PORTS CORPORATION QUEENSLAND

Port of Hay Point Capital Dredging Departure Path and Apron Areas

Initial Advice Statement

August 2004

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1. Project Description

1.1 Scope of Report

This Initial Advice Statement (IAS) was prepared for the Ports Corporation of Queensland (PCQ) for the purposes of identifying environmental, cultural or community issues and regulatory approvals required prior to the commencement of capital dredging to add a departure path and apron areas within the Port of Hay Point. This IAS is intended to scope the potential impacts that will be investigated in detail prior to the project being granted appropriate approvals. An Environmental Impact Statement (EIS) and Environmental Management Plan (EMP) will be prepared as part of the approvals process. Terms of Reference (ToR) for the EIS will be developed based on the outcomes of this report and the requirements of relevant government agencies and submissions of businesses and the community.

1.2 Project Proponent

PCQ is the project proponent and is responsible for the management and development of various port facilities throughout Queensland. PCQ is responsible for the establishment and maintenance of navigable waters at the Port of Hay Point.

1.3 Location

The Port of Hay Point is in the Shire of Sarina. It is located on the central Queensland coast approximately 40 kilometres south of Mackay and includes two coal terminals; Hay Point Coal Terminal (HPCT) and Dalrymple Bay Coal Terminal (DBCT). The berth facilities of the Port are located within Dalrymple Bay.

1.4 Project Scope

To increase the allowable sailing draft for vessels departing the Port of Hay Point and to allow improved exit shipping traffic, PCQ proposes to conduct capital dredging of a new departure path and apron area at the Port.

It is anticipated that a trailer suction hopper dredger (TSHD) or cutter suction dredger will be employed to conduct the proposed capital dredging. PCQ are intending to conduct the proposed capital dredging on receipt of required approvals. PCQ is currently intending to dredge between May and October to minimise potential impacts on turtles and the benefits of this dredging window will be assessed in the EIS. The works are expected to occur in either 2005 or 2006, but may be required to be split over the two years to fit within the time window. The project also involves disposal of clean dredged material in the port area. The majority of the material is expected to be relocated to an approved ocean disposal site. The EIS will evaluate any other options to minimise the volumes placed in the ocean disposal site, such as land disposal.

The project scope includes subsequent maintenance dredging that may be required for the departure path project. Prime Infrastructure Pty Ltd, the lessee of DBCT, already has approval under the EPBC Act to dredge the berth pocket for the proposed Berth 4

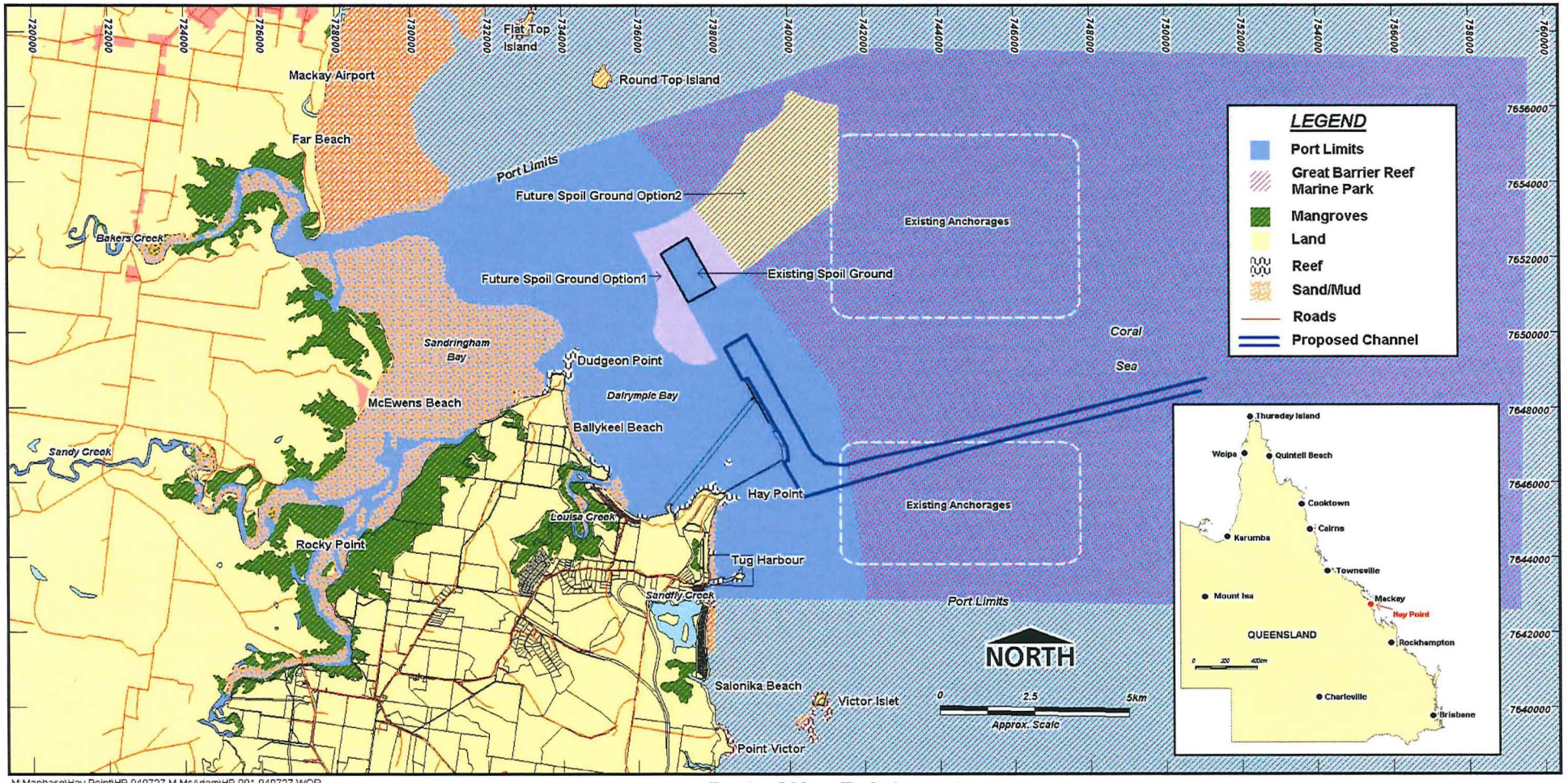
at DBCT. Approval for the sea disposal of dredged material is still required because a previous sea dumping approval lapsed. It is expected that this dredging will be carried out with the same dredge used for the departure path project. Cumulative impacts of this project will be considered in this EIS.

