The Coordinator-General

Coordinator-General's report for an environmental impact statement

Fisherman's Landing Port Expansion project

Under Part 4 of the *State Development and Public Works Organisation Act 1971*

May 2010

Toward Q Tomorrow's Queensland

Queensland Government

Fisherman's Landing Port Expansion project

Contents

Synopsis

Introduction

This report provides an evaluation of the environmental impact statement (EIS) process for the Fisherman's Landing Port Expansion project (FLPE project or the project). It has been prepared pursuant to section 35 of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act).

The proponent for the project, Gladstone Ports Corporation (GPC), proposes the $82.5 million northern expansion of the existing Fisherman's Landing facility at the Port of Gladstone through the reclamation of approximately 170 hectares (ha) adjacent to the existing port facility. The reclamation will provide an additional 153 ha (approximately) of land surface for the port. Fisherman's Landing is situated 10 kilometres (km) north of Gladstone city.

The reclamation will provide additional land to support the future construction of six wharves for the development of transport, storage, loading and unloading facilities. The project also addresses the proposed capital dredging to deepen and widen the Targinie Channel and Fisherman's Landing swing basin, which provide shipping access to the current Fisherman's Landing reclamation. The reclamation area will also provide a disposal location for other future port-related dredging activities.

The FLPE project is a component of the Port of Gladstone Western Basin Master Plan which was finalised by the Coordinator-General in March 2010.

The project has undergone referral in accordance with the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act) on two occasions and the Australian Government Minister for the Environment, Heritage and the Arts, on both occasions (30 January 2001 and 15 August 2004) determined that the proposal is a non-controlled action. Therefore, further consideration of the proposal under the EPBC Act is not required.

An initial advice statement (IAS) was lodged with the Coordinator-General in September 2005 and on 14 October 2005 the FLPE project was declared to be a 'significant project for which an environmental impact statement (EIS) is required' pursuant to section 26(1)(a) of the *State Development and Public Works Organisation Act 1971* (SDPWO Act). An extension to the declaration period to 21 July 2010 was approved by the Coordinator-General in accordance with sections 27A(3) and 32(4) of the SDPWO Act on 18 July 2008.

The EIS for the FLPE project was advertised for public comment from 5 October 2009 until 9 November 2009. An EIS supplementary information document (supplementary document) which addressed the submissions made on the EIS was also produced.

In evaluating the environmental effects, I have considered: the EIS; the supplementary document and detailed environmental management plans (EMPs) prepared by the proponent; public submissions received on the EIS; comments on the EIS and the supplementary document; other advice provided by state and local government authorities (advisory agencies); and other relevant information.

I am satisfied that the requirements of the SDPWO Act have been satisfactorily fulfilled and that sufficient information has been provided to enable me to finalise the required evaluation of the potential impacts attributable to the project.

Impacts on the coastal environment

Development of the site involves the reclamation of approximately 170 ha of Gladstone harbour and the removal of 4 million cubic metres (m^3) of dredge material from Targinie Channel and the Fisherman's Landing swing basin. The EIS analysed the impact of the project on this location by considering its impact on matters including tidal flows, water levels, coastal sedimentation, marine water quality, marine flora and fauna and shore birds. **I have found** that the project will have an impact on all these components to a varying degree including direct removal of seagrass, potential smothering of seagrass, increased sedimentation, decreased water quality, scouring and tide adjustments in specific areas. The impacts are addressed in this report and **I have included** conditions in Appendix 1 which will ensure impacts are avoided where possible and/or minimised to the greatest extent possible.

I have determined an appropriate offset to address the unavoidable impacts (permanent and temporary) on marine fish habitat likely to be caused by the project. This offset forms part of a larger strategic offset package that will be designed to address the cumulative impacts of FLPE and other proposed maritime development activities in Gladstone harbour and will be finalised as part of my evaluation of the Western Basin Dredging project.

Social and economic impacts

The full impact of the FLPE project on fishing (commercial, recreational and indigenous) in Gladstone harbour has not been adequately investigated as part of the EIS process and therefore is currently unknown. **I acknowledge** that it would be a very difficult task to establish the full impacts accurately. However, **I expect** there will be some degree of impact and this impact needs to be determined and analysed in more detail and an appropriate compensation package (if considered necessary) prepared to cover the relevant impacts.

I have determined that the most appropriate way to manage the commercial fishing impacts is for the GPC to administer a process to determine impacts on commercial fishing operations and to determine if, and if so, to what extent compensation needs to be paid to impacted parties due to the impacts. A condition is included within this report to ensure this matter is addressed appropriately.

My consideration of impacts of the project on recreational and indigenous fishing in the area will be incorporated into the overall cumulative impact assessment and offset package and will be finalised in my evaluation of the Western Basin Dredging project.

Transport impacts

A general assessment of traffic impacts on the road network was undertaken for the EIS. The EIS indicates that there is potential for impacts on transport infrastructure from the construction of the Fisherman's Landing reclamation, haulage of rock from the GPC-owned quarry to the reclamation area and from workforce traffic.

I recognise that the approval for the haul route lies outside the scope of this report and is subject to a concurrent approvals process. However, in general, **I am satisfied** that the impacts on the council road network of the rock haulage requirements for the project can be managed by minor upgrade and sealing works to be agreed with the GRC.

Environmental management of the site

The EIS has undertaken a range of assessments to evaluate the potential impacts of the project on noise and vibration levels, lighting on nearby sensitive receivers and air quality. The nearest residential areas are located more than 2 km away from the project site. The evaluation concludes that, provided appropriate management procedures included in the EMP are implemented, dredging operations and construction of the reclaimed area would not significantly impact on the amenity of sensitive receivers. The EIS recommended a number of mitigation measures and **I have stated** conditions in Appendix 1 to ensure these are carried forward.

Conclusion

I consider that the EIS process for the FLPE project has addressed the environmental and other impacts of the project and the mitigation and offset measures to be adopted to avoid where possible or minimise the impacts, meets the requirements of the Queensland Government for impact assessment in accordance with the provisions of Part 4 of the SDPWO Act and Part 5 of the State Development and Public Works Organisation Regulation 1999 (SDPWO Regulation).

Pursuant to section 52 of the SDPWO Act, **I recommend** that the approval for the FLPE project, as described in detail in the EIS and supplementary report, and summarised in section 2 of this report, can proceed, subject to the conditions contained in Appendix 1 of this report.

Signed

……

Colin Jensen
Coordinator-General

Date: 25 May 2010

1. Introduction

This report has been prepared pursuant to section 35 of the *State Development and Public Works Organisation Act 1971* (SDPWO Act) and provides an evaluation of the environmental impact statement (EIS) for the Fisherman's Landing Port Expansion project (FLPE project or the project), The project is also known as the Fisherman's Landing Northern Expansion project.

It is not intended to record all the matters that were identified and subsequently settled. Instead, this report concentrates on the substantive issues identified during the EIS process.

The report:

- summarises the key issues associated with the potential impacts of the project on the physical, social and economic environments at the local, regional, state and national levels
- presents an evaluation of the project, based on information contained in the EIS, supplementary document, submissions made on the EIS and information and advice from advisory agencies and other parties
- recommends conditions under which the project may proceed.

2. Project details

2.1 The proponent

The Gladstone Ports Corporation (GPC) manages the Port of Gladstone and is the project proponent. GPC is a government owned corporation (GOC) under the *Government Owned Corporation Act 1993*. The Port of Gladstone is comprised of six major port facilities including: Boyne Smelter Wharf, South Trees wharf, Barney Point terminal, Auckland Point terminal (Port Central), RG Tanna coal terminal and Fisherman's Landing.

2.2 The project

GPC proposes the $82.5 million northern expansion of the existing Fisherman's Landing facility at the Port of Gladstone through the reclamation of approximately 170 hectares (ha) adjacent to the existing port facility. Fisherman's Landing is situated 10 kilometres (km) north of Gladstone city (refer Figure 1).

The reclamation will provide additional land to support the future construction of six wharves for the development of transport, storage, loading and unloading facilities (refer Figure 2). The project also addresses the proposed capital dredging to deepen and widen the Targinie channel and Fisherman's Landing swing basin, which provide shipping access to the current Fisherman's Landing reclamation (refer Figure 3). The reclamation area will also provide a disposal location for other future port-related dredging activities.

FLPE project involves construction of a bund wall, followed by progressive infilling with dredged material, decant of tailwaters during infilling and final capping and stabilisation of the surface.

It is intended that the construction of FLPE will be staged to meet development and dredged material disposal needs. Based on current likely demand for wharves and the requirement to dispose of dredged material, it is anticipated that at least one third of the bund wall will be constructed in a single construction program.

The site of the FLPE is currently below the high water mark within port limits and is unallocated state land under the administration of the Department of Environment and Resource Management (DERM). Because the land is below high water mark and has not been reclaimed or tenure designated, there is no cadastral property description available. The site is also located within the Great Barrier Reef World Heritage Area but outside the Great Barrier Reef Marine Park.

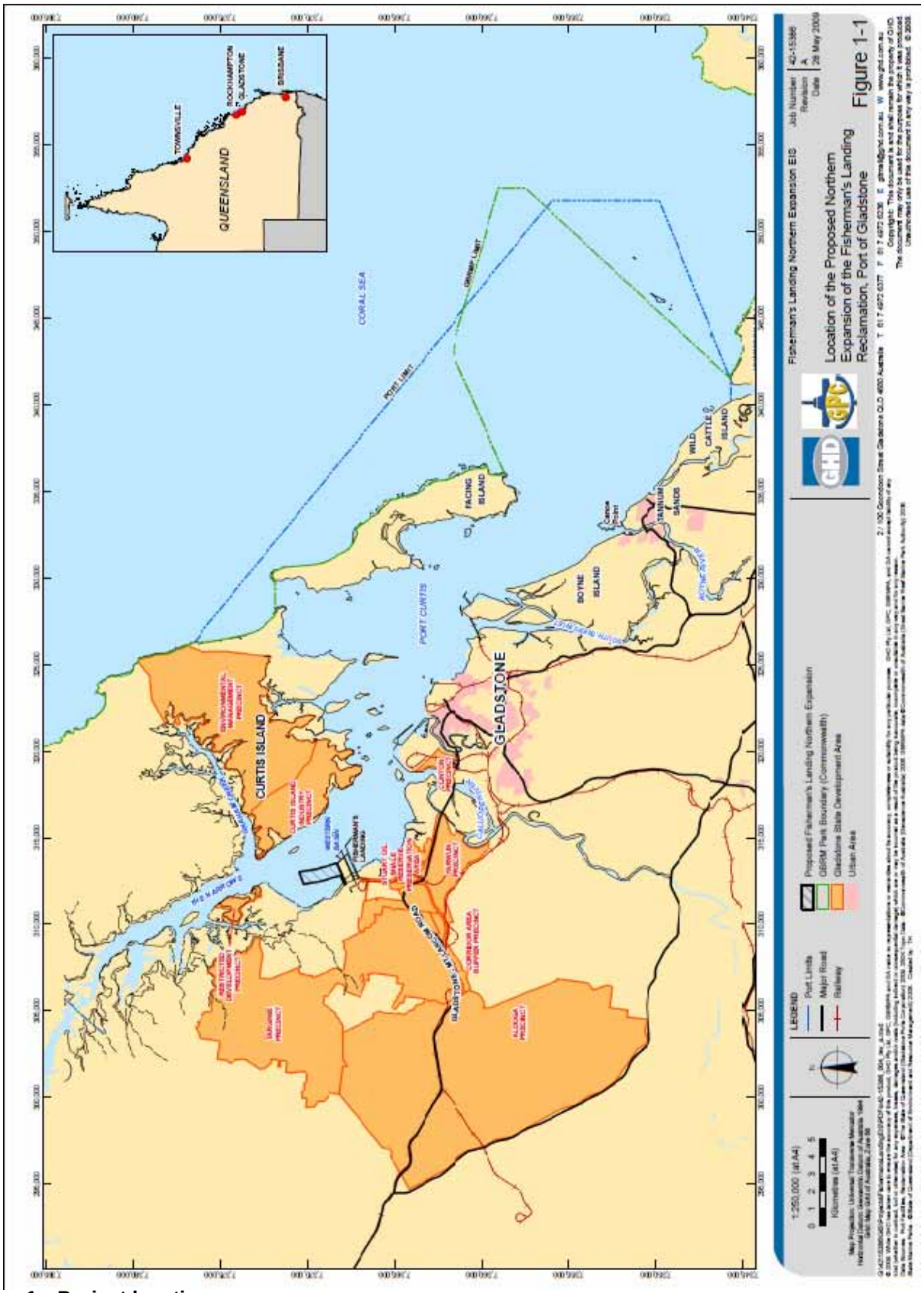

Figure 1—Project location

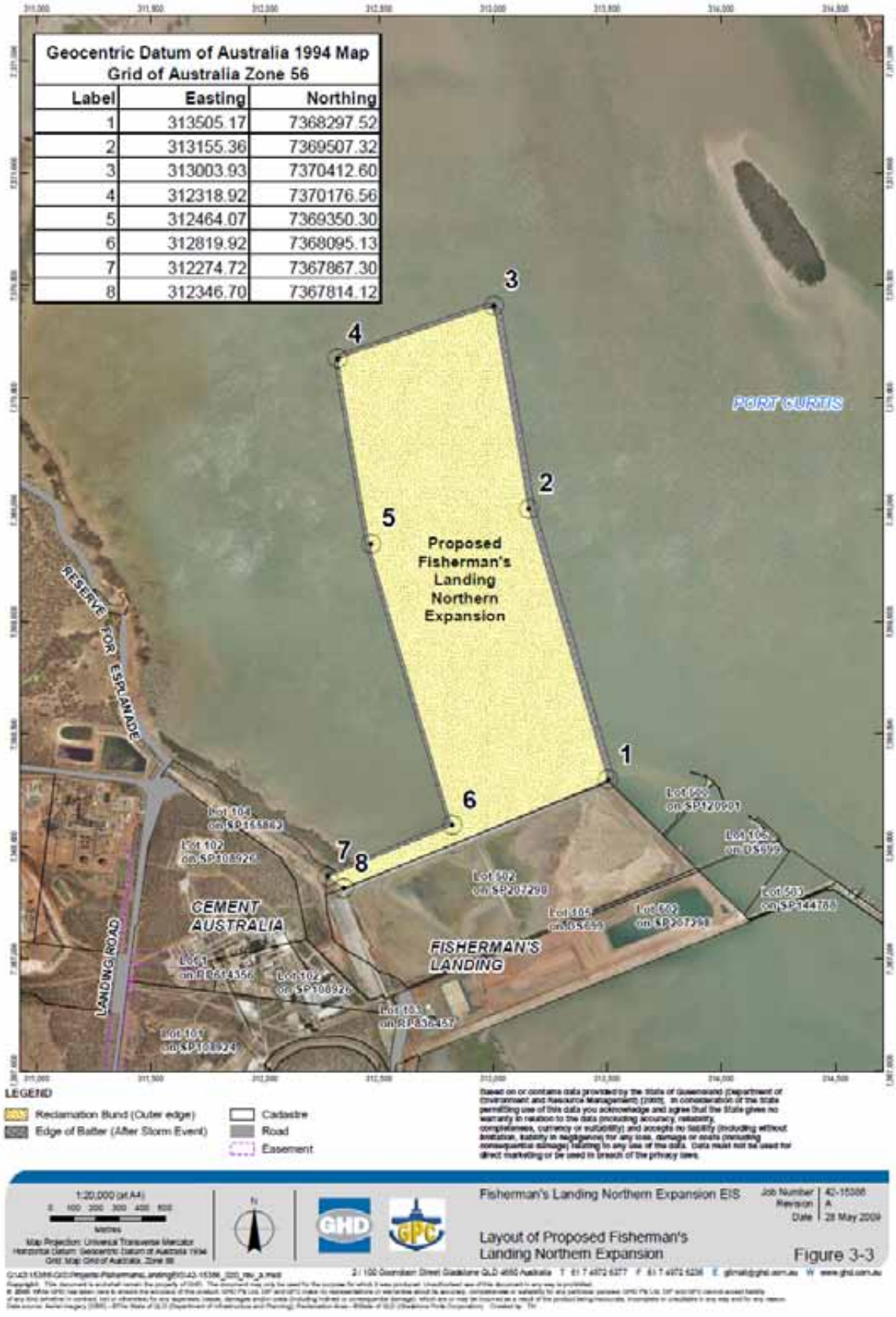

Figure 2—Project layout

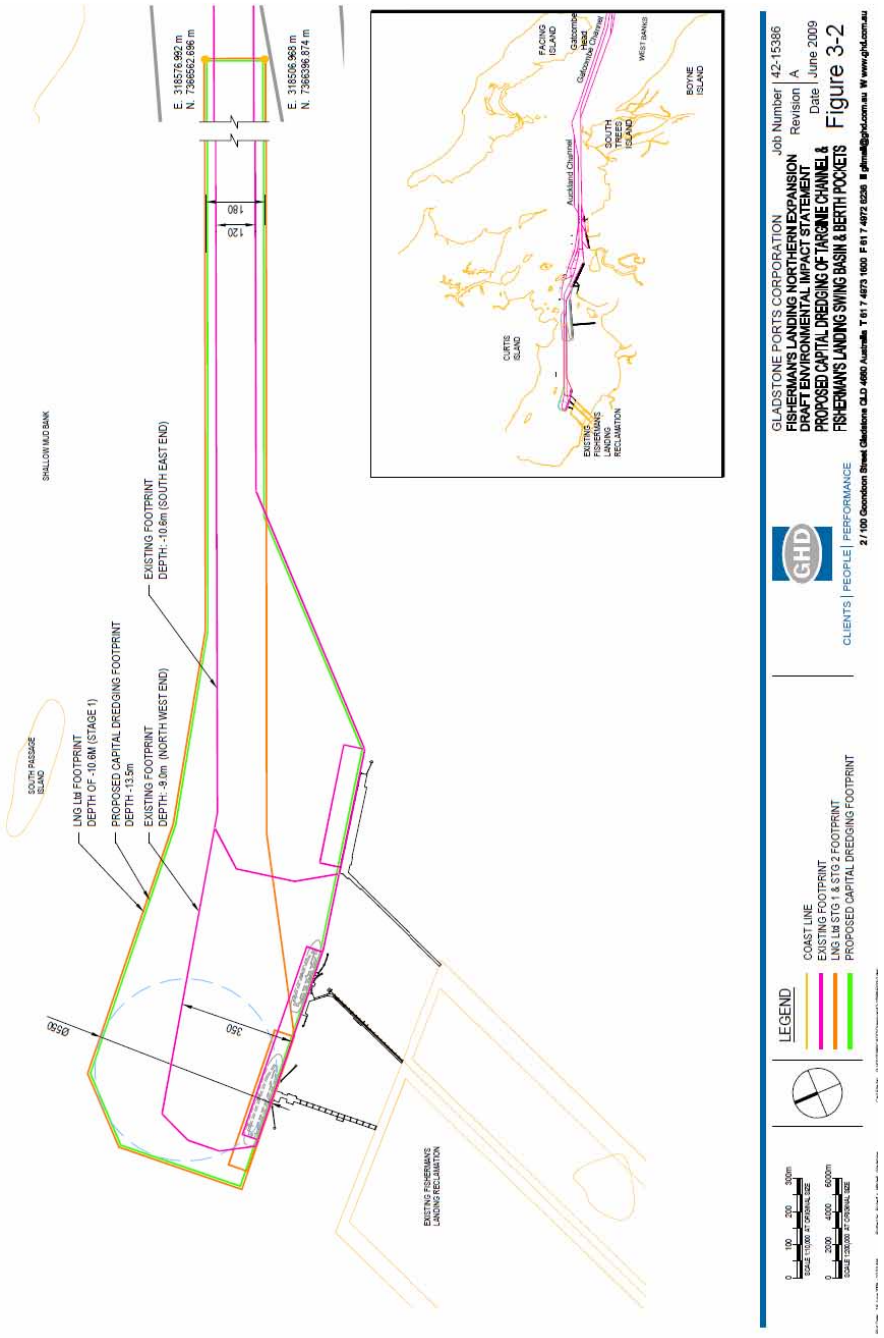

Figure 3—Proposed project capital dredging

2.3 Project context

The FLPE project is a component of the Port of Gladstone Western Basin Master Plan which was finalised by the Coordinator-General in March 2010. The Western Basin Master Plan aims to provide direction at a high level to government decision making on the scale and nature of future industrial development in the western basin of the Port of Gladstone.

