



The Terminal 4 Project **Preliminary Environmental Assessment Report**

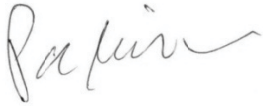
Prepared for Port Waratah Coal Services Limited - November 2010



Preliminary Environmental Assessment

Final Report

Terminal 4 Project | Prepared for Port Waratah Coal Services Limited | 26 November 2010

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Table of Contents

Chapter 1	Introduction	1
1.1	Project overview	1
1.2	The proponent	1
1.3	Site description	1
1.4	Need for the Project	2
1.5	Purpose and content of this Preliminary Environmental Assessment	3
Chapter 2	Background	7
2.1	History of Kooragang Island	7
2.2	History of the T4 Project Area	7
2.3	History of the Kooragang Coal Terminal	8
2.4	Existing maritime approvals	8
2.5	Commercial framework	9
Chapter 3	Project description	11
3.1	Introduction	11
3.2	Rail loop	11
3.3	Stockyard	12
3.4	Conveyor system	12
3.5	Berths	12
3.6	Ancillary facilities and activities	13
Chapter 4	Approval requirements	17
4.1	Introduction	17
4.2	NSW Environmental Planning and Assessment Act 1979	17
4.2.1	Approval process	17
4.2.2	Other State approvals	18
4.3	Commonwealth Environment Protection and Biodiversity Conservation Act 1999	19
4.4	Other approvals	20
4.4.1	Protection of the Environment Operations Act 1999	20
4.4.2	Roads Act 1993	21
4.4.3	Water Management Act 2000	21
4.4.4	Crown Lands Act 1989	21
4.4.5	Environment Protection (Sea Dumping) Act 1981	21
4.4.6	Other approvals	21

Table of Contents *(Cont'd)*

Chapter 5	Stakeholder engagement	23
5.1	Introduction	23
5.2	Objectives	23
5.3	Stakeholder engagement strategy	23
5.3.1	Initial stakeholder identification	23
5.3.2	Stakeholder assessment	24
5.3.3	Stakeholder engagement	24
5.4	Stakeholder Engagement Tools	24
Chapter 6	Preliminary environmental assessment	25
6.1	Introduction	25
6.2	Soils and foundation conditions	26
6.2.1	Existing environment	26
6.2.2	Proposed assessment approach	26
6.3	Groundwater	26
6.3.1	Existing environment	26
6.3.2	Proposed assessment approach	27
6.4	Surface water	27
6.4.1	Existing environment	27
6.4.2	Proposed assessment approach	28
6.5	Ecology	28
6.5.1	Existing environment	28
6.5.2	Proposed assessment approach	31
6.6	Air quality and odour	32
6.6.1	Existing environment	32
6.6.2	Proposed assessment approach	33
6.7	Noise and vibration	33
6.7.1	Existing environment	33
6.7.2	Proposed assessment approach	34
6.8	Traffic and transport	34
6.8.1	Existing environment	34
6.8.2	Proposed assessment approach	35
6.9	Infrastructure	35
6.9.1	Existing environment	35
6.9.2	Proposed assessment approach	36
6.10	Heritage	36
6.10.1	Existing environment	36
6.10.2	Proposed assessment approach	36

Table of Contents *(Cont'd)*

6.11	Visual amenity	37
6.11.1	Existing environment	37
6.11.2	Proposed assessment approach	37
6.12	Energy use, greenhouse gas and climate change	37
6.12.1	Existing environment	37
6.12.2	Proposed assessment approach	38
6.13	Hazards	38
6.13.1	Existing environment	38
6.13.2	Proposed assessment approach	38
6.14	Socio-economic	38
6.14.1	Existing environment	38
6.14.2	Proposed assessment approach	39
Chapter 7	Conclusion	41
References		
Acronyms		

Tables

4.1	Part 3A approval process	18
6.1	Threatened fauna species recorded within or adjacent to the T4 Project area	31

Figures

1.1	Locality plan	4
1.2	The T4 Project	5
1.3	Hunter Valley Coal Chain	6
3.1	The T4 Project with Rail Option 5	14
3.2	The T4 Project with Rail Option 3	15
6.1	Vegetation communities	30

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1 Introduction

1.1 Project overview

Port Waratah Coal Services Limited (PWCS) owns and operates the Kooragang Coal Terminal (KCT) located at Kooragang Island and the Carrington Coal Terminal (CCT) located at Carrington, both in the Port of Newcastle. Additional coal export capacity is required at the port to accommodate the contracted and projected future coal exports from the Hunter Valley and broader New South Wales (NSW). This is underpinned by requirements of the recently endorsed Capacity Framework Arrangements, which form a critical part of the long term export plan for coal produced in the region, and are discussed further in Sections 1.4 and 2.5 of this report.

The Capacity Framework Arrangements provide that PWCS must expand the CCT and KCT to the extent that it is capable of being expanded to cover any capacity shortfall. To fulfil its obligations, PWCS is undertaking technical investigations to determine the potential to expand the KCT to the west, known as the Terminal 4 Project (T4 Project). The land being investigated is zoned for port development purposes and was formerly used as a landfill. The expansion would include a rail loop, stockyard, conveyor system, shipping berths, coal loading infrastructure and facilities shared with those existing at the KCT.

Approval for the T4 Project is being sought under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.2 The proponent

The proponent of the T4 Project is PWCS, which is an incorporated joint venture between a number of coal producers and other participants in the Hunter Valley coal industry, including exporters and importers. PWCS was formed in 1976, at which time it acquired the CCT. It acquired the KCT in 1990. The KCT is now the world's largest (in terms of throughput) and most efficient export coal handling facility.

PWCS provides coal handling services to coal exporters, that is, the receipt, assembly and stockpiling of coal, with subsequent reclaiming of coal and loading of ships for export. Through the CCT and KCT, PWCS services coal mines throughout the Hunter Valley and broader NSW, known as the Hunter Valley Coal Chain, and which is illustrated in Figure 1.3. It is the largest coal export chain in the world, currently consisting of approximately 40 coal mines owned by 14 coal producers.

1.3 Site description

The T4 Project is proposed to be located on Kooragang Island, which is situated approximately two kilometres (km) upstream of the mouth of the Hunter River, in the Newcastle Local Government Area (see Figure 1.1).

Kooragang Island is approximately 2,600 hectares (ha) in size, predominately comprising reclaimed land. It is bounded by the south and north arms of the Hunter River. Vehicle access to Kooragang Island is available by the Tourle Street Bridge and the Stockton Bridge.

The south-eastern part of the island, where the T4 Project area is located, is occupied by heavy and light industries, transport and distribution infrastructure, waste emplacement facilities and port facilities. This includes, but is not limited to, the KCT, Newcastle Coal Infrastructure Group (NCIG) coal terminal, Boral Cement cement manufacturing and distribution facility, Orica Australia chemical manufacturing facility,

Incitec Pivot fertiliser manufacturing facility and the Cargill Oilseed Processer. To the north and west of the Kooragang industrial and port area are estuarine wetlands, mangroves, saltmarsh and pastured and forested lands, subject to agricultural and conservation activities. This includes the Hunter Estuary National Park which forms part of a designated Ramsar site. The nearest residential areas to Kooragang Island are at Fern Bay and Stockton to the east and south-east, and Mayfield and Warabrook to the south and south-west (see Figure 1.2). A history of the development of Kooragang Island is provided in Chapter 2.

The T4 Project area comprises the proposed locations of a rail loop, stockyard, conveyor system, shipping berths and ancillary facilities. It is generally bound by an existing rail-line to the north and west, beyond which is the Hunter Estuary National Park and crown land proposed to be incorporated into the national park. Industrial facilities, including the KCT and NCIG coal terminal, adjoin the T4 Project area to the east, and the south arm of the Hunter River is to the south. The T4 Project area and indicative locations of the proposed project components are illustrated in Figures 1.2, 3.1 and 3.2.

The proposed location of the rail loop, stockyard, conveyor system and ancillary facilities is on an approximate 205ha area of land immediately west of the KCT and NCIG coal terminals. This land is part privately-owned land owned by PWCS and part public land. PWCS has a formal agreement with Newcastle Ports Corporation (NPC) for a long term lease of the public land, provided PWCS can demonstrate that it can successfully build and operate a coal terminal on the site. This land has previously been used for disposal of industrial waste and dredge material and comprises a completely modified landscape. It is dominated by grassland, along with artificially constructed drainage depressions and ponds, which now support wetland communities and provide habitat for a range of native and migratory fauna species. A description of past land uses is provided in Section 2.2.

The shipping berths are proposed to be located along the northern and southern banks of the Hunter River south arm, to the south of the proposed land-based facilities and Cormorant Road, and to the west of the existing berths (see Figures 1.2, 3.1 and 3.2). There is currently a strip of remnant mangrove and saltmarsh vegetation on the northern bank of the Hunter River south arm, in the location of the proposed shipping berths.

1.4 Need for the Project

The need for the project is driven by the requirement for additional coal export capacity at the Port of Newcastle. From a revenue perspective, coal is NSW's and Australia's largest commodity export, exporting to more than 30 countries. Bituminous coal accounted for around \$12.9 billion of NSW export revenue in 2008-2009, which is around a third of the total NSW export revenue for this period (Australian Bureau of Statistics, 2010). The greatest portion of this is shipped from the Port of Newcastle.

In recent years there has been a substantial increase in the demand for, and production of, Hunter Valley and Gunnedah basin coal. Whilst PWCS has responded to the increased demand with almost continual upgrades and expansion since 1996, regional coal production and export demand has outstripped the capacity of the port's coal export facilities, leading to reduced efficiencies, large offshore vessel queues and associated environmental, safety and economic costs and risks. The recently endorsed Capacity Framework Arrangements were developed to underpin the long term operation of the Hunter Valley Coal Chain and provide a solution to the growing capacity constraints.

As part of its obligations under the Capacity Framework Arrangements, PWCS has entered into long term contracts with coal producers and is responsible for ensuring its port facilities have sufficient capacity to handle the contracted coal throughputs. Where a capacity shortfall is predicted which cannot be accommodated by further expansion of the existing PWCS coal loading terminals, the Capacity Framework

Arrangements include a legal obligation for PWCS to build a new terminal (T4). Construction of a new terminal must be finalised within four years of the capacity shortfall being formally acknowledged.

The current installed capacity of both KCT and CCT is 113 million tonnes per annum (Mtpa); approvals are in place to lift capacity to 145Mtpa. Even with the additional capacity and efficiencies provided by the approved upgrades and expansions, PWCS contracted allocations are forecast to exceed capacity in approximately 2015. Further increases in coal production are anticipated.

Accordingly, under the provisions of the Capacity Framework Arrangements, new capacity is required and PWCS must build the T4 Project, either at the currently proposed location or at an alternative location within the Port of Newcastle. Further discussion of the drivers and provisions of the Capacity Framework Arrangements is provided in Section 2.5.

1.5 Purpose and content of this Preliminary Environmental Assessment

The purpose of this Preliminary Environmental Assessment (PEA) is to accompany a Project Application by PWCS for the proposed T4 Project, in accordance with section 75E of the EP&A Act. This document is intended to brief the NSW Department of Planning (DoP) and other relevant government agencies as referred to by DoP, including the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) and Newcastle City Council (NCC) about the Project Application.

Specifically, this document provides the basis for discussions at the Planning Focus Meeting (PFM) and for the provision of Environmental Assessment Requirements (EARs) by the Director-General of Planning.

The body of this report describes:

- the location and history of the T4 Project area;
- the need for the T4 Project;
- the development proposal for the T4 Project;
- statutory requirements for project determination;
- the proposed stakeholder engagement strategy;
- an initial assessment of potential environmental impacts; and
- conclusions identifying key areas for focus in the Environmental Assessment (EA).

