resulting in minor exceedances of up to 4db(A) at sensitive receivers at night time, which would be no more than a 1.2db(A) exceedance over existing noise levels. The noise mitigation constructed on site would be further refined during detailed design for Stages 2 and 3 of the project.

Figure 9: Sensitive receivers (SCA 1 and SCA 2) and noise logging locations



Source: Figure 21-2 of the Port Kembla Outer Harbour Development Environmental Assessment (Volume 1)

Stage 1

Construction

Construction activities associated with Stage 1 that would generate significant noise include:

- dredging activities;
- upgrading works for rail infrastructure in the South Yard, including extension of the No.13 railway siding and turnout installation and removal;
- traffic movements associated with construction works and transport of reclamation fill material from external sources; and
- construction of the shipping berths at the multi-purpose and container terminals.

With the exception of dredging activities that would occur 24 hours a day, construction activities would not be undertaken outside of standard working days and hours.

Construction noise management levels were identified for sensitive receivers and the assessment concluded that the noise impact from dredging and general construction works would comply with the daytime, evening and night time construction noise criteria at all nearby sensitive receivers, with the exception of the South Yard construction works. The noise levels from this activity are predicted to exceed the daytime noise management level by up to 13 dB(A) at the closest sensitive receivers (Wentworth Road and Military Road), and by up to 3 dB(A) at receivers further from the works (Jubilee Road). The Environmental Assessment considers this to be a worst case situation and the actual noise level would be less following careful consideration of the construction methodology at the construction management plan stage.

In relation to road traffic noise during Stage 1, the construction phase (including trucks carrying the fill material) would add an extra 23 heavy vehicles during the peak flow period. All additional traffic would pass the worst affected receivers near Lake Avenue (adjacent to Five Islands Road) and along Gladstone Avenue (adjacent to

Masters Road) at Cringila. The predicted increase in noise levels at these receivers is less than 0.4 dB(A), which complies with the road traffic noise criteria (ie less that 2 B(A) increase) for the worst peak hour flow rate.

Vibration levels from rock blasting associated with dredging works were predicted at receivers in SCA 1 and SCA 2 for charges ranging from 1 kg to 60 kg. The results have been assessed against the long term structural damage safe limits in DIN 4150 and were concluded to comply with the criteria at all sensitive receivers. At the closest industrial/commercial facility on Old Port Road, the predicted vibration level exceeds the criteria when a 60kg charge is assumed. By using charges smaller than 60kg and time delaying the charges, cosmetic damage to these facilities were considered to be unlikely. Recommended conditions set blasting limits to minimise vibration impacts.

Operation

The operation of the initial multi-purpose terminal in Stage 1 would generate noise from the following activities:

- materials exporting – exports would arrive by train and be unloaded to conveyor systems, stockpiles and wheeled loaders, which would then transferred onto ships;
- materials importing – imports would be unloaded from ships by cranes into hoppers, then trucks, or mobile hoppers connected to a conveyor system taking materials directly to a proposed cement production facility (subject of a separate project application and acoustic assessment); and
- transport of goods/materials, by road and rail, to and from Port Kembla, including operation of the upgraded South Yard.

Operations would generally meet the INPs intrusiveness and amenity noise criteria, except night time operations at the South Yard, where exceedances of up to 11 dB(A) at the closest noise receivers under adverse weather conditions have been modelled. The predicted exceedances are due to an idling locomotive at the southern end of the South Yard. Construction of a 6m high acoustic barrier between the locomotive and the nearby noise sensitive receivers results in compliance with the noise criteria for all time periods at all receivers.

Sleep disturbance could also potentially result from train horns, with predicted exceedances of the sleep disturbance criteria of up to 27 dB(A) at receivers on Jubilee Road. Train horns are currently sounded at night at road crossings in three locations within the Port Kembla rail loop (including the South Yard) without complaint and current operations suggest that train 'toots' are being used rather than blasts, that can persist between 2-3 seconds. The use of toots minimises exceedances to 7dB(A) and the assessment identifies that since there would only be one train movement at night during Stage 1 operations that could lead to an exceedance, and an open bedroom window generally provides an approximate attenuation of 10 dB(A), it is unlikely that train horn noise would cause sleep disturbance or significantly affect health and well being.

In terms of road traffic noise, predicted increases in noise level from increased heavy vehicle movements are in the order of 0.2 dB(A) – 0.3 dB(A) at the most potentially affected receivers at Cringila and Masters Road, which is within the Environmental Criteria for Road Traffic Noise 2 dB(A) criteria.

In relation to operational vibration resulting from rail movements at the South Yard, the assessment found this to be inconsequential at the closest vibration sensitive receivers.

Consideration

During the assessment the Department and DECCW raised a number of queries on the noise assessment, including assessment methodology and detail, construction traffic and rail noise assessment (including sleep disturbance from train horns). In response to the issues raised by DECCW and the Department, additional noise modelling and assessment was undertaken by the Proponent, which was incorporated as supplementary information in the revised Submissions Report.

The revised noise assessment provided a summary of the environmental noise criteria and resultant project specific noise goals associated with Stage 1 and the Concept Plan at residential receivers, as outlined in **Table 5.** A summary of the conclusions made from this assessment is presented in **Table 6.**

Table 5: Environmental noise criteria and project Specific Noise Goals

Receiver	Period	RBL (L_{A90})	Intrusive Criterion RBL + 5	Ambient (L_{Aeq})	Amenity Criterion	Project specific Noise Goals dB(A)
Sensitive Catchment Area 1 (SCA1)	Day	47	52	61	52	52
	Evening	46	51	53	43	43
	Night	45	50	52	42	42
Sensitive Catchment Area 2 (SCA2)	Day	39	44	51	60	44
	Evening	39	44	45	48	44
	Night	37	42	46	37	37

Table 6: Summary of results from revised noise assessment

Noise source/type	Stage 1 Project	Concept Plan
Construction noise	• noise levels are predicted to comply with the daytime, evening and night-time noise management goals at all sensitive receivers in SCA1 and SCA2 with the exception of the South Yard. • daytime construction activities at the South Yard are predicted to exceed noise levels by up to 13 dB(A) but could be reduced by as much as 5 dB(A) through the use of a temporary noise barrier. The noisiest activities are likely to occur for only a fraction of the estimated 6 weeks construction period for South Yard works. A Construction Noise and Vibration Management Plan will be prepared to ensure that construction noise impacts comply with relevant noise limits.	• levels of noise impact from Stages 2 and 3 will be determined as part of the project application for these future stages.
Operation noise	• noise impacts are predicted to comply with the daytime, evening and night time noise goals at all sensitive receivers in SCA1 and SCA2 with application of noise mitigation (6 m high acoustic barrier) in the South Yard.	• noise impacts are predicted to comply with the daytime noise goals at all receivers in SCA1 and SCA2 and the evening noise goals at all receivers in SCA2 with the erection of a suitably constructed acoustic shed in the South Yard. • predicted exceedances of the evening and night time noise goals by 1-3 dB(A) at 22 receivers in SCA1. • predicted exceedances of the nighttime noise goals by 1-4 dB(A) at 74 receivers in SCA2. • the modelled operational scenario which produced the predicted noise levels is extremely conservative and these levels are likely to occur on only 1 or 2 days a year.
Road Traffic noise	• the worst case predicted increase in noise level is insignificant at 0.6 dB(A), which is below the ECRTN 'maximum allowable increase' of 2 dB(A).	• same predictions as for Stage 1 Project.
Rail noise	• predicted operational impact from an additional four daily train movements on the Port Kembla Branch Line is insignificant and will comply with the specified criteria in the IGANRIP.	• further investigation of train operations and potential impact from the projected 21 trains per day would be carried out as part of the project applications for Stages 2 and 3 and this has been identified as a further assessment requirement.
Sleep disturbance	• the sounding of an additional two train horns (short duration 'toots') is unlikely to result in	• predicted noise impacts are the same as for Stage 1, even though the frequency will increase

	waking reactions at the worst affected receivers.	from two to five occurrences per night.
Blasting and vibration	• predicted vibration levels would comply with the criteria at all receivers in SCA1 and SCA2. • trial blasting is recommended to be carried out prior to construction stage blasting to determine safe working charge sizes.	• the accumulated vibration dose value (VDV) for Concept Plan operations would comply with the VDV criteria.

Concept Plan

The Department notes that the noise assessment has adopted a conservative approach with the assessment based on worst case conditions. Such conditions would result when three terminals are working concurrently at maximum capacity while there is a thermal inversion, resulting in predicted exceedances (with mitigation measures) of between 1-4 dB(A) at noise sensitive receivers in both SCAs and with the majority of these exceedances within the 1-2 dB(A) range. The Department notes that the worst case scenario, as considered in the revised noise assessment, is likely to occur for only 1-2 days a year and is not considered a significant impact to surrounding receivers.

The Department's assessment is based on existing and projected freight movements and Stages 2 and 3 will be subject to further EA requirements regarding noise and vibration impacts, including appropriate mitigation measures, as part of their respective project applications.

Accordingly, based on the outcomes of the revised assessment and updated mitigation measures, the Department considers that the operational noise impact from the full development operating at its maximum capacity can be minimised to acceptable levels. The Proponent has 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.

In relation to rail activities during Stages 2 and 3, the Proponent has committed to undertaking further acoustic assessment arising from changes to the rail infrastructure associated with these stages following the completion of the Rail Master Plan when more information is known about the likely train movements in the Outer Harbour. The Department supports this action, and a condition is recommended requiring an updated Noise and Vibration Impact Assessment as part of the project applications for these future stages.

To mitigate impacts from potential sleep disturbance associated with the use of train horns, the Proponent has also committed to investigate and develop all feasible and reasonable mitigation measures such as the use of shorter train horn toots, closing the Foreshore Road crossing, and grade separation at Old Port Road, which would reduce the need to sound horns at the existing level crossing. These matters would be further addressed in Stages 2 and 3 of the project.

In summary, and to ensure that the above operational noise issues from the Concept Plan are appropriately addressed, the Department recommends the preparation of an updated Noise and Vibration Impact Assessment as part of project applications for Stages 2 and 3, and the development of a Noise Verification Monitoring Program to outline how noise impacts of projects associated with the Concept Plan would be monitored and managed.

Stage 1

The Department notes that the only construction activities during Stage 1 that would generate exceedances of the noise criteria relate to the construction of a rail siding at the South Yard. Predicted exceedances of the construction criteria are up to 13 dB(A) due to the use of demolition saws. A suitably constructed temporary noise barrier is proposed to be used, which could reduce the potential impact at the sensitive receivers by up to 5 dB(A). However, the noise criteria exceedances would only occur for a short period of time and as such the impacts are considered acceptable as exceedances of construction noise criteria for major infrastructure is common. Notwithstanding, a Construction Noise and Vibration Management Plan would be prepared by the Proponent to inform the implementation of construction noise and vibration mitigation measures. This includes a requirement for the Proponent to employ equipment that have power levels consistent with those provided in the Environmental Assessment and that blasting trials be undertaken to inform safe blasting charge weights and overpressure levels consistent with prescribed criteria.