The FLPE project EIS is being managed in parallel with the Western Basin Dredging (WBD) project EIS. The WBD project seeks to accommodate the long term dredging and dredged material disposal that is required to provide safe and efficient access to the existing and proposed Port facilities in the harbour over the foreseeable future. The development of the Western Basin incorporates dredging associated with the deepening and widening of existing channels and swing basins and the creation of new channels, swing basins and berth pockets. The material dredged during the WBD project is proposed to be placed into an additional reclamation area to the north of the existing Fisherman's Landing reclamation and immediately landward of the proposed FLPE.

FLPE is proceeding separately as it is required to service GPC's immediate needs including the provision of land that can support additional wharves and allocation to dispose of dredged material. The requirement for the FLPE project to proceed is independent of the WBD project.

2.4 Project rationale

2.4.1 Need for additional wharves

The FLPE project is part of the GPC 50 Year Strategic Plan for the development of the Western Basin (GPC 2008a). The five wharves which service the existing facility, are either in use or committed to proposed industries within the Gladstone State Development Area (GSDA). The proposed expansion will allow for subsequent development of adjacent wharves as required and will meet the import/export and storage needs for a variety of industries likely to establish in the GSDA. There are few, if any, remaining areas of land immediately adjacent to the port that are suitable for providing storage facilities for the import and export of bulk materials. Therefore, the formation of additional reclaimed land is required to provide these facilities to future industries locating in the GSDA.

2.4.2 Need for dredging and dredge disposal area

The FLPE will provide a location for dredge material disposal predominantly for the capital dredging to deepen and widen the Targinie channel and Fisherman's Landing swing basin. However, the reclamation area will also provide a disposal location for other future port-related dredging activities as required.

GPC is responsible for maintaining the declared depths within the existing shipping channels, swing basins and berth pockets of the Port of Gladstone. GPC is also responsible for capital dredging to provide shipping channel access to new port facilities as required by proponents. The current Fisherman's Landing and the RG Tanna Coal Terminal reclaimed areas have reached their capacity for placement of dredged material. The current East Banks sea disposal site, which is located north of the entrance to the shipping channel was also initially thought to have no remaining capacity. However, a recent survey has confirmed that some capacity does exist, though not enough to cater for proposed capital and maintenance dredging. Therefore, GPC requires additional areas for the placement of dredged material from capital works, particularly in the inner harbour.

2.4.3 Economic benefits

Direct employment during the bund construction phase is estimated to be 55 person-years or 35 jobs over the anticipated 18 month construction period. The direct permanent employment resulting from the expanded Fisherman's Landing reclamation will relate to the nature of the product to be handled through the newly created port facilities and as such is not yet quantifiable. Indirect employment will result from

the creation of industrial developments remote to the port. Many of these developments would not be viable without ready access to port infrastructure for import or export of product. As such, local, state and national economies will ultimately benefit from the FLPE project.

The provision of additional land for wharf development by the creation of the proposed northern expansion of the Fisherman's Landing will provide access to the port facilities, which is a key component of the import and export chain and assists in encouraging industries to develop within the Gladstone region. Therefore, the proposed FLPE will serve to enhance and expand the existing port infrastructure to service planned and as yet unknown industries within Gladstone and the GSDA.

3. The environmental impact assessment process

3.1 State impact assessment

Section 35(3) of the SDPWO Act requires the Coordinator-General to prepare a report evaluating the EIS for a significant project for which an EIS is required. Under section 35(1) of the SDPWO Act, after the end of the EIS submission period the Coordinator-General must consider the EIS, all properly made and other submissions accepted by the Coordinator-General about the EIS, and any other material the Coordinator-General considers is relevant to the project.

This Coordinator-General's report may state conditions under sections 39, 45, 47C, 49 or 49B of the SDPWO Act, may make recommendations under section 43 or 52 of the Act and impose conditions under part 4, division 8 of the Act, for the undertaking of the project.

On completion of the Coordinator-General's report, a copy is provided to the proponent and publicly notified on the Department of Infrastructure and Planning (DIP) website. Notification of this report completes the assessment process for this project under the SDPWO Act.

This report is prepared in accordance with section 35 of the SDPWO Act to evaluate the environmental effects of the project and any other related matters.

In preparing this report information contained in the EIS and the supplementary document has been assessed. In addition, all properly made submissions on the EIS as provided to the Coordinator-General; comments on the supplementary document from advisory agencies, stakeholders and members of the public; matters raised in correspondence with the proponent; state agencies and local government; and other material relevant to the project has been considered.

3.2 Commonwealth involvement

The project has undergone referral in accordance with the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act) on two occasions and the Australian Government Minister for the Environment, Heritage and the Arts, on both occasions (30 January 2001 and 15 August 2004) determined that the proposal is a non-controlled action. Therefore, further consideration of the proposal under the EPBC Act is not required.

3.3 Declaration as a significant project

An initial advice statement (IAS) was lodged with the Coordinator-General in September 2005 and on 14 October 2005 the FLPE project was declared to be a 'significant project for which an environmental impact statement (EIS) is required' pursuant to section 26(1)(a) of the SDPWO Act.

Matters considered by the Coordinator-General in making this declaration included information contained in the IAS prepared by the proponent; relevant planning schemes and policy frameworks; infrastructure impacts; employment opportunities; environmental effects; complexity of local and state government requirements; level of investment; and the project's strategic significance.

An extension of the significant project declaration period to 21 July 2010 was approved by the Coordinator-General in accordance with sections 27A(3) and 32(4) of the SDPWO Act on 18 July 2008.

DIP managed the EIS process on behalf of the Coordinator-General. DIP invited relevant state and local government representatives, and other relevant authorities, to participate in the process as advisory agencies.

3.4 Terms of Reference for the EIS

The terms of reference (ToR) developed by the Coordinator-General in consultation with advisory agencies and members of the public assists the proponent to develop a comprehensive EIS for the project that satisfies the requirements of the SDPWO Act.

The project's IAS and draft ToR were advertised for public comment on 16 January 2006. Comments on the draft ToR were accepted until close of business (COB) on 13 February 2006. Following consideration of submissions received a final ToR was issued to the proponent on 24 July 2006.

Comments on the draft ToR were received from the following agencies[1]:

- Department of Aboriginal and Torres Strait islander Policy
- Department of Housing
- Department of Local Government, Planning, Sport and Recreation
- Department of Main Roads
- Department of Natural Resources, Mines and Water
- Department of Primary Industries and Fisheries
- Department of State Development, Trade and Innovation
- Environmental Protection Agency
- Queensland Transport
- Calliope Shire Council[2].

No submissions were received from the public.

At the time the significant project declaration period was extended in 2008, the Coordinator-General considered that additional items were required to be added into the ToR, including greenhouse gas emissions, climate change adaptation and cumulative impacts.

3.5 Public notification and review of the EIS

A draft of the EIS was prepared by the proponent and provided to the Coordinator-General in July 2009. The draft EIS was provided to the following agencies for advice prior to formal public advertising of the document:

- DERM
- Department of Transport and Main Roads (DTMR) (including Maritime Safety)
- Department of Employment, Economic Development and Innovation (DEEDI) (Fisheries Queensland).

It was determined that additional information needed to be included in the EIS prior to its release. The proponent undertook additional work and presented a revised EIS to the Coordinator-General in mid-September 2009. The Coordinator-General approved the release of the EIS on 30 September 2009.

The EIS was publicly advertised on Saturday 3 October 2009 in *The Courier Mail* and *Gladstone Observer*, inviting submissions from the public until COB on Monday 9 November 2009. A CD-ROM version of the EIS and the executive summary were made available free of charge from GPC.

The EIS was displayed at:

- Gladstone City Library
- State Library of Queensland, Brisbane.

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[1] See the note in section 8, table 1 of this report for the current names of state government departments following machinery of government changes which came into effect from 26 March 2009.

[2] Following Queensland local government amalgamations that took effect on 15 March 2008, the then Gladstone City, Calliope Shire and Miriam Vale Shire Councils merged to become the Gladstone Regional Council (GRC).

The EIS was also available on the DIP and proponent's websites.

The following agencies were approached formally to conduct an evaluation of the EIS:

- Department of Communities
- Department of Community Safety
- Department of Education and Training
- Department of Emergency Services
- DEEDI
- DERM
- DTMR
- Queensland Health
- Queensland Police Service
- Gladstone Regional Council (GRC).

Submissions (including properly and not properly made) on the EIS totalled 27 (from 24 submitters) from the following groups:

Submission from:	No. received:
Government agencies	9
Private/interest groups/other (15 submitters)	18
Total	**27**

The key issues raised in submissions on the EIS are summarised in section 1.2.1 of the supplementary document and include:

- potential impacts of dredging on marine flora (seagrass and mangroves) and fauna (including dugongs)
- potential impacts of construction of the reclamation area on marine flora and fauna
- potential impacts on commercial fishing operations
- potential impacts on recreational fishers and boaties.

3.6 Supplementary information

All submissions received by the Coordinator-General on the EIS were provided to the proponent. The Coordinator-General determined that preparation of a supplementary document was necessary to address substantive issues raised in submissions on the EIS.

A copy of the supplementary document was forwarded to the following government agencies on 9 March 2010 requesting their specific comments or advice to the Coordinator-General to be considered for inclusion as conditions or recommendations in this report:

- Department of Communities
- Department of Community Safety
- DEEDI
- DERM
- DTMR
- Queensland Health
- Queensland Police Service
- GRC.

The supplementary document was also provided to members of the public who commented on the EIS.

The supplementary document was made available on the DIP and proponent's websites.

Submissions on the supplementary document totalled 10, received from the following groups:

Submission from:	No. received:
Government agencies	8
Private/interest groups/other	2
Total	**10**

The most prominent issues raised in submissions included:

- potential impacts of dredging on marine flora (seagrass and mangroves) and fauna (including dugongs)
- potential impacts on commercial fishing operations and recreational fishing.

The following government agencies advised that they were satisfied that all issues of interest to the agencies had been addressed:

- Queensland Health
- Department of Communities
- Department of Community Safety
- Queensland Police Service.

The following government agencies either provided advice or recommended conditions:

- DTMR
- GRC
- DEEDI
- DERM.

Substantive issues raised in submissions are discussed individually in section 5.

3.7 Public consultation on the project

The proponent conducted a public information and consultation program throughout the EIS process, as documented in Appendix D of the EIS. A stakeholder consultation team was formed to support GPC in undertaking all consultation activities and to implement the stakeholder consultation plan to facilitate the EIS process and meet the requirements for consultation as specified in the ToR for the EIS. The stakeholder consultation activities were also implemented to align with the requirements for the social impact assessment component of the EIS. GPC's consultants, GHD, facilitated the consultation program for GPC.

The EIS indicates that consultation for the FLPE project included activities such as:

- face-to-face meetings with 'affected' and 'interested' parties including government agencies, environmental organisations, local industry and business groups, recreational groups, local indigenous groups
- information and feedback tools including the project website, email address and freecall 1800 phone number.

The proponent has indicated that these activities will continue beyond the EIS process into the construction and operation phases of the development.

Feedback from the consultation process highlighted key issues/concerns regarding the FLPE project related to the following broad sub-groups:

- commercial fishing
- recreational fishing
- environment
- industrial activity
- indigenous issues
- project assessment programs.

These issues and concerns helped to inform the social impact assessment program and were incorporated into technical studies as part of the EIS process.

4. Approvals, permits and licenses

4.1 State approvals

4.1.1 Overview of approvals regime

The SDPWO Act establishes the framework for environmental assessment of declared significant projects in Queensland and is the controlling legislation for the project at the state level.

The planning and approvals framework applicable to the development of the project is the *Sustainable Planning Act 2009* (SPA). The SPA requires certain development to be assessed for their environmental effects and to be approved. Schedule 3 of the *Sustainable Planning Regulation 2009* (SPR) and the relevant local planning instrument determine the types of development requiring approval.

4.1.2 Strategic Port Land

The area of the proposed reclamation is included within the GPC's Strategic Plan 1997-2047 as 'future port development'. Under Schedule 3 of the SPR, development on strategic port land (SPL) that is consistent with a Strategic Port Land Use Plan approved under the *Transport Infrastructure Act 1994* is exempt from assessment against a local government planning scheme.

Development approvals on port lands are subject to the Integrated Development Assessment System (IDAS) defined by the SPA. All development assessable under IDAS that are wholly on SPL or within the strategic port land tidal areas will be assessed by the GPC as the assessment manager. GPC assesses development applications against the approved land use plan, strategic plan and relevant state planning policies.

GPC is currently preparing a new Land Use Plan which will include a set of development codes and guidelines. This document will be released for public comment in late 2010. Once the land for the FLPE project has been reclaimed and prior to development occurring on the reclaimed land, GPC will seek an amendment to the Land Use Plan (in accordance with section 285 of the *Transport Infrastructure Act 1994*) to include the reclaimed area in the plan.

The key approvals necessary for development of the project required under the SPA include:

- a development permit for operational works for tidal works and work within a coastal management district (reclamation) - assessment manager - GPC
- a development approval and registration certificate for dredging operations that is an environmentally relevant activity (ERA 16 - extractive and screening activities (dredging) - assessment manager - DERM.

An application for a development permit for operational works will also require referral for assessment against the *Fisheries Act 1994* (work that is for the removal, destruction or damage of marine plants and waterway barrier works) and the *Transport Operations (Marine Safety) Act 1994*.

All businesses that subsequently take up residency in the expanded port area must obtain all relevant development approvals, as applicable, and must have an EMP that is integrated with GPC's EMP.

4.1.3 Environmentally relevant activities

On 1 January 2009, the *Environmental Protection Regulation 2008* came into effect. The regulation included a revised set of environmentally relevant activities (ERAs) that could be associated with the construction and operation of infrastructure.

The *Environmental Protection Act 1994* (EP Act) requires that any person carrying out an ERA must hold, or be acting under a registration certificate for the activity. It is an offence to carry out an ERA unless the person is a registered operator for the activity, or is acting under a registration certificate for the activity. All operators within SPL are also required to have a development permit approval for the activity, unless a code of environmental compliance applies to the activity.

DERM will be the assessment manager for development approvals for undertaking ERAs pursuant to the EP Act. Development approval required for ERAs is obtained through the Integrated Development Assessment System (IDAS) as defined by chapter 3 of the SPA.

The dredging operations required for construction of the project and maintenance of navigation channels is classified as ERA 16 'extractive and screening activities' consisting of dredging a total of 4 million m^3 or more of material from Targinie channel and Fisherman's Landing swing basin. DERM has provided conditions for ERA 16 which are included at Appendix 1 Schedule B of this report.

4.1.4 Quarry material allocation

The use of dredged material for the reclamation works requires the removal of bed material from tidal waters and therefore requires an allocation of quarry material in accordance with part 5 of the *Coastal Protection and Management Act 1995*. Section 75 of this Act sets out the assessment criteria for deciding an application. These criteria include:

- relevant policies of the state and regional coastal management plans
- impacts on the physical integrity of river bed and banks
- impacts on water quality and ecological values
- impacts associated with placement of the dredged material
- economic and social implications
- views of the local government and the regional harbour master.

An application for a quarry material allocation would be made by the proponent prior to obtaining development permits for operational works.

4.1.5 Summary of state approvals

Part 4, division 3 of the SDPWO Act applies to my evaluation of the project. This EIS evaluation report may state conditions under section 39 of the SDPWO Act and impose conditions under part 4, division 8 of the SDPWO Act for the undertaking of the project.

Appendix 1 Schedule A contains the Coordinator-General's stated conditions that apply to development permits issued under the SPA for the project and states the entity that is to have jurisdiction for the condition after the development approval has taken effect. The conditions are taken to be concurrence agency conditions under the SPA. The conditions stated do not limit the assessment manager's power to assess the development application and impose conditions not inconsistent with the conditions in Appendix 1 Schedule A.

Appendix 1 Schedule B contains the conditions that apply to a development approval for an ERA (ERA 16) for the project pursuant to the EP Act.

Appendix 1 Schedule C contains the Coordinator-General's imposed conditions that apply to the project. The conditions are taken to be approval conditions under the SPA and nominates the entity that is to have jurisdiction for the condition.

5. Evaluation of environmental effects

5.1 Introduction

As described in section 35 of the SDPWO Act, this report provides an evaluation of the environmental effects of the project and places conditions and recommendations on the project for the satisfactory management and mitigation of these impacts.

The SDPWO Act defines 'environment' to include:

(a) ecosystems and their constituent parts, including people and communities
(b) all natural and physical resources
(c) the qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community and
(d) the social, economic, aesthetic and cultural conditions that affect, or are affected by, things mentioned in paragraphs (a) to (c).

'Environmental effects' means 'the effects of development on the environment, whether beneficial or detrimental'. These effects can be direct or indirect, of short, medium or long-term duration and cause local or regional impacts.

This section outlines the major environmental effects identified during the EIS process, including those raised in the EIS, the supplementary document, in submissions on the EIS and in consultation with advisory agencies and other key stakeholders.

Where appropriate, **I have provided** comments on these matters and, where necessary, **I have recommended or stated** development approval conditions to mitigate adverse impacts of the project that have been identified in the EIS.

A summary of the substantive issues raised during the EIS process follows in the next sections of this report.

5.2 Coastal environment

5.2.1 Reclamation area

5.2.1.1 Construction of reclamation area

The EIS indicates that approximately 1.4 million m^3 of bluestone rock materials for construction of the bund walls will be sourced from the GPC-owned quarry on Guerassimoff Road, approximately 4 km from Fisherman's Landing. The bluestone will be extracted and screened at the quarry site to provide the correct sizing for bund wall construction. DERM, in its submission on the EIS, has recommended that only clean rock with fine particles (<12 millimetres (mm)) removed should be used for the proposed bund.

Three haulage options (including two involving construction over 8 hours per day Monday to Friday and one covering 24 hours a day, 7 days a week (24/7)) have been considered in the EIS and supplementary document. These are addressed in more detail in section 5.4 (Transport infrastructure) of this report. Potential impacts of these options are discussed in various sections of this report.

The EIS states that the bund will be constructed with a core of smaller rock and the outer face of the bund wall will be protected from the action of waves by armour rock. However, it is recognised that alternate configurations (based on the distribution of rock size) may be proposed by contractors. DERM has recommended that a geofabric liner be applied to the internal side of the wall to prevent the release of the fine sediments from the reclamation area other than through the designated discharge point(s). Settlement ponds and weir boxes are proposed to manage the quality of tailwaters and stormwater prior to discharge into the harbour.

The height of the bund walls will be retention level (RL) 7m port datum[3], with a crest width of 10m to allow for construction machinery and vehicles to operate along the bund wall once completed.

Once a section of the bund wall is complete and enclosed, dredged material will be pumped into the reclamation. The bund will be filled over time using capital and maintenance dredge material. The EIS indicates that the reclamation area will require in the order of 10 million m^3 of fill when fully constructed. Approximately 4 million m^3 of the total capacity of the reclamation area would be sourced from the dredging required as part of the FLPE project. The remaining fill (i.e. approximately 6 million m^3) will be sourced from dredging requirements of other projects and future port-related dredging activities.

Following completion of filling operations, GPC will undertake capping and appropriate surface treatment of the area. The area will be designed to provide a surface fill and treatment that will minimise or capture any material eroded by stormwater and/or allow the establishment of vegetation over the area. Installation of stormwater management measures will also be undertaken progressively to ensure an appropriate quality of stormwater discharge.

The EIS indicates that sea level rise has been taken into consideration in determining the design wave heights for design of the rock armour for the bund. The rock armour has also been designed for extreme wave conditions with an average return interval (ARI) of 50 years as recommended by DERM's operational policy for building and engineering standards for tidal works.

DERM, in its submission on the EIS, has indicated its acceptance of the proposed design, construction materials and construction methodology provided in the EIS.

I note GPC has committed to assess dredged material to be placed in the reclamation area and undertake effective management of any contaminants.

5.2.1.2 Potential impacts—summary

The EIS notes that the potential impacts which may result from the construction of the bund wall include:

- as rock is placed onto the seabed soft sediments will be remobilised in the water column. Soft sediments will also be pushed out the front and sides of the bund wall which is likely to result in the generation of a visible turbid plume
- the turbid plume will reduce light penetration over the adjacent seagrass beds (however, these seagrasses experience elevate turbidity on a regular basis due to natural tidal resuspension of the soft seabed sediments)
- it is likely that any disturbed sediments that deposit over the seagrass beds will be remobilised and transported away from the tidal flats again during tidal movements and elevated wave conditions
- increased tidal currents at the northern end of the bund wall on both ebbing and flooding tides. This is anticipated to initially increase turbidity through increased scour of the soft seabed sediments at this location
- changes to hydrodynamics which may result in changes to the flushing efficiency of the area, thereby impacting on water quality
- restricted access for recreational and commercial fishing in the area
- complete loss of marine vegetation within the footprint of the reclamation
- corresponding loss of benthic habitat.