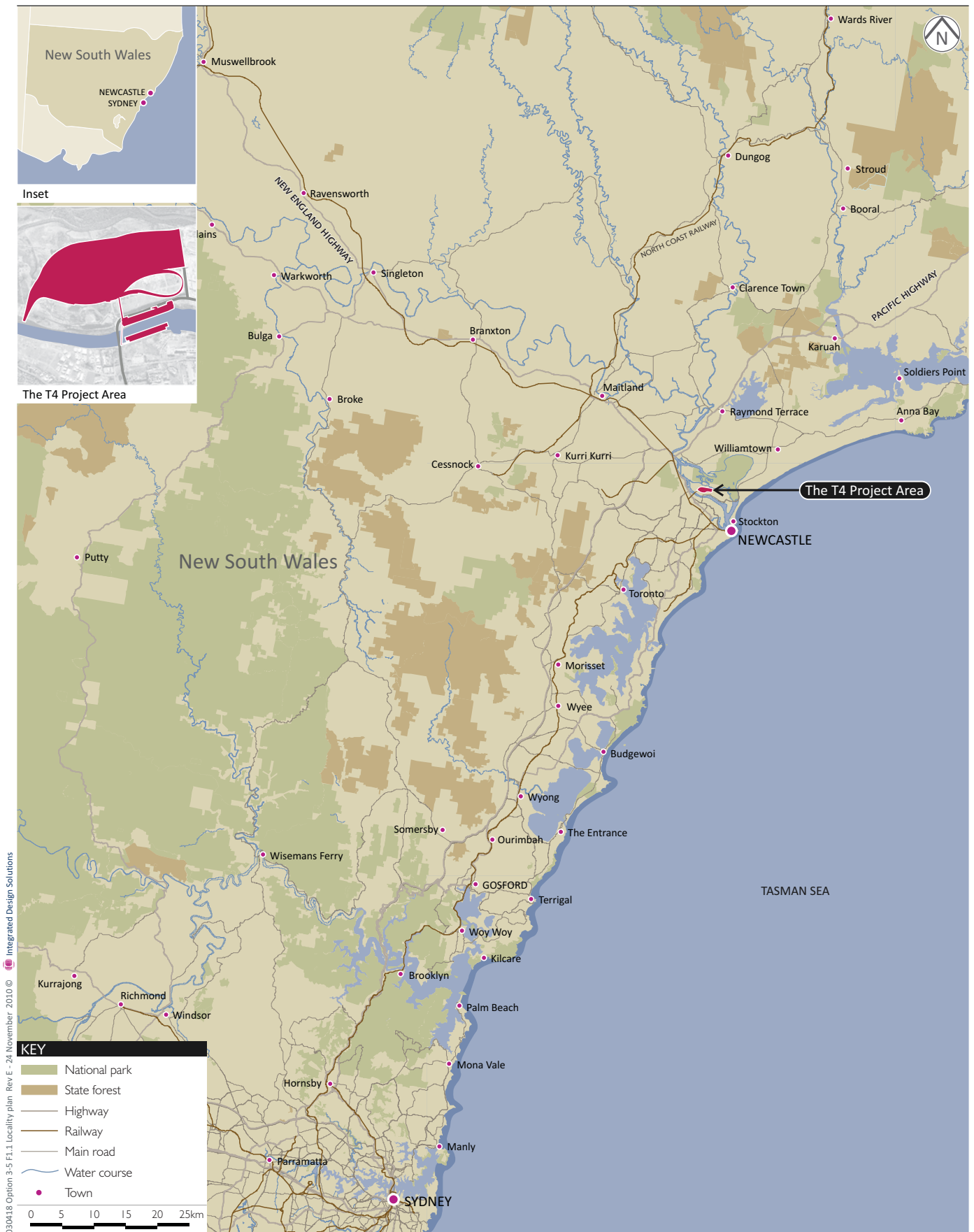


FIGURE 1.1
Locality plan

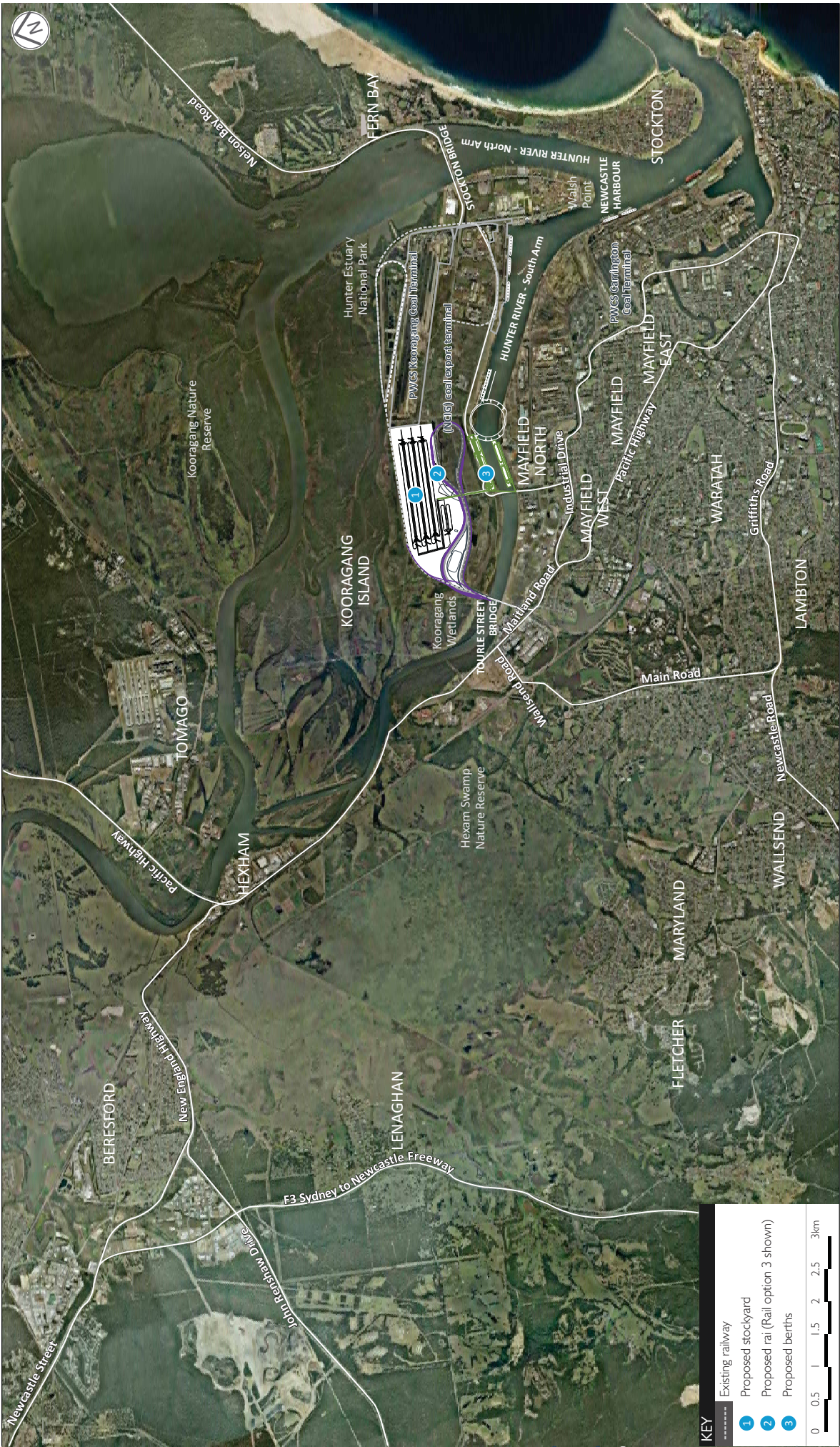


FIGURE 1.2
The T4 Project



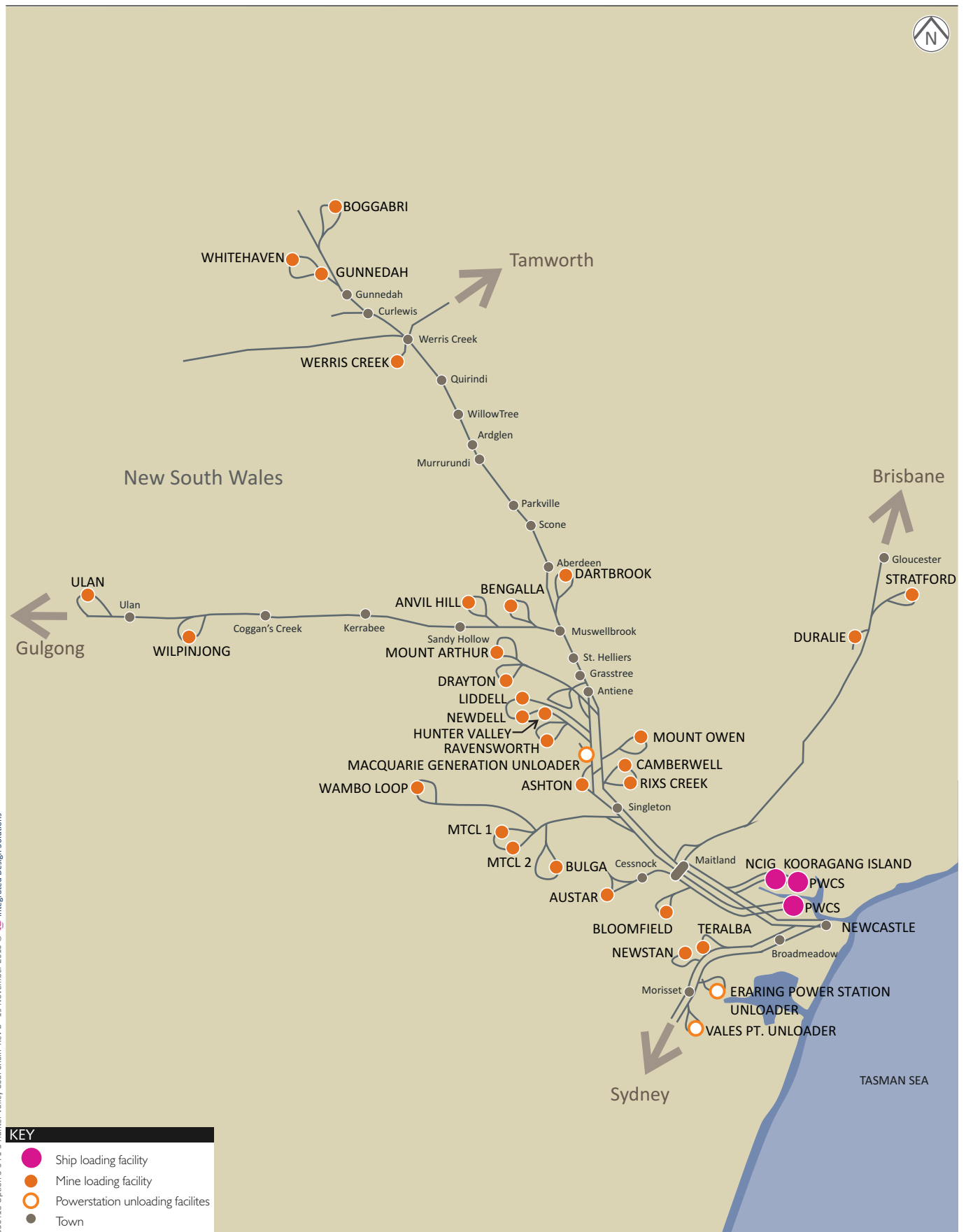


FIGURE 1.3
Hunter Valley Coal Chain

2 Background

2.1 History of Kooragang Island

Kooragang Island was originally a series of low-lying deltaic islands, including Ash, Dempsey and Moscheto Islands, located in the Hunter River estuary. Prior to European settlement these islands were occupied by the Worimi and Awabakal people. Following European settlement and up until the early 1900s, land use was predominately agricultural.

Land reclamation commenced in parts of the Hunter River estuary in the 1880s, using dredge spoil from Newcastle Harbour, and the area began developing as the industrial centre for Newcastle in the early to mid 1900s. In the early 1950s, with the commencement of the Kooragang Island Development Scheme and the *Newcastle Harbour Improvements Act 1953*, the NSW Department of Public Works was given ownership of the islands and the responsibility to construct a 'single land mass' for industrial development and port related activities. Extensive land reclamation was subsequently undertaken, using dredge spoil, and the islands were joined to form Kooragang Island.

Development of heavy and light industries, transport and distribution infrastructure, waste emplacement facilities and port facilities has continued since this time within the south-eastern portion of the island (see Figure 1.2). This has included establishment of the KCT and, more recently, NCIG has commenced construction and operation of Newcastle's third coal export terminal on land adjacent to the KCT. Dredging of the south arm of the Hunter River in association with the development and operation of port facilities has been ongoing.

The land to the north of the Kooragang industrial and port area was dedicated as a nature reserve, the Kooragang Nature Reserve, in 1983. This reserve was subsequently incorporated into the Hunter Estuary National Park. It forms part of the broader 'Hunter Estuary Wetlands', which were designated as a Ramsar site in 1984.

2.2 History of the T4 Project Area

Much of the T4 Project area has been used for disposal of industrial waste and dredge material. The southern and western parts of the T4 Project area comprise the former Kooragang Island Waste Emplacement Facility, which is still licensed as a Solid Waste Class 2 landfill. This waste emplacement facility was operational from 1972 until 1999, during which time waste products from the former BHP Steelworks were buried across the site. This included slag, sludges, coal washery fines and coarse rejects, and a range of industrial and general waste, including asbestos. Upon closure of the BHP Steelworks in 1999, ownership of the waste emplacement facility was transferred to the NSW Government and its operation ceased.