In response to the Department's concerns regarding additional noise impact that may result from greater road traffic if fill haulage by rail or barge is not met, the Proponent indicated that the construction traffic noise assessment had been based upon the worst case truck movements within the first 2 years when trucks will be transporting fill to the site from local destinations such as Mt Prosser. Accordingly and consistent with the transport assessment the Department has recommended as conditions of project approval, limitations to truck movements consistent with that assessed in the Environmental Assessment, unless otherwise agreed by the Director General, following consideration amongst other matters, road traffic noise.

During operation, the noise generated during Stage 1 is predicted to comply with the daytime, evening and night time project specific noise goals at all sensitive receivers in SCA1 and SCA 2 following the application of basic noise mitigation (6 m high acoustic barrier) in the South Yard to address noise from idling trains. In relation to sleep disturbance, the Department considers that it is unlikely that additional train horn soundings would result in waking reactions as this is a current noise source and after implementing shorter duration train horn toots the applicable internal noise levels would be met.

DECCW has recommended specific noise limits to be applied at sensitive receivers during the operation of Stage 1, as shown in **Table 7**, which the Department has incorporated in recommended conditions of the Stage 1 approval. Where no noise limits have been set, the predicted noise levels with the mitigation measures proposed in the Environmental Assessment are below the reported background noise level.

Table 7: Maximum Allowable Noise Contributions

Location	$L_{Aeq\ (15\ minute)}$ dB(A)			$L_{A1,\ (1\ minute)}$ dB(A)
	Day	Evening	Night	Night
Military Road	note 1	39	39	62
Wentworth Street	note 1	42	42	60
Jubilee Road	note 1	note 1	36	59
Any other residential receiver	note 1	note 1	35	note 1
St Patrick's Primary School	39	39	39	note 1
Church on Church Street and Military Road	39	39	39	note 1

Note 1: Daytime and evening noise limits have not been set as predicted noise levels with the mitigation measures proposed in the EA are below the reported background noise level. Where street locations are mentioned, the noise limit applies to any residential receiver on that street.

To reinforce the Proponent's commitments in relation to operational noise and vibration impacts, the Department has recommended that the Proponent prepare and implement an Operational Noise and Vibration Management Plan to outline measures to minimise operational noise and vibration emissions from all project components, including noise impacts from train horn, such as using horn toots and train paths remote from receivers. Accordingly, the Department is satisfied that noise and vibration impacts arising from Stage 1 construction and operation can be managed to acceptable levels by implementation of appropriate noise mitigation measures and compliance with the above recommended conditions.

5.3 Air Quality

Issues

The air quality assessment undertaken for the Concept Plan and Stage 1 Project comprised an investigation of the likely air pollution sources during both construction and operation for the first stage and for the full development, and the local and regional air quality characteristics to determine the local airshed's capacity to absorb emissions from the development. Quantitative air dispersion modelling was conducted to predict the likely air quality impacts that the Concept Plan and Stage 1 may have on the surrounding area.

The project is located on a thin coastal strip with a steep escarpment approximately 8km to the west of the port. The escarpment is a major influence on meteorology and air quality in the region, being able to steer and deflect winds, and decouple winds that can result in an inversion, limiting the dispersion of pollutants in the Illawarra region. Port Kembla is also dominated by heavy and light industry and existing air quality monitoring has identified that the region has ongoing exceedances of particulate matter.

The identified potential sources of air pollution during construction relate to general construction activities, including earthworks, movement of vehicles and unsealed roads, raw materials stockpiles and emissions from construction vehicles and the dredging of spoil. During operation, potential sources of air pollution relate to ship loading/unloading and increased transport vehicle emissions, including from ships, trucks and trains.

The air quality assessment considered relevant guidelines and standards, including the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (DEC, 2005) and the Commonwealth *National Environmental Protection (Air Toxics) Measure* (Air Toxics NEPM) and identified the following pollutants of concern include:

- Dust from earthworks, raw material stockpiles, unsealed roads and movement of vehicles over these roads;
- Nitrogen oxides (NO_x reported as NO_2), carbon monoxide (CO), sulphur dioxide (SO_2) and particulate matter from vehicle engine combustion and earth moving machinery, haul trucks and increased worker vehicles and from auxiliary engines and boilers from moored ships;
- Heavy metals (PAH and TBT) from contaminated sediments in the Outer Harbour that will be relocated to bunded containment areas under the reclamation area;
- Lead, which is present in the Illawarra air shed, and potential for the development to contribute to local lead levels if materials containing lead (eg concentrates for processing) are to be transferred to the port; and
- Toxic air pollutants – includes benzene (found in gasoline), which is typically monitored and used as an indication of the overall toxic air pollution quality.

As noted, the region currently has exceedances of particulate matter criteria for PM_{10} and as the project has the potential to include vehicle use, plant, machinery and industrial activities, it has the potential to further contribute to the already high particulate matter ambient levels in the region.

Odour was also considered as a potential pollutant of concern (in terms of nuisance effects) during the dredging operations of the Outer Harbour. For a densely populated area like Port Kembla, an air dispersion modelling criteria of 2 Odour Units (OU) at the nearest sensitive receptor was considered appropriate. To avoid potential odour from the dredged spoil, the dredging operations would be designed such that spoil is not handled or stockpiled above the water surface.

Identified sensitive receptors in relation to air pollutants include:

- nearest residences – located approximately 400m to the southwest near the corner of Five Islands Road and Military Road. Other residences are in a clockwise arc from 800m to the south-south east to the west;
- commercial and industrial areas – located on the boundary of the project area in all directions (with the exception of adjacent water bodies);
- nearest schools – Illawarra Senior College on Military Road (approx 300m to the south west), Port Kembla Pre-School on Military Road (approx 700m to the south), and Port Kembla Public School on Gloucester Blvd (approx. 1.2km to the south-south east); and
- nearest church and hospitals – Port Kembla Uniting Church (approx 1 km to the south west), Villa Maria Centre (approx 6 km to the west-north west), Illawarra Private Hospital and Victory Hospital (approx 6.5 km to the north-west).

Consideration

Concept Plan and Stage 1 Operation

Air quality issues were raised by DECCW and local residents from the Port Kembla Pollution Meeting group. The residents' group indicated that the local community has experienced severe air pollution from heavy industry over a period of many years and considers that air quality should be monitored whenever there is a potential pollution problem.

DECCW's concerns relate to the predicted exceedance of PM_{10} ground level concentration (GLC) criteria across a large area of Port Kembla. It also raised concerns about the potential heavy metals concentration in dust from blast furnace slag (proposed fill material for reclamation) during construction of Stage 1. DECCW sought a range of information from the Proponent to better understand the reported impacts, including the extent of each exceedance and the conditions likely to result in an exceedance, quantification of dust and PM_{10} sources, likely impacts from the dust generated from slag use, and Best Management Practices to be applied to dust sources.

The Department notes that the original air quality assessment was based on a worst case scenario for the full development operating at maximum capacity during a night time normal inversion. Given that this scenario is unlikely to happen in reality (constituting only 1% of the time), as indicated in the Environmental Assessment, the Department requested that the likely impacts of "normal" operations should also be presented.

In response to the above matters, a revised air quality assessment was undertaken by the Proponent and formed part of the Revised Submissions Report. A number of assumptions and methodologies primarily relating to ship and train movements were also revisited. The assessment included both peak and normal operating conditions for the Concept Plan operations. The results indicate that:

- short term SO_2 GLCs, both in isolation and in combination with background levels, comply with the relevant criteria at all sensitive receptors under both the peak and normal operations;
- short term (24 hour) PM_{10} GLCs may exceed the relevant criteria under both peak and normal operations at some discrete receptors, with the main source of the PM_{10} exceedance anticipated to be from the bulk material stockpile; and
- long term (annual average) predictions of PM_{10} will meet DECCW criteria.

The Proponent proposes to implement best practice management measures during operation, as detailed in the revised air quality assessment. The measures are directed at minimising fuel combustion emissions from vehicles and equipment, fugitive dust and odour from exposed surfaces and vehicles, and hazardous and other air pollutants from disturbance of potentially contaminated land. The Proponent has also committed to:

- the preparation of an Air Quality Management Plan (including a dust monitoring program) for inclusion in the OEMP for each stage of the Concept Plan; and
- undertaking further analysis and atmospheric dispersion modelling for Stages 2 and 3, as part of the separate project applications for these stages.

The Department in consultation with DECCW has carefully considered the potential air quality impacts, particularly in relation to the short term PM_{10} exceedances. The revised 'normal' operations assessment does identify some reduction in short term PM_{10} exceedances at receivers and a lower long term annual emission rate than originally predicted under a worst case scenario. Whilst the Department would prefer a lower number of short term PM_{10} exceedances, it does acknowledge the existing high levels of PM_{10} in the region and the regions existing geographical constraints, which contribute to the short term exceedances and limit the Proponent's ability to meet the short term criteria. It also notes that the longer term annual PM_{10} criteria would not be exceeded and that other air pollutant criteria, short and long term, would not be exceeded.

To address these matters within the Concept Plan, and to facilitate ongoing assessment and review processes for air quality at each project stage, with the objective of minimising air quality impacts, the Department recommends the Concept Plan require the Proponent to:

- design, construct and operate projects associated with the Concept Plan with the objective of meeting relevant air pollutant criteria;
- develop and implement an Ambient Dust Monitoring Program, including the installation and operation of a meteorological monitoring station;
- investigate the installation of Shore Side Power (cold ironing) to minimise ship emissions; and
- to submit updated air quality assessments for future stages of the Concept Plan.

Stage 1

The modelling results for Stage 1 construction suggest that short term NO_2 and PM_{10} GLCs may exceed air quality criteria at discrete receptors close to the development boundary. NO_2 concentrations were predicted to exceed the DECCW criteria for one hour of the modelling period at one receptor and are not expected to exceed the NEPM assessment criteria. Dust impacts associated with the construction phase are anticipated to be generated mainly from the construction stockpile and use of blast furnace slag. In regards to Stage 1 operation, the modelling results suggest that only short term (24 hour) PM_{10} GLCs may exceed the air quality criteria at some discrete receptors.