These potential impacts are discussed in more detail throughout this report.

[3] The height of the tide (expressed as metres and decimals) is referred to the port datum (lowest astronomical tide datum).

5.2.2 Dredging

5.2.2.1 Dredging requirements

GPC has an existing approval under section 86 of the *Harbours Act 1955* for dredging in the Targinie channel and Fisherman's Landing swing basin. A dredge management plan (DMP) has been prepared for this dredging.

The FLPE project proposes the deepening of the Targinie channel and Fisherman's Landing swing basin and berth pockets from -10.6m lowest astronomical tide (LAT) to -13.5m LAT, requiring a volume of 4 million m^3 to be removed.

Capital dredging required for the FLPE project (refer Figure 3 in section 2 above) includes the following:

Targinie channel	Width: 180m Depth: -13.5m LAT Length: from existing Fisherman's Landing to -13.5m deep water within Wiggins Island coal terminal approved area
Swing basin	*Bulk liquids wharf* Width: 550m Depth: -13.5m LAT *Others* Width: varies Depth: -13.5m LAT
Berth pockets	*Bulk liquids wharf* Width: 60m Depth: -13.5m LAT Length: 430m

5.2.2.2 Dredging process

A detailed strategy and dredging contract is yet to be prepared for the proposed capital dredging required for the FLPE project. Triggers for the various dredging stages include LNG Limited's Stage 2 development and a need for other berth users (including Rio Tinto's Yarwun Alumina Refinery) to deepen berth pockets and/or swing basins.

In a submission on the EIS, DERM indicates that in the EIS GPC has provided limited detail on the type of dredges to be used, the dredging rate, or the mode of operation (overflow or non-overflow) for the dredging activity. Section 9 of the SEIS indicates that dredging is likely to be by way of cutter suction dredge (CSD), with trailer suction hopper dredge (TSHD) as an option if needed. The EIS states that further detailed information on the dredging program will be provided with the relevant operational works applications and a detailed DMP prepared for the works.

As part of work undertaken for the WBD project, the proponent provided modelling of a number of different scenarios using different types of dredges and different combination of dredges. The supplementary document notes that the scenario predicted to have the largest impact on water quality in the region, is that which has a cutter suction and trailer suction dredge operating simultaneously. For this situation, although not directly applicable to the proposed FLPE works, it is estimated that up to approximately 3,038 ha of benthic habitat outside the project footprint has the potential to be impacted.

This is based on a turbid plume of five milligrams per litre (mg/L) or more extending over this area 10 percent of the time. Detailed dredging impacts are discussed below.

The supplementary document states that the DMP for the FLPE dredging cannot be finalised until the availability of dredges has been determined through the tendering process. However, a combination of cutter suction dredges, trailing suction hopper dredge and backhoe dredges is likely. The DMP will address:

- type and duration of dredges
- trigger values (especially those at the site of any decanting, and at sensitive areas likely to be impacted)
- disposal methods associated with each dredge type
- actions should any trigger values be exceeded.

In its submission on the supplementary document, DEEDI reinforced the importance of the preparation of the DMP for this project. DEEDI indicate that the following should also be included in the DMP:

- details of the frequency and location of monitoring
- a set of appropriate minimum light requirements for the seagrass communities likely to be impacted
- modelling and monitoring of dredge plumes and the resulting light levels reaching seagrass communities
- sub-lethal indicators of seagrass health that will allow detection of stress in seagrass communities and will trigger the implementation of mitigation strategies
- detailed mitigation measures that will provide appropriate respite for seagrass communities, preventing mortality.

While I acknowledge that some of this information is not currently available, detail required for the DMP will made available to me prior to finalisation of my evaluation of the WBD project.

No dredge spoil rehandling is proposed for dredging specifically nominated in the FLPE project.

GPC has committed to ensure dredging activities will be managed in accordance with the requirements of the *Queensland Acid Sulfate Soil Investigation Team Guidelines* in the *Queensland Acid Sulfate Soils Technical Manual Soil Management Guidelines* and the *National Assessment Guidelines for Dredging*.

The supplementary document also indicates that a habitat monitoring program will be tied into the dredging program for the project and refined during the planning of the dredging activities as part of the DMP.

5.2.2.3 Potential impacts—summary

Potential impacts of the dredging and decanting activities for the project are elevated turbidity and sediment deposition or burial which can affect the health and productivity of sensitive habitats adjacent to the FLPE project.

The EIS indicates that:

- variable turbidity regimes in the project area suggest that existing seagrass species distributions are adapted to temporal changes in turbidity
- the presence of ‘healthy’ seagrasses in the vicinity of the Port of Gladstone indicates that the seagrass meadows can co-exist with the port activities and development
- significant impacts may occur affecting the taxonomic composition and/or biomass of meadows when the severity or duration of any particular impact exceeds levels of natural variation.

Seagrass has a light requirement of between 15 and 25 percent (depending on species) of surface irradiance to maintain key physiological processes. The reduction in light due to turbidity plumes from dredging appears to be a key factor in seagrass mortality in Australia.

The EIS states that the mangrove communities in the vicinity of the FLPE project are adapted to the turbid near shore environments. The expected turbid plume from the Targinie channel and Fisherman’s Landing swing basin dredging and decanting from the reclamation is not expected to substantially increase turbidity along the shoreline where there are mangroves within the project area.

Potential impacts of dredging on water quality are discussed in more detail below.

5.2.3 Dredge disposal—alternative locations

The need for the extra land-backed wharf facilities is noted in section 2.4 of this report, and highlights the need for the Fisherman's Landing reclamation. Whilst fill for the reclamation could be provided from terrestrial sources, this would then require that dredged material from the harbour be placed elsewhere, thereby imposing an additional potential impact on the environment.

Recognising the above, section 2.3.2 of the EIS provided an assessment of alternative dredged material disposal locations. In summary these alternatives are:

- reuse of material—commercial re-use of the dredged material is not considered practical because the material to be dredged generally contains a mix of material types making it difficult to separate. The material is not suitable for beach nourishment as it ranges from large cobbles and gravels to silts and stiff clays
- unconfined disposal in subtidal locations within the port—has the advantage of keeping the material within the marine environment, however is not considered viable because deposited material is likely to be transported into shipping channels, swing basins and berth pockets. This would result in the need for more frequent capital dredging which has the potential to create greater negative environmental impacts in the area
- offshore disposal ground—the east banks sea disposal area is currently used for maintenance dredging material from the inner and outer harbour area, and would not be able to accommodate the total volume of material proposed for capital and maintenance dredging
- alternative reclamation areas within the port—nearshore environments throughout the port generally have the same environmental values, supporting seagrass and fringing mangrove communities and intertidal habitats, with some also supporting soft corals
- inshore disposal area (terrestrial disposal)—Hamilton/Boatshed Point and Laird Point disposal sites were considered as part of the EIS. These two sites could accommodate up to 20 million m^3 of dredged material if the retaining walls were developed to a height of ~15m. However with a number of liquid natural gas (LNG) proponents planning to use the sites for development in the Curtis Island industry precinct, GPC prefers to avoid the placement of dredged material onshore that may prevent these potential sites from being used by the LNG industry. Other onshore sites investigated south of Fisherman's Landing are impacted by the existence of the Stuart Oil Shale deposit and the potential for alienation of the resource by the placement of spoil.

Taking into consideration all options discussed in the EIS, **I consider** the FLPE reclamation area, as shown in Figure 2 of this report, to be the most suitable option available for disposal of capital dredge material for this and other projects and future maintenance dredging activities of the GPC.

5.2.4 Coastal processes

5.2.4.1 Context

The physical processes of the marine environment adjacent to the project area are predominantly characterised by tidal flows with effects from locally generated waves and storm events, which can cause extreme waves and elevated water levels (storm surge).

The processes that transport sediment around the area are dominated by tidal currents driven by the relatively large tide range, coupled with a mild wave climate that stirs up sediments in the shallower areas at times of low tide. Important but infrequent drivers are extreme events such as cyclones, which can generate high waves and water levels that can have major effects on the environment and affect areas that would not normally be affected under prevailing conditions.

5.2.4.2 Coastal morphology

The existing reclamation at Fisherman's Landing was constructed in the early 1980s and consists of a perimeter bund armoured on the outside with a widely graded rock. The perimeter bund has formed a stable revetment for the existing reclamation. The closest channel to Fisherman's Landing is the Targinie channel which provides shipping access to the four berths that use the existing reclamation for

their connecting infrastructure (conveyors, pipelines, services and access). Currently, the Targinie channel is 120m wide and is maintained to a depth of -10.6m LAT through maintenance dredging.

Port Curtis has a relatively high tidal range and tidal compartment producing tidal currents up to 1.5 metres per second (m/s) in the main channels and up to 0.3 m/s in some of the shallower areas. These velocities are capable of moving large amounts of sediment depending on the water depth and wave action. In deep areas, tidal currents are the dominant force for sediment movement and in shallower areas, where tidal currents are smaller, it is the combination of wave action and tidal currents that is important.

5.2.4.3 Wave climate

The EIS includes an analysis of the wave climate. The wave climate was calculated at three points around the proposed project site for both the existing and developed scenarios (reclamation and dredging). Results indicate the following trends (post-construction):

- east of the reclamation there is a small increase (5 percent) in the amount of wave height for waves travelling up the channel with the reclamation blocking occasional waves from the western sectors
- on the western side of the reclamation bund blocks all waves from the southern and eastern sectors
- on the northern end of the reclamation area there is a significant reduction in wave height from the southerly sector
- at the northern and western locations there is a significant decrease in the occurrence of waves >0.3m of 12.3 percent and 13.9 percent respectively.

5.2.4.4 Tidal currents

The EIS states that modelling undertaken for the EIS shows that the most noticeable effect of the reclamation and dredging on the tidal flow occur to the north of the proposed FLPE, where increases in tidal velocities are evident on both the ebb and flood flows. In an area where the base case velocities are a maximum of around 0.3 m/s, increases to 0.6 m/s and 0.8 m/s have been calculated for the ebb and flood tide flows respectively. These maximum velocities occur adjacent to the northern extent of the reclamation. Increased velocities occur over the area of the embayment to the north of the proposed FLPE, gradually tapering off to base-case conditions with distance from the reclamation.

There is expected to be an increase of up to 0.3 m/s in the velocities in the main channel north of the existing reclamation for both ebb and flood flows. This can be attributed to the narrowing of the waterway due to the reclamation. Another noticeable effect is the reduction of around 0.3 m/s in the flows (depth averaged) in the vicinity of the existing Fisherman's Landing berths under both ebb and flood flow conditions. Comparing the with/without dredging cases, it is evident that this reduction is directly attributable to the increased water depths from dredging of the channel.

Some minor impacts are also expected along the main channel south-east of Fisherman's Landing and in between the small unnamed island opposite RG Tanna coal terminal. These differences are all less than 0.2 m/s and are not considered to be significant compared to the maximum tidal velocities, which reach 1.5 m/s in this area under existing conditions.

To the east of the proposed FLPE, the effects on the tidal flows are relatively small and can be attributed to the increased water depths as a result of dredging. However, the increased velocities at the northern end of the reclamation are much more significant as the tidal flows into the embayment to the west and the mangrove areas to the north-west are squeezed through a much smaller opening than currently exists.

5.2.4.5 Water levels

The EIS indicates that the modelling undertaken for the project reveals that there is no significant difference in the predicted water levels between the "reclamation only" and the "reclamation with dredging" cases.

The EIS reports no significant difference in water levels for any of the developed cases in comparison to the base case for any of the locations in the main harbour, i.e. Auckland Point, Fisherman's Landing berth, and the entrance to the Narrows.

Only minor changes to tide levels are expected. Some of the expected minor changes include:

- close to the western side of the reclamation area at the north-east tidal flat, the level of low tide has been increased by around 0.4m and the time of low is about one hour later.
- increases to low tide levels greater than 0.02m are generally restricted to the shallower inter-tidal and sub-tidal flat areas in the immediate vicinity north and west of the project site.

5.2.4.6 Coastal sedimentation

The EIS contains details of the impacts of the proposed development on siltation and sediment transport in Gladstone harbour.

Modelling predicts an increase in the net sediment transport in the ebb tide direction in the main channel adjacent to the reclamation and reduction in the swing basin area off Fisherman's Landing. Increases in the net sand transport potential are also predicted near the north-western and north-eastern corners of the reclamation area. The calculations indicate the potential for scour in these areas, particularly as the sediments in these areas are relatively fine. The scoured material is likely to be deposited in the swing basin that services the existing Fisherman's Landing berths. Therefore, there is potential for an increase in the maintenance dredging required in the swing basin after the reclamation has been constructed, although it is difficult to quantify the increase as it depends on the availability of material for transport.

Material scoured from the north-west corner is likely to be carried into and deposited in the area between the reclamation and the mainland. At the north-east corner the net transport is towards the main channel and hence material scoured from this area is likely to be deposited in the channel.

5.2.4.7 Summary of impacts on benthic soft sediment seabed communities

Table 11-11 in the EIS provides a summary of potential indirect impacts on benthic soft sediment seabed communities due to predicted changes in physical processes. The impacts are:

- area potentially impacted by increased deposition (predicted from decreased bed shear stress)—329.02 ha
- potential area of increased scouring (predicted from increased bed shear stress)—115.33 ha
- area where water level is predicted to change at low tide—246.23 ha
- total area of potential indirect impact (excluding areas that overlap)—461.52 ha.

A potential decrease in water quality (discussed above) and predicted changes in the hydrodynamic regime (tidal velocities, bed shear stress and water levels) around the project site are expected to indirectly impact on seagrass communities. The predicted changes have the potential to:

- partially or completely smother the existing benthic assemblages, seagrass beds and/or seed banks with sediment in some areas on the western side of the reclamation. It is noted however that this area is already turbid and has low tidal velocities, therefore some sediment deposition is already experienced in this area and seagrasses currently persist in this environment
- alter the area of suitable seagrass habitat at the northern end of the reclamation, where it is predicted that scouring of fine sediments will occur
- result in reduction of water quality due to predicted decrease in flushing, which may impact on the health of marine communities
- increase the amount of subtidal seagrass habitat compared to intertidal habitat as a result of increased water depth at low tides. This is not expected to affect the presence of seagrass rather the ratio of subtidal to intertidal meadow.

These predicted changes are discussed in more detail later in this report.

5.2.4.8 Conclusion

Hydrodynamic modelling and sediment transport assessments for the EIS indicate that the significant coastal process impacts of the reclamation and dredging are restricted to that part of the harbour between the existing Fisherman's Landing and the entrance to The Narrows. The only exception to this

is some minor increases in the net sand transport potential in the main channel extending down harbour to Auckland Point. It is not expected that these latter increases will have any significant effects.

5.2.5 Marine water quality

5.2.5.1 Context

5.2.5.1.1 Water quality baseline assessment

A detailed review of previous water quality studies around Fisherman's Landing between 1995 and 2009 is provided in Appendix J of the EIS.

The available water quality data were compared with water quality objectives in the *Queensland Water Quality Guidelines* (2006) (QWQG) and the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (2000) (ANZECC).

A summary of water quality surveys included in Table 8-4 of the EIS indicates that, in the Fisherman's Landing area, pH generally complies with guidelines ranging from pH 7.0 to pH 8.5, whilst total suspended solids and nutrient levels are variable and frequently exceed QWQG and ANZECC guidelines. Some studies have shown that metals in the area have exceeded guidelines and the protection of aquatic ecosystems, in particular cadmium, nickel, cobalt, chromium, copper, silver and zinc. Total suspended solids around the site averaged 29 mg/L and nutrients (total nitrogen (TN) and total phosphates (TP)) exceeded guidelines at most sites sampled.

The EIS indicates that tidal movements, water depth and runoff as well as wind direction and speed can all influence turbidity in Port Curtis because of the shallow depths and soft sediments of the region. Section 8.1.2 of the EIS states that the results of continuous logging of turbidity at a site within the Fisherman's Landing seagrass bed recorded a mean of 99 nephelometric turbidity unit (NTU) and 80th percentile value of 175 NTU.

Results from turbidity monitoring in 2008 at two sites near the Fisherman's Landing (tidal flats and adjacent deeper waters) indicate that turbidity was always higher on the tidal flats than in adjacent waters and the tidal flats exhibited a higher frequency of peaks and higher levels. The data suggests elevated turbidity levels on the tidal flats result from fine sediment re-suspension that is induced by tidal currents. In general, turbidity regularly exceeded the QWQG guideline of 6 NTU and ANZECC guideline of 20 NTU. Turbidity over the tidal flats more frequently exceeded these guidelines and for longer durations than adjacent deeper water. The data also indicates that both the tidal flats and adjacent deeper water regularly experience elevated turbidity and that the local marine flora and fauna are adapted to these conditions.

A more detailed assessment of water quality monitoring results has been undertaken for the WBD project EIS and has been included as Appendix D to the supplementary document. The proponent has committed to continue the monitoring of baseline conditions as well as implementing a construction and operation monitoring program as part of the EMP.

5.2.5.1.2 Sediment quality baseline assessment

The EIS includes details of the sediment sampling undertaken at the proposed sites for capital dredging for the FLPE project, i.e. areas along Targinie channel and adjacent to the existing Fisherman's Landing wharves (swing basin). Results include:

- concentrations of polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs) and pesticides were below the laboratory limits of reporting and the Interim Sediment Quality Guidelines (ISQG) 'low' in all samples
- the concentration of arsenic exceeded the ISQG 'low' in two samples, however, the 95 percent upper confidence limit of the mean for arsenic in all samples was below the ISQG 'low'
- the concentration of tributyl-tin (TBT) was above laboratory limits of reporting in two samples, however, the normalised (to 1 percent total organic carbon) concentrations were compliant to the ISQG 'low' for both samples.

Overall the EIS finds that the quality of the in situ sediments in the study area is compliant to the *National Ocean Disposal Guidelines for Dredged Material* (Environment Australia 2002) (NODGD), *National Assessment Guidelines for Dredging* (Australian Government 2009) (NAGD) and the

Environment Investigations Levels (EIL) of the *Draft Guidelines for the Assessment and Management of Contaminated Land* sediment quality guidelines. It is noted that the NAGD (2009) supersede the NODGD (2002).

5.2.5.1.3 Potential acid sulfate soils

Acid sulfate soils (ASS) are a characteristic feature of low lying coastal environments in Queensland. Undisturbed, these soils can be present in an anaerobic state within marine muds and sands in the form of potential acid sulfate soil (PASS). Actual ASS are the oxidised (disturbed) form, which may occur as the result of natural or anthropogenic disturbance from changes in groundwater levels and/or exposure to oxygen.

ASS in an undisturbed environment may have neutral acidity or be slightly alkaline and no visual appearances indicating its acidic potential. However, when exposed to air either by direct excavation or by indirect changes to the surrounding water table, pyritic material inherent in the soil is oxidised by sulfur oxidising bacteria leading to the formation of sulfuric acid. High concentrations of acid released into receiving waters can potentially cause significant impacts on ecosystem health.

The EIS indicates that PASS was identified in the investigations for the project. Laboratory analysis of results from 30 drill locations under the proposed bund wall revealed that the existing acidity in the seabed sediments to around 2 m depth is not significant, however, concentrations of sulfidic material in 96 percent of the samples analysed suggests the potential for acid generation if the material becomes oxidised.

5.2.5.2 Potential impacts and mitigation associated with the reclamation

The major processes that have the potential to impact on water quality within the receiving environment as a result of the FLPE project include:

construction:

- construction of the bund wall
- dredging and placement of material within the bund
- decanting of tailwaters from placement of dredged material within the bund.

operation:

- runoff/discharge of stormwater following final capping of the reclamation.

5.2.5.2.1 Impacts of bund construction

Construction of the bund will involve the placement of rock material into the harbour by trucks as described in section 3.3.2 of the EIS.

As rock is placed onto the seabed soft sediments will be remobilised into the water column. Soft sediments will also be pushed out the front and sides of the bund wall, thereby generating a visible turbid plume. The turbid plume is likely to temporarily reduce light penetration over the adjacent seagrass beds. It is also likely that any sediments disturbed by the bund wall construction over seagrass will be remobilised and transported away from the tidal flats during tidal movements and elevated wave conditions.