The other significant waste emplacement to occur within the T4 Project area has been the disposal of waste from an electrolysis manganese dioxide (EMD) plant in purpose built trenches across its northern extent. This has been undertaken by the Australian Manganese Company Limited (a subsidiary of BHP Billiton), and then by Delta EMD Australia Pty Limited, since 1989. The EMD plant closed in 2008, although periodic waste disposal continued to occur up until late 2009 in association with the plant closure activities. The Delta EMD site is licensed as a waste emplacement area.

2.3 History of the Kooragang Coal Terminal

The KCT, originally owned and operated by Kooragang Coal Loader Limited, commenced operation in 1984, with an initial throughput capacity of 21Mtpa. It was acquired by PWCS in 1990. The KCT includes rail receival infrastructure, stockpiling areas, coal stackers and reclaimers and a dedicated conveyor system which carries the coal to shiploaders for export to market.

Part of the land on which the KCT is situated is leased from the NSW Government. The lease requires that the KCT be operated as a 'common user facility', wherein PWCS is required to provide access on a non-discriminatory basis to all producers who wish to ship coal.

To meet the increasing demand for NSW coal, and associated growth of the coal industry, PWCS has implemented a continuous program of expansion and efficiency improvements. This has included addition of a second and third terminal to the KCT. Most recently, development consent (DA06-0189) was modified to allow the construction and operation of a fourth dump station, fourth shiploader and associated coal handling and transport infrastructure to provide for 'sprint capacity', referred to as the 'Stage 4 Project'. Construction of the Stage 4 Project has now commenced.

The KCT is an integral component of the Hunter Valley Coal Chain and is the world's largest (in terms of throughput) and most efficient coal handling facility, with an approved throughput capacity of 120Mtpa. Additional capacity is now required, and the T4 Project, subject of this PEA, is proposed to provide this.

2.4 Existing maritime approvals

The NSW Maritime has State approval (DA-134-3-2003-i) for the extension of shipping channels within the port, to a point just east of the Tourle Street Bridge, and inclusive of a swing basin for turning of vessels. The approved activities include dredging, excavation, treatment and disposal of sediments from the south arm of the Hunter River, to provide deep water access to future berth sites, inclusive of the proposed berth sites for the T4 Project.

The approved activities are detailed in a Strategic Dredging Program, which was developed by the NSW Maritime, and comprises seven phases of works. Each phase is for a different part of the channel, as required by the various projects and proponents along the Hunter River south arm, including expansion of coal export facilities by NCIG and PWCS. Phases 1 and 2 are located at the eastern extent of the shipping channels extension area, commencing approximately opposite the existing KCT berths, and Phase 7 is at the western extent, near the Tourle Street Bridge. It is noted that the private sector proponents proposing to carry out dredging works in the south arm of the Hunter River under DA-134-3-2003-i must seek approvals and dredging licenses from the overall consent holder - NSW Maritime - in addition to the requisite licences, permits and approvals from other authorities.

The Strategic Dredging Program was deemed a 'controlled action' under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) by the Department of Environment and Heritage (now DSEWPC), and accordingly is also subject to a Commonwealth approval under the EPBC Act (Reference: 2003/950), granted to NPC on 30 May 2007. The existing Commonwealth approval does not cover Phases 6 and 7 of the Strategic Dredging Program, although these were included in the original EPBC Act referral to DSEWPC.

Several modifications have been made to the original consent. Applications by NPC to modify DA-134-3-2003-i and the Commonwealth approval, to relocate the proposed swing basin approximately 400 metres (m) downstream (east) of the current approved location, are currently pending.

The Strategic Dredging Program commenced in 2007, and is ongoing for works associated with Phases 1 to 4. No projects to date have triggered the need for shipping channels to extend to the western limit of their approved extent and, as such, Phases 5, 6 and 7 have not yet commenced. These phases would likely require a modification to the existing Commonwealth approval, and are likely to require a new EPBC Act referral.

It is noted that any sea disposal of dredged material associated with the T4 Project would require separate permit(s) under the Commonwealth *Environment Protection (Sea Dumping) Act 1981* and a licence under the NSW *Crown Lands Act 1989* (see Sections 4.4.4 and 4.4.5).

2.5 Commercial framework

As outlined in Sections 1.1 and 1.4, PWCS is bound by the provisions of the Capacity Framework Arrangements for the Port of Newcastle, as approved by the Australian Competition and Consumer Commission (ACCC) in 2009. The Capacity Framework Arrangements were developed following extensive discussions and negotiations between the NSW Government and the Hunter Valley coal industry, and form a critical part of the long term coal export plan for the region. They took effect on 1 January 2010 and apply until 31 December 2024.

The Capacity Framework Arrangements are intended to provide a solution to the uncertainty and ongoing capacity constraints experienced in the Hunter Valley Coal Chain, by facilitating long term contracts to underpin and align more efficient and timely investment and promote optimal operation of the coal chain. They also seek to reduce offshore vessel queues and associated demurrage costs and environmental and safety risks, and maintain or improve the international reputation and performance of the Hunter Valley coal industry.

Key components of the Capacity Framework Arrangements include the following.

- The allocation of port capacity to access seekers at the PWCS terminals under long term contracts, in accordance with prescribed nomination and allocation procedures.
- Triggers and processes for determining whether and when expansions of the PWCS coal loading terminals are required (including the construction of a new terminal where necessary). This includes a requirement that PWCS must expand its existing coal loading terminals to provide additional capacity if:
 - the aggregate PWCS contracted allocations exceed the aggregate PWCS available capacity (that is, Capacity Shortfall); and
 - the Capacity Shortfall cannot be fulfilled through voluntary contracted allocation reductions.
- A requirement that if the existing PWCS coal loading terminals are not capable of being expanded to provide the additional capacity to satisfy the Capacity Shortfall, then PWCS must build a new terminal (T4).

As part of its obligations under the Capacity Framework Arrangements, PWCS has entered into long term 'ship or pay' contracts with coal producers, whereby the coal producers must pay for contracted capacity at the PWCS terminals regardless of actual capacity used. In turn, to honour its contractual obligations, and manage the ongoing export demand for Hunter Valley and Gunnedah basin coal, PWCS has the responsibility of ensuring its port facilities have sufficient capacity to handle the contracted coal throughputs.

As mentioned in Section 1.4, PWCS contracted allocations are forecast to exceed capacity in approximately 2015, with demand expected to continue to increase beyond this time. Accordingly, under the provisions of the Capacity Framework Arrangements, new capacity is required and the T4 Project has been triggered.

It should be noted that if the T4 Project is unable to provide sufficient capacity to handle contracted coal throughputs in the future, PWCS will be required to develop another coal terminal in Newcastle.

3 Project description

3.1 Introduction

PWCS proposes to extend the KCT to the west to provide additional coal throughput capacity, in accordance with its obligations under the Capacity Framework Arrangements. The proposed extension would enable optimisation of synergies with the existing infrastructure, systems and workforce at the KCT. This would include some sharing of facilities and environmental management and monitoring systems.

A number of design options for the key project components are currently being investigated, with consideration to operational, environmental and economic factors. The final design will be influenced by the findings of the EA and will be presented and assessed as part of the EA. Key components of the T4 Project are outlined in the following and the footprints under consideration for each of these components are illustrated schematically on Figures 1.2, 3.1 and 3.2.

3.2 Rail loop

Several options for a rail loop to receive coal are being examined. The two preferred options at this stage are Rail Options 5 and 3.

Rail Option 5 includes the provision of rail lines to the west and north of the existing rail lines servicing Kooragang Island (refer to Figure 3.1). Trains would generally follow the same alignment as the existing rail line servicing KCT. While this land to the west and north is zoned for port facilities, it is mostly owned by the Department of Environment, Climate Change and Water (DECCW) and is proposed to be incorporated into the Hunter Estuary National Park.

Rail Option 3 generally follows the same alignment as NCIG's rail loop (both existing and approved). Rail lines would be provided on the outside of NCIG's rail loop (refer to Figure 3.2). Like Rail Option 5, this option involves the construction of rail lines on DECCW owned land, to the west of the junction of the NCIG rail loop.

Both options include a flyover over the main branch to avoid bottlenecking from inbound trains waiting for outbound trains to exit Kooragang Island. Construction of the flyover would also necessitate the construction of a temporary rail line around the construction site, on the DECCW land. This temporary rail line would facilitate uninterrupted rail access for all current Kooragang branch users throughout the construction phase.

To avoid the need for a flyover, there are also options for diverting the existing departure tracks on the Kooragang main branch on a new alignment across the eastern end of the T4 Project area and around the southern side of the NCIG rail loop. Construction of rail lines across the eastern end of the T4 Project area would restrict access between KCT and the T4 Project area and would reduce the size and capacity of the proposed stockyard.

The final preferred rail option will be influenced by technical assessments and outcomes of consultation with relevant stakeholders, and will be presented in the EA.

3.3 Stockyard

The stockyard, incorporating coal stockpiles, stacking, reclaiming and coal transport systems, e.g. conveyors and transfer stations, would be located immediately west of the existing KCT and NCIG stockyards (see Figures 3.1 and 3.2). During construction, cut and fill earthworks would be undertaken across the proposed stockyard area. Current estimates suggest that in the order of 4 to 5 million cubic metres of fill could be required, depending on the final design of the stockyard. This fill is proposed to be sourced as dredge material from the Hunter River, potentially supplemented by fill trucked in from elsewhere.

A range of stockyard configurations and development programs are being investigated, with consideration to various stockpile types, stockyard machines and stockyard capacities. Filling and development of the stockyard may be undertaken across the whole site at the outset, or be undertaken progressively. The current preferred option (Type 3A Stockyard) is presented in Figures 3.1 and 3.2. The final preferred option will be influenced by technical assessments and outcomes of consultation with relevant stakeholders, and will be presented in the EA.

The stockyard reclamation area would be divided into two main areas, fill ponds for hydraulic placement of dredged material, and settlement ponds for managing return water and settling out fines prior to discharge of return water back into the Hunter River.

Closure and capping of waste emplacement areas is proposed to be undertaken prior to or during development of the T4 Project.

3.4 Conveyor system

The coal conveyor and feeder system is proposed to extend throughout the stockyard, to deliver coal from rail receipt to the stockpiles. Conveyors would also extend south, to the berths along the Hunter River, to deliver coal to the shiploaders. This would involve a conveyor crossing of Cormorant Road and the Hunter River.

3.5 Berths

Berthing, wharf and shiploading facilities are proposed to be located along the northern and southern banks of the Hunter River south arm, immediately south of the land-based facilities and west of the existing berths (refer to Figures 3.1 and 3.2).

At this stage, up to five berths are proposed, to provide berthing for a variety of vessels ranging from Handy size (35,000 tonnes) to Cape size (150,000 tonnes). Maximising the potential throughput of these berths would require the installation of shiploaders on all wharves.

Dredging for extension of the shipping channels and access to the berth sites would be carried out in accordance with the existing NSW Maritime development consent (DA-134-3-2003-i) and any Commonwealth approvals. Accordingly, it does not form part of the current Project Application. Sea dumping permits for dredge material unsuitable for use as engineering fill would be sourced under parallel processes, if required.

3.6 Ancillary facilities and activities

Ancillary facilities proposed to support the T4 Project include the following:

- electricity supply and a new 33kV/ 11kV substation;
- switchrooms;
- dust suppression and fire fighting systems;
- washdown facilities;
- water and wastewater management systems;
- security fences;
- IT and data links;
- refuelling facilities;
- amenities;
- administration and workshop buildings;
- internal access roads; and
- external access road(s). Access road alignments are yet to be finalised, but access to the stockyard and berths would most likely be from Cormorant Road.

The ancillary requirements are reduced by the proposed sharing of the facilities at the existing KCT.

Construction of the T4 Project would potentially require relocation of some existing services such as transmission lines, gas lines, water lines, fibre optic cable and roads. This may include part of Cormorant Road, to accommodate the proposed rail loop under Rail Option 3.