As with the Concept Plan, best management measures and practices are proposed to be implemented during construction and operation of Stage 1. The Department considers that dust and other emissions can be minimised during Stage 1 with the Proponent's committed control measures, the air quality standards and monitoring regime identified in the Concept Plan, and the recommended terms and/or conditions, including:

- constructing the project in a manner that minimises dust emissions from construction sites, including the implementation of a range of measures such as:
  - covering of truck loads, road sweeping, vehicle speed limits, truck washes and shaker grids at site exits;
  - unloading of fill trains through a below track system;
  - the sealing of trafficable areas and areas susceptible to windblown dust impacts;
  - the use of stockpile veneers and the watering of dusty areas; and
  - the cessation of works if necessary.
- undertaking odour monitoring during dredging activities; and
- the implementation of comprehensive Construction and Operation Air Quality Management Plans focused on adaptive management measures to minimise dust emissions from the site.

In relation to comments received from DECCW regarding whether dust from the blast furnace slag (which is proposed to be used for fill as part of the reclamation area for the development) posed a human health risk to sensitive receptors surrounding the port, the Proponent undertook an assessment of the heavy metals in slag dust equivalent to the maximum average concentrations for characterisation as described in the DECCW resource recovery exemption for blast furnace slag. This assessment identified that all of the metals potentially present in the blast furnace slag met the one hour maximum and annual concentration assessment criteria and it is considered unlikely that the use of blast furnace slag as fill in the reclamation area for the development would result in adverse human health impacts to sensitive receptors surrounding the port.

5.4 Contamination

Issues

Harbour Sediments and Water Quality

Concept Plan

Sediments in the Outer Harbour are affected by both natural processes, such as tidal flushing, and to a lesser extent, mechanical mixing from deep draft vessels and tug boat movements. The bed profile of the Outer Harbour comprises a layer of marine estuarine sediments which comprise silt clays, sandy silts and silty sandy clays with fine to coarse gravels. These sediments are underlain by stiff alluvial clays and shallow bedrock.

These sediments have been impacted by port operations, contaminants leaching from adjoining fill materials and groundwater migration from up gradient sources. The Outer Harbour is also the receiving water body for stormwater discharge from the Darcy Road Drain and Salty Creek that collect run off from the industrial catchment of the Port Kembla foreshore.

A review of previous investigations of both the Inner and Outer Harbour sediment and water quality identified a range of contaminants. These contaminants included heavy metals, arsenic, naphthalene, Tributyltin (TBT) and Polynuclear Aromatic Hydrocarbons (PAH) and it was reported that for the majority of compounds tested, concentrations of contaminants in the Outer Harbour's sediments were similar to or higher than the dredged material from the inner harbour. It was also concluded that the distribution of contaminants was relatively random.

The *Acid Sulfate Soil Risk Map* (DNR, 2002) identifies that there is a 'High Probability' for acid sulfate soils within the 'Estuarine Bottom Sediments' of the Inner Harbour and that there is a potential for severe environmental risk if bottom sediments are disturbed by activities such as dredging. This conclusion has been extrapolated to the Outer Harbour, which is categorised as 'Ocean' and therefore not classified.

The Outer Harbour also includes an existing spoil emplacement area used to dispose of spoil dredged (some contaminated) from the Inner Harbour and contains approximately 460,000 m^3 of slag and dredged spoil. The area is bounded, in part, by underwater bunds constructed from slag material and has a level of approximately 4m PKHD and a depth in excess of 7m. The spoil emplacement area overlaps with the proposed berth basin between the multi purpose and container terminals and would require partial extraction during Stage 1.

In response to these previous investigations, the Proponent undertook detailed investigations for Stage 1 and committed to undertaking further investigations for Stage 3. The Department notes that the majority of dredging will occur in Stage 1 (within sub stages), that no dredging is proposed for Stage 2 and relatively minor dredging is

proposed for Stage 3, this being associated with the existing swing basin extension and the northern portion of the multi-purpose terminal.

Stage 1

The detailed investigations for Stage 1 (including intrusive investigations) focused on those locations where dredging would occur - mainly the proposed multipurpose berth dredge box, the proposed container berth dredge box, and the existing underwater emplacement area. Samples were also taken in the vicinity of the Darcy Road drain and the Salty Creek harbour outlets, as these receive water from the adjoining industrial catchments and are a potential pathway for contaminants. Harbour water sampling was also undertaken consistent with historical monitoring regimes.

The analytical results from this investigation were generally consistent with the findings of previous investigations of sediment contamination within the Outer Harbour. The results of the sediment analysis program were compared against the following guidelines:

- ANZECC/ARMCANZ (2000) *Interim Sediment Quality Guidelines* (ISQG) Low and High Trigger Values to assess environmental impacts; and
- *National Environment Protection (Assessment of Site Contamination) Measure* (NEPM) guidelines for commercial and industrial land use to assess suitability for use in land reclamation that will comprise the future berths.

The following is a summary of the site characterisation:

- heavy metals (concentrations exceeding the ISQG-Low) were identified across the majority of the dredge footprint within the shallow sediments with highest concentrations predominantly within the top 1.0 m of the emplacement area;
- copper and lead concentrations (and to a lesser degree arsenic) exceeded the site investigation level (SIL4) (NEPM, 1999) criteria in localised areas at the southern end of the eastern dredge footprint and also in the vicinity of the Darcy Road. However, the sediment is considered to be suitable for reclamation works related to the proposed commercial/industrial development with no significant risk to human health;
- the presence of acid sulfate material between 0 and 3.3 m (anoxic layer), consistent with *the Acid Sulfate Soil Risk Map;*
- PAH contamination (concentrations exceeding the ISQG-Low) was identified across the majority of the dredge footprint with highest concentrations predominantly within the emplacement area. The PAH concentrations generally correlated with field observations of hydrocarbon/chemical and hydrogen sulphide odours;
- the extent of TBT contamination (concentrations greater than the ISQG-Low and High) appeared to be confined to the southeast most corner of the Container Berth Dredge Box, adjacent to the eastern breakwater;
- heavy metal concentrations in the harbour water samples were less than the adopted ANZECC assessment criteria, with the exception of cadmium concentration in two samples (likely to be erroneous) and copper concentrations in one sample;
- eluriate results indicated that there is a potential for copper, arsenic, vanadium and zinc to be released into the water column during dredging at concentrations which could exceed their respective ANZECC (2000) 95% Marine trigger values.

To manage the contaminated sediments, the Proponent proposes to construct a series of discrete bunded fill areas within the reclamation footprint. The majority of dredging would occur in Stage 1 and would utilise a range of dredging methodologies and management measures including silt curtains and booms. In relation to the existing soil emplacement area, material from the existing spoil emplacement area which overlaps with the proposed berth basin location would be dredged and emplaced into newly constructed bunds, with the original bund walls remaining intact during this process. To avoid sediment plumes, minimise the spread of contaminants and prevent sedimentation of the shipping channel, a Dredging and Reclamation Environmental Management Plan would be implemented. The Plan would include, amongst other matters, environmental performance criteria for dredging, reclamation and emplacement works and details of how the environmental performance of the dredging, reclamation and emplacement works would be managed and monitored and what actions would be taken to address identified adverse environmental impacts.

The following conclusions were drawn from the sediment investigation:

- contamination was identified within the sediment of the Stage 1 dredge area which could be disturbed and mobilised during construction works. Mobilisation of bioavailable contaminants into the water column could lead to incidental ingestion by fish and other marine species and/or dermal absorption into the food chain;
- there is potential for Acid Sulfate Soil (ASS) to be present within the harbour sediments and it becoming actual ASS when brought to the surface and exposed to oxygen, which can present a significant environmental risk;
- the eluriate test results indicate that, after allowing for a dilution ratio of 1:4, the dredging and reclamation works are unlikely to have a significant impact on the receiving environment; and
- the proposed sediment emplacement and encapsulation structures are considered to be appropriate to manage the contaminated sediments.

Soil and Groundwater Contamination

Concept Plan

In relation to the Concept Plan, the Proponent undertook a review of existing environmental investigations relating to the site. The site has a relatively high potential to be contaminated due to existing and past industrial land uses and extensive reclamation and filling activities, with much of the original shoreline buried under various fill materials and dredged sediments. Groundwater which flows in a north easterly direction through the site towards the Outer Harbour has a highly degraded water quality rating and is influenced by regional factors.

Previous land based investigations have identified elevated levels of heavy metals, polychlorinated biphenyls (PCBs), PAHs, petroleum hydrocarbons (TPH), and arsenic. These investigations identified that the contaminants were primarily related to fill processes and not deeper in natural soils. Recent investigations suggest that contamination concentrations are less than the commercial/land use criteria with the exception of hotspots.

In relation to groundwater, previous investigations identified that groundwater levels ranged from approximately 0.16 to 4.4 m below ground surface (bgs), is saline and is dominated by tidal influences rather than hydrological conditions. Investigations have identified a range of groundwater contaminants including heavy metal and arsenic, with the highest concentration of heavy metals reported in groundwater from the area around Jetty No. 3 and to the west of the Darcy Road drain. However, leaching of metal contaminants into the groundwater appears to be minimal, with groundwater contaminants resulting from external regional influences rather than localised influences. Notwithstanding, previous investigations have advocated ongoing and expanded groundwater monitoring at the site to monitor environmental risks and the Proponent has advised that it has an existing groundwater monitoring program.

In the vicinity of the proposed road corridor to the multi-purpose terminals, groundwater levels are between 4.2m and 4.3m bgs; and in the vicinity of the proposed link road to the container terminals, at approximately 2.6m bgs. Given that the excavation works for the new roads would be limited to a depth of around 1.5m bgs, it is considered unlikely that groundwater would be encountered during construction of these roads.

While groundwater management is not expected to be required as part of the land based construction works, it would be required for the proposed reclamation area as it has the potential to impact on groundwater flow regimes to the Outer Harbour. This would be the case if the hydraulic conductivity of the reclamation area was significantly different to that of the natural soil profile of the Outer Harbour shoreline. The reclamation area would be designed to ensure that the existing groundwater flow regimes are not significantly altered.

Potential issues relating to soil and groundwater contamination for the Concept Plan are likely to include:

- mobilisation of contaminated soils from excavation works and construction vehicles resulting in new exposure pathways and potential human health risk. The greatest potential would likely occur during excavation and construction activities of the new road links from Christy Drive to the multi-purpose terminals, Foreshore Road to the container terminals, and from Darcy Road to the recreational boat harbour; and
- mobilisation of contaminated soils from surface water runoff potentially impacting the receiving waters of Darcy Drain, Salty Creek and the Outer Harbour.

Notwithstanding, the extent of disturbance of potentially contaminated soil is quite small relative to the footprint of the total development. The Environmental Assessment indicated that further investigations would be undertaken as part of the project applications for Stages 2 and 3.

Stage 1
A more detailed investigation was carried out for Stage 1 works, with the investigation focusing on areas of high risk, including in the vicinity of the proposed new road link off Christy Drive and properties adjacent to the proposed new corridor where excavation works are proposed. The investigation consisted of advancing boreholes, collection of soil samples and laboratory analysis of samples for contaminants of potential concern based on historic site activities and previous investigation results.