Most disturbance should be limited to the first layer of rock, as any additional rock for the section will be placed on rock, not the soft seabed. The laying of additional rock is likely to generate further disturbance, however to a lesser degree. Therefore, the generation of plumes through the placement of rock is likely to be transient.

Other potential impacts of the bund construction include:

- increased risk of remobilisation of the mud wave during elevated wind and wave conditions, or during spring tides
- erosion of rock material during storm (cyclone) conditions that may occur during construction
- spillage of oils and fuels from construction equipment impacting on marine water quality.

The EIS notes a number of measures which GPC will employ to mitigate potential turbid plumes including:

- GPC will visually monitor and photograph turbid plumes caused by placement of rock on a daily basis during the initial stages of construction. Silt curtains may be employed if plumes are visible above the natural background turbidity, they are substantial in area and constantly present. The proponent will consult with DERM about the use of silt curtains
- fine material (<12 millimetres (mm)) will be scalped from the core material of the bund wall
- armour material will be placed on the exposed face of the core material closely behind the work face
- any material that is displaced above LAT or its current elevation will be monitored and managed in accordance with an ASS management plan
- no refuelling or maintenance of construction equipment will occur on the site, nor will equipment be parked at the site overnight. Equipment will undergo regular maintenance and pre-start inspections. Spill kits will be present on site and emergency response procedures will be established.

If the project adopts a 24/7 construction schedule this will create a situation where there will be no rest/recovery period for the entire period of construction (i.e. around 18 months). The lack of a rest/recovery period has implications for both benthic communities that may be impacted by the plume (via effects of shading and/or burial) and communities that use these areas, including marine megafauna. It is likely that the area that will be impacted by the plume will suffer from chronic loss of light for the entire construction period.

5.2.5.2.2 Impacts of filling of bund

The EIS maintains that minimal impacts to water quality are expected from the filling of the bund with dredged material.

The EIS indicates that a geotextile fabric will be placed on the inner face of the bund prior to commencement of filling operation to minimise the migration of fines through the bund wall and into the surrounding waters. Dredged material placed against the inner wall will also act as a filter layer to assist in preventing the migration of fine material.

5.2.5.2.3 Impacts of hydrodynamic and flushing efficiency

The EIS confirms that construction of the reclaimed area will alter the hydrodynamic (current direction and velocity), sedimentation patterns and flushing characteristics of the local area.

The EIS indicates that construction of the reclamation area is expected to result in increased tidal currents at the northern end of the bund wall on both ebbing and flooding tides. Initially, it is anticipated that this will result in increased turbidity through increased scour of the soft seabed sediments in this location. However, post-construction an equilibrium should be reached and it is not anticipated that the natural range and patterns in turbidity in the area surrounding the bund will change substantially, because the overall change to tidal velocity behind the bund is minimal, although now the currents will flow around the bund instead of in a more east/west direction across the flats from the shoreline to deeper areas.

The EIS also states that predicted changes to hydrodynamics will result in changes to the flushing efficiency of the area, which in turn impact water quality. Modelling undertaken as part of the EIS indicates that:

- there is good flushing potential for the main harbour up to Fisherman's Landing and reduced flushing potential beyond that point
- flushing efficiency of the water body to the west of the reclamation area becomes less efficient with increasing distance from the northern end of the reclamation area resulting in a maximum difference at the south east flats of 10 percent (i.e. 50 percent flushing for the reclamation plus dredging scenario compared with 60 percent for the base scenario for this location). This would reduce the efficiency of flushing of contaminants and nutrients that may be in the area
- slight reductions in flushing efficiency of areas surrounding the Passage islands and the western shoreline of Curtis Island.

5.2.5.2.4 Impact of stormwater and catchment runoff

Once the reclaimed area is filled, the final surface will be capped with suitable material. There is a potential for sediments to be entrained in the stormwater runoff and released to the harbour. The stormwater from the site is unlikely to be contaminated with nutrients, organics, hydrocarbons or metals as initially there will be no activities on the undeveloped area that would result in the introduction of contaminants to the area. Stormwater runoff from any subsequent industrial development on the reclaimed area will be regulated by the relevant approval processes.

The EIS notes that there are three stages to the management of stormwater from the reclaimed area:

- stormwater runoff from the bund walls once they are above sea level
- management of decant waters during filling of the reclamation
- stormwater runoff from the final surface following completion of infilling and capping.

I have required stormwater management measures to be implemented by GPC during these three stages (Appendix 1, Schedule A, Conditions 2-5).

GPC has committed to routinely monitoring water quality surrounding the reclamation throughout the construction process. After construction the proponent will continue the monitoring in accordance with the EMP, in order to determine whether there is a change in water quality characteristics compared to the pre-construction values. Event based monitoring will also take place to capture effects of runoff events during rainfall. If significant changes in water quality compared to baseline are identified, further mitigation measures will be considered.

When future industries develop on the final reclamation, they will be required to install appropriate stormwater management measures to manage both clean and potentially contaminated stormwater from their sites through the relevant development approvals processes.

5.2.5.2.5 Impacts of sediment quality during dredging and reclamation

Sampling and analysis undertaken for the project indicate that the concentration of contaminants in the sediments underlying the proposed FLPE are generally compliant with the NAGD and EILs. Therefore, the mobilisation of these sediments into the water column during construction of the bund wall is not expected to result in the introduction of contaminants into the water column.

The EIS provides results of previous sediment sampling and analysis. Based on the analysis, the EIS states that it is likely that all sediments to be dredged in future programs would be suitable for placement in the FLPE area.

I note the proponent has committed to undertake sampling and analysis of sediments for the capital dredging component of this project and all related future dredging programs.

5.2.5.2.6 Management of potential acid sulfate soils

When disturbing large volumes of PASS there is the potential to cause significant long term environmental harm and corrosion to built infrastructure. Given the extent of PASS identified in the EIS assessment and the proximity of the works to sensitive marine environments, the dredged material will require careful monitoring and management of potential impacts. The supplementary document confirms that no actual ASS was identified beneath the footprint of the project site.

In the EIS, GPC commits to development and implement an acid sulfate soils management plan (ASSMP) for the reclamation area construction and for the dredge spoil to be placed in the reclamation area from dredging subject to this project and from other dredging projects. The ASSMP will form part of the construction EMP. The ASSMP will also cover the placement of dredge spoil within the reclamation area, prior to dredge placement and will include validation testing. No actual ASS will be placed within the reclamation area without treatment.

The ASSMP will be prepared in accordance with the *Queensland Acid Sulfate Soil Technical Manual Soil Management Guidelines* and submitted for approval prior to bund construction.

The ASSMP will be managed in accordance with Sections 4.8 and 4.9 of the State Planning Policy 2/02 *Planning and Managing Development involving ASS*. The management plan will recommend treatment and management options as required. If investigations indicate that the material could not be placed

within the reclamation without resulting in unacceptable impacts to the surrounding waters, then the material would not be accepted into the reclamation and alternatives means of disposal will be negotiated with the relevant agencies. More detailed information on the process to be followed to manage ASS for the reclamation and dredging processes is covered in section 10 of the supplementary document.

5.2.5.2.7 Conclusions

To ensure the implementation of the management plan and the appropriate management of potential ASS, **I have stated** a condition (Appendix 1, Schedule A, Condition 1) that must be attached to a development permit for the project.

5.2.5.3 Potential impacts and mitigation associated with the dredging operations

5.2.5.3.1 Management of water discharged from reclamation area

The EIS indicates that:

- monitoring of the decant plume from previous dredging and reclamation projects at Gladstone Port has indicated that the plume cannot generally be seen or measured approximately 20-50m from the outfall
- background turbidity in the vicinity of Fisherman's Landing has been monitored for up to six months and regularly exceeded the QWQG and ANZECC guidelines
- the predicted increase in bed shear stress at the northern end of the reclamation means that seagrass is unlikely to be present in the immediate vicinity of the northern wall, which is the point at which the decanting is proposed
- based on various recent studies, GPC would prefer that site specific water quality objectives for turbidity for decant waters from the site be developed.

In its submission on the EIS DERM indicated that it generally seeks to limit dredge spoil decanting water quality at the point of discharge to a maximum turbidity or suspended solids (TSS) equivalent to the 80th percentile of the receiving waters, which was reported as ranging from 10 NTU to 31 NTU between June and October 2008 at Fisherman's Landing. DERM also advised that the discharge limit for turbidity of 100 NTU originally proposed in the EIS is based on the dilution of the discharge water to achieve acceptable quality rather than the adoption of an 80th percentile target, which is inconsistent with the best practice in protection of receiving water quality. Consequently, the supplementary document provided a re-assessment of the modelling and argued that targeting a value of 40 NTU at the discharge point is more appropriate given the flushing characteristics along the north eastern region of the reclamation.

DERM has nominated 30 NTU as the maximum turbidity level at the outfall. This is reflected in Conditions 1-4, Appendix 1, Schedule B of this report. The limit will be enforced unless it can be demonstrated to DERM in the DMP that a higher limit can still protect the values of the receiving environment.

To achieve the nominated water quality objectives GPC has indicated that multiple cells, connected via weir boxes with adjustable gates, will be established within the reclamation area to allow the finer materials to settle out of suspension.

Due to the large scale of the reclamation (10 million m^3), the total quantity of sediment released to waters from the reclamation area over the life of the project will be substantial. Once settled this sediment may be partially resuspended and could then combine with suspended sediment from other dredging projects and from scouring around the reclamation area. Discharge from the reclamation area may also continue for two or more years beyond construction meaning that any impact on water quality arising from the discharge of sediment in the decant will be long lasting. For these reasons, a conservative approach to limiting sediment release to waters from the reclamation area is considered to be appropriate.

In its submission on the EIS DERM also indicated that a monitoring program is needed to confirm the accuracy of information contained in the EIS in relation to water quality and ecological impacts, and to inform future assessment and regulation of similar activities. In the supplementary document, GPC has

committed to include monitoring of the decant pond and outfall region in the EMP and if needed additional reclamation cells can be incorporated.

Specific water quality objectives for this project have been recommended by DERM and are included in Conditions 1-4 in Appendix 1, Schedule B of this report. **I am satisfied** that this condition will ensure that the impacts of turbidity and sedimentation can be suitably managed. **I also agree** that these conditions may be varied by agreement with DERM if demonstrated that a higher limit would be acceptable.

5.2.5.3.2 Management of dredging operations

A detailed dredging strategy and dredging contract is yet to be prepared for the proposed capital dredging of Targinie channel and the Fisherman's Landing swing basin and berth pockets. Proposed dredging activities are noted in section 5.2.2 of this report.

Based on previous dredging programs undertaken by GPC the spatial extent of the visible plume from a cutter suction dredge is typically not large. Results of turbidity monitoring during the 2009 dredging of Berth 1 at the existing Fisherman's Landing wharf indicated that the elevation in turbidity in the vicinity of the dredge was not higher than at the reclamation cell or outfall and was not elevated above 44 NTU during the daily measurements.

As part of the EIS a plume model was conducted to assess the potential for the migration of a turbid plume from the bund outfall. The EIS provided the following conclusions from the modelling:

- the water body in the vicinity of the reclamation area shows a high potential for the dispersion of turbidity. This can be seen in the maximum turbidity reading of 12 NTU above ambient recorded at the closest point monitored to the modelled outflow location in the north-east corner of the reclamation. This indicates substantial mixing of the plume in the immediate receiving environment, resulting in minimal increase in turbidity above ambient. The increase above ambient is also well within the natural range and variability in turbidity within the project area.
- results from the modelling show low levels of turbidity above ambient extending both ways along the main channel and higher levels of turbidity centred around the northern half of the reclamation. This demonstrates that there would be no discernable impact on turbidity anywhere in the harbour apart from the immediate area in the vicinity of the reclamation and in the embayment to the north and west of the site.

Modelling undertaken for the supplementary document estimates that, in the indicative worst case scenario for the WBD project, approximately 3,038 ha of benthic habitat outside the project footprint has the potential to be impacted in terms of being touched by the dredge plume at least once (based on 10th percentile exceedences), i.e. this area may be affected by a plume of 5 mg/L above background for ten percent of the time. While these exceedences could impact benthic communities, for such a small increase in total suspended solids (TSS), it is considered highly unlikely that benthic communities under this spatial footprint would be affected.

The supplementary document suggests that a dredge plume concentration of 29 mg/L TSS above background could start to cause shading effects on benthic communities. This increase in TSS is predicted to occur over an area of 406.8 ha for only ten percent of the time and over 2.12 ha for 50 percent of the time. Analysis of the scenarios presented in the supplementary document therefore suggests that while dredge plumes could extend for some hundreds of hectares actual impacts to benthic communities may only be realised over a much reduced area.

GPC has committed to develop a DMP for the capital dredging, which employs a reactive water quality monitoring program, similar to that undertaken for the recent Berth 1 dredging at Fisherman's Landing. Daily monitoring of key sites adjacent to the dredge will also be included in the DMP, undertaken within the final reclamation cell, at the outfall and at the seagrass beds. The supplementary document indicates that a habitat monitoring program will be tied into the dredging program for the project and refined during the planning of the dredging activities as part of the DMP. The proponent has committed to continue monitoring of seagrass and algal meadow health within the study area. More specific detail of GPC's proposed monitoring program is addressed in section 6.8.2 of the supplementary document.

Future maintenance dredging also has the potential to produce turbid plumes from the dredge head during the dredge operations. Therefore, maintenance dredging will be undertaken in accordance with a DMP and need to be approved under relevant legislation.

5.2.5.4 Conclusions—marine water quality

Water quality monitoring data indicate that the study area, encompassing the project site and the adjoining waters of the harbour, experiences highly variable turbid conditions. In addition, elevated levels (compared to the relevant guidelines) of nutrients and other contaminants were observed in recent surveys. Sediments also exhibit some low level contamination (within acceptable limits) in a few locations, and more generally, potential for acid generation.

The EIS has determined that site specific measures should be developed to manage potential construction related water quality impacts. **I note** the proponent has committed to undertake ongoing monitoring of turbidity and nutrient levels during construction, and for a period after construction, to detect adverse trends in water quality related to dredging and other construction activities. **I am confident** that early detection would enable active management of these impacts prior to their affecting any sensitive ecosystem receptors, including seagrass meadows. **I note** the proponent has committed to the management of potential impacts through the implementation of environmental management plans.

I note the extent of similar dredging and reclamation works that have been successfully undertaken by GPC in developing port land and operating the port and **I am confident** that similar, or better, management would be applied in the construction of this project.

I require the installation of stormwater management measures and capping and grassing of the final reclaimed surface to minimise impacts on surrounding waters from contaminated stormwater discharge. The construction and final reclamation area design is critical to achieving desired water quality outcomes in the long term.

To ensure the appropriate management of marine water quality **I have stated** a number of conditions noted above. Also, **I specify** a number of conditions relating to ERA 16 to ensure appropriate management of the dredging activities (Appendix 1, Schedule B, Conditions 1-3).

5.2.6 Marine flora

5.2.6.1 Mangroves and saltpan communities

Potential impacts of turbidity and sedimentation on mangrove and intertidal communities are discussed in section 5.2.4.7 above.

5.2.6.1.1 Construction impacts

The EIS indicates that approximately 1.9 ha of intertidal vegetation occurs in the footprint of the proposed FLPE. The majority of the vegetation (1.45 ha) is closed mangrove forest to 5m tall, dominated by *Rhizophora stylosa* (red mangrove). Smaller patches of *Avicennia marina* and *Ceriops tagal* also occur on the site. These species, landform and substrate correspond with the regional ecosystem (RE) 12.1.3 (listed as ‘not of concern’ under the *Vegetation Management Act 1999* (VM Act)).

A small area (0.45 ha) of sparse saltpan vegetation on marine clay exists behind the mangrove community. This community consists primarily of patches of *Sporobolus virginicus* (saltwater couch), samphire species and bare mud. This species, landform and substrate correspond with the RE 12.1.2 (listed as ‘not of concern’ under the VM Act). These vegetation areas are reflected in Figure 4 below.

All marine vegetation, including mangroves and seagrasses, are protected under the *Fisheries Act 1995*. Consequently, the proponent will be required to obtain a permit from DEEDI for relevant construction activity relating to the FLPE.

The EIS states that the loss of intertidal mangrove and saltpan communities as a result of the FLPE project is expected to be minimal. The physical removal of these communities has the potential to cause direct mortality to individual animals that reside within the area at the time of clearing and habitat loss.

Potential indirect impacts include degradation of fauna habitat due to increased sedimentation, altered local hydrology, pollution or potential disturbance of ASS and indirect impact to fauna breeding and feeding activities through noise, dust and light disturbance.

5.2.6.1.2 Operational impacts

The EIS indicates that physical impacts to mangrove and saltpan communities are not expected during the operational phase of the project. Impacts of stormwater discharges from the final reclamation are discussed in section 5.2.5.3.1 above.

5.2.6.1.3 Conclusion

I am satisfied that the mitigation measures listed in Section 11.2.2 of the EIS, to be implemented by the proponent, will minimise the impact of the project on intertidal vegetation.

The requirement for offsets for the proposed clearing of marine plants is discussed in section 5.2.7 of this report.

I have stated conditions (Appendix 1, Schedule A, Conditions 6 and 7) to minimise potential sediment release during mangrove and saltpan clearing.

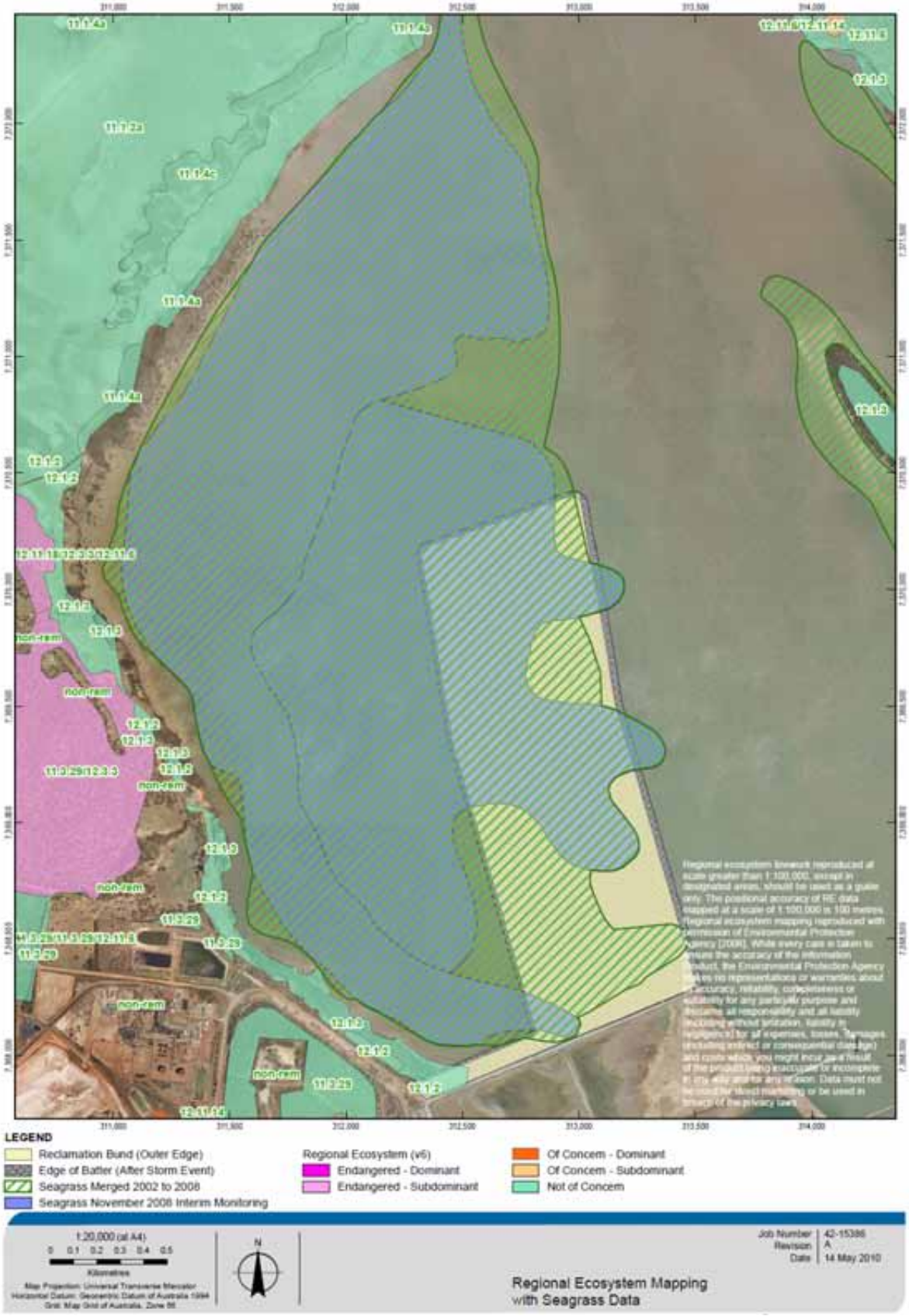

Figure 4—Regional ecosystem mapping with seagrass data

5.2.6.2 Seagrass

Potential impacts of turbidity and sedimentation and hydrodynamic processes on seagrasses are discussed in section 5.2.4 above.