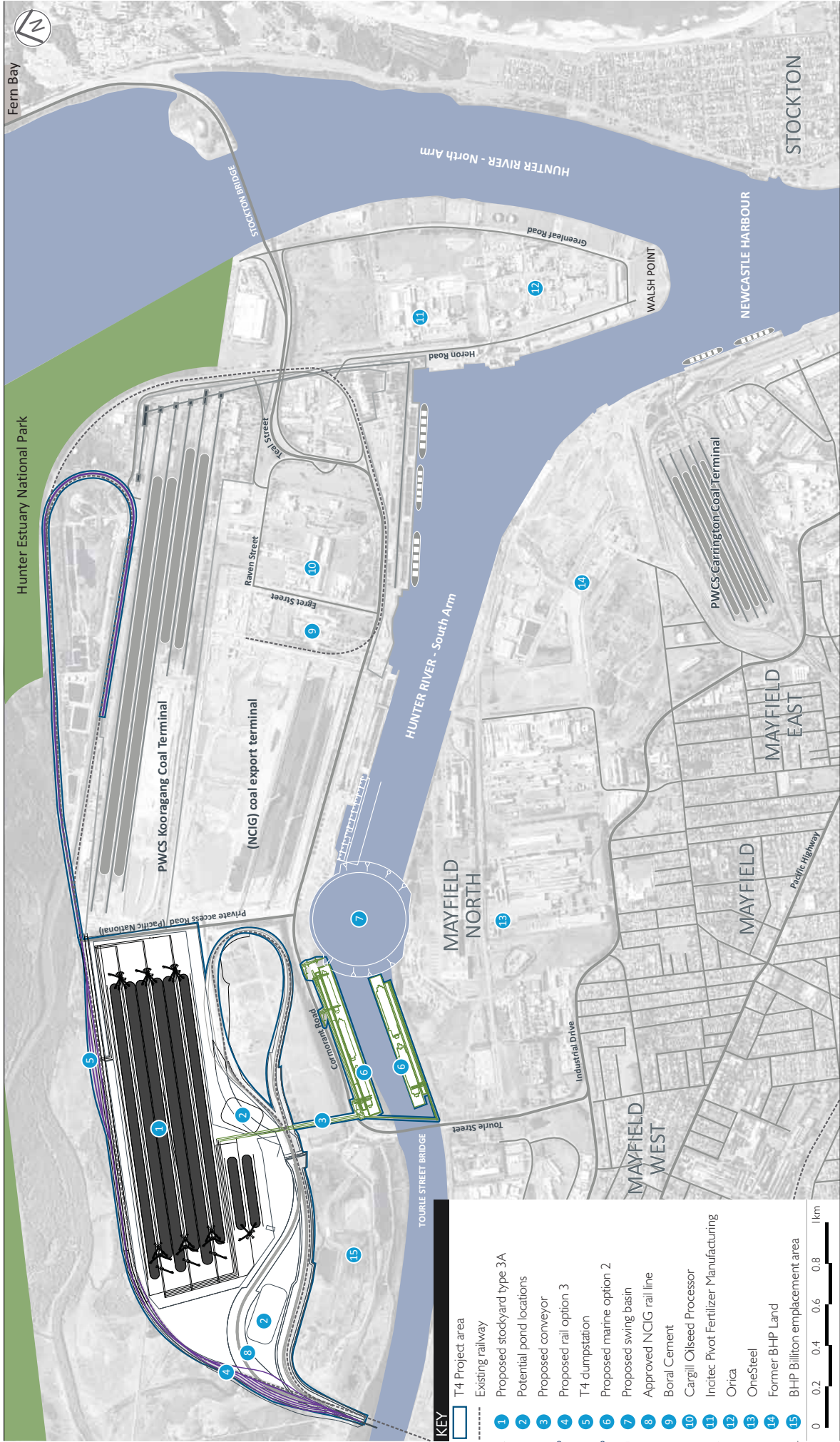


FIGURE 3.1
The T4 Project with Rail Option 5



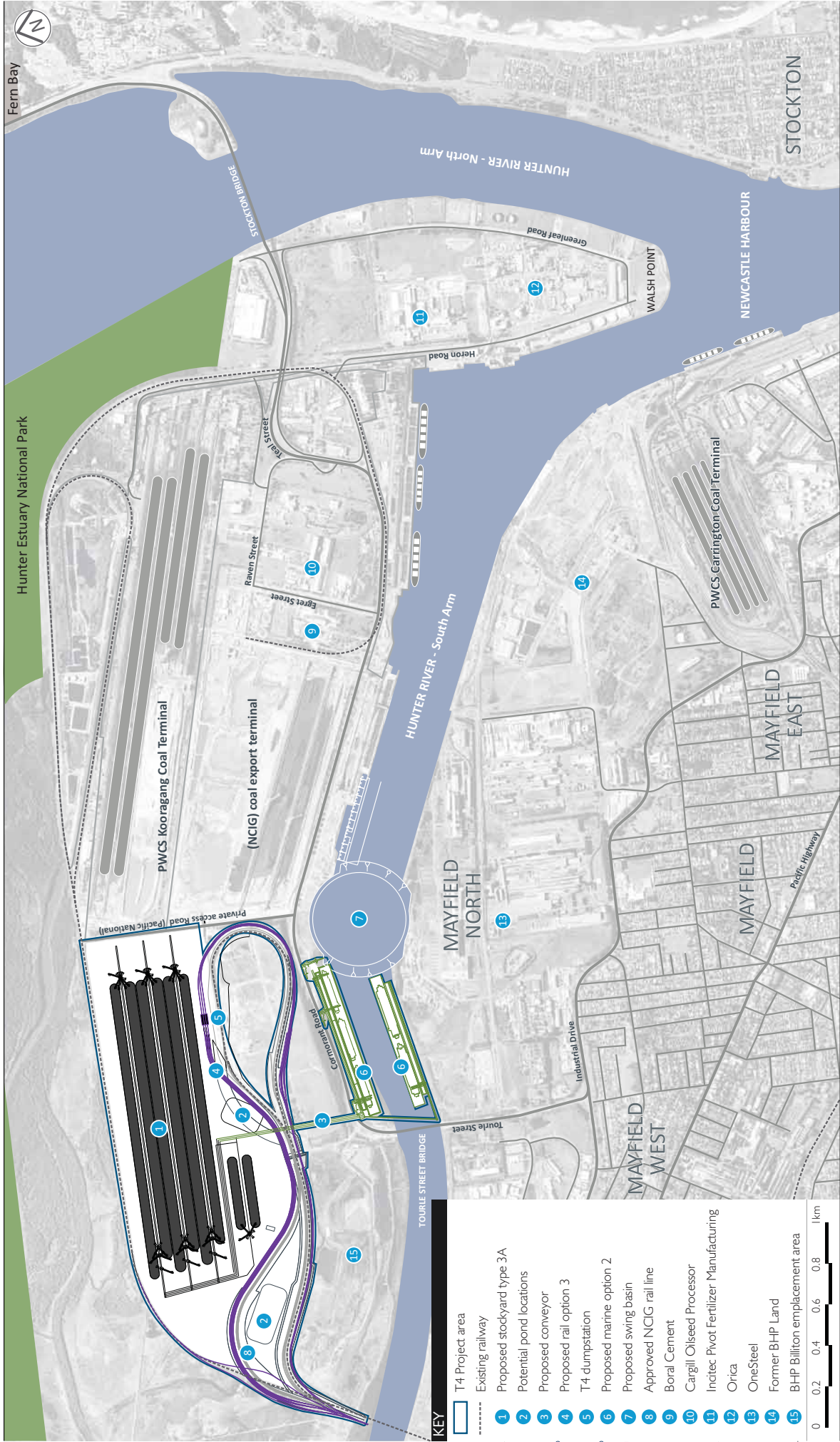


FIGURE 3.2
The T4 Project with Rail Option 3



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4 Approval requirements

4.1 Introduction

The T4 Project will be assessed under the provisions of Part 3A of the EP&A Act.

A referral will be made under the Commonwealth EPBC Act. If an approval is required under this legislation, the intention would be that Commonwealth matters are assessed via the Part 3A process, in accordance with a bilateral agreement between the Commonwealth and the State.

This chapter describes the approval process under both the EP&A Act and EPBC Act. An overview of other approvals that may be required for the T4 Project is also provided.

4.2 NSW Environmental Planning and Assessment Act 1979

4.2.1 Approval process

The EP&A Act and the *Environmental Planning and Assessment Regulation 2000* provide the framework for environmental planning and assessment in NSW. Part 3A of the EP&A Act relates to major development deemed to be significant to the State. Section 75B(1) of the Act states that Part 3A applies to:

“... the carrying out of development that is declared under this section to be a project to which this Part applies:

- (a) by a State environmental planning policy, or*
- (b) by order of the Minister published in the Gazette.”*

State Environmental Planning Policy (Major Projects) 2005 (Major Projects SEPP) defines certain developments that fall under Part 3A, i.e. development deemed to be significant to NSW. Clause 6 of the Major Projects SEPP states:

“(1) Development that, in the opinion of the Minister, is development of a kind:

- (a) that is described in Schedule 1 or 2, or*

...

is declared to be a project to which Part 3A of the Act applies.”

Ports and wharf facilities are a form of development described in Schedule 1 of the Major Project SEPP. Clause 22 of Schedule 1 defines ports and wharf facilities as:

“Development for the purpose of shipping berths or terminals or wharf-side facilities (and related infrastructure) that has capital investment value of more than \$30 million.”

The T4 Project meets this definition as it is a development for the purpose of shipping berths and wharf-side facilities that has an estimated capital value in the order of \$3,500 million.

Under Part 3A, the Minister for Planning is the consent authority.

As such, the T4 Project will be assessed under the provisions of Part 3A of the EP&A Act. There are nine main steps in this process, starting with a declaration by the Minister that a development is a major project and ending with the Minister's determination. Each step is described in Table 4.1 below.

Table 4.1 **Part 3A approval process**

Step	Actions
1. Declaration	The proponent makes a formal request to the Minister for Planning to declare the project as a major project to be assessed under Part 3A. The Minister makes an assessment whether to declare the project.
2. Project Application	A Project Application is submitted to the DoP, which can be accompanied by a PEA, to obtain terms of reference known as EARs.
3. Planning Focus Meeting	A PFM is commonly held with government agencies to discuss the proposal.
4. EARs	The Director-General of the DoP issues EARs for the proposed development which must be addressed in an EA.
5. Prepare draft EA	A draft EA is prepared by the proponent addressing the EARs issued by the Director-General. During preparation of the draft EA, the proponent consults with relevant stakeholders including the council, government agencies and the community. Once submitted, the Director-General assesses the adequacy of the draft EA against the EARs.
6. Public exhibition	If adequate, the EA is finalised and placed on public exhibition for a period of not less than 30 days.
7. Consideration of submissions	The proponent responds to all submissions made during the public exhibition process. If changes are made to the proposed development to address concerns, the proponent generally prepares a preferred project report.
8. Assessment report	The Director-General provides an assessment report to the Minister with a recommendation as to whether the proposed development should be approved or refused.
9. Determination	The Minister approves and sets associated conditions or refuses the application.

4.2.2 Other State approvals

There are a number of approvals, authorisations and licences under other legislation that apply to the T4 Project. It is important to note that if the project is approved under Part 3A there are also a number of approvals that cannot be refused, although necessary conditions can be applied.

Section 75U of the EP&A Act lists the approvals under other legislation that do not apply to projects approved under Part 3A and these are:

- the concurrence under Part 3 of the *Coastal Protection Act 1979* of the Minister administering that Part of the Act;
- permits under section 201, 205 or 219 of the *Fisheries Management Act 1994*;
- an approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977*;
- a permit under section 87 or a consent under section 90 of the *National Parks and Wildlife Act 1974*;
- an authorisation referred to in section 12 of the *Native Vegetation Act 2003* (or under any Act to be repealed by that Act) to clear native vegetation or State protected land;

- a permit under Part 3A of the *Rivers and Foreshores Improvement Act 1948*;
- a bush fire safety authority under section 100B of the *Rural Fires Act 1997*;
- a water use approval under section 89, a water management work approval under section 90 or an activity approval under section 91 of the *Water Management Act 2000*; and
- Division 8 of Part 6 of the *Heritage Act 1977* does not apply to prevent or interfere with the carrying out of an approved project under Part 3A.

Section 75V of the EP&A Act lists the authorisations and licences under other legislation that must be obtained but cannot be refused if they are necessary for carrying out projects approved under Part 3A. Of relevance to the T4 Project these are:

- an environment protection licence (EPL) under the *Protection of the Environment Operations Act 1997* (POEO Act);
- a consent under section 138 of the *Roads Act 1993*; and
- a licence under the *Pipelines Act 1967*.

4.3 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act aims to protect matters deemed to be of national environmental significance (NES) including:

- world heritage properties;
- places listed on the National Heritage Register;
- Ramsar wetlands of international significance;
- threatened flora and fauna species and ecological communities;
- migratory species;
- Commonwealth marine areas; and
- nuclear actions (including uranium mining).

If an action (or project) will, or is likely to, have a significant impact on any of the matters of NES, it is deemed to be a Controlled Action and requires approval from the Commonwealth Environment Minister or the Minister's delegate. To determine whether a proposed action will or is likely to be a Controlled Action, an action may be referred to DSEWPC.

As discussed in Section 6.5, the T4 Project may have an impact on the following matters of NES: Ramsar wetlands; threatened flora and fauna species and ecological communities; and migratory species. A referral is currently being prepared for the T4 Project for DSEWPC's consideration. This referral will consider and assess whether the T4 Project will, or is likely to, have a significant on these matters of NES.

Where an action is designated a Controlled Action, the DSEWPC decides on the approach to be used for assessing the relevant impacts from any of the five different pathways. One of the assessment pathways is by an accredited process whereby a State or territory manages the assessment on behalf of the Commonwealth (often referred to as a bilateral agreement).