In general, land contaminants were below the established soil assessment criteria for the proposed land use, with the exception of an isolated elevated copper reading. Chrysolite type asbestos fibres were also identified in an isolated sample. The conclusion of this assessment identified that with the exception of the isolated locations, the fill could be described as *General Solid Waste* if it is required to be disposed off site.

During the Stage 1 reclamation works, the Proponent is seeking to use blast furnace slag and coal wash from sources within the vicinity of the project. In relation to the blast furnace slag, it is understood that the material is generally an inert material and has been used for Inner Harbour reclamation. Notwithstanding, the slag can be contaminated as a result of other waste streams and will need to be subject to quality assurance controls. To use these materials, the Proponent will also need to obtain a Specific Resource Recovery Exemption under the *Protection of the Environment Operations (Waste) Regulations 2005.*

Consideration

Harbour Sediments and Water Quality
Concept Plan
The Department notes that the preliminary investigations have identified that sediments within the Outer Harbour are contaminated with a range of contaminants, including heavy metals, that are related to past and current industrial uses adjoining the harbour and from the emplacement of contaminated material from previous dredging works, including those undertaken in the Inner Harbour. Notwithstanding, the Department considers that the dredging of this material, if appropriately managed, should not result in a significant environmental impact given that there would a number of controls employed, including a monitoring regime, as further discussed below in the Stage 1 assessment.

Although the detailed sediment investigation did not include the Stage 3 dredge areas (i.e. area north of Jetty No 6 and swing basin expansion area, south of the northern breakwater), potential issues involving contaminated sediments from dredging activities, based on previous investigations, are considered likely to be similar to those assessed for Stage 1, as the Stage 3 dredge area is within the Outer Harbour and in proximity to areas that have been investigated. These issues include the potential release and mobilisation of contaminants into the water column during the dredging and emplacement of materials and disturbance of potential ASS. The Environmental Assessment recommended that further sediment investigation be conducted as part of the project application for Stage 3. The Department is satisfied with this approach and has incorporated this requirement into the Concept Plan approval.

Stage 1
As noted, the majority of dredging will be undertaken during Stage 1 and it is during this stage that there are potential risks associated with the dispersal of contaminants and acid sulfate soils during dredging and emplacement.

Accordingly, the most effective means to prevent spread of contaminants within the Outer Harbour during the works is to effectively manage turbidity levels, which will involve restricting impacts to the areas immediately surrounding dredging and emplacement. This is commonly achieved through the installation of silt curtains, and in some circumstances, physical barriers. The Department therefore recommends that the Proponent be required to install and maintain turbidity control measures around all dredge and emplacement areas for the duration of the works. To monitor the effectiveness of these measures, the Department recommends that the Proponent monitor background turbidity at reference points within the Outer Harbour and only remove turbidity control measures once turbidity within the area confined has dropped below 50 mgL^{-1}.

As an overarching system to link background turbidity monitoring with water quality monitoring during dredging and emplacement works, and with ameliorative actions in the event of elevated impacts, the Department

recommends that the Proponent's commitment to implement an environmental management plan and turbidity monitoring be reinforced as requirements of approval.

The Department considers it appropriate that the contaminated sediments be retained within the Outer Harbour and locked under the reclamation area to prevent future disturbance and spread of the materials. Notwithstanding, as sediments throughout the dredged area have potential to be contaminated, the Department considers that all dredged material should be encapsulated. In this regard, conditions are recommended regarding suitable design and construction methodology for containment structures to prevent the dispersal of contaminated sediment and to ensure appropriate management of environmental and health risks.

The Department also notes the Proponent's commitments for a number of other mitigation measures to minimise potential impacts during dredging and reclamation activities, including:

- transport of dredged sediments while wet and immediate placement in the reclamation area to prevent the oxidation of potential ASS; and
- a further qualitative risk assessment to evaluate the risk to human health and the environment associated with the contaminated sediment. A Remedial Action Plan would be prepared if the risk assessment concludes that the contamination hot spots present an unacceptable risk to the environment.

Soil and Groundwater Contamination

Concept Plan

The Department notes that due to past and historical uses, there is potential for land contamination across the site. The site will retain its current industrial and commercial operations and the detailed assessment for Stage 1 suggests that contaminant levels above the soil assessment criteria for the proposed land uses would be restricted to isolated locations. Accordingly, the Proponent has committed to undertaking additional contaminated land investigations for subsequent stages, particularly in relation to areas subject to excavation, including:

- the extension of the road link from Christy Drive;
- reconfiguration of rail in the South Yard;
- extension of the existing rail siding into the proposed container terminals; and
- new link road from Darcy Road to the boat harbour, and proposed land based hard stand area.

The Department supports this further assessment and has identified this matter in its recommended further assessment requirements.

In relation to groundwater impacts, the Department notes that groundwater contamination is primarily related to regional and off site influences and that due to its depth, does not limit the development. Notwithstanding, the Department does note that the project's reclamation poses a minor risk to groundwater flow, particularly if the hydraulic conductivity of the reclamation area is significantly lower to that of the natural soil profile of the existing Outer Harbour shoreline. From a contamination standpoint, the flux of contamination migrating onto the harbour should not change subject to the hydraulic conductivity of the reclamation being similar. Accordingly, the Department recommends the inclusion of a requirement that the terminals do not significantly alter groundwater flows and that reclamation areas have a hydraulic conductivity consistent with the existing Outer Harbour shoreline.

Stage 1

The detailed investigations undertaken for Stage 1 were focused on the Christy Drive road link, which identified the potential for contamination hot spots and the Proponent has committed to the preparation of an environmental management plan to ensure that these contaminants are appropriately managed, including selective excavation, stockpiling, soil characterisation and disposal.

The Proponent has also identified that detailed investigations were not undertaken in relation to excavations to be undertaken for the South Yard rail infrastructure upgrade, the temporary construction road link and the sulphuric acid pipeline. Due to the relatively limited excavations associated with the road and pipeline works, the Proponent has identified that risks associated with contamination are limited. Whilst the Department generally concurs with this position, it considers that due to potential hot spots throughout the site, the Proponent should undertake further investigations at these locations to inform appropriate management practices and has recommended conditions to this effect.

In relation to the works associated with the South Yard rail investigations, the Department concurs, based on previous rail infrastructure assessments that potential land contamination issues associated with these works can be easily managed during construction and are unlikely to result in significant environmental risk. Notwithstanding, the Department supports the Proponent's commitment to undertake further investigation at this location and has recommended that this commitment be incorporated into the above recommended investigations.

To ensure that contaminated material is appropriately managed, used and disposed of (including asbestos) and to ensure that the land is appropriately remediated for its intended use, the Department also recommends conditions related to auditing consistent with the *Land Contamination Management Act 1997,* and waste management and classification processes.

The reclamation works will require spoil to be sourced from various sources, some of which are yet to be defined. The Proponent has identified that potential sources include blast furnace slag and coal wash and that a Resource Recovery Exemption under the *Protection of the Environment Operations (Waste) Regulations 2005* would be required, and that it would implement quality assurance controls to ensure that the fill material is suitable for reclamation activities. The Department supports these processes and recommends conditions relating to this matter, including the receipt of non-contaminated materials, and incorporating such procedures into a Dredging and Reclamation Environmental Management Plan.

Whilst the project will be designed to mitigate groundwater impacts, the Department considers it prudent that the final design of these works be verified to ensure that the design does not unduly impact groundwater flows and that groundwater quality and flows are monitored. Accordingly, the Department supports ongoing groundwater monitoring and recommends that the existing monitoring program be revised to meet NOW and DECCW requirements and that the final design of the works is verified.

On the basis of the proposed mitigation measures and recommended requirements and conditions, the Department considers that contamination within the harbour and on land and groundwater can be appropriately managed by adopting suitable dredging methodologies and environmental safeguards, and considers that potential issues arising from the dredging and construction works associated with Stage 1 would be similar for the other stages of the Concept Plan. Notwithstanding, further detailed sediment investigation should be conducted prior to the dredging of remaining areas in Stage 3. Similarly, further detailed investigation of land and groundwater contamination of areas affected by Stages 2 and 3 should be undertaken prior to excavation and construction works in these areas.

5.5 Terrestrial and Aquatic Ecology

Issues

Aquatic ecology

The existing aquatic ecology at the Outer Harbour consists of soft substrate habitat and hard substrate habitat and is characterised in **Table 8** below.

Table 8: Aquatic habitat in the Outer Harbour

Habitat type	Attributes
Soft substrate	• no established seagrass or mangrove communities; • no significant macroalgal flora (marine vegetation) associated with the soft substrate habitat. Red algae is the only species found in previous surveys that are present within the footprint of the proposed development; • potential presence of potentially toxic dinoflagellate cysts (*Gymnodinium catenatum*) that cause algal blooms; • sampling of sediment infauna (UNSW, 2009) in the Outer Harbour and in Salty Creek identified 32 sediment infauna taxa and 11 taxa respectively in the two locations.
Hard substrate	• Red (Rhodophyta) and Brown (Phaeophyta) algae are the predominant macroalgae found in the Outer Harbour (eastern breakwater and existing jetties) from surveys undertaken by UNSW in 2009; and • Fish fauna found in the Outer Harbour are dominated by a few species (Mado, Yellowtail, Moon wrasse, Silver Sweep, Eastern Hulafish, Red Morwong and Yellowfin Bream).

Concept Plan and Stage 1

Construction activities associated with the Concept Plan that would impact on aquatic ecology include: dredging of sediments (Stages 1 and 3); underwater rock blasting (Stage 1), spoil placement and reclamation (Stages 1, 2, and 3), and redirection of Salty Creek and extension of Darcy Road Drain (Stage 1) into the Outer Harbour. The majority of these works would occur during Stage 1 and the assessment is focussed on this stage.

Potential impacts to aquatic ecology associated with these activities include:

- **smothering of sediment infauna** – dredging and soil emplacement will result in a loss of Red Beach shallow sandy beach habitat and approximately 30% of the deeper soft substrate habitat in the Outer Harbour. This would be replaced by 2.74 km (inclusive of approximately 1.77km of rock revetment walls) of new hard substrate habitat following the completion of the reclamation and the implementation of the Concept Plan;
- **water quality changes** – generation of turbid plumes can impact on macroalgal communities through reduced water quality (prolonged reduction in light availability). Potential suspension of contaminated sediments can impact on the hard substrate community structure through potential disruption to recruitment and settlement processes;
- **disturbance and suspension of dinoflagellate cysts** – this raises the possibility of future toxic algal blooms;
- **blasting** – underwater blasting creates shockwaves which can have adverse effects on fish and marine mammals; and
- **creation and removal of hard substrate habitat** – the development would not result in the removal or modification of the existing rocky reef formed by the harbour breakwaters (eastern and northern). Additional hard substrate habitat would be constructed as indicated above.