5.2.6.2.1 Construction impacts

A long term seagrass monitoring program in Port Curtis and Rodds Bay was initiated by GPC in collaboration with the former Department of Primary Industries and Fisheries (now DEEDI). An initial baseline study was undertaken in 2002 which identified 129 discrete seagrass meadows, two of which partially occur within the project area (refer Figure 4). Thirteen of these were selected for long-term monitoring which was conducted in 2004, 2005, 2006, 2007 and 2008. A total of 7,246 (± 421) ha of coastal (<5m below Mean Sea Level (MSL)) seagrass meadows and 6,332 (± 4626) ha of deep water (>5 m below MSL) seagrass meadows were identified within the area of the baseline study.

The construction of the reclamation area will directly remove approximately 89.18 ha of seagrass from the area. The supplementary document notes that the percent of regional seagrass to be directly impacted by the project is as follows:

- < 20 km - 2.65 percent
- < 40 km - 0.86 percent
- < 65 km - 0.37 percent
- ~ 200 km - 0.03 percent.

Approximately 2.74 ha of seagrass is proposed to be removed from Meadow 8 (intertidal meadow) and approximately 86.44 ha from Meadow 9 (subtidal meadow). Both meadows are located to the north of the existing Fisherman's Landing area. In the 2008 survey Meadow 8 was consistently dominated by *Zostera capricorni*, whilst Meadow 9 was consistently dominated by *Halophila decipiens*. However, it must be noted that survey result indicate that these meadows have varied in area and biomass from year to year.

Meadow 8 recorded 269.1 (± 11.3) ha of seagrass in the 2002 survey and 294.9 (± 12.6) ha in the 2008 survey. The proposal to remove 2.74 ha from this meadow represents 0.9 percent of the meadow population.

Meadow 9 recorded 268.3 (± 14.9) ha of seagrass in the 2002 survey and 242.5 (± 8.2) ha in the 2008 survey. The proposal to remove 86.44 ha from this meadow currently represents 35.6 percent of the meadow population.

The area of reclamation currently without seagrass (84.35ha) has been shown to historically support seagrass meadows. This area may still provide seed bank and/or suitable habitat under favourable climatic conditions. Therefore, the full area of the reclamation is considered in determining the environmental offsets required for this project.

While seagrass resources will be removed locally and may result in a local-level displacement of turtles, dugongs and dolphins (expected to relocate to other habitat areas), the project is not expected to have a significant net negative effect on the diversity of the systems within the Port Curtis region, nor is it expected to have flow-on impacts to the communities that use the habitats within the project area. In accordance with the Queensland Government Environmental Offsets Policy (QGEOP) an environmental offset is required for the loss of marine habitat.

I note that GPC has committed to continue to contribute to both the DEEDI long term seagrass monitoring program and the Port Curtis Integrated Monitoring Program. The specific impacts of the construction of the reclamation and dredging on the adjacent seagrass communities will be included in these programs.

5.2.6.2.2 Sedimentation

The EIS states that seagrass in the vicinity of the project area may suffer impacts resulting in the smothering of existing substrates by sediments settling from the water column during the dredging and decant activities for the project. However, modelling has indicated that the turbid plume from the reclamation outfall point is expected to reduce in concentration at a very short distance from the outfall, indicating that any sediment deposition is likely to be localised around the outfall.

Potential impacts on seagrasses include:

- partially or completely smother the existing seagrass beds with sediment in some areas of the western side of the reclamation
- reduced water quality due to predicted decrease in flushing.

These are discussed in more detail above.

5.2.6.2.3 Conclusion

I am satisfied that the mitigation measures listed in Section 11.2.2 of the EIS, to be implemented by the proponent, will minimise the impact of the project on intertidal vegetation. However, **I have stated** a condition (Appendix 1, Schedule A, Condition 8) to ensure additional monitoring of seagrass in the project area.

The following section of this report also provides details of proposed environmental offsets for the project.

5.2.7 Environmental offsets

5.2.7.1 Strategic offset

The FLPE project, together with the WBD project, would contribute to the majority of the cumulative effects on the marine environment of Port Curtis. Other activities of note that may occur over similar timeframes include the Wiggins Island coal terminal (WICT) construction, the proposed pipeline crossing of The Narrows and ancillary dredging needed for various LNG projects.

Given the cumulative nature of impacts caused by these various activities, all relevant projects are to be considered together taking into account their additive effects both spatially and temporally.

A strategic offset proposal has been prepared by GPC to mitigate the residual impacts of the projects under its control; the WBD, FLPE and WICT projects. **I am currently considering** this proposal as part of my assessment of the WBD project. In addition, **I intend** to widen the scope of the strategic offset package to include the temporary impacts of the proposed construction of marine facilities on Curtis Island and the installation of a bundled pipeline crossing of The Narrows. The overall package will be finalised in my upcoming evaluation of the WBD project.

I note however that precise details of methodology, timing etc cannot be accurately determined due to the number of independently funded projects and their relative dependencies. The outcome of the assessment will provide an indication of a realistic worst case scenario and the agreement of an appropriate offset for residual impacts. Given the potential for one or more projects not proceeding and the likelihood that mitigation strategies will reduce actual impacts (compared to predictions), it is likely that an agreed offset package would be an over-estimate of requirements. Monitoring programs will be designed to enable a comparison of actual impacts against predictions and potentially lead to an adjustment of offsets if required.

The EIS includes an impact assessment for the proposed FLPE works on marine fish habitat. In summary, this comprises a permanent loss of 174 ha seabed (including 90 ha of seagrass and 84 ha of 'potential' seagrass), removal of 1.9 ha of intertidal vegetation and potential significant indirect effects on adjacent seagrass beds.

5.2.7.2 Conclusion

A requirement of QGEOP is that the design of a project should seek to avoid and minimise impacts prior to considering offsets. In the case of this project **I am satisfied** that GPC has adequately investigated project options and that some impacts on the marine environment will be unavoidable. **I am also confident** that the range of mitigation strategies, including those specified by approval conditions in this report, will minimise impacts as far as practicable.

In consultation with DEEDI and DERM, **I have determined** that an appropriate offsets package sufficient to acquit the requirements for impacts to marine fish habitat for the combined GPC projects (FLPE, WBD and WICT) is as follows:

- the protection in perpetuity of an area of 5000 ha of coastal land at Port Alma currently within GPC's SPL
- contribution of $5 million to DEEDI (Fisheries Queensland) to support future research or studies which have practical and tangible outcomes for fisheries habitat and productivity within the region.

I note that the intention of the funding contribution is to provide mitigation of impacts on fisheries resources within the local area. The mitigation program would be undertaken over a five year period and is designed to complement the long-term nature of the Port Alma offset component.

Taking into account the relative scale and nature of impacts on marine fish habitat for each of the projects, **I have determined** that the proportional contribution for the FLPE project is 15 percent of the total.

I have stated a condition (Appendix 1, Schedule A, Condition 9) to ensure an appropriate offset for the project.

5.2.8 Marine fauna

5.2.8.1 Marine megafauna

5.2.8.1.1 Survey results

A marine megafauna survey was undertaken by GHD for the EIS. During an aerial survey, extending from Rodds Bay in the south, encompassing the entire coast of Curtis Island, to Port Alma in the north, dugong, dolphins, turtles, sharks rays and seasnakes were observed. None of these were shown to be exclusively using the project area.

The following species listed as threatened under the Nature Conservation Act (Wildlife) Regulation 2006, pursuant to the *Nature Conservation Act 1992* are likely to or possibly may occur within the project area:

- endangered
  - Loggerhead turtle (Caretta carette)
  - Olive Ridley turtle (Lepidochelys olivacea)
- vulnerable
  - Humpback whale (Megaptera novaeangliae)
  - Flatback turtle (Natator depressus)
  - Green turtle (Chelonia mydas)
  - Hawksbill turtle (Eretmochelys imbricate)
  - Estaurine crocodile (Crocodylus porosus)
  - Dugong (Dugong dugon)
- rare
  - Australian Snubfin dolphin (Orcaella heinsohni)
  - Indo-Pacific Humpback dolphin (Sousa chinensis).

The EIS indicates that the Leatherback turtle (Dermochelys coriacea) is listed as endangered but is unlikely to occur within the project area.

Appendix M of the EIS provides a full assessment of marina fauna potentially affected by the project.

Concerns were raised by submitters to the EIS relating to potential marine megafauna impacts. These included:

- impacts on dugong and other marine fauna due to removal of seagrass and habitat
- potential mortality or injury to marine turtles due to dredging operations
- impacts on marine fauna due to increased light, noise and vibration
- entrapment of marine fauna in the bund area.

5.2.8.1.2 Potential construction impacts

Potential construction impacts on listed marine fauna include the direct loss of food resources and foraging habitat (by direct removal and smothering of habitat), the physical capture of individuals inside the reclamation area once the bund is closed, the capture and strike of individuals during dredging operations and potential, but unlikely impacts from underwater noise from dredging operations.

The project is located within the northern limits of the Rodds Bay dugong sanctuary.

Of the species listed above, dugong and green turtles are the most likely species to be impacted by the direct removal of seagrass meadows in the project area, as seagrass is the main component of both these species' diets.

The EIS indicates that past research reveals that dugong feed preferentially on *Halophila* and *Halodule* species of seagrass as they are more palatable, nutritious and easy to digest. The seagrasses located in the project area, particularly Meadow 9, substantially contribute to a high value food resource within Port Curtis. However, studies indicate that the diet of the largest population of dugong in Australia is dominated by *Thalassia* species, which are nutritionally poorer than *Halophila* and *Halodule* species. Although a potentially high value food resource will be lost via the removal of approximately 80 ha of seagrass meadows, dugong will continue to feed in the area on meadows of similar and varying species composition.

The Australian Snubfin dolphin and the Indo-Pacific Humpback dolphin may be impacted by the removal of foraging habitat. However, as these species are highly mobile predators and in the regional context the habitat loss is minimal, it is unlikely the project will have a significant adverse effect on these species.

The indirect impact on food resources and foraging habitat is discussed in section 5.2.5.2.1 (Impacts of bund construction) of this report.

Underwater noise will be generated by dredging. The nature of dredging noise is that it occupies the mid to low-frequency range, it is tonal and it is usually continuous. The EIS notes that available information relating to the sensitivity of cetaceans and dugongs to dredging noise indicates that dredging is not considered to pose a significant risk. Information available on noise impacts on turtles is limited, however turtles do not appear to change behaviour due to noise.

Construction lighting will be directionally controlled and shielding may also be used to minimise light spill that could cause nuisance to local residents, motorists, other users of adjacent land and marine and terrestrial fauna (including wading/migratory bird species). Further discussion on potential lighting impacts is included in section 5.5.3 (Lighting) of this report.

5.2.8.1.3 Potential operational impacts

The EIS indicates that the potential operational impacts on marine fauna include interactions with vessels and a decline in water quality (noted above).

Vessel-related impacts to marine fauna as a result of increased shipping in the Port Curtis region may potentially include:

- vessel strike
- interrupted communication of marine fauna
- habitat displacement from increased noise and presence.

It is likely that the increased vessel traffic will result in localised fauna displacement. However, in the regional context this impact is unlikely to be an issue.

5.2.8.1.4 Conclusion

I am satisfied that the mitigation measures outlined in section 8 of the EIS, to be implemented by the proponent, will minimise the impact of potentially degraded water quality on marine fauna.

The EIS identifies the risk to marine fauna of entrapment when the bund wall is closed.

To minimise the direct impacts relating to the reclamation activities, the proponent has committed to, immediately prior to and after the reclamation area is closed:

- engage a fauna spotter to ensure no marine fauna is stranded within the reclamation area
- seine netting the area to capture any fish remaining inside the bund. These will then be released at an appropriate location outside the project area.

Additionally, if there are any instances of overflow into the bund once it is closed, the proponent will immediately inspect the area within the bund for any stranded marine fauna. If strandings have occurred, the proponent has committed to seine net the area as per the procedure noted above.

The EIS indicates that the dredging activities will operate under an approved EMP that includes as a minimum the following provisions:

- dredge activities to be restricted to agreed footprint of channel and swing basin works
- where a trailer hopper suction dredger is used, the drag heads of the dredge vessels will be fitted with turtle exclusion devices for the duration of the dredging
- the amount of off-bed suction time will be minimised to reduce the risk of turtle capture
- a fauna spotter will be present on the vessel during dredging
- a log of listed marine fauna observed during dredging operations will be kept and provided to GPC at the end of the dredging campaign.

The EIS outlines appropriate measures to minimise risk to turtles and these measures should be reflected in conditions of any approval.

I specify a condition (Appendix 1, Schedule B, Condition 4) relating to ERA 16 to ensure appropriate protection to turtles and other marine fauna from dredging works related to the FLPE project. A component of condition 1 (Appendix 1, Schedule B) also relates to management of impacts on turtles due to dredging.

I also state a condition (Appendix 1, Schedule A, Condition 10) to minimise entrapment of marine fauna and to manage release of any trapped fauna during the construction of the containment area.

5.2.8.2.5 Marine fauna offsets

The agreed strategic offset package for marine fish habitat impacts includes measures that would provide valuable biodiversity conservation outcomes within the region. The Port Alma offset site comprises tidal waterways that support a range of marine fauna, including listed species. The protection of this site in perpetuity therefore provides a significant positive biodiversity protection outcome. In addition the funding package includes components that, whilst aimed at marine fish habitat conservation and enhancement, also has benefits for the overall marine environment of the region.

The agreed offset package, while providing the full requirement for mitigation of impacts to marine fish habitat may not completely address the likely worst case impacts on coastal environmental values. In particular, certain marine species such as dugongs and turtles are likely to be affected by the loss of seagrass areas and periods of degraded water quality in the vicinity of the proposed works.

I will consider these matters in the overall cumulative impact assessment and offsets package for the Gladstone port projects and this will be finalised in my evaluation of the WBD project.

5.2.8.2 Benthic communities

5.2.8.2.1 Context

The project area and the surrounds supports a number of marine benthic habitats including soft silty habitats, clay and rubble habitats and seagrass meadows. The assemblages sampled for each habitat type, during a benthic marine ecology survey undertaken by GHD, were reflective of the sediment habitat observed. Crabs, worms, small gastropods, seagrasses and algal assemblages occurred in soft sediments and pebble habitats. Crabs, gorgonians, echinoderms, sponges and similar were present in clay and rubble sediments.

5.2.8.2.2 Potential impacts

The construction and operation of the FLPE has the potential to impact the benthic communities of Port Curtis directly and indirectly. The reclamation will result in the direct removal of benthic organisms and the loss of benthic habitat.

Changes to the coastal processes around the project site (noted above) may lead to changes in the existing benthic communities and may also change the amount of habitat suitable for benthic communities, particularly around the northern end of the project site. However, construction of the bund may provide additional habitat suitable for benthic colonisation.

Potential impacts to water and sediment quality (noted above) may indirectly lead to changes in the density and diversity of the benthic communities at Port Curtis. However, the EIS anticipates that any changes that occur will only be short-term in duration.

An immediate short-term reduction in biodiversity is expected from the dredging requirements of the project. However, the benthic communities are already affected by maintenance dredging but still persist in the area. The EIS provides that assemblages are likely to recolonise the area over time.

5.2.8.2.3 Conclusion

Given the small size of the project area and that the benthic communities found in and adjacent to the project area are not unique to the Port Curtis region, **I conclude** that it is unlikely that the project will adversely affect the Port Curtis benthic community as a whole. Mitigation measures relating to water and sediment quality outlined in the EIS will help to reduce impacts on the benthic communities.

5.2.9 Avifauna and other terrestrial fauna

5.2.9.1 Context

Section 11.1.12 of the EIS lists the bird species that have been observed during surveys of the site and are likely to occur in the area. Birds observed during the GHD surveys included the mangrove gerygone (*Gerygone levigaster*), grey fantail (*Rhipidura fuliginosa*), collared kingfisher (*Todiramphus chloris*), silvereye (*Zosterops lateralis*), white-faced heron (*Egretta novaehollandiae*), striated heron (*Butorides striatus*), strawnecked ibis (*Threskiomis spinicollis*), whimbrel (*Numenius phacopus*), pied oystercatcher (*Haematopus longirostris*), black-winged stilt (*Himantopus himantopus*) sharp-tailed sandpiper (*Calidris acuminata*), common tern (*Sterna hirundo*) and silver gull (*Larus novaehollandiae*) all of which are listed as 'least concern' under the *Nature Conservation Act 1992* (NC Act).

The supplementary document reports that during June 2009 surveys undertaken by GHD seventy-seven birds species were recorded from the study area and adjacent habitat, the vast majority of which were forest/woodland-dependent species recorded from the woodland habitat to the west of the study area.

The FLPE project has the potential to impact on terrestrial fauna including direct and indirect mortality, and the loss of habitat and feeding sites including mangroves (1.45 ha), saltpan vegetation (0.45 ha) and intertidal mudflats (0.31 ha). The impact is expected to be very minimal as there is an abundant supply of similar habitat available is close proximity to the site.

The EIS indicates that migratory wetland bird species and some migratory terrestrial bird species may inhabit intertidal areas at Fisherman's Landing, however it is unlikely that these species use the project area other than as a flyover area.

It is likely there will be an initial loss of most fauna species at the commencement of clearing, with the exception of highly mobile species, i.e. most birds. These birds are likely to relocate into neighbouring pockets of remnant vegetation particularly to the north of the site. During this time they may be more vulnerable to predation, due to increased exposure to predators. This may also result in more losses due to greater competition within these areas which could lead to reduced breeding success and the death of individuals that are unable to cope with reduced resources.

Any clearing of intertidal vegetation will result in localised reduction in the amount of refuges, microhabitats, nest sites and food available for a number of native fauna species. Given the relatively small area of habitat to be cleared and the availability of similar habitat within the adjacent vegetated

areas this loss of resources is not expected to have a significant impact on the number and diversity of native species in the project area.

The EIS finds the potential for shorebirds to be influenced by noise from the construction of the bund is low, particularly as the area is currently subject to relatively high ambient noise levels from existing industrial sources.

Additional impacts on bird species that may be caused by a 24/7 construction schedule, including light, noise and vibration at night, could be the disturbance of those migratory shorebirds that may roost in the mangroves or feed on tidal flats in close proximity to the activities. Lighting on the haul route and on the reclamation area will be directionally controlled and shielding may also be used to minimise light spill that could cause nuisance to wading/migratory bird species. Further discussion on potential lighting impacts is included in section 5.5.3 (Lighting) of this report.

The combined impacts of noise and vibration are expected to be localised, with animals further from the northern expansion area minimally affected or able to habituate.

The continuous heavy vehicle movement associated with a 24/7 construction schedule could potentially lead to injury or fatality of terrestrial fauna caused by collision, particularly during night operations.

Section 11.2.8 of the EIS and section 15.4.2 of the supplementary document lists a number of mitigation measures that GPC will implement during construction.

5.2.9.2 Conclusion

I am satisfied that the project site is not an important or critical habitat for the listed migratory species or other shorebirds. **I am further satisfied** that the mitigation measures, listed in section 11.2.8 of the EIS, committed to by GPC will help to minimise any potential impacts on birds species.

5.3 Social and economic issues

5.3.1 Context

Issues raised in submissions on the FLPE EIS and supplementary document relating to potential social and economic impacts of the project tend to be based on cumulative impacts of all the current activities being undertaken in Gladstone harbour by GPC and also other proposed future port activities (e.g. WBD project, currently undergoing EIS assessment), rather than being FLPE project-specific and as such need to be considered in conjunction with the other projects. This project contributes to the potential cumulative impacts from the multiple projects, and has the potential to impact on commercial, recreational or indigenous fisheries, including loss of fish habitat, loss of access to harvest stock, impacts on the local seafood chain, and potential to displace fishing effort to other habitats within the Gladstone region.