On 17 June 2002, the Commonwealth accredited the NSW EA process under both the EP&A Act and *Threatened Species Conservation Act 1995* (TSC Act). If the T4 Project is deemed to be a Controlled Action and approval is required under the EPBC Act, the Commonwealth may elect that the action is assessed under the NSW bilateral agreement coordinated by the DoP.

If a bilateral agreement is used, a copy of DoP's assessment report would be forwarded to DSEWPC on completion of the State process. The Commonwealth Environment Minister must then make a decision on whether to approve the taking of the action within 30 business days of receiving the assessment report.

The approvals schedule for the T4 Project has been developed to enable integration of the Commonwealth approvals process, if required, into the State process under a bilateral agreement. The timing of the EPBC Act referral and Commonwealth Minister's decision is such that if it is found that approval is required under the EPBC Act, the EARs could be developed to incorporate Commonwealth assessment requirements.

4.4 Other approvals

4.4.1 Protection of the Environment Operations Act 1999

The T4 Project would require an EPL under the provisions of the POEO Act. Under Schedule 1 of the POEO Act, 'coal works' require an EPL if they have a capacity to handle more than 500 tonnes per day of coal or they have the capacity to store more than 5,000 tonnes of coal. The T4 Project would meet these requirements.

The T4 Project area currently has three EPLs that relate to existing uses on the site:

- EPL 6437 held by Hunter Development Corporation;
- EPL 7675 held by PWCS since its purchase of the site from Delta EMD Australia Pty Limited in July 2010; and
- EPL 1552 held by PWCS.

EPLs 6437 and 7675 permit waste disposal associated with the Kooragang Island Waste Facility. EPL 1552 permits coal works and shipping in bulk and is associated with the KCT.

Should the T4 Project proceed, full or partial surrender, consolidation or transfer of the three existing EPLs would be required.

The EA for the T4 Project will provide details on the above EPLs and the proposed process for surrendering, consolidating or transferring these licences into an EPL for the T4 Project.

As previously stated, under the provisions of the EP&A Act, an EPL cannot be refused if it is necessary for carrying out a project approved under Part 3A.

4.4.2 Roads Act 1993

Under section 138 or Part 9, Division 3 of the *Roads Act 1993*, a person must not undertake any works that impact on a road, including connecting a road (whether public or private) to a classified road, without approval of the relevant authority, being either the Roads and Traffic Authority or local council, depending upon classification of the road.

An approval under the *Roads Act 1993* would be required for the T4 Project given that it is expected to necessitate a number of works to Cormorant Road, potentially including:

- realignment of part of the road;
- provision of new access to the road; and
- provision of potential conveyor or services corridors across the road.

Once again, under the provisions of the EP&A Act, an approval under section 138 or Part 9, Division 3 of the *Roads Act 1993* cannot be refused if it is necessary for carrying out a project approved under Part 3A.

4.4.3 Water Management Act 2000

It is likely that activity approvals would be required under section 91 of the *Water Management Act 2000* as part of the construction activities for the T4 Project, including controlled activity approval and an aquifer interference approval.

Once again, under the provisions of the EP&A Act, approvals under section 91 of the *Water Management Act 2000* cannot be refused if they are necessary for carrying out a project approved under Part 3A.

4.4.4 Crown Lands Act 1989

Dredge material unsuitable for use as engineering fill is proposed to be disposed of at sea. Accordingly, a licence would be required from the NSW Land and Property Management Authority under the *Crown Lands Act 1989* to temporarily use certain Crown Land within the Coastal Waters of NSW for the deposition of dredge spoil. Provided this licence is obtained, approval for this activity would not be required under the *Coastal Protection Act 1979*.

4.4.5 Environment Protection (Sea Dumping) Act 1981

The NPC received in-principle approval for sea disposal of all material in the south arm dredging footprint from the DSEWPC (then Department of Environment and Heritage) in December 2003. However, DSEWPC has since advised that sea dumping permits need to be sought by the organisation responsible for the dredging and disposal operations. Accordingly, PWCS would be required to seek Commonwealth approval under the *Environment Protection (Sea Dumping) Act 1981* for disposal of dredged material at sea.

4.4.6 Other approvals

A comprehensive review of all relevant legislation and policies will be undertaken during the preparation of the EA. All approvals and licences required for the construction and operation of the T4 Project will be identified and reported in the EA. Relevant approvals and licences will also be discussed with government agencies during the stakeholder engagement process (refer to Chapter 5).

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5 Stakeholder engagement

5.1 Introduction

The T4 Project has the potential to generate considerable interest from stakeholders, including government agencies, the local community and special interest groups. In particular, potential ecological, traffic, noise and dust impacts associated directly with the T4 Project, and related wider issues – expansion of coal mining, greenhouse gas emissions and climate change – all have the potential to generate community concern.

To address the challenges of identifying and engaging with the relevant stakeholders and ensuring issues raised are effectively addressed as part of the project planning and assessment, a stakeholder engagement strategy has been prepared specifically for the T4 Project. Engagement has commenced in accordance with this strategy and is summarised in this chapter.

5.2 Objectives

The objectives of the stakeholder engagement strategy include the following:

- to identify all relevant stakeholders who have an interest in the T4 Project and the ongoing operations of PWCS, including community groups who may identify themselves as the ‘affected community’;
- to provide stakeholders with accurate and timely information on the T4 Project;
- to identify and understand the aspects of the T4 Project which are of most interest to stakeholders;
- to seek feedback on the design of the T4 Project and the proposed approaches to minimising impacts on the local community, and identify opportunities to accommodate community feedback into the project design; and
- to establish relationships with the community which can be utilised in the future to the benefit of the community and PWCS, such as partnering in long term community development projects.

5.3 Stakeholder engagement strategy

The key components of the stakeholder engagement strategy are initial stakeholder identification, stakeholder assessment and stakeholder engagement. Each of these components is described below.

5.3.1 Initial stakeholder identification

The initial stakeholder identification process is complete. This task involved compiling a list of all stakeholders likely to be relevant to the T4 Project. It largely drew on PWCS existing information and understanding of the community in which it operates.

The broad stakeholder groups identified include NCC, State and Commonwealth government agencies, the local community and nearest residential neighbours, special interest groups, Aboriginal groups, neighbouring industry, industry representative groups, employees of PWCS, State and Commonwealth members and ministers and the media.

The stakeholder list will be regularly reviewed and updated throughout the EA and the development of the T4 Project.

5.3.2 Stakeholder assessment

Following the 'initial stakeholder identification', an assessment of the stakeholders was undertaken to further understand the extent to which the various parties were likely to be impacted by and/or have an interest in the T4 Project. The purpose of this exercise was to inform the development of appropriately tailored stakeholder engagement strategies and schedule.

5.3.3 Stakeholder engagement

The initial round of stakeholder engagement has commenced with introduction of the project concept to a number of stakeholders.

Once sufficient detail has been prepared on potential development options for the T4 Project, it is proposed to re-engage with all stakeholders. This would be to provide an update on project progress, introduce the options being considered, and seek feedback on these.

As the project progresses additional stakeholder engagement would be undertaken. This would be to discuss the preferred option selected, expected environmental and community impacts, and planned mitigation, and seek feedback on these. As part of this engagement, it would be possible to provide feedback on how the results of previous engagement have been taken into account in the project design.

Stakeholder engagement is proposed to continue throughout the implementation of the T4 Project.

5.4 Stakeholder Engagement Tools

A range of formal and informal stakeholder engagement tools will be used according to the particular needs of individual stakeholders. These will include phone calls, meetings and briefing sessions, public displays, newsletters and factsheets. In addition, a T4 Project webpage will be developed to provide information about the T4 Project and access points to raise concerns or request further information. The webpage will be regularly updated.

Formal consultation with government agencies will include a PFM, held after lodgment of this PEA, as well as meetings and briefings to discuss specific aspects of the T4 Project.

6 Preliminary environmental assessment

6.1 Introduction

This chapter provides a preliminary assessment of the potential environmental and socio-economic impacts of the T4 Project. There is considerable baseline environmental data available for the T4 Project area, Kooragang Island and the surrounding areas from past and ongoing studies. This includes monitoring, modelling and assessment undertaken for existing and proposed developments by PWCS and other industrial facilities. In particular, the KCT and NCIG studies provide an understanding of the environmental interactions of coal terminal operations in the local area.

This chapter has been prepared following a desktop review of the existing information, a site visit and an analysis of the proposed T4 Project footprint and activities, to characterise the existing environment and identify potential environmental impacts and areas for further investigation in the EA. Detailed assessments of each environmental aspect are proposed as part of the EA, using the approaches set out in this chapter.

Aspects considered in this chapter are:

- soils and foundation conditions;
- groundwater;
- surface water;
- ecology;
- air quality and odour;
- noise and vibration;
- traffic and transport;
- infrastructure;
- heritage;
- visual;
- energy use, greenhouse gases and climate change;
- hazards; and
- socio-economic.

6.2 Soils and foundation conditions

6.2.1 Existing environment

There is considerable existing data on soil and geotechnical conditions within and adjacent to the T4 Project area, sourced from hundreds of test bores, monitoring wells, test pits and cone penetration tests. The T4 Project area broadly comprises fill (industrial waste and dredged fines), underlain by soft alluvial soils, comprising clays, silts and sands, which extend to the bedrock. Coal washery reject and natural alluvial clays within the T4 Project area may include potential acid sulphate soils (PASS).

A range of contaminants are present at elevated levels associated with past landfilling (refer Section 2.2). The principal contaminants are polycyclic aromatic hydrocarbons, benzo(a)pyrene, total petroleum hydrocarbons, phenols, asbestos, ammonia, cyanide, manganese and other metals (Douglas Partners, 2010). Monitoring data indicates that contaminant migration has occurred beyond the waste emplacement areas, however, the extent of contaminant migration has not been defined (Douglas Partners, 2010). None of the landfill sites within the former Kooragang Island Waste Emplacement Facility have engineered base or side lining systems, and all but one do not have a leachate collection system.

Closure and capping plans have been prepared for former landfills in the T4 Project area as part of the existing EPL conditions. These plans, or revisions thereof, would be implemented prior to or as part of the development of the T4 Project, and will be described in the EA.

6.2.2 Proposed assessment approach

A soils and geotechnical assessment will be undertaken as part of the EA. The key areas proposed for investigation include:

- the risk and implications of interception, exposure and/ or mobilisation of contaminants and PASS, for instance from the proposed drainage and earthworks;
- suitability of the foundation materials to accommodate the T4 Project, including potential for settling under load; and
- interaction of the T4 Project components with site capping, including implications for piling and design of foundations.

The soils and geotechnical investigation will use existing information, supplemented by additional soil test pits and bores across the T4 Project area and at the proposed fill extraction and berth locations in the Hunter River. Management and mitigation measures will be developed, including safeguards and ground preparation requirements for construction over fill and weak natural soils. Due to the potential interactions and contaminant pathways, the soil/ geotechnical investigation is proposed to be closely linked to the groundwater investigation.

6.3 Groundwater

6.3.1 Existing environment

Groundwater within the T4 Project area is contained within two principal aquifers, an upper unconfined aquifer within the fill strata, and a semi-confined aquifer within the underlying estuarine sediments (Douglas Partners, 2010). These aquifers are partially separated by a discontinuous clay aquitard, although the two systems are generally considered to be connected, with a downward gradient from fill

to estuarine groundwater (GHD, 2009). A third deeper aquifer is potentially present where stiff estuarine clay layers separate the deeper sand layers (Douglas Partners, 2010).

Groundwater flow within the fill strata is primarily subhorizontal, towards the closest surface drainage features although, some downward leakage also occurs (Douglas Partners, 2010). Flow within the estuarine aquifer is primarily to the south arm of the Hunter River, with some flow to the north as well (Douglas Partners, 2010).

Groundwater monitoring is and will continue to be undertaken within and surrounding the T4 Project area. Results to date indicate that groundwater has been contaminated by historic use of the area as an industrial waste facility. Concentrations of total petroleum hydrocarbons, benzo(a)pyrene, polycyclic aromatic hydrocarbons, phenols, ammonia, cyanide, sulphate, manganese, lead and other metals have exceeded the relevant water quality guideline limits on various occasions (Douglas Partners, 2010).

6.3.2 Proposed assessment approach

A groundwater assessment is proposed as part of the EA. This will draw on existing information and monitoring data, supplemented by additional testing, where necessary. The existing hydro-geological model of the site aquifers will be further developed and groundwater modelling undertaken to predict potential contaminant pathways and the potential impacts of the T4 Project on groundwater flows and the receiving environments. Suitable management and monitoring strategies will be developed.