The hard substrate of the eastern breakwater was previously identified as potential habitat for juveniles of one threatened fish species, the black cod. However, this species has not been previously recorded in the harbour. A threatened species assessment was undertaken for black cod in relation to the Stage 1 development, which concluded that Stage 1 would have no net impact on this species as there would be no direct impact on its potential key habitat. Indirect impacts through water quality changes during construction would be mitigated through the installation of silt curtains and other controls around the work areas.

The entrance to Salty Creek at Red Beach on the Outer Harbour (see Figure 3) would form part of the reclamation area. When the seabed fronting the creek entrance is reclaimed, a culvert would be constructed within the reclamation area to ensure that tidal flushing and flood discharge conveyances are maintained. Once constructed, the Salty Creek entrance would become permanently open to the sea and no longer be characterised as an intermittently closed or open lake or lagoon (ICOLL) which experiences fluctuations of water levels and salinity. Changes to the dynamics of Salty Creek could alter the species composition of flora and fauna that currently inhabit this system, from a smaller assemblage of species adapted to greater fluctuations in water level and salinity to a larger assemblage of species typically found in the surrounding marine environment. The changes also have the potential to improve water quality by permanently opening the entrance to the sea and allowing greater tidal flushing.

A further change to the entrance conditions of Salty Creek (relevant to Stages 2 and 3) is the enclosure of the drainage culvert to facilitate the unimpeded movement across and between the operational terminals. The drain enclosure would create a long dark tunnel which is likely to adversely impact on fish passage between the sea and the estuary.

Once operational, potential impacts to aquatic ecology would include stormwater runoff from hardstand areas and alteration of the hydrological regime of Salty Creek.

A range of mitigation measures are proposed to minimise identified potential impacts. These include:

- turbidity controls – silt curtains would be installed around the work areas as part of the Dredging and Reclamation Environmental Management Plan to minimise potential dispersion of sediments, including dinoflagellate cysts. The effectiveness of turbidity control will be reviewed through the proposed water quality monitoring. An Algal Bloom Contingency Plan would also be developed for the construction phase of the project;

- biological monitoring – this would monitor the effects of dredging and spoil emplacement on marine ecosystem health (eg larval settlement on the existing and newly created hard substrate) within the Outer Harbour;
- blasting management – the design criteria for blasting activities would incorporate the pressure thresholds for physical trauma to fish and marine mammals, including physical modelling of pressure changes in the water column and installation of physical barriers, if necessary. A Marine Mammal Management Plan would be developed based on relevant guidelines;
- offset for loss of soft substrate – an offset package of aquatic habitat improvement works at Tom Thumb Lagoon and the Garungaty Waterway (discussed below) is proposed to compensate for this loss. New hard substrate is also proposed to be incorporated in the design of the wharf face and rock revetments by creating structural complexity to surfaces so as to facilitate recruitment and settlement of epibiota on the new structures. This includes:
  - boulder sized rocks (placed without cement) for revetments which provide crevices and artificial rock pools in the intertidal and sub-tidal areas;
  - textured finish on the vertical walls by placement of objects such as concrete knobs; and
- installation of light into the Salty Creek culvert upon its enclosure during Stage 2.

Terrestrial ecology

The ecological investigation conducted for terrestrial flora and fauna determined that the landside area of the development site provides limited habitat for native flora and fauna, with the exception of the Green and Golden Bell Frog (*Litoria aurea)* due to the highly disturbed and industrialised nature of the site and the surrounding environment. The Green and Golden Bell Frog (GGBF) is an endangered species under *Threatened Species Conservation Act* 1995 (TSC Act).

No flora species listed as threatened under the TSC Act were identified as occurring within the development area. Neither are there any threatened species of seabirds or shorebirds that may nest, or be dependent on the Red Beach area (proposed to be reclaimed) as regular roosting or feeding areas.

The most significant population of GGBF in the Illawarra Region is found at North Port Kembla, which is adjacent to the Outer Harbour. The old rail corridor (eastern side of the development area) is a significant GGBF habitat as it supports freshwater channels, shelter, foraging and movement habitat. The corridor lies within the main breeding ponds at the Heritage Park and is 200m north east of the Brick and Block site (site 15), another prime breeding area. A new road linking Darcy Road to the recreational boat harbour is proposed to be constructed in this rail corridor during Stage 2 of the Concept Plan.

The GGBF assessment included targeted surveys and previous investigations undertaken by Gaia Research (2008) for DECCW on potential and existing habitat in the vicinity of the Outer Harbour area. This investigation identified six sites within the development area that are either potential habitat, or provides scope for the creation of habitat for GGBF, as shown in **Figure 10.**

Concept Plan

The Environmental Assessment concluded that the identified GGBF habitat areas are unlikely to be adversely affected during Stage 1 construction activities. However, during Stage 2 of the Concept Plan, the proposed construction of an access road within the disused railway corridor linking Darcy Road to the boat harbour includes a risk of GGBF being inadvertently killed or injured during construction and operation of the road. This rail corridor is significant because it is in close proximity to Site 15, which is a prime breeding site for the Port Kembla sub-population.

The Proponent has committed to manage potential impacts on the GGBF, including the preparation of a GGBF Master Plan, to provide a strategic framework for how GGBF and its habitat will be managed across the Outer Harbour area. For each construction stage, a comprehensive Green and Golden Bell Frog Management Plan (GGBFMP) would be prepared prior to construction works commencing. The plans would be prepared with consideration of the GGBF Master Plan and in accordance with relevant DECCW plans and guidelines and would include:

- identification of any actual or potential threats from construction and operation;
- appropriate mitigation actions;
- monitoring and reporting on ongoing effectiveness of the management plan;

- a program of works and timeline for habitat creation (eg planting suitable vegetation for foraging and installation of structures to facilitate movement of the frogs); and
- installation of frog exclusion fencing surrounding construction areas and an education campaign for construction personnel.

Figure 10: Location of known or potential GGBF Habitat Sites

Source: Figure 17-2 of the Port Kembla Outer Harbour Development Environmental Assessment (Volume 1)

Stage 1

Construction activities associated with Stage 1 may impact on potential GGBF habitat through the following means:

- use of herbicides along the foreshore to control noxious weeds (Bitou Bush);
- disturbance of drainage areas along railway lines in the vicinity of Outer Harbour which may function as refuge and/or dispersal areas for GGBF (sites 17 and 18); and
- removal of potential foraging habitat surrounding an artificial concrete-lined drain in the South Yard to allow for the extension of a rail siding (site 8).

As outlined above, potential impacts on identified GGBF habitat would be avoided and managed through an overarching GGBF Master Plan for the entire site and a detailed GGBFMP would be prepared for Stage 1.

A small patch of vegetation containing species characteristic of Coastal Saltmarsh (an Endangered Ecological Community under the TSC Act) on Salty Creek would be removed during Stage 1. This patch is of relatively low

quality and conservation significance due to its small size (approx 30m^2), is weed infested and has low species diversity, and its potential habitat value for fauna such as wading birds is thus limited.

Consideration

Aquatic Ecology

Concept Plan and Stage 1

The Department considers that the loss of approximately 40ha of deeper soft substrate habitat from the reclamation works, although significant in area, would have relatively low impact due to a low diversity of faunal habitat in existence and based on previous investigations of dredging impacts on sediment fauna, dredged areas would recover to the pre-dredging community structure. Notwithstanding, there would be sufficient sediment habitat remaining in the Outer Harbour to provide species for recruitment to the dredged areas following the completion of dredging and reclamation.

To offset the loss of both the soft substrate habitat and the sandy beach area of Red Beach, the Proponent has identified opportunities for habitat improvement projects at Tom Thumb Lagoon and Garungaty Waterway. These areas are tidal water bodies, which offer soft sediment habitat for fish and other aquatic fauna within the catchment of Port Kembla Harbour. Restoration programs for these areas are currently being undertaken by Wollongong City Council and Conservation Volunteers Australia, and the Proponent has proposed soft substrate habitat measures to complement the restoration programs by increasing fish passage, aquatic biodiversity, and tidal exchange; and promoting estuarine communities such as saltmarsh, mangroves and seagrass which are currently underrepresented in the harbour catchment.

The Department notes that the proposed habitat improvement projects are consistent with the Council's Estuary Management Plan (2007) and are supported by I & I NSW. To formalise the proposal, a recommended condition requires the Proponent, prior to commencement of construction works, to submit for the Director-General's approval a Habitat Offset Package. The package is to provide details of the proposed measures to offset the loss of soft substrate habitat in the Outer Harbour and sandy beach area of Red Beach, including a program (timeline) to achieve the implementation of the final suite of measures. The I & I NSW, DECCW and Wollongong City Council are required to be consulted during the preparation of the package and relevant management/contingency plans.

The I & I NSW also support the proposed aquatic ecology measures which include controls for turbidity, blasting and dispersion of suspended dinoflagellate cysts, and a biological monitoring program to monitor the effects of dredging and spoil emplacement on marine ecosystem health within the Outer Harbour. These necessary controls and monitoring program are reflected in recommended conditions for Stage 1, which are also relevant for other stages of the Concept Plan, which requires further assessment of ecological impacts for Stages 2 and 3.

Other recommended conditions for Stage 1 construction to minimise impact on water quality and aquatic ecology include installation of sediment fences at the riparian zone, water diversion structures, filter rolls at stormwater drain locations, and use of geomesh on stockpiles which are to be incorporated into a Construction Environmental Management Plan.

In relation to the hard substrate flora community in the Outer Harbour, macroalgal taxa tolerant to low light conditions dominate this community, suggesting that the ambient water quality conditions provide relatively prolonged periods of high turbidity. Increased turbidity levels are common in the harbour as a result of both port operations and climatic events. The assessment therefore considered that any reduction in light availability due to increased turbidity levels is not likely to have significant impact on the macroalgal community over the long term. The greatest impact on the hard substrate community structure was identified to be from the mobilisation of contaminants into the water column (containing a range of heavy metals, PAH and other contaminants) as this could potentially disrupt recruitment and settlement processes.

The Department considers that potential impacts relating to mobilisation of contaminants and resuspension of toxic dinoflagellate cysts during dredging works can be adequately managed through provision of silt curtains, water quality monitoring and implementation of management plans including a Dredging and Reclamation Environmental Management Plan, and Construction Soil and Water Quality Management Plan.

Extension of Salty Creek and Darcy St drain into the Outer Harbour via constructed culverts would be fish friendly, facilitating fish passage between the creek and the sea. Once the culverts are enclosed under hardstand during Stage 2, lights should be introduced to encourage fish movement between these waters. Conditions are recommended that require the implementation of specific measures and the above management plans.