1.5 Project Background

Construction of a departure path for the Port was included in the scope of the Stage 6 & 7 Expansion of the DBCT proposed by PCQ in 2000. The proposed departure path was designed to service only the Dalrymple Bay Coal Terminal. It was 2.4 km long and 165 metres wide and was to be dredged to a depth of RL –14.0 metres, plus insurance depths. This project went through a comprehensive EIS process, including assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), with the complete project receiving State and Commonwealth approval in early 2001. The Stage 6 expansion of DBCT was completed in 2003, however Stage 7 of the project, including DBCT Berth 4 and the departure path and apron area has not been constructed at this stage.

Since receiving approval for the departure path, the owners of both coal terminals have carried out further studies relating to the benefits of a departure path. These studies have indicated that the optimum depth of the departure path would be RL –14.9 metres. It was also identified that a departure path would provide benefits to the HPCT, requiring a different alignment to that which was originally proposed to service only DBCT.

To optimise the design of the departure path, PCQ commissioned modelling of the path and has worked closely with both coal terminals and Maritime Safety Queensland (Regional Harbour Master and pilots). The new design and alignment that meets the operational and safety needs of the port has now been developed and agreed. PCQ is now reviewing potential environmental impacts of the project, determining appropriate management measures and seeking the required environmental approvals for the revised project scope.



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Port of Hay Point

Figure 1 Locality Plan

1.6 Proposed Capital Works Specifications

The extent and location of the proposed capital works is illustrated in Figure 2.

All the proposed works lie within the declared port limits of the Port of Hay Point. However, because the Great Barrier Reef Marine Park (GBRMP) overlaps the port limits, part of the works fall within the Marine Park, in an area which has a general use zoning. It is expected that approximately 9 million cubic metres of dredge spoil will be generated by the proposed capital dredging. The proposed dredging will involve the following:

- Provision of a ship manoeuvring apron immediately adjacent to and parallel to the DBCT and HPCT dredged berths. This area lies outside the GBRMP. The apron is a minimum of 500 metres wide. The apron will be dredged to achieve a minimum declared depth of RL –14.9 metres LAT. The actual dredged depth will be slightly deeper to provide for insurance depths in between dredging programs. It is expected that the average dredged depth will be approximately RL –15.2 metres. This value will be finalised in detailed engineering and presented in the EIS. Because of the imprecise nature of dredging, to achieve the average dredged depth of RL – 15.2 metres, it is expected that the peak depths will not exceed RL –15.5 to –15.6 metres.
- Provision of a departure path from the apron to open waters. There will be a transition zone between the apron and departure path. The path will be 500 metres wide for the first 500 metres then taper to a width of 300 metres over the next 3 kilometres. The remainder of departure path will be 300 metres wide and continue until a minimum natural depth of RL –14.9 metres is achieved. The total path length is expected to be approximately 9.5 kilometres long. The majority of the path is in the GBRMP, but remains within the port limits. Note: All widths referred to represent the width at the base of the path. The sides are sloped and the width at the seabed will be marginally larger. The required slope or batter will be determined in the detailed engineering phase and presented in the EIS. As for the apron area the departure path will be dredged to achieve a minimum declared depth of RL –14.9 metres LAT. The actual dredged depth will be slightly deeper to provide for insurance depths. It is expected that the average dredged depth will be approximately RL –15.2 metres. The final number will be presented in the EIS for approval.

The current ocean disposal ground located approximately 4 kilometres to the north east of the DBCT berths does not have sufficient capacity to accommodate the volume of dredge spoil that will be generated during the proposed capital dredging due to depth restrictions. PCQ have separately commissioned studies to determine a new spoil disposal location to enable the continuation of capital and maintenance dredging campaigns at the Port.

It is expected that 9 million cubic metres of dredged material will require disposal as part of the capital dredge works. Approvals for a five year maintenance dredge period will also be sought as part of this project. Maintenance dredging for the five year period is expected to generate in the order of 900,000 cubic metres per annum. A

better estimate of maintenance dredging requirements will be provided safer hydrodynamic modelling and the outcomes will be presented in the EIS.