Potential impacts on commercial fisheries and recreational fishing and boating were considered in the EIS. Additional information was provided in section 12 of the supplementary document. However, issues were raised in submissions from the Queensland Seafood Industry Association, GRC and DEEDI on the EIS and supplementary document and a number of public submissions on the EIS, specifically related to impacts on commercial and recreational fishing and the need for appropriate compensation. These matters are considered in more details in the following sections.

Results of a social impact assessment undertaken as part of the EIS are addressed in Appendix O and summarised in section 13 of the EIS. **I note** GPC has committed to ensure all mitigation measures relating to social impacts included through the EIS documents are actioned throughout the life of the project.

5.3.2 Impacts on fisheries

5.3.2.1 Recreational / indigenous fishing

5.3.2.1.1 Context

The EIS confirms that fishing is a major recreational activity throughout the entire Gladstone region, with Gladstone having one of the highest rates of boat ownerships of any community in Australia. Fishing is by far the most prominent recreational activity undertaken in and around the project area.

The EIS indicates that use of the area by recreational fishers is governed by the seasonality of targeted species, the tidal signature of the area and the amount of time available for fishing activities. The majority of recreational fishing in the area is undertaken on the weekend, both from the shore and recreational vessels.

Species caught in the area include whiting, bream, flathead, gar, long tom, steelback, grunter, blue salmon, barramundi, mud crab and prawns.

Indigenous fishing activities are undertaken by Traditional Owners in the study area. Indigenous fishers are able to use recreational fishing apparatus and stone fish traps to take fish. Possession, size and gender limits do not apply to indigenous fishers who are fishing for traditional purposes.

The EIS acknowledges that Port Curtis is an important resource for the local fishing community as it offers protected waters that support a variety of edible and sport fisheries species. During consultation with the local fishing community during the EIS process it was identified that the shoreline adjacent to the project area is an important local crab fishing site as it can be safely accessed from the shore.

Figure 12-1 in the supplementary document provides details of proposed marine exclusion zones between Fisherman's Landing wharf and the RG Tanna terminal. The supplementary document indicates that GPC does not propose to prevent access to The Narrows and Graham's Creek.

5.3.2.1.2 Potential impacts

As noted above, potential impacts to recreational and indigenous fishing in Gladstone harbour are not specific to the FLPE project, but rather are related to all current and proposed future activities.

The EIS states that the potential impacts on the local indigenous and recreational and commercial fisheries during construction of the project include the direct removal of approximately 170 ha of potential fishing grounds and the establishment of restricted areas in the vicinity of the project area during construction for security and safety reasons. Construction activities may also lead to a reduction in local catch as species temporary relocate to other areas to avoid the disturbance (including noise, vibration and light). This impact is considered to be limited as DEEDI has advised that most recreational fishing in the vicinity of the existing Fisherman's Landing wharf, is conducted in an area to the north of the proposed reclamation, known as The Narrows.

Recreational and indigenous fishers may also be impacted by dredging operations for this project as the dredges will limit access to fishing is these areas. However, it is expected that fishers have adapted to past dredging operations which are continually occurring in Gladstone harbour and have adjusted their fishing patterns accordingly and therefore will make similar adjustment for the proposed dredging operations for this project. Increased sedimentation from dredging operations may also impact on fish availability in some areas and smother local seagrass beds which has the potential to impact fish breeding and feeding cycles.

The area available to recreational fishers will also be further limited as access to the shoreline adjacent to the project area will be restricted for safety and security reasons. Additional restrictions may also be implemented around project infrastructure, particularly while vessels are occupying the berths.

Reduced access to recreational and indigenous fishing may have an economic impact on recreational and indigenous fishers and their families as it is possible that fishing catches from the Fisherman's Landing area may provide a food source and supplement to family income.

In its submission on the EIS, the Port Curtis Coral Coast Native Title Claim Group suggested that GPC introduce a total ban on fishing and crabbing activities to all project contractors, sub-contractors and

employees in the vicinity of proposed works. In the supplementary document, GPC committed to prevent project workers from fishing and crabbing in the area during their work shifts.

5.3.2.1.3 Conclusions

I acknowledge that the full impact of the FLPE project on recreational and indigenous fishing in Gladstone harbour has not been adequately investigated as part of the EIS process and therefore is currently unknown. **I also acknowledge** that it would be a very difficult task to establish the full impacts accurately. Therefore, my consideration of impacts to recreational and indigenous fishing in Gladstone harbour will be incorporated into the overall cumulative impact assessment and will be finalised in my evaluation of the WBD project.

I note GPC has indicated that it is considering the construction of a boat ramp and parking facilities in the vicinity of the Fisherman's Landing site to provide boat launching facilities for recreational and indigenous fishers. However, specific details have not been provided at this time. Details will be incorporated in the cumulative impact assessment as part of my evaluation of the WBD project.

5.3.2.2 Commercial fishing

5.3.2.2.1 Context

The EIS estimates that approximately six commercial fishing operations use the project and adjacent surrounds. The main activities that occur in the area include setting pots to collect mud crabs, fish netting and trawler thoroughfare along Targinie channel. DEEDI has indicated that approximately 10-15 percent of commercial fishing operations based in Gladstone are conducted in the Port Curtis area.

The species targeted by the local commercial fishing industry include mud crab, mullet, shark, blue salmon and barramundi. The seagrass habitats within and adjacent to the project area may provide nursery areas for other fish and crustacean commercial species.

The Queensland Seafood Industry Association (QSIA), in its submission on the EIS states that the proposed reclamation area is a productive mullet, salmon and shark fishery.

There is currently a 500 m exclusion zone around existing wharves and vessels at berth. Gladstone harbour is closed to commercial fishers from Friday 6pm until Sunday 6pm to provide access for recreational fishers.

5.3.2.2.2 Potential impacts

As noted above, potential impacts to commercial fishing in Gladstone harbour are not specific to the FLPE project, rather to all current and proposed future activities of GPC.

The EIS states that the potential impacts on the commercial fisheries during construction of the project include the direct removal of approximately 170 ha of potential fishing grounds and the establishment of restricted areas in the vicinity of the project area during construction for security and safety reasons. Construction activities may also lead to a reduction in the local yield as the targeted species may move away from the area to avoid the disturbance (including noise, vibration and light).

Commercial fishing may also be impacted by dredging operations for this project as the dredges will limit access to fishing is these areas. However, it is expected that fishermen have adapted to past dredging operations which are continually occurring in Gladstone harbour and have adjusted their fishing patterns accordingly and therefore will make similar adjustment for the proposed dredging operations for this project. Increased sedimentation from dredging operations may also impact on fish availability in some areas and smother local seagrass beds which has the potential to impact fish breeding and feeding cycles.

During operation of the project it is likely that access to the shoreline adjacent to the project area will be restricted for safety and security reasons. Additional restrictions may also be implemented around project infrastructure, particularly while vessels are occupying the berths.

There is concern among the Gladstone commercial fishery community that removal of soft sediment habitat resulting from the construction of the reclamation area will reduce juvenile fishery species habitat, having flow-on effects to catch rates and economic viability of the fishery in the future. The need

for compensation for these potential losses has been raised in a number of submissions throughout the EIS process. **I note** GPC has indicated that it will participate in any Queensland government-led forums/discussion on the matter. The EIS indicates that the rock revetment walls will provide fishery habitat possibly offering a greater quantity of spatial refuge for juvenile taxa than does open seabed. It is also noted that the fishery communities are already adapted to using other meadows in the Gladstone region for those times during which seagrass meadows in the Western Basin are sparse.

QSIA has been advised by local fishers that they believe ASS in the region has led to ulcerated crab shells. The supplementary document indicates that evidence to support this claim is not well documented. The local fishers are concerned that potential impacts of the release of ASS may lead to more deformed crabs, thereby limiting marketable catches. QSIA concerns for the industry also relate to loss of habitat, loss of access, displaced effort and seafood supply chain issues. QSIA considers local fishers are entitled to appropriate compensation for loss of income and resource access as a result of various GPC projects.

The supplementary document states that commercial fishery data for the Gladstone area from 2002 to 2008 do not show a decline in catches in the years following a decline in available seagrass habitat. This would be expected if the reproductive success of species using the habitats to be affected was tightly linked to the availability of that habitat. Instead, a decline in catches is observed corresponding with the time of reduction in available habitat, suggesting commercially targeted species prevalence was more affected by those events that lead to the loss of seagrass than they were to the loss of seagrass itself.

It is evident that the marine communities using this habitat already persist under a fluctuating regime of meadow availability and absence. It is predicted that any species using the habitat to be affected will relocate to the other seagrass meadows (approximately 7,000 ha) in the Gladstone area.

In its submission on the supplementary document, DEEDI indicates that the extent of fish habitat direct loss, modification and anticipated indirect temporary impact or permanent loss that will result from the FLPE is significant and that appropriate recognition of the likely flow-on impacts on localised catch rates, catch/unit effort and catch composition is necessary in the development of a management and compensation strategy associated with the project.

5.3.2.2.3 Conclusions

The EIS suggests that there will not be significant impacts on the juvenile fishery productivity in this area. This argument is not supported by DEEDI, QSIA (refer above), GRC and a number of public submitters. DEEDI suggests that the proposed development will have an impact on commercial, recreational and indigenous fisheries operating in the harbour and that these should be taken into account and offsets/compensation paid where negative impacts are experienced. DEEDI also suggested that an offset include the enhancement of other recreational fishing locations or providing structures which will attract fisheries resources as part of a much broader offsets package which includes marine habitats.

GRC, in its submission on the EIS, suggests that monetary compensation should be made available to commercial fisherman for the loss of productive fishing areas and to the community for the social impacts of losing approximately 170 ha of the Gladstone harbour (414 ha including the 500m exclusion zone).

GRC also requested that I require appropriate mitigation actions of the proponent to account for the social impacts of the project, such as a recreational offsets package to mitigate impacts to indigenous and recreational fishers.

I acknowledge that the full impact of the FLPE project on fisheries in Gladstone harbour would be a very difficult to accurately establish. However, **I agree** with DEEDI, GRC and QSIA that there will be some degree of impact and this impact needs to be determined and analysed in more detail and an appropriate compensation package (if considered necessary) prepared to cover the relevant impacts.

As noted above, potential marine impacts in Gladstone harbour are not specific to the FLPE project, rather to all current and proposed future activities of GPC. Therefore, my consideration of impacts to commercial fishing in Gladstone harbour will be incorporated into the overall cumulative impact assessment and will be finalised in my evaluation of the WBD project

5.3.3 Community health and safety

5.3.3.1 Road safety

If public roads are to be used as a haul route to transport the materials for the construction of the bund wall, construction traffic and increased traffic from construction workers may reduce road safety for drivers and passengers on the streets of the transport corridor. Refer to section 5.4. (Transport infrastructure) of this report for further discussion on this matter.

5.3.3.2 Marine based activities

The proposed construction work may impact on the safety of marine based activities, such as fishing, boating and jet skiing, particularly where industrial equipment is used in close proximity to recreational areas. The bund construction and dredging will result in reduced access to recreational areas. Exclusion zones are proposed to be introduced to mitigate public safety and help to ensure the security of the construction and dredging equipment. Current and proposed exclusion zones are included in Figure 12-1 of the supplementary document.

I am satisfied that there are sufficient alternative areas within Port Curtis that can be accessed by the public for recreational purposes.

5.3.3.3 Visual amenity/Aesthetic quality

Impacts to the visual amenity of the area and the aesthetic quality of the area as a result of the increase in industrial focus will be experienced by those that access the area. An increase in the industrial focus of the area may affect the level and nature of public use of the area, particularly those that visit the area for environmental appreciation and/or recreation.

I am satisfied that the visual character of the reclamation is consistent with the development of port facilities within the Port of Gladstone and does not constitute a significant adverse visual impact. **I am further satisfied** that, the nearest residence being 2 km away, the reclamation is sufficiently removed from residential areas to have no visual impact upon residential amenity.

5.3.4 Cultural Heritage

5.3.4.1 Indigenous cultural heritage

The key legislation in Queensland with regard to Aboriginal cultural heritage is the *Aboriginal Cultural Heritage Act 2003*. This Act requires that a cultural heritage management plan (CHMP) be prepared to manage Aboriginal cultural heritage.

The project area is situated partially within the external boundaries of the registered Port Curtis Coral Coast (PCCC) Native Title claim. The PCCC claim area takes in the small area of land in the south west of the project area near the shoreline. The claim does not include the waters of the Gladstone harbour.

I note that a CHMP has recently been signed by the PCCC and GPC and that a Deed of Understanding which discusses meetings/forums and funding of particular indigenous projects has also been signed.

5.3.4.2 Non-indigenous cultural heritage

A number of pieces of Commonwealth and state legislation provide a legislative basis for non-indigenous cultural heritage including the EPBC Act, *Australian Heritage Council Act 2003* (Commonwealth), *Queensland Heritage Act 1992* and the *Historic Shipwrecks Act 1976*.

The EIS provide details of desktop research undertaken on non-indigenous cultural heritage. In its submission on the EIS, DERM sought additional information on shipwreck data. This data was presented in the supplementary document.

I note that, GPC has committed to take steps in accordance with sections 89 and 90 of the *Queensland Heritage Act 1992* and the *Historic Shipwrecks Act 1976*, including reporting details to DERM, if any archaeological artefacts (including shipwrecks) are discovered during the course of construction.

5.3.5 Mineral resource deposits

5.3.5.1 Context

The project area traverses and is adjacent to the state's oil shale deposits under tenements MDL 225, MDL 177, ML(A) 80081 and ML 80003 (Stuart oil shale deposits) and exploration permit EPM 3215 held by Queensland Energy Resources Limited (QER) and its related entities. QER is looking to develop the State's oil shale deposits within the Stuart area and the Fisherman's Landing project area has the potential to sterilise portions of the resource.

In its submission on the EIS, QER states that it is strongly supportive of GPC's endeavours to develop the FLPE project and expects to be a customer of the facility for importing of pre-assembled modules for its future shale to oil plant site.

DEEDI, in its submission on the EIS, indicated that the portion of the deposit is unlikely to be exploited as it is located off-shore and falls outside the boundary of a granted mining lease and/or mining lease application.

5.3.5.2 Conclusion

As the potential construction and operation of QER's technology demonstration plant may have minor constructional and possibly operational interface issues with the FLPE project, **I encourage** GPC to maintain satisfactory communication with QER and DIP during the construction of the FLPE project.

5.4 Transport infrastructure

5.4.1 Road network impacts

5.4.1.1 Context

The proposed FLPE is located in the harbour east of Landing Road and is accessed by either Serrant Road or the end of Landing Road that curves around to join on SPL fronting the harbour. Landing Road is the main north-south access spine for this area of the Yarwun Precinct of the GSDA. The quarry for the proposed FLPE is located to the west of Landing Road near the end of Guerassimoff Road.

A detailed assessment of traffic impacts on the road network was not undertaken for the EIS. However, a general assessment was provided in the EIS. The EIS indicates that there is potential for impacts on the transport infrastructure from the construction of the Fisherman's Landing reclamation haulage of rock from the GPC-owned quarry to Fisherman's Landing reclamation area and the workforce traffic.

The EIS describes the construction of the bund, the main source of road traffic, as occurring with one eight hour shift per day from Monday to Friday for both construction rates (refer below). The supplementary document puts forward the additional option of constructing the bund 24/7.

5.4.1.2 Workforce traffic

No more than 30-40 vehicles per day will be added to the traffic on Landing Road from bund construction and the dredging workforce. This would be less than the 5 percent change threshold that would trigger any assessment of impacts on the state or council controlled road network. Therefore, there are not likely to be any impacts on traffic or road surfaces resulting from workforce traffic.

5.4.1.3 Rock haulage traffic

Two haulage rates and methodologies have been considered in the EIS (refer Figure 5):

- High construction rate: a 1,800,000m^3/year, which will require a contractor to carry out operation using mine haulage vehicles without using public roads with the exception of road crossings (200 truck circuits per day / 8 hours per day Monday to Friday)
- Low construction rate: a 400,000m^3/year haulage, scaled to suit the current fleet of GPC vehicles and will use road registered vehicles for haulage operations (150 truck circuits per day / 8 hours per day Monday to Friday).

The supplementary document proposes a third haulage rate of 1,800,000 m^3/year which will use a proposed off-road haul route and mine haul vehicles, thereby removing bulk haulage of quarry material on council-controlled road infrastructure (refer Figure 6 of this report). This option will apply only to the high construction rate and will involve around 240 truck circuits per day (based on a fleet of five CAT 777 trucks), 24 hours a day, 7 days a week (24/7) and will take approximately 18 months to complete.

5.4.1.4 High construction rate options

If the construction rate is ~1,800,000m^3/year, GPC will undertake a specific haul route study to determine the most appropriate route to establish a dedicated, off road haul route to minimise potential impacts on traffic, road user safety and council road surfaces. The haul route will not be along council roads as the high construction rate dictates that off road, mine haul trucks will be required to move material. A likely haul route is shown in Figure 6 of this report. However, there will be a need for at least one council road crossing at Forest Road. GPC will undertake a separate approvals process to gain the required development approvals for the off road haul route if this is required to facilitate the higher construction rate. Pavement, intersection and traffic impacts will be reviewed at that time.

The 24/7 option compared to the 8 hours a day option would reduce per hour truck circuits from around 25 to 10 per hour. Therefore, there would be less hourly impact on the Council road crossing. However, the reduced impact would be spread over a greater time span (i.e. 24 hours a day for 18 months).

The high rate construction option haul route may be exposed to additional risks to the public which will be managed as part of the haul operation. Measures to minimise these risks that will be employed include:

- haul road to exclude all other unauthorised traffic in recreational hours by the construction of safety bunds and fencing along both sides of the route to exclude the public and trail bikes
- greater security controls will be provided to regularly monitor compliance with exclusion of the public from the haul route.

A number of safety measures have been highlighted in section 15.3 of the supplementary document which will be employed by the proponent to ensure the safety of heavy equipment operators and construction workers for the 24/7 operation.

Additional impacts of the 24/7 option include impacts of night lighting and additional night noise. These are addressed elsewhere in this report.

5.4.1.5 Low construction rate option

If the construction rate is ~400,000m^3/year the EIS indicates that the following two routes will be considered for the proposed haulage of rock from the GPC-owned quarry to the reclamation area:

- Route 1—crossing Landing Road from state land and use Serrant Road and the materials transport corridor; and
- Route 2—entering Landing Road from state land north of Serrant Road and following Landing Road to the north.

Both Landing and Serrant roads are council-controlled roads.

The most likely option, if a low construction haul rate is selected, will be a combination of Route 1 and Route 2. Loaded traffic will travel down Serrant Road and return via Landing Road unloaded. This will minimise the impact on Landing Road and also minimise truck conflicts.

5.4.1.5.1 Road surface impacts

Impacts to the council road system will depend on the route selected.

Impacts on Serrant Road are anticipated to be minimal. Impacts potentially include:

- pavement damage to Landing and Serrant roads
- traffic impact at the crossing of Serrant Road and Landing Road.

GPC has committed to undertake continual maintenance on Serrant Road during the operational phase.

Impacts on Landing Road are expected to be minimal if trucks are unloaded on the return journey. Should Landing Road be used by loaded trucks impacts could be significant and major upgrade works may be required.

In the past where roads have been used for the transport of gravel material, GPC has upgraded and maintained the roads as required to meet its and the public's needs.

At GRC's request, GPC has agreed to provide a full depth gravel pavement with two coat bitumen spray seal over it for the approved on-road haul route option.

I note GPC has committed to working with the GRC to agree to the appropriate road upgrades and/or providing a monetary contribution.

5.4.1.5.2 Traffic volumes

The EIS indicates that traffic volume impacts on the council road networks traffic volumes, associated the haulage work (15 truck circuits per hour depending on option), are minor and that there a suitable gaps in traffic, therefore no significant traffic mitigation measures are required. However, GPC will ensure that appropriate traffic controls will be established at the relevant intersections, including any temporary signage for construction work. Upgrade works including unsealed shoulders and turning lanes at strategic locations will discussed with GRC to aid traffic flow.

5.4.1.5.3 Road safety

As noted above, the social impact assessment included in the EIS recognises the potential for reduction in road safety for other users of the transport routes between the quarry and the reclamation as a result of the FLPE project. It also recognised that the consequence of such is 'major', likelihood 'high', impact 'negative' and duration 'medium'.