Terrestrial ecology

Concept Plan

The majority of potential impacts to the GGBF will occur during Stages 2 and 3 of the Concept Plan and the Department considers that, consistent with DECCW's representations on this matter, the Proponent should prepare a comprehensive GGBF Master Plan to provide a strategic framework on how GGBF and their habitat will be managed within the working harbour area, and to inform the development of GGBF Management Plans for each project associated with this Concept Plan approval. The GGBF Master Plan will address a range of matters including performance criteria/objectives, enhancement and protection measures for GGBF habitat and resources required, and a timeline for the implementation of proposed works and actions.

Potential impact on GGBF habitat is not expected during Stage 1, as the few identified potential foraging habitat that could be modified by construction activities are unlikely to be preferred habitat due to lack of existing shelter. Notwithstanding, protection of the species and its habitat during construction and operation of this stage would be ensured by the development and implementation of a project specific GGBF Management Plan.

During Stage 2, there is an increased risk of potential adverse impact when a road link to the boat harbour and rail link to the container terminal are constructed and operated owing to the location of the infrastructure near a prime GGBF breeding area (site 15). Whilst options to mitigate habitat loss and/or fragmentation of GGBF habitat along the disused rail corridor have been deferred to the detailed design phase of the access road, the Department is satisfied that due to the proposed further assessment requirements and the need to prepare a GGBF Master Plan, that these matters will be adequately addressed in future project stages.

Stage 1

In accordance with the proposed GGBF Master Plan for the Concept Plan, a specific GGBF Management Plan would be prepared for Stage 1 that provide details on the management and monitoring of GGBF during construction and operation of this stage . As requested by DECCW, the Proponent would be required to consult with this agency in the preparation of the plans.

In relation to other fauna, the Department notes that excessive light spill from the site during construction and operation of the Stage 1 development could deter nocturnal species (owls, bats) from foraging areas. To minimise light spill on surrounding area and any potential impacts to opportunistic fauna species, external lighting should be carefully selected. To this effect, a condition is recommended requiring mitigation of off-site lighting impacts from the project during construction and operation and compliance with *Australian Standard AS4282 1997 – Control of the Obtrusive Effects of Outdoor Lighting.*

5.6 Heritage

Issues

The Port Kembla Outer Harbour began to take its current shape in the 1890s in response to adjoining industry demand and shipping requirements with a range of wharf structures and jetties, and the construction of the two large breakwaters commencing in 1901. There are three existing jetties in the Outer Harbour (Jetty Nos. 3, 4 and 6) which would be impacted. Whilst these are not heritage listed, their heritage value has been considered in the Environmental Assessment.

A total of seven heritage listed items were identified within the study area, as outlined in **Table 9** and shown in **Figure 11.** Of these, two are of national significance, one of state significance and four of local heritage significance. Of all the identified items, five may be directly or partially impacted by the project.

Table 9: Listed Heritage Items within or in proximity to Development Area

Item	Location	Register	Significance	Within Development Area	Affected by Proposed Development
Breakwater	Gloucester	Wollongong LEP	Local	No	Potential indirect

Battery	Boulevard, Port Kembla	(WLEP) Wollongong Heritage Study (WHS)			impact (visual)
Commonwealth Rolling Mills and Gardens	Old Port Road	WLEP, WHS	Local	No	Potential indirect impact (visual)
Concrete Tank Barriers	Gloucester Boulevard, Port Kembla (northern end of beach)	WLEP, WHS	Local	No	Potential indirect impact (visual)
Historical Military Museum	Gloucester Boulevard, Port Kembla	WLEP, WHS	Local	Yes	Potential direct impact by the proposed road construction work
Mobile Block Setting Stream Crane	Eastern Breakwater, Outer Harbour	WLEP, WHS	State	Yes	Potential direct impact by the proposed road construction work
Shipwreck *HMAS Adele*	Port Kembla	National Shipwreck Database (NSD), NSW Maritime Heritage Database (MHD)	National	No	Unlikely
Shipwreck of *Ketch Clio*	Port Kembla, northern breakwater	NSD, MHD	National	No	Unlikely

Figure 11: Location of heritage items in the context of the site

bla Outer

Source: Figure F2 of the Historic Heritage Assessment and Statement of Heritage Impact (Vol 7, Appendix M of the Port Kembla Outer Harbour Development Environmental Assessment).

The jetties to be impacted were assessed as being of low local significance as they have been heavily modified, are in relatively poor condition, and deemed unsuitable for incorporation into the new port development. For these reasons, the Proponent considers that heritage measures for their retention and preservation are inappropriate, and the jetties are therefore proposed for demolition and replacement with modern structures. The Environmental Assessment recommended that photographic archival recording of these jetties be undertaken prior to their demolition.

The majority of the land based heritage items form part of a remnant military precinct. The Historical Military Museum consists of a four storey brick and concrete structure (the museum), a gun pill box and air raid shelter. The Museum initially served as a lookout post for the battery during the Second World War and now serves as a museum opened to the public. Important aspects of this item are its views out to the sea and the spatial relationship between the Museum and the gun pill box as an integrated coastal defence installation.

The Mobile Block Setting Steam Crane is a rare example of steam technology, believed to be the only such crane type surviving in Australia and is assessed as being of State significance for both its rare and representative qualities. The crane was used for the construction of the eastern breakwater and may need to be relocated during Stage 2.

The Breakwater Battery comprising of the former 6" Naval gun emplacements dating to the Second World War, is a site of coastal defence of the Wollongong area, located adjacent to the museum and concrete tank barriers. The Breakwater Battery has local technological significance as it provides an understanding of the spatial layout of a coastal fortification of the Second World War and is representative of the era's coastal defence installation.

The Tank Barriers are representative of an effective means of obstructing and delaying invading military force, which were originally placed on beaches at Berkeley Harbour to prevent tank movements. It is noted that these items are currently not located in their original context, nor are they located in an area which is demonstrative of their original use.

The *HMAS Adele* was wrecked at Port Kembla in 1943 and the *Ketch Clio* ran aground off the northern breakwater at the Harbour in 1927. The Proponent has conducted ongoing bathymetric survey of the Outer Harbour since the early 1980s, and has not identified the ship wrecks. The assessment concluded that the likelihood of encountering the shipwrecks within the Outer Harbour basin is extremely low, but committed to cease work and engage a suitably qualified maritime professional should shipwreck material be retrieved during dredging or other activities during Stages 1 and 3. Impacts of the project on the Commonwealth Rolling Mills and Gardens, identified as having local significance, are expected to be low, if any, due to the distance between the items and the project.

There are no registered Aboriginal sites located within the footprint of the Concept Plan or evidence of recorded sites. Due to this lack of evidence and the highly modified nature of the site, impacts to Aboriginal heritage are considered highly unlikely.

Concept Plan and Stage 1

The Proponent contends that there would be minimal and indirect impact on the majority of the identified items during the construction and operation of the full development, with the exception of the Historical Military Museum and associated pill box and the Mobile Block Setting Steam Crane. These items may be affected during construction of a new access road through an existing rail corridor during Stage 2 of the Concept Plan.

The proposed access road is positioned between the Museum and the pill box, and while it would not have any physical impact on these items, nor interrupt the views of the Museum to the sea, it could potentially impact the spatial arrangement of these items. The Proponent recognises the importance of addressing this impact through the detailed design of the new road, and maintaining public access between the heritage items and the Outer Harbour. It should be noted that the pill box, while an important part of the heritage values of the site, does not form part of the project site and is not owned by the Proponent.

The new access road would be located immediately adjacent to and potentially in the path of the steam crane. The Proponent has endeavoured to avoid impacts on this item through consideration of alternative alignments. However, the chosen alignment provides access which does not compromise security and port operations and

avoids other heritage items in the vicinity. Consequently, the crane is proposed to be relocated to allow use of this area for the development. The crane is considered to be a movable heritage item, and its current location is not original (now situated in a fenced off area, which is covered with white quartz gravel). Relocation of the crane would not impact its heritage significance provided it is retained and interpreted in proximity to its present site and alignment, and in keeping with its historical use.

Demolition of Jetties Nos 3 and 4 would occur during Stage 1; and Jetty No 6 during Stage 3.

Consideration

Concept Plan

The Department is satisfied that the Proponent has undertaken an adequate assessment of the likely impacts of the proposal on non-Indigenous heritage items. The Department notes that the key impacts of the project would be from the proposed access road, which would be subject to further detailed assessment at Stage 2 of the Concept Plan. The Proponent has committed to minimise, wherever possible, the impacts of the development. Where impacts cannot be avoided, it has committed to the implementation of a number of measures, as follows:

- archival photographic recording of Jetties Nos. 3, 4 and 6 prior to their demolition, consistent with the recommendations made in the heritage assessment, and supported by the Heritage Branch; and
- preparation of a Conservation Management Plan (CMP) for the Mobile Block Setting Crane prior to commencement of construction activities within proximity of the item. In the event that relocation of the Crane is warranted, the Proponent has committed to restore and relocate the item to a suitable prominent location and to investigate the erection of interpretative signage.

The Department supports the preparation of a CMP for the Mobile Block Setting Crane and its restoration and relocation to an appropriate place, should this be necessary. In noting its significance, the Department concurs with the assessment that a CMP be prepared prior to Stages 2 and 3 and that relocation, if necessary, should be consistent with the prepared CMP.

In regards to the proposed access road that would be aligned between the concrete pill box and Historic Military Museum, the Department acknowledges that this road may intrude on the spatial relationship of the items, and notes that there is no commitment to prepare archival and photographic recording of the items. Consequently, the Department recommends a requirement for archival recording of the item and surrounds, along with requirements for the lodgement of the recording with local and Stage heritage organisations. The Department also recommends requirements to ensure that the design and construction of the road minimises impact on the heritage items and provides equitable access for visitors of the Museum, in consultation with the Historic Military Museum.

Stage 1

The demolition of Jetties Nos. 3 and 4 would occur during Stage 1 and, as discussed, would be subject to archival recording. The Department acknowledges that the three jetties are of low, local significance due to their relatively poor condition and substantial modification and is satisfied that the demolition of these structures will not significantly detract from the local heritage and accepts that demolition is required to allow the port to evolve and respond to current and future port activities. Notwithstanding, in order to strengthen the Proponent's commitments in this regard, it is recommended that the approval require archival recording to be consistent with the heritage report recommendations.

In relation to shipwreck material of *HMAS Adele* and *Ketch Clio*, the Department concurs with the Proponent that the likelihood of encountering either shipwrecks within the Outer Harbour basin is low, based on previous extensive surveys undertaken in locating these shipwrecks. Notwithstanding, the Proponent has committed to cease work should shipwreck material be encountered and the Department recommends the engagement of a qualified Maritime Archaeologist to assess the shipwreck and undertake any required underwater archival recording.