In addition, it will also be necessary to accommodate the expected 400,000 cubic metres of material to be dredged as pat of the development of the approved DBCT Berth 4 at the new spoil disposal site, plus any other ongoing maintenance requirements of the port, which is low. Therefore, a total of approximately 14 million cubic metres of dredge material will require disposal as part of capital and maintenance works over a five year period from the commencement of dredging works.

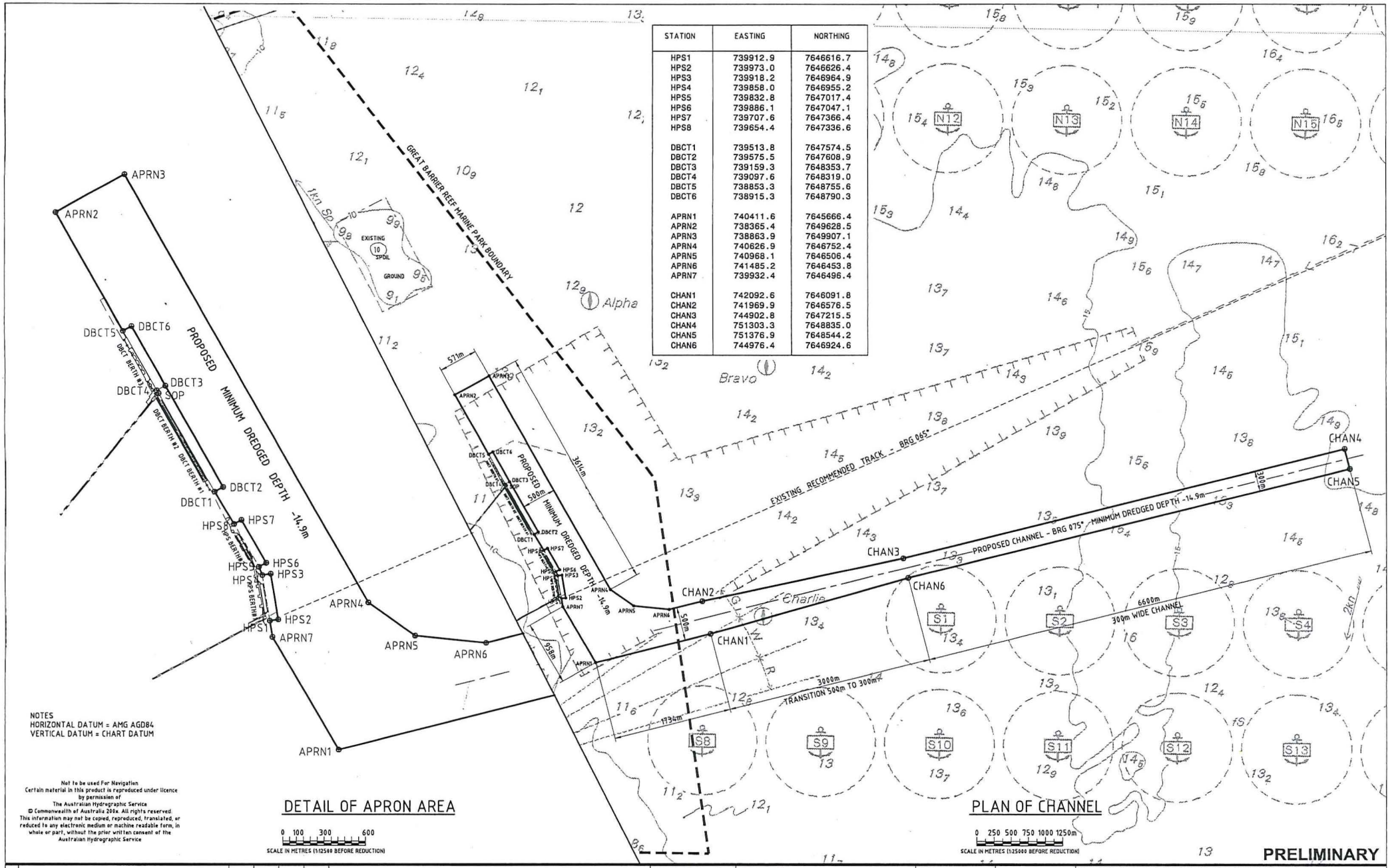
The EIS will include a review of both land based and ocean disposal options, with the potential impacts of the preferred option being assessed. It is anticipated that the volume of dredge spoil to be disposed will not be able to be accommodated at a land based disposal site, therefore the majority of material is expected to be disposed at sea. Studies conducted to date indicated that there are only a few sites suitable for relocation of dredge spoil, some of which are located within the Great Barrier Reef Marine Park. Two potential locations for the new spoil ground have been identified as shown in Figure 1.

The project includes installation of six navigation aids along the departure path to clearly define it for shipping. The navigation aids are fixed into the seabed.