The key areas proposed for investigation are the potential for:

- exacerbation or migration of existing contamination and/ or new contamination, such as from mobilisation of soil contaminants into groundwater, additional loading and 'squeezing' of the ground, connection of groundwater aquifer systems from penetration of the clay aquitard and/ or migration of potentially contaminated water that accumulates in the T4 Project area;
- changes to groundwater recharge and flow regimes, such as from filling and capping of the site, infiltration of saline water from dredge material used as fill and other project-related alterations to the surface water regime;
- potential impacts on groundwater dependent ecosystems, including adjacent wetlands outside of the T4 Project area; and
- potential impacts on any groundwater users on Kooragang Island.

6.4 Surface water

6.4.1 Existing environment

Surface hydrology within the T4 Project area has been completely modified by land reclamation, earthworks and artificial drainage structures, including floodgates, bridges, culverts, drains and levees. The existing surface drainage network comprises artificially constructed depressions and ponds which fill with water in response to rainfall, and ultimately drain to the Hunter River south arm.

Water quality monitoring has been undertaken at ponds within and surrounding the T4 Project area since 2000, in accordance with EPL 6437. The monitoring results indicate that water quality has been degraded by past land uses including waste dumping, with the ponds periodically characterised by low levels of contaminants (Resource Strategies, 2006). The measured pH, electrical conductivity, phenols, free cyanide, lead and zinc levels have periodically exceeded the relevant guideline limits (Resource Strategies,

2006). Water quality monitoring data is also available for the Hunter River upstream and downstream of the T4 Project area.

The existing surface water management system at the KCT includes direction of process water and stormwater runoff from operational areas of the site to settling ponds for removal of fines prior to reuse on the site. This system is designed to contain all site water up to and including the 1 in 100 year storm event. Discharges only occur when these storages exceed capacity and they are reportable to DECCW.

The KCT uses water for dust suppression, fire fighting, vehicle wash down, vessel water supplies, liquid resistors, wharf activities, amenities and landscape irrigation. These demands are met by stormwater captured on-site and recycled process water, augmented by potable water sourced from Hunter Water.

6.4.2 Proposed assessment approach

The key areas proposed for investigation in the surface water assessment are the drainage implications from infilling of ponds within the T4 Project area and the potential for water quality impacts during construction and operations, giving consideration to contamination and PASS present across the T4 Project area. The surface water assessment will set out principles for water management during construction and operations, including options for re-use and recycling of water. Given that the water management system will likely be integrated with that at KCT, it is proposed to revise the current KCT water balance model to include the T4 Project, and confirm that water demands can be met. Assessment of the potential for flooding impacts will also require consideration.

6.5 Ecology

6.5.1 Existing environment

The ecology of the T4 Project area and surrounds has been investigated as part of previous and ongoing ecological investigations. Previous investigations have been reviewed by Umwelt (2010), in the context of the T4 Project, and key findings are summarised in the following.

i Vegetation communities

The T4 Project area is a highly modified environment and predominately comprises areas of bare ground and disturbed grassland dominated by introduced species. The artificial ponds are currently mapped as comprising saltmarsh, freshwater wetland and *Phragmites* swamp communities. Saltmarsh and a mangrove complex are present along the edge of the Hunter River, at the proposed berth location. An aerial photograph showing the locations of currently mapped vegetation communities within the T4 Project area is presented as Figure 6.1. It is noted that whilst previous ecological investigations have been undertaken within the T4 Project area, the vegetation of the whole of the T4 Project area has not been recently mapped.

The T4 Project area does not include any vegetation communities listed under the EPBC Act. However, some of the saltmarsh, freshwater wetland and *Phragmites* swamp communities currently mapped may correspond to the following endangered ecological communities (EECs) listed under the TSC Act:

- Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions; and
- Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions.

The mangrove complex is afforded some protection under the *Fisheries Management Act 1994*, but is not listed under the TSC Act or the EPBC Act.

ii Fauna habitats

Umwelt (2010) identified that the T4 Project area contains three different fauna habitat types, being grassland, estuarine and wetland habitats.

The grassland habitats are only expected to provide habitat for a low diversity of native fauna species. However, they may provide habitat for the eastern grass owl (*Tyto longimembris*) which is listed as vulnerable under the TSC Act, and has been recorded locally. Further, dispersal of some aquatic species such as the green and golden bell frog may occur across these areas.

Aquatic habitats within the T4 Project area are expected to provide habitat for fauna species such as migratory shorebirds and micro-bats (Umwelt, 2010). The T4 Project area is located within the 'Lower Hunter Estuary', which supports a large variety of migratory and resident bird species during critical stages of their breeding cycles, and provides a refuge for bird species during inland drought. While rich in bird life, the estuary shows a low diversity of native amphibian, reptile and mammal species. Much of the native fauna has been displaced by habitat destruction and predation by introduced species.

Wetland habitats within the T4 Project area include an area known as the Deep Pond and four smaller ponds immediately west of Deep Pond (refer to Figure 6.1). Deep Pond provides habitat for a range of wetland dependent species, including deep diving ducks, migratory waders and shorebirds. These include a number of threatened species, such as the blue-billed duck (*Oxyura australis*) and freckled duck (*Stictonetta naevosa*). The four small ponds mentioned above provide habitat for the threatened green and golden bell frog (*Litoria aurea*).

There are no wetlands listed under State Environmental Planning Policy No. 14 – Coastal Wetlands (SEPP 14) located within the T4 Project area but three such wetlands (844, 844a and 823) are located adjacent to the T4 Project area.

iii Threatened flora

One threatened flora species, *Zannichellia palustris*, has been recorded within the T4 Project area. This species is listed as endangered under the TSC Act. A review of the conservation status of this species has been recommended, given that it is not considered to be endemic to the area (Umwelt, 2010). The likelihood of identifying any other threatened flora species within the T4 Project area is low.

iv Threatened and migratory fauna

The Hunter Estuary Wetlands Ramsar site, located adjacent to the T4 Project area, provides habitat for at least 42 of the 66 bird species listed under international migratory species conventions. Some of these species have also been recorded within the T4 Project area, at the Deep Pond.

The threatened fauna species which have been recorded within or in close proximity to the T4 Project area are listed in Table 6.1, along with their conservation status and the location of the recording(s).

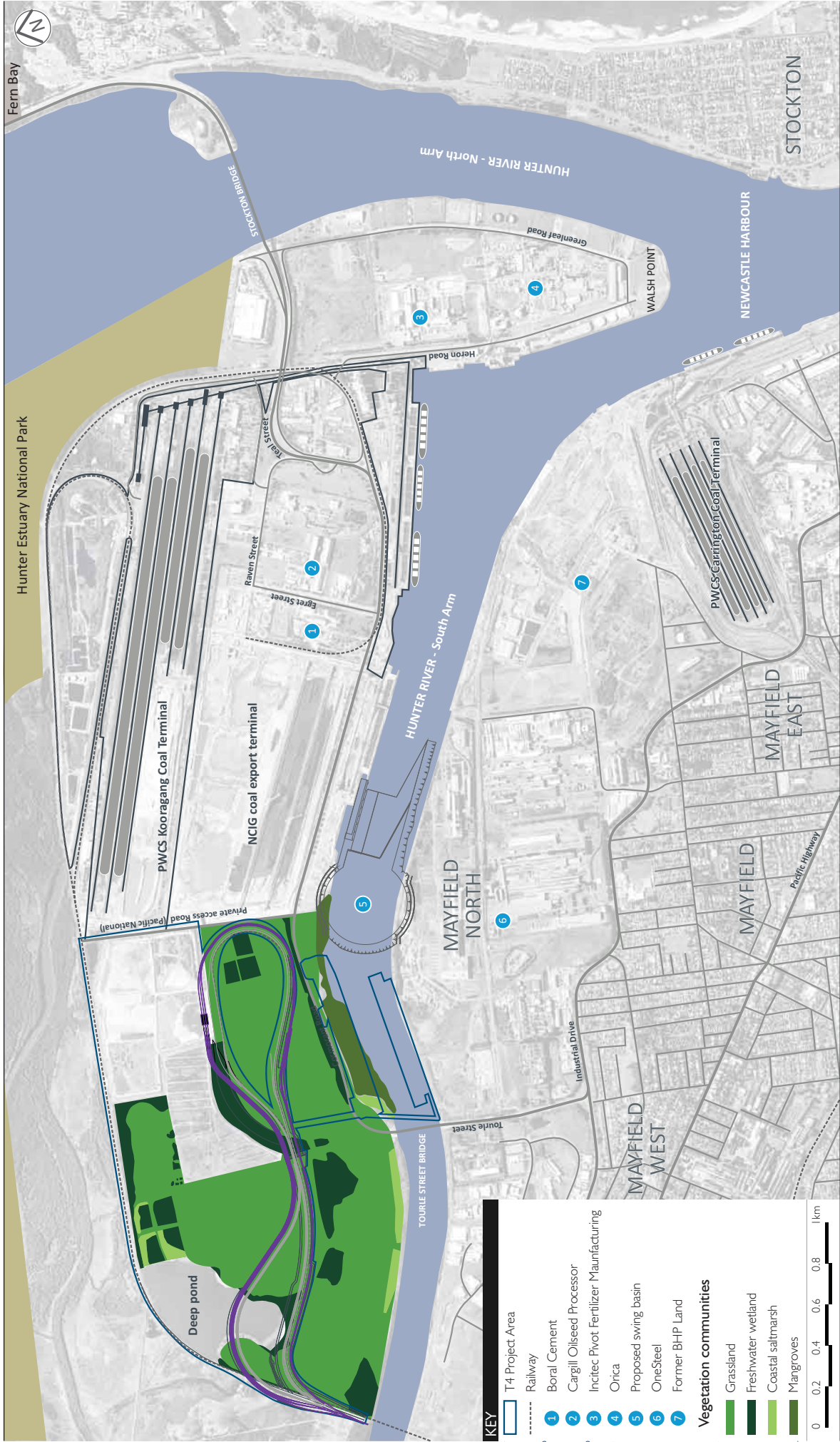


FIGURE 6.1
Vegetation Communities



Table 6.1 Threatened fauna species recorded within or adjacent to the T4 Project area

Species name		Conservation status		Location recorded
Common name	Scientific name	TSC Act	EPBC Act	
Green and golden bell frog	<i>Litoria aurea</i>	E	V	Numerous records over multiple survey periods
Eastern osprey	<i>Pandion haliaetus</i>	V	MAR, MIG	Deep Pond
Eastern grass owl	<i>Tyto longimembris</i>	V	-	Adjacent to T4 Project area
Australasian bittern	<i>Botaurus poiciloptilus</i>	E	-	Adjacent to T4 Project area
Black-tailed godwit	<i>Limosa limosa</i>	V	MAR, MIG	Deep Pond and adjacent to T4 Project area
Blue-billed duck	<i>Oxyura australia</i>	V	MIG	Deep Pond and adjacent to T4 Project area
Freckled duck	<i>Stictonetta naevosa</i>	V	MIG	Deep Pond
Maggie goose	<i>Anseranas semipalmata</i>	V	MAR	Deep Pond
Black-necked stork	<i>Ephippiorhynchus asiaticus</i>	E	-	Deep Pond
Red-backed button-quail	<i>Turnix maculosa</i>	V	-	Near Deep Pond
Spotted harrier	<i>Circus assimilis</i>	V	MIG	Near Deep Pond
Grey-headed flying-fox	<i>Pteropus poliocephalus</i>	V	V	T4 Project area
Eastern bentwing-bat	<i>Miniopterus schreibersii oceanensis</i>	V	-	Adjacent to T4 Project area
Eastern freetail-bat	<i>Mormopterus norfolkensis</i>	V	-	T4 Project area
Little bentwing-bat	<i>Miniopterus australis</i>	V	-	T4 Project area
Eastern false pipistrelle	<i>Falsistrellus tasmaniensis</i>	V	-	T4 Project area
Large-footed myotis	<i>Myotis macrotarsus</i>	V	-	T4 Project area

Notes: 1. Source: Umwelt (2010)

2. E – endangered; V – vulnerable; MAR – marine; MIG – migratory.

6.5.2 Proposed assessment approach

To assess the potential impacts of the T4 Project on the ecological values of the T4 Project area and surrounding environments, a detailed ecology assessment will be undertaken. The assessment will include, but not necessarily be limited to, the following activities.

- A detailed review of the ecological investigations previously undertaken within and adjacent to the T4 Project area, including flora communities, and flora and fauna species recorded.
- Additional field surveys of terrestrial and aquatic habitats to fill information gaps or target particular flora or fauna species.
- Research into the green and golden bell frog conducted by the University of Newcastle throughout the 2010/2011 spring – autumn period. This research has already been commissioned. It will aim to contribute to an understanding of the green and golden bell frog population size and habitat utilisation on Kooragang Island. Knowledge gained from this research will assist in the development of management strategies for its long term conservation.