As noted, the majority of the dredging and reclamation works will occur during Stage 1, and while the chance of encountering the shipwreck is low, the Department considers that it is prudent for the Proponent to prepare a mitigation strategy in the event of an unexpected discovery of a shipwreck. A requirement is recommended for the Proponent to prepare such a mitigation strategy. The strategy would be prepared in consultation with the

Department (Heritage Branch) and detail standard assessment, mitigation, recording, consultation and notification requirements.

In summary, the Department considers that the Proponent's commitments in conjunction with the recommended Concept Plan modification and Stage 1 project conditions of approval would ensure the project would not significantly affect non-indigenous heritage in the project area and vicinity.

5.7 Other Issues

Hydrology and Water Quality

The main impact on water quality associated with construction of Stage 1 and other stages of the Concept Plan, relates to dredging works and reclamation activities, general land based construction works and alterations to existing watercourses and drainage lines, specifically the redirection and extension of Salty Creek and Darcy Road Drain into the Outer Harbour. Matters relating to dredging are considered further in the contamination and ecological sections of this report.

Salty Creek is an estuarine creek system approximately 1.4 kilometres in length located between Five Islands Road and the Outer Harbour. The creek has been anthropogenically modified, with sections of the creek being straightened, channelised and rock lined to maximise land use, drainage, through flow, and flood protection of surrounding assets. The majority of land use within the Salty Creek catchment is industrial, which is estimated to be greater than 80% of the catchment; accordingly the catchment is degraded and highly modified. partly due to its degraded and highly modified environment and contains minimal existing water sensitive urban design or storm water control devices.

Overbank flows and cross-catchment flows occur during major rainfall and flow events, due to the relatively flat topography of the catchments and high levels of landscape disturbance from industrial development. The existing Outer Harbour Railway Loop embankment forms an obstruction to overland flows emerging from the low-lying building and paved surfaces and acts as a dam wall in major flood events resulting in water passing through it at the Salty Creek culvert and beneath the railway at the Old Port Road railway underpass, some 400m north of the Salty Creek culvert. Some 400m south of the Salty Creek mouth, Darcy Road Drain enters the Outer Harbour west of No. 3 Jetty. The Darcy Road Drain catchment is the main source of storm water and effluent from a number of adjacent commercial and industrial premises including Orica and the former Port Kembla Copper site.

Local hydrology would be altered as Salty Creek and Darcy Road Drain are proposed to be extended through the reclamation area. The Salty Creek culvert would remain open as part of Stage 1 works but would be enclosed during Stage 2 to facilitate access between and across the multi-purpose and container terminals. The Proponent has committed to design the extensions with sufficient capacity to ensure there is no increase in flood risk. As Salty Creek would become permanently open to the sea and therefore tidal flushing, benefits to water quality within the creek and localised upstream flooding are expected.

During the operation of Stage 1, the main impact on water quality relates to surface water runoff from impervious surfaces and unpaved reclamation areas and pollutant loads from shipping transport and operation activities. An increase in hardstand and impervious surfaces from reclamation could lead to elevated concentrations of pollutants in particular total suspended solids and hydrocarbons. Accordingly, pollution control devices would be included in stormwater drainage to capture pollution before it reaches the harbour.

The Proponent has committed to prepare management plans during construction for soil and water, stormwater and demolition to manage water quality impacts associated with construction activities, including the demolition of existing jetties in the harbour. Pollution control devices, including the installation of a formal and permanent drainage system and temporary sediment retention basins, would capture and filter sediment runoff from land based activities prior to discharge to the harbour.

In relation to water quality impacts due to surface water runoff from impervious surfaces and unpaved reclamation areas, preventative sedimentation and runoff measures are considered paramount at the construction and operation stage. As indicated above, a Construction Soil and Water Quality Management Plan will be required and shall detail how excavated and disturbed surfaces and water pollutants from the site will be managed. The plan is to be developed in consultation with the DECCW and I & I NSW. The Operation Environmental Management Plan will also cover stormwater and water quality management.

In relation to flow changes from Salty Creek and Darcy Road Drain through the reclamation area, the Department considers that the possible hydraulic impacts due to the proposed changes would be minor, subject to appropriate design of the channel structures/culverts and implementation of proposed mitigation measures. In this respect, the Department supports the Proponent's commitment to design these structures to cater for flood events up to the 100 year ARI design storm events, including the consideration of climate change impacts.

In recognition of the Proponent's various design and management commitments in relation to water quality, and to ensure that the matter is addressed in a holistic manner, the Department has recommended that the Proponent prepare and implement an Integrated Water Cycle Management Plan, which would incorporate Water Sensitive Urban Design measures and be integrated with the Operational Environmental Management Plan.

Hazards and Risks

A Preliminary Hazards Analysis (PHA) has been undertaken of the port operation at Outer Harbour for the Concept Plan and Stage 1. The PHA has identified a range of hazardous scenarios, including:

- flammable gas leak into a container from a gas cylinder, and delayed ignition and explosion;
- flammable liquids release, ignition and pool fire;
- toxic gas release and dispersion downwind towards sensitive land uses (off-site);
- fire in the Ammonium Nitrate (AN) storage area leading to explosion with potential to impact adjacent sites;
- explosion of stored AN; and
- collisions between ships due to ship movements.

The area surrounding the proposed development is comprised of industrial land uses and the closest residential area is located over 600 metres to the south west of the site. The above hazardous incidents have been carried forward for consequence analysis and the results show that the following incidents may have potential offsite impacts:

- an explosion of 300 tonnes of AN could result in an overpressure of 7kPa at a distance up to 600m from the explosion; and
- toxic gas release (eg chlorine) could result in fatalities in the surrounding industrial area and injury in residential areas.

The designated storage area for the AN is in the north west corner of the container terminal, a distance of about 600m to the closest boundary of residential areas to the southwest. The Department's Major Hazards Unit reviewed the proposal and advised that given the low likelihood of AN explosions, the risk from AN storage would be minimal. Similarly, the storage of toxic gas (chlorine/ammonia) in the northwest corner of the container terminal would minimise off-site impacts. Chlorine would be transported in cylinders and drums. As cylinders have robust cap fitting and drums have concave dished ends, the Department considers that the likelihood of leaks from damaged cylinders and drums is very low.

During Stage 1 operation, the PHA identified that there would be no storage or export or import of dangerous goods undertaken on the site, except for the transfer of sulphuric acid via a relocated pipeline from the multi-purpose berth to the existing aboveground tanks at the Orica site. However, during Stages 2 and 3, dangerous goods may enter the port and require temporary storage at the container terminal.

Based on the PHA consequence results, a number of recommendations have been made in the Environmental Assessment (section 13.4 – Mitigation Measures) and safeguards have been proposed in Appendix A of the PHA for mitigation of risks. To ensure that hazards and risk related issues are adequately managed throughout the life of the development, the Department recommends that the Concept Plan approval specifically require the Proponent to apply these recommendations and safeguards to each stage of the Concept Plan and has recommended a requirement for the Proponent to undertake an independent Hazard Audit for each project after 12 months of operation and three years thereafter. The Department also recommends that potential risks be further assessed as part of the project applications for Stages 2 and 3.

In relation to stage 1, the Department has recommended the Proponent prepare and implement a comprehensive suite of studies and plans to ensure the safe operation of the port, including:

- Pre-Construction – Fire Safety Study, Final Hazards Analysis, and Construction Safety Study;

- Pre-Commissioning – Emergency Plan and a Safety Management System;
- Pre-Operation Compliance Report;
- Post-Operation Compliance Report; and
- Ongoing – yearly Hazard Audit (post-operation) and every three years thereafter.

In conclusion, the Department considers that the identified potential hazards and risks associated with the Concept Plan and Stage 1 can be appropriately managed in the design of the project, the application of the identified safety measures and through the preparation and implementation of the above referenced documents.

Coastal Hydrodynamics

The Proponent commissioned hydrodynamic process studies to identify the impacts of the development on shipping operations in the Outer Harbour. The studies focused on infragravity (long) wave and gravity (swell) wave processes, tidal discharge and sea level fluctuations. The Environmental Assessment indicated that long wave resonance (seiching) poses a significant constraint on existing shipping operations within the Outer Harbour, and their presence remains the most relevant to the development for shipping trade.

The long wave modelling indicates that adverse impacts on shipping operations from reclamation was unlikely, and ship movements under seiching conditions in the Outer Harbour are generally well within the Permanent International Association Navigation Congress (PIANC) guideline standards for the 1% design event (100 year storm). While the proposed reclamation may change the amplitudes and frequencies of long waves that could develop within the Outer Harbour, the changes would not adversely affect shipping operations. However, the Environmental Assessment noted that the shape of the seaward (northern) end of the proposed container terminal should be designed to eliminate the formation of a long wave in this location.

The results also note that the Outer Harbour reclamation is unlikely to significantly affect the tidal discharge of the Inner Harbour, nor would it have any significant impact on tidal velocities. However, the reclamation and the construction of the culvert within the reclamation area would change Salty Creek from an intermittently closed or open lake or lagoon (ICOLL) to a small estuary with an ocean entrance that would be open permanently, thereby reducing salinity and water level fluctuations within the estuary. This may also positively impact on the passage of fish from the estuary to the ocean and *vice versa*, and has been considered in section 5.6.

To ensure that formation of long wave activity within both the Inner and Outer Harbours is minimised and also to ensure no detrimental effects on harbour tidal flushing, the Department recommends that the Concept Plan require that all stages of the plan are designed and constructed such that this objective is achieved.

Landscape and visual amenity

The landscape character of the Outer Harbour is predominantly industrial and commercial. The Environmental Assessment included a landscape and visual impact assessment which identifies potential visual impacts associated with future development activities on the local and regional character of the area. The assessment used two assessment criteria: the visibility of the proposed development and the capacity of the existing landscape to absorb the new infrastructure.

Based on 16 identified viewing locations, the assessment found that:

- viewers in the immediate area (within 1 km) would likely experience a low to moderate visual impact due to the screening effect of adjacent existing commercial and industrial buildings and structures;
- viewers from residential areas to the south and west of the Outer Harbour (between 1km and 4km), would likely experience a low to moderate visual impact and would view the development in the context of the existing port and industrial development in the foreground and/or background; and
- viewers from the regional area (beyond 4 km), the visual impact would also be low to moderate and the project would be generally indistinguishable from the surrounding landscape.

The assessment did not identify any viewing locations that would have a high level of visual impact and the Department notes that the existing heavy industrial activity within the port area would assist in absorbing the potential impact of the various activities to be undertaken progressively from Stage 1. Throughout each stage, the visual impacts associated with the construction and operation phases would be similar and once the full development is completed and operational, the main visual impacts would result from increased port

infrastructure such as cranes, forklifts and trucks, increased hardstand areas, increased shipping and rail movements into and out of the harbour and increased terminal lighting.