1.7 Authorities, Permits and Survey Requirements

The proposal will potentially have implications under the jurisdiction and interest of Local, State and Commonwealth Government Agencies. The ToR will be drafted to meet the legislative requirements of all Government agencies. The relevant legislation identified includes:

- *Environment Protection and Biodiversity Conservation Act 1999;*
- *Environmental Protection (Sea Dumping) Act 1981;*
- *Great Barrier Reef Marine Park Act 1975;*
- *Aboriginal Cultural Heritage Act 2003;*
- *Cultural Record (Landscapes Queensland and Queensland Estate) Act 1987;*
- *Integrated Planning Act 1997*;
- *Fisheries Act*
- *Coastal Protection and Management Act 1995;* and
- *Environmental Protection Act 1994.*



STATION	EASTING	NORTHING
HPS1	739912.9	7646616.7
HPS2	739973.0	7646626.4
HPS3	739918.2	7646964.9
HPS4	739858.0	7646955.2
HPS5	739832.8	7647017.4
HPS6	739886.1	7647047.1
HPS7	739707.6	7647366.4
HPS8	739654.4	7647336.6
DBCT1	739513.8	7647574.5
DBCT2	739575.5	7647608.9
DBCT3	739159.3	7648353.7
DBCT4	739097.6	7648319.0
DBCT5	738853.3	7648755.6
DBCT6	738915.3	7648790.3
APRN1	740411.6	7645666.4
APRN2	738365.4	7649628.5
APRN3	738863.9	7649907.1
APRN4	740626.9	7646752.4
APRN5	740968.1	7646506.4
APRN6	741485.2	7646453.8
APRN7	739932.4	7646496.4
CHAN1	742092.6	7646091.8
CHAN2	741969.9	7646576.5
CHAN3	744902.8	7647215.5
CHAN4	751303.3	7648835.0
CHAN5	751376.9	7648544.2
CHAN6	744976.4	7646924.6

NOTES
HORIZONTAL DATUM = AMG AGD84
VERTICAL DATUM = CHART DATUM

DETAIL OF APRON AREA

0 100 300 600
SCALE IN METRES (1:12500 BEFORE REDUCTION)

PLAN OF CHANNEL

0 250 500 750 1000 1250m
SCALE IN METRES (1:25000 BEFORE REDUCTION)

PRELIMINARY

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Checked	Approved	Date
C	APRN1 MOVED, APRN7 ADDED	NW			08.02.05
B	VERTICAL DATUM NOTE CORRECTED	NW			6.08.04
A	FOR REVIEW	NW			29.07.04

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Plot Date: 08 February, 2005 - 10:02 AM

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Scale	AS SHOWN
Drawn	N WATTS
Designed	M McADAM
Drafting Check	
Design Check	
Approved	
Date	

This Drawing must not be used for Construction unless signed as Approved

Client PORTS CORPORATION QUEENSLAND
Project HAY POINT DEPARTURE CHANNEL
Title DREDGE AREA EXTENTS PLANS
Original Size A1
Drawing No: 41-13081-001
Rev: C

1.8 Legislative and Other Requirements

1.8.1 Overview

PCQ is required to give due consideration to the likely environmental impacts of the proposal under various state and local legislation, guidelines and policies. This section identifies legislation and provides a description of other documents and guidelines relevant to environmental management of the proposal. It is not intended that this section provides a legal review of the proponent's obligations but is simply to highlight key environmental legislation relevant to this proposal.

1.8.2 Environment Protection Biodiversity and Conservation Act, 1999 (Commonwealth)

The *Environmental Protection Biodiversity and Conservation Act 1999* (Commonwealth) provides for the conservation and management of species and communities of flora and fauna deemed to have conservation significance.

The *Environment Protection and Biodiversity Act 1999* (EPBC Act) deals with matters of National Environmental Significance including; "migratory species" and "threatened species and ecological communities". Under the EPBC Act (1999) an approval from the Federal Environment Minister must be sought prior to taking an "Action" which has, will have, or is likely to have, a significant impact (defined in the Act) on;

- a matter of national environmental significance; or
- the environment on Commonwealth land (i.e. Defence Estate).

An Action includes a project, development, undertaking, activity or series of activities.

Where an action which would otherwise require approval under Part 9 of the EPBC Act occurs in the Great Barrier Reef Marine Park, and the proponent is authorised to undertake the action under the *Great Barrier Reef Marine Park Act 1975*, then an approval under the EPBC Act is not required.

1.8.3 Environment Protection (Sea Dumping Act) 1981 (Commonwealth)

The *Environment Protection (Sea Dumping) Act 1981* (the Sea Dumping Act) was enacted to fulfil Australia's international responsibilities under the London Convention of 1972 and has been amended to implement the 1996 Protocol to the London Convention (which Australia ratified in 2001).

Under the Protocol, Australia is obliged to prohibit ocean disposal of waste materials considered too harmful to the marine environment and regulate the permitted dumping of wastes at sea to ensure the environmental impact is minimised, (for example with dredge spoil or the disposal of vessels or platforms).

The Sea Dumping Act regulates the deliberate loading and dumping of wastes and other matter at sea. It applies to all vessels, aircraft or platforms in Australian waters and to all Australian vessels or aircraft in any part of the sea.

The Sea Dumping Act is administered by the Department of the Environment and Heritage or the Great Barrier Reef Marine Park Authority (GBRMPA) if dumping is to take place within the Great Barrier Reef Marine Park. The Sea Dumping Act applies in respect of all Australian waters (other than waters within the limits of a State or the Northern Territory), from the low water mark out to the limits of the Exclusive Economic Zone.

Only material that is deemed to be clean under the "National Ocean Disposal Guidelines for Dredged Material" (2002) will be disposed at sea.

1.8.4 Great Barrier Reef Marine Park Act 1975 (Commonwealth)

A Marine Parks Permit will be required under the *Great Barrier Reef Marine Park Act (GBRMP Act)* 1975 where an activity has potential direct or indirect effects on the GBRMP. Where an application is made under the GBRMP Act, the GBRMPA will consider the Sea Dumping Act, National Ocean Disposal Guidelines for Dredged Material, *Great Barrier Reef Marine Park Regulations* 1983 and any GBRMP policies.