- An impact assessment and development of mitigation measures, including recommendations for compensatory habitat requirements.

A key consideration will be the impact of infilling ponds in the T4 Project area. This will include impacts to threatened and migratory species which utilise these ponds, including the green and golden bell frog and migratory birds, and to any EECs which may occur within these ponds. Other key considerations relate to the clearing of mangrove vegetation to accommodate the berthing facilities and potential impacts to surrounding habitats, including SEPP 14 wetlands and the Hunter Estuary Wetlands Ramsar site.

6.6 Air quality and odour

6.6.1 Existing environment

Air quality at Kooragang Island and surrounding areas is influenced by dust emissions from industrial and non-industrial sources, including the KCT. Industry in the area generates emissions from fuel combustion and energy use, including nitrogen oxides, sulphur oxides and carbon dioxide. Third party emissions from ships in the port are also a source of emissions, particularly sulphur dioxide, which is generated by the combustion of heavy bunker oils.

There is a network of air monitoring equipment in and around the KCT, operated by DECCW, PWCS and other industrial facilities, which provides data on existing air quality in the local area. Dust deposition gauges monitor the levels of dust deposition, and high volume air samplers monitor particulate matter concentrations. There are also two weather monitoring stations operated within two kilometres of the T4 Project area, located at the KCT and Mayfield West, respectively. This data, in conjunction with air dispersion modelling and assessment undertaken for existing and proposed industrial developments provide a good understanding of existing air quality and dispersion characteristics in the local area.

The monitoring data for 2008 indicate that annual average total suspended particulates (TSP) and PM₁₀, and dust deposition levels are well below the DECCW assessment criteria. Air quality predictions by PAE Holmes (2006, 2009) indicate that this is the case even when considering predicted future emissions from NCIG and KCT (Stage 4). Periodic exceedences of the maximum 24-average PM₁₀ criterion of 50 micrograms per cubic metre (µg/m³) have been recorded, such as on two days in 2008 at Fern Bay, possibly due to dust storms or bushfires rather than industrial emissions.

Based on the data available, PAE Holmes (2009) calculated background dust concentrations at residential areas in the vicinity of KCT to be:

- annual average TSP of 45µg/m³ (DECCW criterion is 90µg/m³);
- annual average PM₁₀ of 21µg/m³ (DECCW criterion is 30µg/m³); and
- annual average dust deposition of 2g/m²/month (DECCW criterion is 4g/m²/month).

The nearest residential areas to the T4 Project area are at Mayfield and Warabrook. Air dispersion toward these areas, and accordingly the potential for dust impacts, is potentially enhanced by winds from the west-north-west and north-west, which on an annual basis, are the most common winds in the area (PAE Holmes, 2009).

Odours are generated by some industrial facilities on Kooragang Island, however, the existing operations at the KCT do not generate any significant odour emissions.

An array of dust controls and safeguards are currently in place to ensure that air quality of surrounding areas is not adversely affected by KCT operations. This includes regular monitoring of air quality undertaken in accordance with relevant development consent and DECCW licensing conditions.

6.6.2 Proposed assessment approach

An air quality assessment will assess the potential for construction and operational impacts at sensitive receivers. It will include quantitative dispersion modelling of dust emissions to predict future dust levels in the surrounding area, taking into account existing meteorological and air monitoring data. Key considerations will include the potential for cumulative impacts, including the risk of exceeding the 24-hour maximum PM₁₀ criterion, and the implications of the T4 Project area location, to the west of the existing KCT site, which may necessitate consideration of additional, more westerly assessment locations to those adopted for the previous KCT assessments, possibly including Warabrook, Sandgate and Mayfield West.

The air quality assessment will also consider non-dust emissions, such as nitrogen oxides, sulphur oxides and carbon dioxide associated with the T4 Project, and the potential cumulative effects of sulphur dioxide emissions from ships associated with the T4 Project while being loaded. Given the relatively modest fuel consumption anticipated, these are not expected to be significant, and the assessment of non-dust emissions will be predominately in the context of the greenhouse gas, energy use and climate change assessment, described in Section 6.12.2.

Project related air quality impacts will be confined to the T4 Project. However, impacts associated with the existing KCT will be considered as part of cumulative air quality impacts. The cumulative assessment will consider emissions from all sources in the area surrounding the T4 Project area, including other industry on Kooragang Island.

No odour sources have been identified in association with the T4 Project, other than potential temporary odours from dredging, or any on-site treatment of contaminated materials required to facilitate construction. Nevertheless, an odour assessment will be conducted that is commensurate with the level of risk.

6.7 Noise and vibration

6.7.1 Existing environment

The existing acoustic environment of Kooragang Island and the surrounding residential, commercial and industrial areas is influenced by noise from transport, domestic, natural and industrial sources, including from the existing KCT. Noise levels within these areas have been well characterised by monitoring, modelling and assessment undertaken for existing and proposed industrial developments. This includes ongoing noise monitoring undertaken by PWCS at the KCT, Fern Bay and Stockton, and continuous meteorological monitoring undertaken at the weather stations mentioned in Section 6.6.1.

Recent monitoring by Heggies (2010), undertaken in May 2010, indicates that KCT generated noise levels comply with relevant noise criteria set out in approvals at nearby residential locations in Stockton and Fern Bay and at other industrial sites within Kooragang Island. The results indicate that:

- noise levels generated by KCT at residential locations in Stockton and Fern Bay range between 41 and 42dBAL_{eq(15 minute)}, which are 1 to 2dBA lower than the criteria of 43dBA; and
- noise levels at industrial locations on Kooragang Island range between 59 and 70dBAL_{eq(15 minute)}, which is below or at the criteria of 70dBA.

PWCS actively manages and monitors noise at the KCT to minimise the potential for impacts, comply with regulatory and PWCS noise limits, and improve noise performance. This is done in accordance with the conditions of consent, an approved Noise Management Plan, and a continuous noise improvement program which includes acoustical design, procurement, construction and commissioning processes.

6.7.2 Proposed assessment approach

An acoustic assessment of the T4 Project will be undertaken in accordance with the DECCW (2000) Industrial Noise Policy. It will assess the potential for noise and vibration impacts at sensitive receivers, and develop mitigation measures to ameliorate the potential for adverse impacts. The assessment is proposed to address potential construction and operational impacts, and include quantitative modelling of noise emissions.

Existing meteorological and noise monitoring data will be used, supplemented by additional monitoring where necessary. Key considerations will include the potential for cumulative noise impacts, and the geographic location of the T4 Project area, west of the existing KCT site, which may necessitate the inclusion of other, more westerly assessment locations to those adopted for the previous KCT acoustic assessments, such as at Warabrook, Sandgate and Mayfield West.

Noise impacts from road traffic are expected to be minimal, given that road traffic generated by similar proposals on Kooragang Island was predicted to have negligible noise impact (e.g. Umwelt, 2009; Resource Strategies, 2006). However, this will be quantitatively assessed in accordance with DECCW requirements.

The potential for noise associated with rail and shipping for the T4 Project will also be assessed where it is directly related to the project itself. This will include the impact of rail and shipping noise generated by operations within the T4 Project area. Separate studies will be required to address increases in rail and ship movements outside the T4 Project area.

6.8 Traffic and transport

6.8.1 Existing environment

i Road network

The road network surrounding the T4 Project area is shown on Figure 1.2. The key roads in the vicinity are identified in the following.

- Industrial Drive (arterial road) and Tourle Street, which provide access to Kooragang Island from Newcastle and the Pacific Highway, via the Tourle Street bridge.
- Fullerton Road, which provides access to Kooragang Island from Stockton, Fern Bay and Nelsons Bay, via the Stockton Bridge.
- Cormorant Road and Teal Street, which together comprise the main arterial route through Kooragang Island, connecting the Tourle Street Bridge and the Stockton Bridge. This route comprises the main arterial link between Newcastle, the Newcastle Airport and Nelsons Bay. It is used by through traffic as well as vehicles accessing industrial facilities on Kooragang Island.

- Local roads at the eastern end of Kooragang Island, including Egret Street, Raven Street, Heron Road and Greenleaf Road, which provide access to various industrial facilities.
- Private access roads and vehicle tracks within and adjacent to the T4 Project area, which service the various land parcels and industrial facilities on Kooragang Island.

The road network to and from Kooragang Island generally comprises wide roads with broad shoulders and turning aprons to accommodate large vehicles, and excellent sight distances. Most of the network caters for all vehicle types. Similarly, Stapleton Transportation & Planning Pty Limited (STAP) (2009) identified that the road network on Kooragang Island operates at a high level of service with significant spare capacity.

STAP (2009) reported that the key intersections in the vicinity of the T4 Project area, i.e. Cormorant Road/ Industrial Drive, Cormorant Road/ Teal Street and Cormorant Road/ Egret Street all operate at a good or satisfactory level of service during peak periods, with the exception of the illegal right turn from Egret Street to Cormorant Road which is subject to considerable delays. Counter measures have been installed to prevent right hand turns at this location.

Traffic counts by the NSW Roads and Traffic Authority and by STAP (2005, 2009) have found that there has been negligible increase in traffic volumes on the road network surrounding the T4 Project area in recent years. Peak traffic flows generally occur on the local road network between 6.00am and 9.00am in the morning and between 3.00pm and 5.00pm in the afternoon/ evening (STAP, 2009).

ii Rail network

There is an existing rail line on Kooragang Island, inclusive of rail loops and coal receival facilities at the KCT and the NCIG coal terminal (see Figure 1.2). All coal transport to the KCT and the NCIG coal terminal is by rail. This rail line also services other industrial facilities on Kooragang Island, including Boral Cement and other facilities on Walsh Point.

6.8.2 Proposed assessment approach

A detailed traffic and transport assessment of the T4 Project will be undertaken. Key considerations will be the potential impacts of construction and operational traffic on performance of the local road network and parking availability. However, given the existing traffic conditions and the fact that the NCIG and PWCS Stage 4 construction workforce peaks will be completed well before the T4 Project commences construction, additional traffic generated by the T4 Project is not expected to be a major issue. The other key areas for assessment will be impacts of the potential realignment and conveyor crossing of Cormorant Road, proposed road access to the T4 Project area, driver safety in the vicinity of the T4 Project area.

6.9 Infrastructure

6.9.1 Existing environment

There are existing surface and subsurface services and easements located within and adjacent to the T4 Project area including water mains, fibre optic cables, Telstra cables, sewer main, gas mains, overhead high voltage powerlines, navigational aides and an Energy Australia wind turbine. Transport infrastructure is discussed above in Section 6.8.

6.9.2 Proposed assessment approach

The EA will document any services which would be relocated as part of the T4 Project, and the outcomes of consultation undertaken with service providers. The assessments of potential construction impacts undertaken for the EA will cover relocation of services.

6.10 Heritage

6.10.1 Existing environment

Searches of Commonwealth, State and local government heritage databases and a review of heritage investigations undertaken at Kooragang Island by Resource Strategies (2006), HLA (2005), Umwelt (2003), Protech Steel (2001) and ERM Mitchell McCotter (1996), identified that no items or places of indigenous or non-indigenous heritage significance have been recorded within the T4 Project area.

Only two Aboriginal heritage places are registered on Kooragang Island. One is located to the north of the T4 Project area, and the other, which was recorded near the Tourle Street Bridge, has been destroyed (Resource Strategies, 2006). No traditional owners have raised any concerns regarding existing operations at the T4 Project area, and consultation with local Aboriginal groups regarding other developments on Kooragang Island has not identified any significant cultural heritage values associated with the island.

The non-indigenous heritage items on Kooragang Island are the Tongues Tree Fig, 131 Radar Igloo and School Master's House, located on the western part of Ash Island, more than 2.5km from the T4 Project area, and a Palm on Greenleaf Road, at Walsh Point. These are all local heritage items on the Newcastle LEP.

The Hunter Estuary Wetlands, part of which are located in the Hunter Estuary National Park to the north of the T4 Project area (see Figure 1.2) are a registered place on the Register of the National Estate.

It is considered unlikely that any previously unrecorded items of heritage significance would be present in the T4 Project area, given the results of previous assessments and given that the area has been heavily disturbed, including by land filling and reclamation. This would likely have destroyed any evidence of former occupation of the area.

6.10.2 Proposed assessment approach

The T4 Project is not likely to impact known items or places of heritage significance, with the possible exception of the Hunter Estuary Wetlands, given that none are located within the T4 Project area. The potential for any impacts on the wetlands will be investigated as part of the groundwater and ecology investigations. Given the highly disturbed nature of the site, and the low potential for any heritage values to be attached to the land, the heritage assessment will largely focus on a review of existing information, consultation with local Aboriginal groups, and assessment of whether the heritage-listed Palm is likely to be impacted. Surveys will be undertaken on land not subject to previous assessments and undisturbed land.