The Department considers that the proposed development would generally be seen as part of the existing port and industrial character of the area. Notwithstanding, there are opportunities to ensure that the design of the built elements and site landscaping are visually compatible with the surrounding broader land uses and that offsite impacts such as outdoor lighting are minimised. In this respect, Stage 1 conditions are recommended requiring the preparation of a Design and Landscape Management Plan in consultation with the Council and local community. This Plan will, amongst other matters, address design details of the built elements of the project including storage sheds and plant and equipments, and rehabilitation and landscaping consistent with relevant standards and guidelines.

Climate change

The Environmental Assessment considered climate change scenarios and identified that the total development to be delivered as part of the Concept Plan was likely to be affected by changed climatic conditions during its design life, with the most significant impact being from sea level rise and storm surges during extreme weather events.

Due to the long term nature of climate change, impacts from such change were presented for the Concept Plan using risk scenarios, climate change variables, and risk ratings for various infrastructure types. Climate changes are predicted to occur around 2030 wherein port infrastructure is assessed as being of high risk from sea level rise and intensity of storms and wind events. The construction and upgrading of road and rail infrastructure would be at moderate risk from increased average temperatures, changes in rainfall patterns and extreme events.

The Department is satisfied that the proposed reclamation levels (4 m) and finished hardstand levels (5.2 m) have been designed to meet sea level rise predictions contained in the DECC's *Draft Sea Level Rise Policy* for the years 2050 and 2100, with a freeboard suitable to cater for further sea level rise beyond this period. It also considers that the assessment undertaken for climate change and sea level rise reflects the objectives and principles of the Department of Planning's publication *NSW Coastal Planning Guideline Adapting to Sea Level* (August 2010).

The Department also notes that impacts from intense rainfall and storms would be managed by the Proponent through risk management and emergency regimes, such as maintenance regimes to take into account accelerated infrastructure degradation, suitable stormwater drainage capacity, and heat impacts on rail operations, including rail buckling and the like.

Waste management

The NSW Waste and Resource Recovery Strategy 2007 was considered in the assessment of waste generated by the proposed development. The Strategy aims to maximise the conservation of natural resources and to minimise environmental harm from waste management and disposal of waste.

The Environmental Assessment identified the various types of waste that would be generated during construction and operation of the Concept Plan. Dredged material from the Outer Harbour would be reused to fill the reclamation area, along with imported fill from external sources. During operation, general solid waste is proposed to be collected and disposed of via a licensed contractor. Hazardous waste storage would be subject to specialised management procedures (including monitoring) and would be disposed of via an authorised contractor to an approved site. Waste that is transported to the Port by ships arriving from overseas would be subject to Quarantine regulations.

To appropriately manage wastes consistent with the objectives of the NSW Waste and Resource Recovery Strategy 2007, the Proponent has committed to prepare Waste Management Plans for both construction and operational activities for Stage 1, which would detail the different waste streams, waste storage requirements, waste handling measures and disposal methods. The Plans would be reassessed for Stage 2 and 3 as part of the project applications for these stages.

The Department considers that waste generation can be adequately managed through the implementation of the proposed Waste Management Plans. Notwithstanding, the Department recommends conditions requiring waste management to be undertaken in accordance with the *Waste Classification Guideline* (DECC 2009), to maximise

reuse/recycling of waste, and to dispose of waste at lawful facilities. Environmental impacts related to dredged sediments, the receipt of fill and contaminated land have been considered in section 5.4.

Minor Development

To ensure consistency with the assessment pathways prescribed by the *State Environmental Planning Policy (Infrastructure) 2007* SEPP and the MD SEPP (Part 20 Three Ports Site) and to reduce the complexity of assessing minor development under Part 3A of the Act, the Proponent has requested the exclusion of minor development from the application of Part 3A and for such development (eg exempt and complying) to be dealt with under either Part 4 or Part 5 of the EP&A Act using the provisions of the SEPPs.

The Department agrees with this approach, and has therefore recommended that the Concept Approval identify those minor development categories that are to be dealt with under Parts 4 and 5 of the EP&A Act whilst ensuring that core components of the concept plan such as dredging, reclamation, construction of berths and terminals and road and rail infrastructure would remain subject to Part 3A. In assuming the determining authority role for the range of development that could be dealt with under the above SEPPs, the Proponent would have a statutory responsibility to satisfy itself of the consistency of such development with the intent and scope of the Concept Plan approval, and the assessment of such development consistent with the further assessment requirements prescribed by the Concept Plan approval.

6. CONCLUSIONS AND RECOMMENDATIONS

The proposed Port Kembla Outer Harbour Development is driven by the limited available land in the Inner Harbour to accommodate future trade growth and the need for additional portside and landside facilities to continue attracting new trades and increasing the volume of existing cargoes. Expansion of the port is particularly critical to industries that rely on port services to deliver goods to, or receive goods, from the international market.

The project is consistent with the *State Plan* and the Department considers that the project is consistent with the priorities set for employment generation in the Illawarra Region under the *Illawarra Regional Strategy*. Manufacturing is the main economic driver for the region identified in the Strategy and the port expansion would provide a significant opportunity to support investment and employment in this sector. Growth of the port would entail a multiplier effect that would have a significant economic impact on output, employment and earnings to the wider region and the State. In the short and long term, the port expansion would act as a stimulus to the local and regional economy during both construction and operational phases.

The key environmental impacts, which are also reflected in the issues raised in public submissions, are focused on traffic and transport, noise and vibration, air quality, aquatic and terrestrial ecology, and heritage. The Department has assessed the Proponent's Environmental Assessment, Submissions Report and Statement of Commitments as well as the submissions received from agencies and the public on the project. Based on its assessment, the Department is satisfied that the project is sufficiently justified and is consistent with relevant Government policies and strategies, and considers that the Proponent has generally undertaken a robust and conservative assessment of the impacts of the project and that the impacts can be managed and/or mitigated to an acceptable level.

Stage 1 would provide the foundation for subsequent stages of the Concept Plan and enable the operation of the first multi-purpose berth and terminal in the short to medium term. A wide range of requirements are recommended to manage potential impacts resulting from the Stage 1 project and the Concept Plan. These requirements would ensure the key issues addressed in this report are appropriately addressed and managed to acceptable levels. They will also ensure that commitments made in the Environmental Assessment and in the Submissions Report are implemented, as well as strengthening the management and mitigation of identified impacts.

Based on the above, the Department recommends that the Minister grant concurrent approval for the Concept Plan and Stage 1 project, subject to respective terms and/or conditions of approval. Concept Plan approval for the total development would provide certainty to government stakeholders that the Port is able to accommodate trade growth and contribute to economic growth over a 20-30 year period in line with regional and state planning strategies.

for 3.3.11

Daniel Keary
Director
Infrastructure Projects

3.3.11

Chris Wilson
Executive Director
Major Projects Assessment

3/3/11

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Deputy Director-General
Development Assessment & Systems Performance

APPENDIX A – ENVIRONMENTAL ASSESSMENT

APPENDIX B – SUBMISSIONS

See the Department's website at www.planning.nsw.gov.au.

APPENDIX C – PROPONENT'S RESPONSE TO SUBMISSIONS

See the Department's website at www.planning.nsw.gov.au.

APPENDIX D – CONSIDERATION OF ENVIRONMENTAL PLANNING INSTRUMENTS

State Environmental Planning Policy (Major Development) 2005
The Major Development SEPP identifies development to which the assessment and approval process under Part 3A of the Act applies. The proposed Port Kembla Outer Harbour Development is development for the purposes of port facilities, shipping berths or terminals that has a capital investment value of more than $30 million, consistent with Clause 22, Schedule 1 of the SEPP.

The development proposal on the proposed site therefore meets the criteria specified in the SEPP. On 10 October 2008, the Director-General of the Department of Planning, as delegate of the Minister for Planning declared the project to be subject to Part 3A of the Act.

In addition, the provisions of Schedule 3 - Part 20 (Three Ports Site) of the Major Development SEPP specifically apply to the proposal. The Three Ports Site zone land and surrounding waterways in the three major NSW ports (Port Kembla, Port Botany and Newcastle) to accommodate port activities, including maritime industrial and bulk storage facilities.

Under Part 20, the Outer Harbour site is zoned SP1 Special Activities and IN3 Heavy Industrial within the Port of Port Kembla wherein port facilities are permissible with consent. The concept plan and Stage 1 are consistent with the objectives of this zone, which include:

- the enabling of the efficient movement and operation of commercial shipping, and to provide for the efficient handling and distribution of freight from port areas through the provision of transport infrastructure; and
- to facilitate development that by its nature or scale requires separation from residential areas and other sensitive land uses.

State Environmental Planning Policy (Infrastructure) 2007
The aim of the Infrastructure SEPP is to facilitate the effective delivery of infrastructure across the State. Clause 68(4) of the SEPP states that "Development for the purpose of wharf or boating facilities may be carried out by or on behalf of a public authority without consent on any land". The project is therefore permissible without consent.

The Department notes that consultation with Council and the RTA has been undertaken at various stages of the assessment and that the consultation requirements of the SEPP have been met.

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development
One of the aims of SEPP 33 is to require development consent for hazardous and offensive development. The Environmental Assessment used the document *Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines* for determining whether a proposal is hazardous and/or offensive. The risk screening process in the guidelines considers the class and volume of waste materials to be stored on the subject site and the distance of the storage area to the nearest site boundary.

A Preliminary Hazard Analysis (PHA) was prepared for the proposal under the provisions of this SEPP. The PHA concluded that the risk criteria for the full development (Concept Plan) and during Stage 1 is not exceeded and the Outer Harbour development can be categorised as 'potentially hazardous'. In this context, the Department recommends a number of requirements directed at preventing hazardous situations by the application of suitable measures and safeguards throughout the life of the development

State Environmental Planning Policy No. 55 – Remediation of Land
The aim of SEPP 55 is to promote the remediation of contaminated land for the purpose of reducing risk of harm to human health or the environment. The policy specifies considerations that are relevant to consent and approval authorities in determining applications for development. The Department has considered the requirements of the SEPP for the project, and considers that the subject land can be made suitable for the intended use.

State Environmental Planning Policy No. 71 – Coastal Protection

The overall aim of SEPP 71 is to ensure a consistent and strategic approach to coastal planning and management. The Environmental Assessment considered the proposal against the specific aims of this SEPP which include the protection of the coast, improvement of public access and visual amenity of the coast and beach environments, preservation of the marine environment, and appropriate design and setting of the development. It has also considered the proposal against the matters for consideration set out in clause 8 of the policy. The Department considers that the Environmental Assessment has comprehensively assessed these matters and that the environmental impacts and net benefits from the proposed development would generally be consistent with this policy.