5.4.1.6 Future development

Final traffic volumes associated with the future development of the Fisherman's Landing wharf have not been included as part of the EIS process. Traffic volumes will depend on industry requirements over time. **I note** that GPC has committed to engage with the relevant agencies and authorities in the traffic planning processes as the area progressively develops.

5.4.1.7 Conclusions

I recognise that the approval for the haul route lies outside the scope of this report and is subject to a concurrent approvals process. However, in general, **I am satisfied** that the impacts on the council road network of the rock haulage requirements for the project can be managed by minor upgrading and sealing works to be agreed with the GRC.

I have imposed a condition (Appendix 1, Schedule C, Condition 1) to ensure that any impacts on the council road network are appropriately managed.

Figure 5—Potential haul routes - EIS *(Figure 6-6 EIS)*

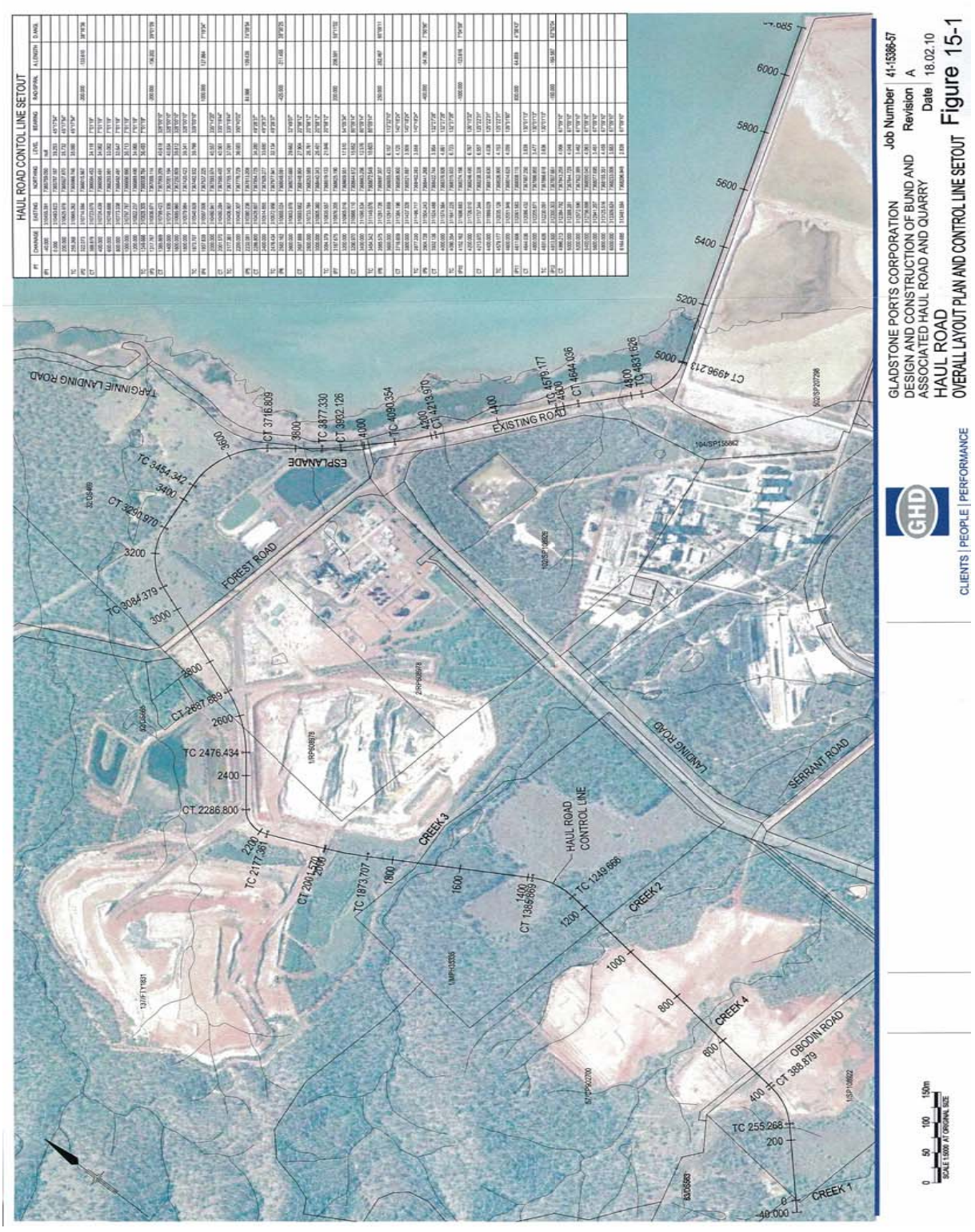

Figure 6—Potential haul route - 24/7 option (Figure 15-1 supplementary document**)**

5.4.2. Airport impacts

5.4.2.1 Context

All developments in the vicinity of airports, aerodromes and airfields must take into consideration the specifications stated in the Civil Aviation Safety Authority's (CASA) *Manual of Standards Part 139 - Aerodromes.* The manual contains specification (standards) prescribed by CASA of uniform application, determined to be necessary for the safety of air navigation including obstacle restrictions and limitations and is incorporated in the *Civil Aviation Safety Regulations Part 139 - Aerodrome Certification and Operation* by reference.

The closest operational airport to the proposed FLPE and quarry is the Gladstone airport. The project is not expected to adversely impact the operations of the Gladstone airport. Separate investigations will be carried out for the construction of any structure on the completed reclamation.

The project is also not expected to impact of any future airport proposal for Kangaroo Island (included in the Calliope Shire Council Planning Scheme 2007). However, GRC, in its submission on the EIS, expressed concern about the potential for future development on the reclaimed land to impact on a future airport. The EIS indicated that any future development on the reclaimed land will require separate approval and impacts on current and future airspace must be considered at that time. GRC has suggested that the Gladstone Port Land Use Plan needs to be updated to include restrictions on building and infrastructure on the site not to exceed 40 metres in height to avoid projection into the operational airspace around a future airport on Kangaroo Island.

5.4.2.2 Conclusions

The construction of the reclamation area and the dredging related to the project are not expected to impact on the Gladstone airport operations.

I acknowledge that future development proposed to be located on the reclaimed area will undergo relevant assessment including assessment of potential impacts on airport operations (current and future). However, **I have stated** a condition (Appendix 1, Schedule C, Condition 2) to ensure CASA requirements are met in relation to aviation matters for future development on the reclaimed area.

5.4.3 Maritime issues

The EIS does not provide details of future shipping requirements for the expanded port facilities as these are unknown at this time and are is out of the scope of this EIS process.

In its submission on the supplementary document, the Department of Transport and Main Roads (DTMR) has indicated certain requirements that should be met by the GPC prior to any construction of dredging works. DTMR has indicated that mitigation measures may require provision of new or modification to existing aids to navigation (AtoN) systems and infrastructure, vessel traffic service (VTS) systems and infrastructure and ship-sourced pollution prevention systems. DTMR has sought a firm commitment from GPC to guarantee required funding and implementation timetables.

I have stated a condition (Appendix 1, Schedule A, Condition 11) to address maritime safety in the area during construction and dredging.

5.5 Environmental management of site

5.5.1 Air emissions

5.5.1.1 Air quality

The EIS states that only minor impacts on air quality are expected from the project, with some vehicle emissions and dust generation along the haul routes and at the bund wall construction during placement of capping material on the final reclamation surface and dredge emissions during dredging. Dust will be managed through the use of water trucks as required and vehicle emissions will be kept to a minimum through regular vehicle maintenance , good driving practices and ensuring standard emission reduction

devices remain on all vehicles. Emissions from dredge equipment will also impact on air quality although only to a minor degree. **I am satisfied** that the level of air emissions that may be generated by this project are minor and will be appropriately managed by the proponent undertaking the mitigation measures proposed in the EIS and formalising them in the project's construction EMP.

5.5.1.2 Greenhouse gas emissions

Appendix F of the EIS provides an assessment of the potential greenhouse gas emissions of the project. The EIS indicates that approximately 33,300 tCO_2-e of greenhouse gas will be produced during the project with almost 90 percent of these emissions being due to the dredging activities. Other sources of emissions identified include:

- transportation of bund armour and core material from the quarry to the reclamation area
- embodied emissions from the manufacturing of the geotextile material to be used to line the bund
- diesel fuel consumption of the on-site machinery.

The EIS also outlines several mitigation options to reduce greenhouse gas emissions including defining the most direct and efficient haulage route from the quarry to the reclamation area, sourcing the dredge material from the closest possible dredging operations, encouraging efficient driving methods by the truck and machinery operators to reduce the amount of fuel used and sourcing geotextile manufactured from recycled PET plastics.

I am satisfied that the level of greenhouse gas emissions that may be generated by this project are relatively minor and may be reduced by the proponent undertaking the mitigation measures proposed in Appendix F the EIS and formalising of these in the project's air quality component of the construction EMP.

I have stated a condition (Appendix 1, Schedule A, Condition 12) to manage the finalisation of the project's EMPs including the air quality component.

5.5.2 Noise and vibration

The EIS identifies a range of potential noise and vibration sources from project activities including:

- general earthworks (including fill and compaction)
- truck movements for delivering rock and core material to the site
- construction worker traffic entering and leaving the site
- dredging
- general car traffic
- heavy vehicle carriers delivering the mobile plant at the start and end of construction
- quarry operations.

Potential noise impacts on sensitive receptors, including residences as close as 2.5km to the reclamation area and a protected area 2.5 km from the site, were assessed for the project.

Noise modelling results presented in section 10 of the EIS indicate that noise impacts from the site would be in the order of 26 decibels (dB(A)) to 34dB(A), depending on the activity(s) being undertaken, at the nearest residential receiver, which is located on Fisherman's Road, approximately 2.5 km from the construction site. This is below the night-time targets tabled in the EIS (Tables 10-7 and 1-8). The sleep disturbance 45dB(A) L_{max} noise goal is also expected not to be exceeded. At other residential receivers, noise impacts are expected to be 20dB(A) or less. These levels are below current ambient and background noise levels.

Predicted noise levels at the protected area is 32dB (A) and is expected to be similar to the ambient noise levels experienced in this area. Modelling suggests that noise levels experienced on nearby tidal flats will range from 40-55 dB(A). These levels are similar to noise levels experienced adjacent to other sites within the GSDA and comparable to noise levels in natural environments during windy conditions or experiencing elevated insect noise.

The EIS indicated that construction activities will be undertaken between the hours of 6:30am and 6:30pm, Monday to Friday. Any works scheduled outside of these hours (i.e. additional work required or if the 24/7 option is used) will comply with the night-time site specific noise criteria identified for the two sensitive receivers.

The EIS indicates that the nature and levels of vibration emitted by equipment at the site will vary with the activities being carried out. However, vibration investigations undertaken for the EIS indicate that there should be no appreciable impact at all sensitive receivers.

Environmental impacts associated with noise on marine fauna and shorebirds are addressed in sections 5.2.6 and 5.2.8 of this report.

Noise mitigation measures have been included in the EMP for the project. These include:

- all combustion engine plant, such as generators and compressors will be checked to ensure they produce minimal noise
- vehicles will be kept properly serviced and fitted with appropriate mufflers
- where practical, machines will be operated at low speed or power and will be switched off when not being used rather than left idle for prolonged periods
- machines found to produce excessive noise, compared to industry best practice, will be removed from the site or stood down until repairs or modifications can be made
- controls will be placed on vehicles which use reversing alarms/beepers (if identified as an issue during works).

Table 15-2 of the supplementary document provides additional construction noise and vibration management controls. **I note** this includes a noise and vibration complaints monitoring and management component.

I am satisfied that the potential noise and vibration impacts on local residents and marine and terrestrial fauna will be minor and can be managed through the inclusion of appropriate management controls in the project's Construction EMP.

I have stated a condition (Appendix 1, Schedule A, Condition 12) to manage the finalisation of the project's EMPs including the noise and vibration component.

5.5.3 Lighting

Although the EIS states that no construction will be undertaken at night, the supplementary document, as noted above, proposes a second option of road haulage and bund construction which would involve operations 24/7.

5.5.3.1 Dredging

Dredging associated with the Targinie channel and Fisherman's Landing swing basin will be undertaken as 24 hour a day operation and the lighting on the dredge and supporting vessels required to maintain safe shipping will be specified by Marine Safety Queensland (MSQ).

5.5.3.2 Day time haulage and construction option

If the day time operation option is used for the project, the only lighting to be provided on the reclamation area (during construction and operation) will be navigational lights as per MSQ requirements. As this type of lighting is already in use in the port area, the impacts from navigational lights are expected to be very minor for local residents and marine and terrestrial fauna.

5.5.3.3 24/7 haulage and construction option

The supplementary document indicates that lighting requirements for the nights works are likely to consist of:

- reclamation area
  - two mobile lighting towers (4 to 6 lights each tower) at each work face (likely to be three)
  - one mobile tower at each change in direction and turn-around points

- haul route
  - temporary lighting towers at all changes in direction points, intersections, major creek crossings and intervals along the haul route.

The lights will be directionally controlled and shielding may also be used to minimise light spill that could cause nuisance to residents, motorists, other users of adjacent land and marine and terrestrial fauna (including wading/migratory bird species).

5.5.3.4 Conclusion

Environmental impacts associated with lighting during construction of the reclamation and dredging have been covered earlier in this report. **I note** the supplementary document proposes a mitigation strategy which involves implementing lighting solutions to reduce potential marine fauna attraction to the site. Management of lighting will be included in the construction and operational EMPs. Based on my assessment of the information provided throughout the EIS process, **I concur** with the findings that there will only be minimal impacts from lighting on the public, marine birds and nocturnal marine fauna.

5.5.4 Hazard and risk

A hazard and risk assessment conducted for the EIS identified the nature and scale of hazards that may occur during the construction of the reclamation bund, haulage of rocks for construction from the quarry, dredging, and filling and decanting from the bund. High risks identified for the project include:

- increased traffic during construction phases
- construction work accidents
- failure or subsidence of reclaimed land
- disturbance of potential acid sulfate soils
- vessel collision
- vessel collision with the bund wall
- damage due to cyclone.

Opportunities to mitigate these potential risks are noted in Table 16-7 of the EIS. These issues will also be covered in the EMP's relevant management plans. The proponent has committed to prepare a number of emergency response plans (ERP) to guide those responding to potential emergency situations, such as oil spill, fire and explosion and natural hazard.

The EIS indicates that GPC prepares a risk management plan (RMP) for the life of all of its projects. **I note** that GPC commits to engage with the Queensland Police Service, Department of Community Safety and other relevant agencies in the development of the RMP and the ERP, including high level planning.

I have imposed a condition (Appendix 1, Schedule C, Condition 3) to assist with the management of emergency situations which may arise as a result of the project.

5.5.5 Health and safety

The EIS identifies air quality, noise levels and community safety as the main community values for public health and safety that may be affected by the construction of the reclamation bund, haulage of rocks for construction from the quarry, dredging, and filling and decant from the bund. The EIS also addresses worker health and safety and provides a qualitative summary of worker hazards, consequences and mitigation measures. The implementation of workplace health and safety procedures and the EMP's relevant management plans aims to minimise the potential risks to workers and the community to an acceptable level 'no harm' level. These documents will include measures to address the risk to plant operators and haulage vehicles if the 24/7 construction option is used.

6. Environmental management plans

Potential environmental issues requiring attention have been identified during the impact assessment process. The purpose of the construction and operations environmental management plans (EMP) is to detail the actions, procedures and responsibilities to be carried out during the implementation of the project in order to mitigate adverse and enhance beneficial environmental and social impacts.

The objectives of the EMPs are to provide:

- a practical framework for establishing best practice environmental management standards and guidelines to mitigate potential environmental harm for each activity
- a mechanism to assist managers, supervisors and construction crews to comply with current legislation
- a means of identifying environmental issues and to provide general procedures which must be considered when undertaking construction and operational activities
- a mechanism to reduce the potential impacts of construction and operational activity
- a preliminary basis for establishing environmental due diligence during the construction and operational phases.

The EMP establishes the framework, including environmental protection objectives, standards, measurable indicators and control strategies (i.e. to demonstrate how the objectives will be achieved), to ensure that the measures are implemented during each stage of the project.

This is also achieved by specifying the monitoring, reporting and auditing requirements, with nominated responsibilities and timing, to ensure that the commitments are met. The EMP also identifies corrective actions if monitoring indicates that the performance requirements have not been met.

Draft EMPs for each stage of the project including bund construction, dredging, dredge disposal in bunded area and capping and stabilisation of the bunded area, were provided in Chapter 18 of the EIS. These draft EMPs outline commitments to protect the environmental values potentially affected by construction of the land areas and dredging. These commitments include environmental protection objectives, standards, measurable indicators and control strategies (to demonstrate how the objectives will be achieved).

Elements included in the draft EMPs include:

- marine water quality
- flora and fauna
- storage and handling of hazardous substances
- waste management
- noise and vibration
- air quality (including greenhouse gas emissions)
- visual and amenity
- traffic and site access
- health and safety
- mosquitoes and biting midges
- environmental emergence procedures
- management and staff responsibilities
- staff environmental training
- cultural heritage
- fire ants.

GPC or their appointed construction contractor will prepare a detailed construction phase EMP that must address the requirements set out in the draft EMP. The EMP (Construction) will take into consideration the specific construction methods proposed and tailor appropriate mechanisms, monitoring and reporting requirements to these methods. Other specific management plans that will be prepared prior to project commencement include:

- dredge management plan (including water quality)
- acid sulfate soils management plan
- traffic management plan.

The EMPs will be refined and expanded following release of this report; during the detailed design phase of the project and through consultation with the regulators.

The EMPs will become reference documents because they convert the undertakings and recommendations of the environmental studies into a set of actions and commitments to be followed by the designers, constructors and future operators of the proposed project.

The EMPs will also serve as the benchmark for measuring the effectiveness of environmental protection and management. This can be achieved by specifying the monitoring, reporting and auditing requirements, with nominated responsibilities and timing, to ensure the necessary mitigation measures are met. The EMPs also provide, as appropriate, for unforseen events by outlining corrective actions that may be implemented in these situations.

The EMP for the project is required to be finalised prior to commencement of works and must include all relevant approval conditions arising from the project's approval and subsequent permits, authorities and/or licences.

I have stated a condition (Appendix 1, Schedule A, Condition 12) to ensure avoidance or minimisation of environmental impacts of the FLPE project.

7. Conclusion

Having regard to the documentation provided during the EIS process for the FLPE project , I am satisfied that the requirements of the Queensland government for impact assessment in accordance with the provisions of part 4 of the SDPWO Act have been met.

I find that the EIS process has provided sufficient information to government and to the community to allow an informed evaluation of potential environmental impacts which could be attributed to the project.

I am satisfied that careful management of the key construction and operational activities should ensure that any potential environmental impacts will be avoided or minimised.

I note that development of the project will proceed in accordance with a suite of EMPs for the development and the proponent has committed to finalising these plans in consultation with DERM and other regulatory agencies.

In reaching a conclusion on the acceptability or otherwise of the management of potential impacts of the project, **I have considered** the draft EMPs.

Where necessary, **I have stated** conditions that the GPC and other relevant entities are to adhere to.

On the basis of the information provided, including advice from advisory agencies, **I am satisfied** that the adverse environmental impacts associated with the project are able to be addressed through:

- implementation of conditions listed in Appendix 1 of this report, as conditions for aspects of the project that are subject to a development approval under SPA
- obtaining relevant environmental authorities from DERM under the EP Act
- finalisation and implementation of the project EMPs and DMP
- implementation of the project generally in accordance with the arrangements described in the EIS, supplementary document and the project commitments, unless otherwise amended in this report.

I consider that there is a need for the proposed development as it will provide additional wharves and storage area for future industries locating in the GSDA and it will provide an area for disposal of capital and maintenance dredge spoil for the FLPE project and future port-related projects. This project is a key component of Queensland's import and export chain and assists in encouraging industries to develop within the Gladstone region.

I note that aspects of the project, such as the dredging methodology as described in the EIS have been formulated in a preliminary sense only. Detailed plans will be formulated for approval by GPC and DERM as assessment managers as the project is implemented.

I recommend that the project, as described in detail in the EIS and supplementary document and summarised in Section 2 of this report, can proceed, subject to the conditions contained in Appendix 1 of this report.

In the event of any inconsistencies between the EIS documents and the conditions in this report, the conditions in this report prevail.