6.11 Visual amenity

6.11.1 Existing environment

i Visual setting

The visual setting of the T4 Project area and surrounds is dominated by the large scale industrial and port facilities on Kooragang Island and along the southern bank of the Hunter River, to the east and south of the T4 Project area. These include coal stockpiles, coal stackers/ reclaimers, conveyors, wharves, shiploaders, ships, bulk liquid storage tanks, sheds and administration buildings.

Built and natural landscapes are also features of the local and regional viewsapes, including to the north, east and south of the T4 Project area. These include bodies of water and vegetation within the riverine, estuarine and wetland environments of Hunter Estuary National Park, the Hunter River and coastline, as well as commercial and residential areas of Newcastle. Other visible features of the local setting include roads, bridges, rail lines, electricity transmission lines and a wind turbine on Kooragang Island.

The T4 Project area itself comprises flat to hummocky terrain, shaped by previous landfill activities, with grasslands and artificial ponds.

ii Lighting

The local area is generally well lit by fixed lighting at existing industrial and port facilities which operate 24 hours per day, vehicle lights along the road network and lighting from ships utilising the port.

iii Viewpoints

The T4 Project area is visible from viewpoints along the Hunter River, adjacent roads (the closest of which is Cormorant Road) and at surrounding industrial facilities. More distant views are available from the elevated residential areas on the mainland, e.g. at Mayfield, Mayfield West, Warabrook and Sandgate. Intervening landform, vegetation and buildings provide some screening of views.

6.11.2 Proposed assessment approach

A visual assessment will be completed as part of the EA. This will identify potentially sensitive viewpoints, assess potential changes to viewsapes and develop mitigation measures. Key considerations will be the appearance of the proposed infrastructure and night lighting (albeit that these would be visually consistent with the adjoining coal terminals); removal of features, such as ponds and a strip of mangroves at the water's edge; and the location of the T4 Project area further west than the existing coal terminals, constituting an extension of the industrial viewsapes and potentially exposing it to receivers who do not currently have views of these facilities.

6.12 Energy use, greenhouse gas and climate change

6.12.1 Existing environment

Energy efficiency and greenhouse gas (GHG) reduction initiatives are currently implemented by PWCS and will continue to be developed and implemented for its operations as technologies and policies evolve. An investigation of KCT energy usage and GHG emissions was undertaken by SEE Sustainability Consulting (SEE) (2007), and included quantitative calculations of Scope 1, 2 and 3 emissions. Scope 1 emissions are direct emissions from on-site activities. Scope 2 emissions are indirect emissions from the on-site

consumption of electricity, steam or heat produced by another organisation. Accordingly, Scope 1 and 2 emissions are due to the actual operation of a project. Scope 3 emissions are the indirect emissions from transport and end-use of the coal.

The SEE (2007) assessment results were unchanged by the subsequent Stage 4 proposal (SEE, 2009). SEE (2007, 2009) identified that consumption of purchased electricity, diesel and petrol were the key contributors to on-site energy usage at the KCT and Scope 1 and 2 emissions. Scope 3 emissions are associated with coal transport and combustion, including shipping and railing of coal.

6.12.2 Proposed assessment approach

An energy use, greenhouse gas and climate change assessment of the T4 Project will be undertaken. This will include energy usage and Scope 1, 2 and 3 GHG emission calculations; an analysis of the likely effects of the predicted emissions; and a review of existing PWCS energy efficiency and emissions reductions measures to identify any potential improvements. The estimated Scope 1, 2 and 3 GHG emissions will be calculated in the context of their contribution to global emissions and climate change. Broader issues of the role and efficiency of coal as an energy source will also be examined.

The assessment will also consider the potential for climate change to affect the T4 Project; that is, from sea level rise and potentially higher intensity storm events.

6.13 Hazards

6.13.1 Existing environment

Potential hazards identified in association with existing KCT operations relate to the potential for spills or leaks of hazardous materials and for fires from spontaneous coal combustion. PWCS has existing safety systems and procedures in place to reduce and respond to such incidents, including a fire fighting system. Storage and handling of potentially hazardous materials is in accordance with the relevant statutory requirements.

6.13.2 Proposed assessment approach

A preliminary hazard analysis (PHA) will be undertaken to identify and evaluate the potential hazards associated with the T4 Project, in accordance with the requirements of State Environmental Planning Policy No. 33 – hazardous and offensive development. The key issues expected to be covered in the PHA relate to the potential for spills, leaks or fires associated with storage, handling and use of potentially hazardous materials, i.e. diesel, petrol, hydrocarbons and gas cylinders; general construction and operational activities such as conveyor operations and stockpiling; failure of structures and water management systems; road modifications; transport of over-sized equipment; and rail operations.

The EA will also include an assessment of potential impacts on maritime safety.

6.14 Socio-economic

6.14.1 Existing environment

The existing PWCS operations contribute to the local and regional economies by providing direct and indirect employment and income, with potential flow on benefits to society. PWCS directly employs 440 full-time people and engages a further 400 contractors, most of whom are locally based. PWCS donates

close to \$500,000 per annum to a range of local institutions including the Hunter Medical Research Institute and Newcastle Surf Life Saving Club.

In addition, the KCT and CCT are integral components of the Hunter Valley Coal Chain and contribute to the social and economic benefits of the broader coal industry. These include employment generation and fuel for low-cost electricity generation and industries like steel-making. The coal industry is NSW's and Australia's largest source of export revenue and through royalties, employment, investment and revenue generation, is a major contributor to the social and economic development of regional Australia.

Thermal coal supplied from the Hunter Valley Coal Chain is used to generate electricity in a number of countries around the world, including countries in Asia, providing significant economic and social benefits to those countries.

While community engagement undertaken by PWCS as part of its ongoing operations and for assessment of previous proposals, has identified issues regarding potential impacts through noise and dust, it has also identified wide support for PWCS operations and the measures it incorporates into its operations to reduce impacts on the local area

6.14.2 Proposed assessment approach

A social impact and economic assessment of the T4 Project will be undertaken. This will seek to identify and address the social/ community impacts of the T4 Project, quantify the economic contribution of the T4 Project to the local and regional community, and qualitatively assess the potential flow-on benefits. In particular, the T4 Project would create direct employment, revenue through taxes and royalties and is expected to be a significant contributor to security of employment and revenue throughout the Hunter Valley Coal Chain and the communities in which it operates.

The socio-economic assessment will also include effects such as noise, air quality, ecology, greenhouse gas and climate change, visual, traffic and transport and contamination. The results will be used to comment on actual and perceived impacts on amenity and community values identified in the community consultation program. The costs and benefits will be weighed up to assess whether the T4 Project would be of net benefit. This will be undertaken through a benefit cost analysis (BCA), which will compare the quantification and valuation of the T4 Project's incremental benefits and costs against a no project scenario. The BCA will include a choice modelling study to estimate monetary values for the potential environmental, cultural and social impacts or externalities of the T4 Project.

As outlined in Chapter 5, community engagement for the T4 Project has commenced in accordance with a project-specific engagement strategy, and will continue throughout the T4 Project.

At this stage, no significant social or community impacts such as population growth or impacts on housing, community services, infrastructure or facilities in the Newcastle region are anticipated as a result of the T4 Project. However, demographic information will be analysed to characterise the population.

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7 Conclusion

The Hunter Valley is home to the world's largest and most complex coal chain, responsible for handling one of Australia's most significant commodity exports. It includes 14 coal producers, 40 coal mines and 80 brands of primarily thermal coal. It creates many thousands of direct and indirect jobs.

The most important part of the Hunter Valley Coal Chain is the harbour-based terminal/vessel loading operations. In 2010, PWCS, the world's largest coal export terminal, will load some 97 million tonnes of coal with an estimated value of \$10 billion onto well over 1,000 export vessels. This makes PWCS a critical mainstay of economic activity locally, state-wide, nationally and internationally. Although PWCS has committed \$1.6 billion to coal loading infrastructure investment and delivery over the past decade, it is currently at one of the most critical junctures in its history as it prepares to handle booming and unprecedented demand for coal loading services.

Recognising the vital economic importance of the Hunter Valley Coal Chain, the NSW Government and the Hunter Valley coal industry recently negotiated a long term operational framework – the Capacity Framework Arrangements – to ensure that adequate coal handling infrastructure is developed in the most efficient and timely manner to meet the growing demands of international coal customers and increasing coal throughput. The arrangements are also intended to minimise costly vessel queues off Newcastle, a problematic occurrence in recent years due to broad and historic flaws in the way the overall Coal Chain operates. The arrangements came into effect on 1 January 2010.

A central part of the plan is an expectation that PWCS will build the T4 Project, a new coal loading terminal adjacent to the KCT, to cater for future coal loading operations when existing terminal operations have reached capacity. The long term viability of the entire coal chain and Australia's reputation as an efficient and reliable coal exporter depends on the ability of PWCS to deliver the T4 Project.

To fulfil its obligations, PWCS has spent much of 2010 undertaking technical investigations to determine the potential to deliver the T4 Project. Upon granting PWCS the right to build the T4 Project, subject to environmental and planning approvals, the NSW Government recognised that the T4 Project area is generally zoned for port development purposes and was formerly used as a landfill. The T4 Project would include a rail loop, stockyard, conveyor system, shipping berths, coal loading infrastructure and facilities shared with those existing at KCT.

The T4 Project requires approval under Part 3A of the NSW EP&A Act. A referral is being prepared to determine whether the project also requires approval under the Commonwealth EPBC Act. If an approval is required under this legislation, the intention would be that Commonwealth matters be assessed under the NSW Government's current Part 3A process, in accordance with a bilateral agreement between the Commonwealth and the State.

Stakeholders will be consulted throughout the preparation of the EA on the design of the T4 Project and the mitigations measures proposed to reduce impacts on the local environment and community. This will include identification of opportunities to accommodate community feedback into the project design. Preliminary stakeholder consultations are already well advanced, with PWCS management articulating the broad T4 Project intention to the community, local, State and Commonwealth government agencies and political offices and the media.

The T4 Project has the potential for positive and negative impacts. Potential positive impacts would include substantial capital investment into the local area, tax payments, increased employment (direct and indirect) and the beneficial use of a landfill area. Potential negative impacts include impacts on

groundwater, ecology, air quality, noise and vibration. An EA will be prepared to address all potential positive and negative impacts. The results of the preliminary assessments in Chapter 6 will be used to guide the relative priorities for further assessment and mitigation strategies. Accordingly, the study scopes proposed in Chapter 6 have been developed commensurate with the level of associated potential risk.

The EA will be assessed by the NSW DoP, and if an approval is required under the EPBC Act, the Commonwealth DSEWPC. If approval is required under the EPBC Act, the DoP and DSEWPC would provide an assessment report to the NSW Minister for Planning and Commonwealth Minister for Sustainability, Environment, Water, Population and Communities respectively, recommending whether the project should be approved or refused. Should the T4 Project obtain approval(s) and proceed, the benefits to the local area, the State and Australia would potentially be significant.

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Acronyms

$\mu\text{g}/\text{m}^3$	micrograms per cubic metre
ACCC	Australian Competition and Consumer Commission
BCA	benefit cost analysis
dba	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
CCT	Carrington Coal Terminal
DECCW	Department of Environment, Climate Change and Water
DoP	Department of Planning
DSEWPC	Department of Sustainability, Environment, Water, Population and Communities
E	endangered
EA	Environmental Assessment
EARs	Environmental Assessment Requirements
EEC	endangered ecological community
EMD	electrolysis manganese dioxide
EP&A Act	Environmental Planning and Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPL	Environment Protection Licence
GHG	greenhouse gas
ha	hectares
KCT	Kooragang Coal Terminal
km	kilometres
$L_{eq}(15 \text{ minute})$	The A-weighted sound pressure level averaged on an energy basis over a 15 minute period.
m	metres
Major Projects SEPP	State Environmental Planning Policy (Major Projects) 2005
MAR	marine
MIG	migratory
Mtpa	million tonnes per annum
NCC	Newcastle City Council
NCIG	Newcastle Coal Infrastructure Group
NES	national environmental significance
NPC	Newcastle Ports Corporation
NSW	New South Wales
PASS	potential acid sulphate soils
PEA	Preliminary Environmental Assessment
PFM	Planning Focus Meeting
PHA	preliminary hazard analysis
PM_{10}	particulate matter with equivalent aerodynamic diameters of $10\mu\text{m}$ or less
POEO Act	Protection of the Environment Operations Act 1997
PWCS	Port Waratah Coal Services Limited
SEE	SEE Sustainability Consulting
SEPP	State Environmental Planning Policy
SEPP 14	State Environmental Planning Policy No. 14 – Coastal Wetlands
STAP	Stapleton Transportation & Planning Pty Limited
T4 Project	The Terminal 4 Project
TSC Act	Threatened Species Conservation Act 1995
TSP	total suspended particulates
V	vulnerable

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