1.8.5 State Development and Public Works Organisation Act 1971

PCQ intend to seek designation as a "significant project" under section 26 of the *State Development & Public Works Organisation Act 1971* (SDPWO). The SDPWO Act establishes an environment assessment process for projects deemed significant. This process removes duplication with the EPBC Act, where the process is accredited by the Department of Environment and Heritage, and streamlines approval processes under the *Integrated Planning Act 1997.*

1.8.6 Environmental Protection Act, 1994 (Qld)

Sections 36 and 37 of the *Environmental Protection Act* 1994 (EP Act 1994) notes that all persons have a duty of care to the environment. Therefore, it is not permissible to cause environmental harm (as defined in the Act) whilst undertaking any activity unless all reasonable and practical means are taken to minimise that harm.

The EP Act 1994 outlines the scope and content for preparing environmental protection policies to protect Queensland's environment. These policies may be made about the environment or anything that affects or may affect the environment. It should also be noted that all subordinate legislation to the Act, such as the Environmental Protection Policies, binds all persons. Compliance with all policies will be required.

1.8.7 Aboriginal Cultural Heritage Act 2003

The *Aboriginal Cultural Heritage Act 2003* and the Torres Strait Islander Cultural Heritage Act 2003 came into force on 16 April 2004. Underpinning the Act is a 'cultural heritage duty of care', which requires that a person who carries out an activity must take all reasonable and practicable measures to ensure the activity does not harm Aboriginal cultural heritage.

The Act establishes a framework for the conduct of assessment of cultural heritage impact and processes to be undertaken in preparing Cultural Heritage Management

Plans. It is expected that cultural heritage management plan will be required for the project.

1.8.8 Coastal Protection and Management Act 1995

The *Coastal Protection and Management Act 1995* (CP&M Act) has recently been rolled into the *Integrated Planning Act 1997*. An assessment under the CP&M Act may be triggered in relation to assessable development within tidal waters. This includes disposal of dredge material within tidal areas and construction within tidal areas.

1.8.9 Integrated Planning Act 1997

Development which is a material change of use and which is inconsistent with a land use plan approved under the Transport Infrastructure Act 1994, section 171 triggers assessment under the *Integrated Planning Act 1997* (IPA).

Development involving coastal works will trigger the IPA. This project will require an approval under IPA for both the dredging works and ocean disposal of the dredged material. Any reclamation proposed will also require an IPA approval.

2. Existing Environment and Potential Impacts Associated with the Project

2.1 Introduction

The potential environmental impacts associated with this project are those that may result from dredging of the proposed departure path and apron areas and the disposal of dredge spoil.

The potential environmental impacts of dredging at the Port of Hay Point have been well studied and documented during past capital and maintenance dredging activities. As such, the following overview of the existing environment and an initial assessment of potential impacts are based on information drawn from previous studies undertaken within the Port of Hay Point and surrounds.

2.2 Water Quality

The coastal environment surrounding the Port of Hay Point has experienced minimal water quality impacts due to the relatively undeveloped catchment, a low population and lack of other industries with the potential to release pollutants into the surrounding waterways. Increased turbidity levels can occur naturally as a result of mobilisation of seafloor sediments during extreme storm events that result in elevated wind and wave conditions (WBM 2004) and as a result of the discharge of turbid freshwater plumes from adjacent rivers and creeks during the wet season.

Likely impacts on water quality resulting from dredging and spoil disposal include:

- mobilisation of seabed sediments into the water column resulting in increased turbidity levels; and
- mobilisation and release of contaminants from sediments into the water column.

Results of previous monitoring and modelling have indicated that turbid plumes generated by dredging and spoil disposal are likely to move in a north-northwest to a south-southeast direction in accordance with tidal currents (URS 2000). Sustained periods of onshore winds may result in plumes moving towards the coast. Previous modelling has indicated that suspended sediment concentrations are likely to reduce to 10 – 15% of the initial concentration within half an hour and to approximately 1% of the initial concentration within three hours (URS 2000).

Therefore, increases in turbidity caused by dredging and spoil disposal are likely to be relatively localised and short-term and therefore are unlikely to have a significant impact on marine flora and fauna within the study area. Previous monitoring has indicated the potential for surface plumes generated during spoil disposal in the current spoil ground to migrate in the direction of Round Top and Flat Top Islands (WBM 2004). However, while these plumes were visible, the turbidity levels were very low and within the range of background levels recorded in the Bay (WBM 2004). The potential for the migration of turbid plumes towards these sensitive habitats and the

likely turbidity concentrations will be assessed using the results of hydrodynamic modelling.

Previous sediment sampling conducted in the current berth and departure apron areas of the Port of Hay Point has not identified exceedances of the National Ocean Disposal Guidelines for Dredged Material (DEH, 2002). Therefore, it is expected that the sediments to be dredged will be uncontaminated and will not result in the release of contaminants into the water column. This will be confirmed prior to dredging through implementation of an approved sediment sampling and analysis plan.

2.3 Marine Processes

Sediment transport in coastal environments is mediated by the prevailing combination of wind, waves and tides. Key coastal processes that dominate sediment transport dynamics at Dalrymple Bay include:

- a large tidal range generating relatively high tidal currents;
- limited wave heights due to the Outer Great Barrier Reef; and
- the occurrence of tropical cyclones, which can generate extreme wind and wave conditions (URS 2000).