GPC and its agents must implement the conditions and recommendations of this report and all commitments presented in this report.

Copies of this report will be issued to:

- GPC (the proponent)
  - pursuant to section 35(5)(a) of the SDPWO Act and
  - as assessment manager for a development permit for tidal works under the SPA
- DERM as assessment manager for material change of use for ERA 16 (Dredging) under the EP Act and associated Regulation
- DEEDI as assessment manager for development permit for operational works for disturbance of marine plants under the *Fisheries Act 1994*/SPA.

Copies of the report will be also issued to agencies responsible for implementation of conditions including:

- GRC
- DTMR.

Copies of the report will also be made available to the proponent's two shareholding Ministers.

In accordance with section 35(5)(b) of the SDPWO Act, a copy of this report will also be made available on the DIP web site at: www.dip.qld.gov.au.

8. Acronyms and abbreviations

ANZECC	Australian and New Zealand Environment Conservation Council
ASS	Acid sulfate soils
CG	Coordinator-General
CHMP	Cultural Heritage Management Plan
DCS	Department of Community Safety
DEEDI	Department of Employment, Economic Development and Innovation
DERM	Department of Environment and Resource Management
DEWHA	Department of Environment, Water Heritage and the Arts
DMP	Dredge management plan
DoC	Department of Communities
DTMR	Department of Transport and Main Roads
EIL	Environment investigations level
EIS	Environmental impact statement
EMP	Environmental management plan
EP Act	*Environmental Protection Act 1994*
EPBC Act	*Environment Protection and Biodiversity Conversation Act 1999*
ERA	Environmentally Relevant Activity (under EP Act)
ERP	Emergency response plan
EVR	Endangered, Vulnerable, Rare (species)
FLPE	Fisherman's Landing Port Expansion project (the project)
GRC	Gladstone Regional Council
GSDA	Gladstone State Development Area
IEMS	Integrated Environmental Management System
IAS	Initial advice statement (as defined by the SDPWO Act)
IDAS	Integrated Development Assessment System (of the *Sustainable Planning Act 2009*)
IPA	*Integrated Planning Act 1997*
MCU	Material Change of Use
NC Act	*Nature Conservation Act 1994*
NTU	Nephelometric turbidity unit (turbidity indicator)
PASS	Potential acid sulfate soils
PCCC	Port Curtis Coral Coast
QH	Queensland Health
QNCW Reg	*Queensland Nature Conservation Wildlife Regulation 1994*
QPS	Queensland Police Service
QSIA	Queensland Seafood Industry Association
QWQG	Queensland Water Quality Guidelines
RE	Regional ecosystem
RMP	Risk management plan
SDPWO Act	*State Development and Public Works Organisation Act 1971*
SDPWO Regulation	State Development and Public Works Organisation Regulation 1999
Supplementary document	EIS supplementary information document
SPA	*Sustainable Planning Act 2009*
SPL	Strategic port land
SPR	Sustainable Planning Regulation 2009
ToR	Terms of Reference (as defined by the SDPWO Act)
VM Act	*Vegetation Management Act 1999*
WBD	Western Basin Dredging project

Machinery of government changes

Due to machinery of government changes from 26 March 2009 (see *Public Service Department Arrangements Notice* (No.2) 2009), the following changes to Queensland government departments referred to in this report occurred (summarised in Table 1):

Table 1

New department (as of 26 March 2009)	Previous department/s
Department of Employment, Economic Development and Innovation—DEEDI	Department of Primary Industries and Fisheries—DPI&F Department of Mines and Energy—DME Department of Tourism, Regional Development and Industry—DTRDI Department of Employment and Industrial Relations—DEIR
Department of Environment and Resource Management—DERM	Environmental Protection Agency—EPA Department of Natural Resources and Water—DNRW
Department of Transport and Main Roads—DTMR	Department of Main Roads—DMR Queensland Transport—QT
Department of Communities—DoC	Department of Communities—DoC Department of Housing—Housing Department of Local Government, Sport and Recreation—DLGSR Disability Services Queensland—DSQ
Department of Community Safety—DCS	Department of Emergency Services—DES

Appendix 1—Conditions

Schedule A—Coordinator-General's stated conditions for the Fisherman's Landing Port Expansion project

Schedule B—Draft conditions for a development approval for environmentally relevant activities for the Fisherman's Landing Port Expansion project

Schedule C—Coordinator-General's imposed conditions for the Fisherman's Landing Port Expansion project

Schedule D—Jurisdiction table for conditions

Schedule A—Coordinator-General's stated conditions

The schedule contains stated conditions that would attach to a development permit for operational works issued under the *Sustainable Planning Act 2009* for the project. The conditions are taken to be draft conditions for:

- tidal works
- work within a coastal management district.

Water quality

Condition 1

Prior to an application being lodged for a development permit for material change of use or operational works involving disturbance of potential or actual acid sulfate soils, or for approval of a Dredge Management Plan, submit to DERM for consideration a site-specific Acid Sulfate Soil Management Plan. ASS investigations and management plan preparation must be conducted in accordance with:

- State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils
- the SPP 2/02 Guideline: Acid Sulfate Soils, and with reference to the Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland (Ahern et al. 1998)
- the Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines (Dear et al 2002).

The proponent must conduct all works to ensure that no environmental harm as defined under the *Environmental Protection Act 1994* is caused.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

Condition 2

The design, construction materials, and construction methodology for the outer (bund) wall of the reclamation area should be generally in accordance with the details provided in section 3.3 of the EIS, that is:

- only clean rock with fines (<12mm) removed shall be used for the revetment and breakwater walls
- all material used for walls and capping shall be free from contaminants consistent with the *Queensland Draft Guidelines for the Assessment and Management of Contaminated Land Environmental Investigation Levels (1998)*
- no excavation of sediments within the reclamation area is permitted, except in accordance with an Acid Sulfate Soil Management Plan approved by the DERM
- a geofabric liner shall be applied to the internal side of the wall to prevent release of fine sediments from the reclamation area other than through the designated discharge point in accordance with specified discharge limits
- outer rock armour for the reclamation bund walls must be in place within 28 days of completion of bund walls and not more than 100m of unprotected bund wall is to be exposed to prevailing winds at any time
- capping of the reclamation area shall be profiled such that stormwater drains to internal collection and treatment prior to discharge to external waters.

The surface fill material for the reclamation area must be stabilised to resist wind and storm water erosion, in the short and longer terms.

The surface treatment of the reclaimed area must be designed to ensure the leachate of contaminants will be avoided.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

Condition 3

All dredge spoil proposed to be placed in the reclamation area shall be sampled and analysed for contaminants in accordance with the *Draft Guidelines for the Assessment and Management of Contaminated Land (EPA 1998)* prior to dredging.

Any material that exceeds these guidelines shall be subject to a risk assessment to determine the likelihood that contaminants will be mobilised into the surrounding environment and any management and monitoring that is required.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

Condition 4

Prior to application for operational works approval, or approval of a dredge management plan, for the reclamation area, detailed design drawings shall be provided to the DERM demonstrating that appropriate stormwater management will be applied during construction and post-construction such that stormwater discharges will have no adverse impact on receiving water quality. Design drawings must demonstrate that:

- all stormwater from the reclamation area will be adequately contained and treated before discharge, including gross pollutant removal
- the design has regard to short term surface soils or topping material as well as the longer term/finished surface treatment
- the discharge points include appropriate structures to prevent erosion.
- the bund wall must incorporate a 3 percent fall from the outside to inside
- during filling a dedicated decanting point must be established, into which both the tailwaters from the dredged material and any stormwater flow will be directed.
- post-construction, a stormwater system must be installed, which will direct runoff to certain points on the reclamation surface and allow fine material to settle out of suspension before being discharged into the harbour.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

Condition 5

To confirm the accuracy of information contained in the EIS in relation to water quality and ecological impacts and to inform future assessment and regulation of similar activities:

- prior to the commencement of construction of the reclamation area or dredging activities subject to this approval, a monitoring program to assess the impacts from the dredging on water quality and ecological health must be developed and implemented in consultation with DERM and DEEDI (Fisheries Queensland)
- all data obtained from the monitoring program must be made available to DERM within 28 days.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

Marine flora

Condition 6

The proponent must erect a suitably designed temporary barrier immediately seaward of the area of mangroves to be cleared as part of the reclamation works to ensure that sediment released during clearing is effectively contained.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

Condition 7

For any construction and associated works requiring the removal, construction or damage of marine plants as defined under the *Fisheries Act 1994*, the proponent must submit an application for approval of marine plant disturbance to the Chief Executive of DEEDI prior to any works.

The Chief Executive of DEEDI is the entity with jurisdiction for this condition.

Condition 8

The survival and recovery of seagrass and algal communities in the vicinity of the project will be monitored during the construction period and for a minimum of three years following completion of dredging, in accordance with the requirements of the Chief Executive of DEEDI.

The Chief Executive of DEEDI is the entity with jurisdiction for this condition.

Environmental offsets

Condition 9

Prior to the commencement of dredging works for the FLPE project, GPC must:

a) submit documentation to satisfaction of the Coordinator-General that the agreed offset for marine fish habitat (noted in section 5.2.7 of this report) has been secured, or

b) if a) cannot be achieved, submit for approval to the Coordinator-General an alternative offset proposal that is equivalent to or better than the agreed offset for marine fish habitat.

The Chief Executive of DEEDI is the entity with jurisdiction for this condition.

Marine fauna

Condition 10

Prior to the commencement of construction, the proponent must prepare, in consultation with the DERM, a management plan to minimise the risk of trapping mobile marine fauna, especially turtles, dugong and cetaceans (including in the containment area), and to define the actions to be taken in the event of capture.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

Transport

Condition 11

The proponent must, prior to the commencement of construction:

- identify and assess all risks to maritime safety and ship-sourced pollution relating to all stages of the Fisherman's Landing Port Expansion project (i.e. bund construction and related dredging activities)
- define required mitigation measures for identified risks and include details in the following management plans to the satisfaction of the regional Harbour Master Gladstone and General Manager (Maritime Safety Queensland):
  - vessel service management plan
  - aids to navigation management plan
  - ship-sourced pollution prevention management plan

  (Management plans may already be in existence. If so, they may require modification to address this condition.)

- consult with DTMR through the Regional Harbour Master Gladstone and the General Manager (Maritime Safety Queensland) when preparing the management plans and take account of the reviews and incorporate any proposed amendments
- discuss funding arrangements for new and modified maritime infrastructure and systems requirements resulting from the project with DTMR through the Regional Harbour Master Gladstone and the General Manager (Maritime Safety Queensland).

The Chief Executive of DTMR is the entity with jurisdiction for this condition.

Environmental management plans

Condition 12

The proponent and/or its contractor(s) must finalise the FLPE environmental management plans to the satisfaction of DERM at least one month prior to commencement of construction of the project.

The proponent and/or its contractor(s) must comply with all requirements of approved environmental management plans.

The Chief Executive of DERM is the entity with jurisdiction for this condition.

END OF COORDINATOR-GENERAL'S STATED CONDITIONS SCHEDULE A

Schedule B—Draft conditions for environmentally relevant activities

This schedule contains recommended conditions that would attach to a development permit for an environmentally relevant activity issued under the *Sustainable Planning Act 2009* for the dredging components of the project.

The conditions are taken to be draft approval conditions for:

- ERA 16 'extractive and screening activities' consisting of dredging a total of 4 million m^3 of material from the bed of Gladstone harbour.

Condition 1

Any application under the *Sustainable Planning Act 2009* for a development permit for material change of use for dredging (Environmentally Relevant Activity 16) for the FLPE project must be supported by a Dredge Management Plan which details information relating to the potential environmental impacts of the dredging, including:

- dredge type and capacity
- dredging methodology and particularly whether, and to what extent, overflow dredging will be used, and any measures adopted through contractual arrangements for overflow dredging to limit discharge of sediment to waters
- if a trailing suction hopper dredge is used, the design and operational measures to be implemented through contract arrangements with the dredge operator to minimise risk to turtles, and the monitoring and reporting of turtle mortality
- specific minimisation and mitigation strategies to be implemented for potential impacts of light attenuation and sedimentation on seagrass communities, including specific turbidity and/or seagrass impact trigger levels associated with specified and practicable requirements to alter dredging operations to reduce impacts and
- monitoring programs for sensitive ecosystems to demonstrate the effectiveness of proposed mitigation measures.

DEEDI (Fisheries Queensland) must also be consulted in the preparation of the Dredge Management Plan.

Where construction and dredging methods with lower environmental impacts are practical, these methods should be implemented.

The Director-General of DERM is the entity with jurisdiction for this condition.

Condition 2

Any application under the *Sustainable Planning Act 2009* for a development permit for material change of use for dredging (Environmentally Relevant Activity 16) for the FLPE project must be undertaken in accordance with the following:

- the dredging activity must be carried out only within the site shown on Figure 3 of this report
- dredging must not commence until provision has been made to lawfully place or dispose of the dredge material
- dredging must be carried out in accordance with a dredge management plan approved by the DERM
- prior to the commencement of dredging activities, a monitoring program to assess the impacts from the dredging on ecological health and water quality must be developed in consultation with the administering authority and then implemented

- if dredge material is placed in the Fisherman's Landing Port Expansion area Figure 2 of this report, water discharged from the dredge spoil disposal area must comply with the release limits listed in Table 1 - Contaminant release limits to water, of this report
- monitoring must be undertaken and records kept of contaminant releases to waters from the discharge location for the quality characteristics, and not less frequently than specified in Schedule B Table 1 of this report.

The Director-General of DERM is the entity with jurisdiction for this condition.

Condition 3

In relation to placing dredge spoil in the reclamation area:

- water discharged from the reclamation area (drain waters and stormwater) must only be released to surface waters in the vicinity of the north eastern corner of the reclamation area or through approved discharge pond/outlets that are designed to meet the discharge criteria
- water discharged from the reclamation area must comply with the release limits listed in Table 1 - Contaminant release limits to water, of this report
- prior to, or as part of an application for operational works approval, or approval of a dredge management plan for each dredging project proposing to dispose of dredge spoil within the reclamation area subject to this approval, detailed design drawings must be provided to DERM demonstrating that the system of cells, baffles and weir boxes within the outer bund wall of the reclamation area will be effective in ensuring that discharge water will meet the limits specified for suspended sediment and turbidity, taking into account the specific dredge spoil characteristics
- monitoring must be undertaken, and records kept, of contaminant releases to waters from the discharge location for the quality characteristics, as agreed with DERM
- DERM must be notified by telephone, email, or fax of any exceedence of the Release Limits stated in Schedule B Table 1 of this report within 24 hours of becoming aware that an exceedence has occurred.

The Director-General of DERM is the entity with jurisdiction for this condition.

Condition 4

Any application under the *Sustainable Planning Act 2009* for a development permit for material change of use for dredging (Environmentally Relevant Activity 16) for the FLPE project must be supported by conformance with the following activities to minimise risk to turtles and other marine fauna:

- where a trailer hopper suction dredger is used, the drag heads of the dredge vessel shall be fitted with a turtle exclusion device for the duration of the dredging
- operation of the trailer hopper suction dredger shall be in accordance with a written operational procedure forming part of the approved dredge management plan that ensures that the amount of off-bed suction time is minimised to reduce the risk of turtle capture
- any marine fauna captured by the dredge head must be recorded and reported to the DERM and Gladstone Ports Corporation at the end of the dredging campaign.

The Director-General of DERM is the entity with jurisdiction for this condition.

Table 1—Contaminant release limits to water

Monitoring point(s)	Discharge location	Quality characteristics	Type of release limit		
			Minimum	80th percentile	Maximum
W1	Port Curtis outfall	Suspended solids	-		100 mg/L[1]
W1	Port Curtis outfall	Turbidity	-	25 NTU[1]	30 NTU[1]
W1	Port Curtis outfall	pH	6.5	-	9.0
W1	Port Curtis outfall	Ammonia			1 mg/L
W1	Port Curtis outfall	Cadmium (filtered)	-	-	0.7[2]µg/L
W1	Port Curtis outfall	Chromium (filtered)	-	-	4.4[2]µg/L
W1	Port Curtis outfall	Copper (filtered)	-	-	1.3[2]µg/L
W1	Port Curtis outfall	Lead (filtered)	-	-	4.4[2]µg/L
W1	Port Curtis outfall	Mercury (filtered)	-	-	0.1[2]µg/L
W1	Port Curtis outfall	Nickel (filtered)	-	-	7.0[2]µg/L
W1	Port Curtis outfall	Silver (filtered)	-	-	1.4[2]µg/L
W1	Port Curtis outfall	Zinc (filtered)	-	-	15[2]µg/L

1. Limits to be enforced unless it can be demonstrated to DERM in the Dredge Management Plan that a higher limit can still protect the values of the receiving environment. Approval to adjust these limits is required from DERM.
2. Limits for metals are trigger values only. Exceedence of these limits triggers an investigation as per ANZECC/ARMCANZ (2000)

END OF COORDINATOR GENERAL'S DRAFT CONDITIONS FOR ENVIRONMENTALLY RELEVANT ACTIVITIES SCHEDULE B

Schedule C—Coordinator-General's imposed conditions

This schedule contains imposed conditions provided by the Coordinator-General pursuant to part 4 division 8 of the SDPWO Act for aspects of the project that are not subject to a development approval within the Port of Gladstone SPL.

In accordance with section 54A and 54B of the SDPWO Act, **I nominate** that the following imposed conditions apply to the project to the extent that:

- the project does not involve a material change of use that, under the SPA, is impact assessable
- division 4, subdivision 2 and divisions 5, 6, 6A and 7 of the SDPWO Act do not apply to the project.

Transport

Condition 1

If the on-road haul route option is used, the proponent must:

- carry out roadwork upgrades as agreed with GRC to provide for relevant traffic loads
- enter into an agreement with GRC for contributions towards maintenance and pavement impacts upon impacted council roads.

The Chief Executive Officer of GRC is the entity with jurisdiction for this condition.

Condition 2

Once the reclamation is complete, the proponent must seek an amendment to the Land Use Plan (in accordance with section 285 of the *Transport Infrastructure Act 1994*) to include a requirement that all future development on the reclaimed area is in accordance with Civil Aviation Safety Authority (CASA) requirements, such as CASA's *Manual of Standards Part 139 - Aerodromes*, including issues such as building and infrastructure height restrictions/ limitations and lighting.

The Chief Executive Officer of GPC is the entity with jurisdiction for this condition.

Management of site

Condition 3

The proponent must, prior to the commencement of any works, consult with the Queensland Police Service, Department of Community Safety and other emergency services agencies in the development of a risk management plan and emergency response plan, for the all stages of the project.

The Chief Executive Officer of GPC is the entity with jurisdiction for this condition.

END OF COORDINATOR-GENERAL'S IMPOSED CONDITIONS SCHEDULE C

Schedule D—Jurisdiction table for conditions

Appendix	Approval	Condition no.	Agency for jurisdiction
1 Schedule A	CG stated conditions	1	Department of Environment and Resource Management
1 Schedule A	CG stated conditions	2	Department of Environment and Resource Management
1 Schedule A	CG stated conditions	3	Department of Environment and Resource Management
1 Schedule A	CG stated conditions	4	Department of Environment and Resource Management
1 Schedule A	CG stated conditions	5	Department of Environment and Resource Management
1 Schedule A	CG stated conditions	6	Department of Environment and Resource Management
1 Schedule A	CG stated conditions	7	Department of Employment, Economic Development and Innovation
1 Schedule A	CG stated conditions	8	Department of Employment, Economic Development and Innovation
1 Schedule A	CG stated conditions	9	Department of Employment, Economic Development and Innovation
1 Schedule A	CG stated conditions	10	Department of Environment and Resource Management
1 Schedule A	CG stated conditions	11	Department Transport and Main Roads
1 Schedule A	CG stated conditions	12	Department of Environment and Resource Management
1 Schedule B	ERA 16 - dredging	1	Department of Environment and Resource Management
1 Schedule B	ERA 16 - dredging	2	Department of Environment and Resource Management
1 Schedule B	ERA 16 - dredging	3	Department of Environment and Resource Management
1 Schedule B	ERA 16 - dredging	4	Department of Environment and Resource Management
1 Schedule C	CG imposed conditions	1	Gladstone Regional Council
1 Schedule C	CG imposed conditions	2	Gladstone Ports Corporation
1 Schedule C	CG imposed conditions	3	Gladstone Ports Corporation

END OF JURISDICTION TABLE FOR CONDITIONS SCHEDULE D

END OF APPENDIX 1

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