Peak current velocities in the area are typically 0.2 m/s during neap tides and 0.5 m/s during spring tides. Tides flood towards the south-southeast and ebb towards the north-northwest (WBM 2004). Wind has also been observed to influence current speed and direction in the study area.

The relatively deep waters in the study area mean that seafloor sediments are only resuspended and transported during moderate to extreme wind and wave events (URS 2000). The potential for resuspension and transport of sediments from the designated ocean disposal ground will be assessed as part of the EIS.

Creation of a departure path and deepening of the apron areas will result in an alteration to the seabed bathymetry in this area. In turn, this may affect the hydrodynamic processes within the vicinity of the coal terminals and local sediment dynamics. The potential impacts of the proposed capital dredging on marine processes in the study area will be quantitatively explored through detailed hydrodynamic modelling commissioned as part of the EIS.

2.4 Marine Flora and Fauna

2.4.1 Intertidal Communities

Much of the northwestern and eastern sides of Hay Point have been modified by concrete shoreline reclamation works during past expansion of the coal terminal (URS 2000). Dalrymple Bay is relatively shallow (6 – 10 m), with the mangrove lined Louisa Creek flowing into the centre of the Bay. Dudgeon Point separates Dalrymple Bay from Sandringham Bay to the north. The Sandy, Alligator and Bakers Creek systems flow into Sandringham Bay and support extensive mangrove communities. Mangrove

communities at Hay Point itself are limited to a 22 ha stand on the southeast side of the point (URS 2000).

Sand and mud flats are present in Dalrymple Bay, however, these are much less extensive than those that are present in Sandringham Bay to the north. The Sandringham Bay flats are listed as nationally important wetlands (URS 2000).

It is not anticipated that dredging will have an impact on the mangrove and intertidal communities of the study area due to the substantial distance of the area to be dredged from these communities.

2.4.2 Seagrass

No seagrass beds were identified in the study area in a regional survey undertaken by Coles *et al* (1993), although a small patch of *Halophila* seagrass was found off the northeast side of Dudgeon Point during a port wide survey by WBM (PCQ, 1995). Scattered patches of seagrasses (*Halophila* and *Halodule*) were located to the west-northwest of Round Top and Flat Top Islands, which are located over 5 kilometres north of the current spoil ground, outside the port limits (URS 2000).

PCQ commissioned the Department of Primary Industries and Fisheries and CRC Reef to undertake a survey of the seabed in the vicinity of the proposed works in July 2004. The preliminary results of this study have identified a very low density of seagrass having an average coverage of only 1 to 2 per cent in areas which have previously not contained seagrass. The results of this study will be further investigated as part of the EIS.

2.4.3 Fisheries

The Mackay region supports important commercial fishery grounds. Prawn trawling, coastal net setting and crab pot fishing occurs on a commercial scale, in and beyond Dalrymple Bay (including the current ocean disposal ground). The net and crab pot fisheries target species such as mud crabs, barramundi, threadfin salmon, grunter and flathead (URS 2000).

Trawling is focussed on the coastal grounds near the mouths of estuaries and creeks to target the mangrove nursery areas for banana prawns, which represent 30 – 40% of the local catch. King prawns are the other major prawn species, comprising 50 – 60% of the local catch, with tiger, endeavour and coral prawns comprising the remaining 10% (URS 2000). Spawning generally occurs in the late spring/summer/early autumn period (URS 2000).

The proposed departure path falls largely within an existing maritime safety zone where boats are not allowed to fish or traverse, so it is not expected that the dredging and ongoing use of the departure path will impact on local fisheries.

Recreational shoreline and boat fishing also occurs in the area with catches including snapper, cod, grunter, mackerel and trevally (URS 2000).

2.4.4 Corals

There are no coral reefs within the Hay Point region, however, low numbers of various soft corals and sediment tolerant hard coral species (e.g. *Goniastrea* sp.) have been observed on intertidal platforms and inshore rocky shoals (URS 2000).

2.4.5 Turtles

Six species of turtle could occur within the study area, including Loggerhead, Flatback, Green, Leatherback, Olive Ridley and Hawksbill. Of these, Green turtles are most frequently observed within the Port area, with Flatbacks the predominant species nesting on local beaches between October and February (URS 2000). A detailed study of turtles in the port area was completed in 2003 by the Queensland Parks and Wildlife Service and will be reviewed in the EIS. At the time of the survey, only five green turtles were found in transects of the area, with none recorded within the port limits (WBM 2004).

2.4.6 Whales and Dugong

A number of cetaceans potentially occur within the Mackay region, however, all are nomadic species that will generally remain offshore. Humpback whales may enter the inner port area on an infrequent basis during their migration along the Queensland coast (URS 2000). The dugong is a protected species and is known to occur in the region, however there have been few sightings, probably due to the lack of seagrass resources within the area. Previous studies for past capital dredging have shown that cetaceans should not be impacted by the dredging works (URS 2000).

2.4.7 Benthic Communities

Benthic communities within the area are typical of unvegetated subtidal habitats in this region (WBM 2004). In deeper waters, benthic communities consist of occasional isolated individuals in an open/bare substrate (URS 2000). Polychaete worms are typically the most abundant infauna species, with crustacea and bivalves typically less abundant (WBM 2004). Benthic species in the areas adjacent to the existing spoil ground include coralline red algae, sponges, hydroids, soft corals, feather stars, bryozoans and ascidians.

Juvenile prawns are likely to feed on benthic infauna in Dalrymple Bay as they migrate from the shallow estuary to the deep water spawning and trawling grounds outside Dalrymple Bay (URS 2000). The dumping of dredge spoil in an offshore disposal ground is likely to result in the temporary smothering of benthic fauna in this area. However, the area affected by spoil disposal is insignificant compared to other habitat available in the area and impacts on migrating prawns and on commercial prawn trawling activities are not likely to be significant. Previous studies conducted at the existing ocean disposal ground at the Port of Hay Point and in other locations, have suggested that recovery of these communities occurs within 2 – 5 years (URS 2000).

2.4.8 Listed Marine Fauna

A search of the Commonwealth EPBC Act database indicates that there are approximately 80 listed marine species that may be present in the study area. These include:

- Numerous species of pipefish.
- Several species of seahorse.
- Dugong.
- Loggerhead, green, leatherback, hawksbill and flatback turtles.
- One skink species, several sea snake species.
- Several whale and dolphin species.
- One shark species.
- Saltwater crocodiles.
- Several bird species.
- Several mammal species.
- One frog species.

There are also a number of listed migratory species that may occur within the study area. Previous studies have identified a number of protected fauna species (humpback whales, dugong, flatback turtles and green turtles) that are likely to visit the waters within the port (URS 2000).

2.4.9 Marine Pest Species

A common mechanism for the introduction of marine pests to ports is through discharge of ballast water. A port wide survey conducted in 1997 did not identify any targeted marine pest species and of the seven possibly introduced species found, none were considered actual or potential pests (URS 2000).

Where marine pests are located in areas to be dredged, there is a risk that these pests will be transferred to the disposal ground via spoil disposal. However, in the absence of marine pest species at the Port of Hay Point, this is not a risk for the current project.

2.4.10 Likely Impacts of the Project

The principal impacts of dredging on marine flora and fauna include:

- Spoil disposal – physical and chemical disturbance associated with the relocation of sediments from the channel to the spoil ground.
- Generation and migration of turbid plumes – indirect impacts associated with the reduction in water quality caused by the mobilisation of sediments into the water column during dredging and spoil disposal.
- Physical impacts – potential injury to marine fauna coming into contact with the dredge arm or to benthic communities removed by dredging.

- Movement of dredge spoil out of the designated spoil ground.

The results of an underwater survey undertaken by the Department of Primary Industries, Queensland Fisheries Service in mid July 2004 will provide more detailed information on the nature of the benthic flora and fauna communities in the areas proposed to be dredged. The results of this survey will be reviewed as part of the EIS.

Benthic flora and fauna communities are most likely to be impacted by ocean disposal of dredge spoil, as they are relatively immobile. In particular, the dumping of dredge spoil is likely to result in the smothering of benthic communities at the spoil ground. A number of factors will influence the overall impact of spoil disposal on benthic macroinvertebrates, such as dredge spoil attributes and their similarity to the receiving habitat, period of burial, depth of spoil and community composition at the receiving habitat (WBM 2003). Previous studies conducted at the existing ocean disposal ground at the Port of Hay Point and in other locations, have suggested that recovery of these communities occurs within 2 – 5 years (URS 2000). Results from macroinvertebrate monitoring of the spoil ground in 2003 showed there was no evidence of a significant long term impact from dredge spoil disposal from the 2001 Stage 6 DBCT Expansion Project (Hydrobiology, 2004a).

The remobilisation of sediments into the water column during dredging temporarily reduces light penetration to flora and fauna in the plume path. These impacts are likely to be transient and similar to natural variations occurring in the region. Disturbance of contaminated sediments may result in the release of chemical contaminants into the water column, increasing their bioavailability and toxicity to marine organisms, however, the material to be dredged is expected to be clean uncontaminated material.

Marine fauna are mobile and can generally avoid impacted areas for the duration of dredging activities. However, injury and death of marine fauna, particularly turtles, resulting from being captured in the dredge hopper is a potential impact associated with this project. Based on previous studies, turtle numbers in the port area are expected to be low (URS 2000). No turtle captures or deaths have been recorded during previous dredging campaigns at the Port (PCQ pers. comm. 2004). PCQ would propose to use devices such as turtle deflectors to minimise the risk of capturing turtles. The benefit of imposing a dredging window to avoid the turtle nesting season will also be considered in the EIS. Previous studies indicated that dredging activities were unlikely to impact Humpback whales (*Megaptera novaeangliae*) during their northern migration (URS 2000).

2.5 Sediment Quality

Previous sediment sampling conducted in the current berth and departure apron areas of the Port of Hay Point has not identified exceedances of the National Ocean Disposal Guidelines for Dredged Material (NODGDM, EA 2002) (Hydrobiology 2004b and various studies reported in URS 2000). Previous sampling detected small amounts of biologically inert coal in sediments adjacent to the berths (<1% by weight) (URS 2000). Therefore, it is expected that the sediments to be dredged will be uncontaminated and will be suitable for both land based disposal and unconfined ocean disposal. The

physical characteristics of the material will also influence its suitability for any land based disposal (including reclamation) that may be considered.

The seafloor in the inner sector of the proposed shipping channel consists of a surface layer of silts and silty fine sands underlain by very stiff clays (URS 2000). Sediments in the berth pockets were fine silts. Sediments at the current spoil ground in 2000 were remnants of previous dredging fine to coarse sands interspersed with clays in cohesive lumps (WBM 2004).

A comprehensive sediment testing program will be implemented as part of the EIS process to characterise the sediment to be dredged in terms of its physical and chemical characteristics. This testing will be conducted according to an approved sampling and analysis plan that will be prepared in accordance with the requirements of the NODGDM.

2.6 Cultural Heritage

The Dalrymple Bay area forms part of the traditional territory of the Yuibera clan group of the Birri Gubba tribe. A large and culturally diverse population exists in the study area, with influences from European, South Sea Islander and Torres Strait Islander people. There are two Native Title claims current near Dalrymple Bay (URS 2000). Limited information on the overall indigenous heritage of the area exists.

2.7 Noise and Vibration

Current major noise sources at the Port of Hay Point include:

- port related activities, such as loading and unloading of ships; and
- construction noise associated with the Port.

Previous investigations have been undertaken to identify potential impacts to marine mammals associated with underwater noise and vibration (URS 2000). Potential impacts on the noise environment resulting from dredging activities are considered to be minimal.

2.8 Meteorological Environment and Climate

The Port of Hay Point experiences a tropical maritime climate, which has a hot and humid wet season during summer and a dry, clear winter. The mean annual rainfall is 1,608 mm, with 80% of this figure falling in the six months from November to April. Mean maximum temperatures range from 21.2 degrees Celsius to 30.0 degrees Celsius, while mean minimum temperatures range from 12.7 to 23.4 degrees Celsius. Predominant synoptic winds are from the southeast and sea breezes during the afternoon are generally from the northeast. Cyclones occur in the region during the wet season and have caused severe damage to coastal and nearby inland areas near Dalrymple Bay in the past.

2.9 Air Quality

Air quality in the region is of good standard. Dust from port operations and exhaust emissions from port traffic are the major pollutant inputs into the local airshed.

Potential impacts on air quality resulting from dredging activities are considered to be transient and minimal.

2.10 Land Use and Land Use Planning

The main land uses in the Hay Point region are:

- Conservation Areas and Environmental Buffers.
- Coastal Communities (Louisa Creek, Half Tide, Salonika).
- Port activities at the Port of Hay Point (coal stockpiles, buildings, related infrastructure).
- Rural residential areas and rural land.
- Commercial services and community facilities.
- Tourist activities related to four wheel driving, fishing and camping.
- Indigenous practices.

Potential impacts on land uses and land use planning resulting from dredging activities are considered to be minimal.

Part of the works will be occurring within the GBRMP and any restrictions imposed by GBRMP zonings or policies will be considered as part of the EIS.

2.11 Socio-Economic Impacts

The Hay Point region is sparsely populated and has an approximate regional population of 10,000 (Sarina Shire population figure) and immediate population of 1,539 (URS 2000). There are several small communities in the immediate Port area, including Louisa Creek, Timberlands, Half Tide and Salonika. The townships in the region are accessed by road. The community is comprised mainly of people seeking a low density or beach lifestyle.

The economy of the Hay Point region is based primarily on Port activity, agriculture, forestry and fisheries, however recreation and tourist activities are becoming increasingly important in the region.

Potential impacts on the socio-economic environment in the Hay Point region from dredging activities are likely to be beneficial. There will only be a small workforce involved in the dredging or monitoring activities. Accommodation and local shops are likely to experience a marginally higher demand. Dredging of a departure path and apron areas at the Port will ensure the increased efficiency of the port facilities for coal shipping and its contribution to the local and regional economy. Businesses in the Mackay region will benefit from any increase coal exports through the port.

Direct employment in port-related activities accounted for an estimated 764 full-time equivalent jobs and a further 1,188 flow-on jobs were generated by the port-related activity. The total of 1,952 full-time equivalent jobs earned an estimated $85 million in household income in year 2001/02. Direct and flow-on value added was estimated at over $200 million for the same period.

3. Potential Impacts Associated with Operation and Maintenance

The maintenance of the declared depth of the ship manoeuvring apron and departure path will result in a requirement to conduct maintenance dredging and/or bed levelling at the Port. The potential for siltation of both these areas and the likely frequency of maintenance dredging required will be assessed as part of the hydrodynamic modelling conducted as part of the EIS. The potential impacts of maintenance dredging will be similar to those detailed for capital dredging in Section 2, however, maintenance dredging will be at a much smaller scale than the capital dredging. It is not anticipated that there will be any other activities involved in the maintenance and operation of the proposed departure path and apron areas.

4. Monitoring and Reporting

A detailed and practical Environmental Management Plan (EMP) will be prepared for the specific purpose of ensuring minimal environmental impact as a result of dredging and spoil disposal activities. Strict monitoring of the contractors' operations will be required in order to ensure compliance with the EMP.

5. Conclusions

The proposed project will allow PCQ to create a departure path and associated apron area to increase the navigable depth for ships using the Port of Hay Point. It is expected that any impacts of this project on the natural, social or built environment will be minimal and transient. Where impacts are likely, these can be minimised through appropriate mitigation measures specified in an EMP for the construction and maintenance phases of the project.

Consultation with the relevant State and Commonwealth Government Agencies will be undertaken to identify the need for and scope of the environmental impact assessment. A Draft ToR for an EIS will be prepared and advertised for public comment. Agency and community comments will then be incorporated into a Final ToR for the EIS.

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
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1	JAK			J Keane		09/08/04