Port of Gladstone Gatcombe and Golding Cutting Channel Duplication Project

Channel Duplication Project Draft Offset Strategy

Gladstone Ports Corporation

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Acronyms and abbreviations

Abbreviation	Explanation
AEIS	Additional information on the EIS
BUF	barge unloading facility
CG report	Coordinator-General's report for an environmental impact statement for the Western Basin Dredging and Disposal Project
Cth	Commonwealth
DMPA	dredged material placement area
DoE	Department of Environment
DSEWPC	Department of Sustainability, Environment, Water, Population and Communities
EHP	Department of Environment and Heritage Protection
EIS	Environmental Impact Statement
EP Act	*Environmental Protection Act 1994* (Qld)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
ERA	environmentally relevant activity
Fisheries Act	*Fisheries Act 1994* (Qld)
FLPEP	Fisherman's Landing Port Expansion Project
GBRWHA	Great Barrier Reef World Heritage Area
GPC	Gladstone Ports Corporation Limited
ha	hectares
HES	high ecological significance
km	kilometres
LAT	lowest astronomical tide
m	metres
Mm^3	million cubic metres
MLES	matters of local environmental significance
MNES	matters of national environmental significance
MSES	matters of state environmental significance
Mtpa	million tonnes per annum
NC Act	*Nature Conservation Act 1992* (Qld)
Offsets Act	*Environmental Offsets Act 2014* (Qld)
Offsets Regulation	*Environmental Offsets Regulation 2014* (Qld)
Offsets Policy	Queensland Environmental Offsets Policy (Version 1.6, June 2018)
Project	Gatcombe and Golding Cutting Channel Duplication Project
Qld	Queensland
RIMReP	Reef 2050 Integrated Monitoring and Reporting Program
Reef 2050	Reef 2050 Long-Term Sustainability Plan
SDPWO Act	*State Development and Public Works Act 1971* (Qld)
SDAP	State Development Assessment Provisions
SID	Supplementary Information Document
TSHD	trailing suction hopper dredger
WBDDP	Western Basin Dredging and Disposal Project
WBE	Western Basin Expansion

1 Introduction

1.1 Overview

Both the Commonwealth and Queensland Government have offset policies. The basic principle of both policies is that offsets are required for certain developments where there is an unavoidable impact on significant environmental values. To counterbalance this loss, offset actions, which can include improvement and protection of alternative sites and/or actions that improve environmental viability, can provide a conservation outcome that is deemed to be equivalent to the value being lost.

This draft offset strategy describes Gladstone Ports Corporation Limited's (GPC) approach for delivering offsets for the Gatcombe and Golding Cutting Channel Duplication Project (the Project) as part of the Environmental Impact Statement (EIS) and approvals process.

1.2 Background

The Project involves the duplication of the existing Gatcombe and Golding Cutting shipping channels to provide a duplicated channel parallel to the main shipping channels with sufficient depth and width to allow improved two-way passage into and out of the Port under all weather and tidal conditions. The Project involves the dredging of seabed material within the Port of Gladstone and the placement of dredged material for beneficial reuse purposes within the Port.

The Project involves a range of activities, including:

- Construction of the Western Basin Expansion (WBE) reclamation area bund walls and a barge unloading facility (BUF) adjacent to the existing Western Basin (WB) reclamation area prior to dredging commencing
- Initial dredging works of approximately 0.25 million cubic metres (Mm^3) of seabed material (including dredging tolerance) to establish a 2.3 kilometre (km) long barge access channel to a depth of -7 metres (m) lowest astronomical tide (LAT) to allow barges to transport dredged material from the Gatcombe and Golding Cutting bypass shipping channels to the BUF adjacent to the existing Western Basin reclamation area
- Dredging approximately 12.6Mm^3 of seabed material (including dredging tolerance) to deepen the existing Gatcombe and Golding Cutting bypass shipping channels. The preferred dredging methodology involves utilising a trailing suction hopper dredger (TSHD) which loads the dredged material from the Gatcombe and Golding Cutting shipping channels into barges (four barges will be working in cycles for the entire dredging operation). The barges will transport the material to the BUF adjacent to the existing Western Basin reclamation area to be unloaded using large excavators into trucks for beneficial reuse within the existing Western Basin and WBE reclamation areas. The proposed duplicate channels will be approximately 15km long and dredging is proposed to be undertaken to an ultimate depth of -16.1m LAT, with a channel width (toe to toe) of 200m.
- Dredged material placement for beneficial reuse within the Western Basin and WBE reclamation areas
- Provision of supporting services to the Project activities
- Removal, relocation and installation of new navigational aids
- Demobilisation of dredging operation
- Project maintenance phase activities, including:
  - Reclaimed land surface stabilisation and maintenance activities on the reclamation areas
  - Final land uses on reclaimed land (i.e. stormwater ponds, port and port-related industry with three to four wharves attached to the northern reclamation area)

- Maritime operations within duplicated channels
- Maintenance dredging within the duplicated channels.

Figure 1 shows the location of the Project activities.

The draft Project EIS (statutory public display version) and the Additional Information on the EIS (AEIS) identified a number of values that are considered 'prescribed environmental matters' for which offsets may be imposed. Offsets proposed to address potential residual impacts of the Project on matters of national environmental significance (MNES) and matters of state environmental significance (MSES) are discussed in Chapter 9 (nature conservation) of the AEIS.

1.3 Purpose of report

This report provides a draft offset strategy for the Project which contains draft offset strategy options for considering during the preparation of the final Project offset strategy which will address both the Commonwealth and Queensland offset requirements.

Environmental offsets for the Project are governed by the following:

- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and associated Environmental Offsets Policy (October 2012)
- *Environmental Offsets Act 2014* (Qld) (Offsets Act) and associated Queensland Environmental Offsets Policy (Version 1.6) (June 2018) and Regulations.

The purpose of this draft offset strategy is to:

- Summarise the Commonwealth and Queensland Governments' offset requirements and policies
- Discuss the GPC Whole of Port Offset Strategy (March 2010) and relevance to the Project
- Identify the environmental values that exist within the Project impact areas that may require offsetting after avoiding, mitigating and managing potential impacts
- Outline the Project's proposed draft offset options.

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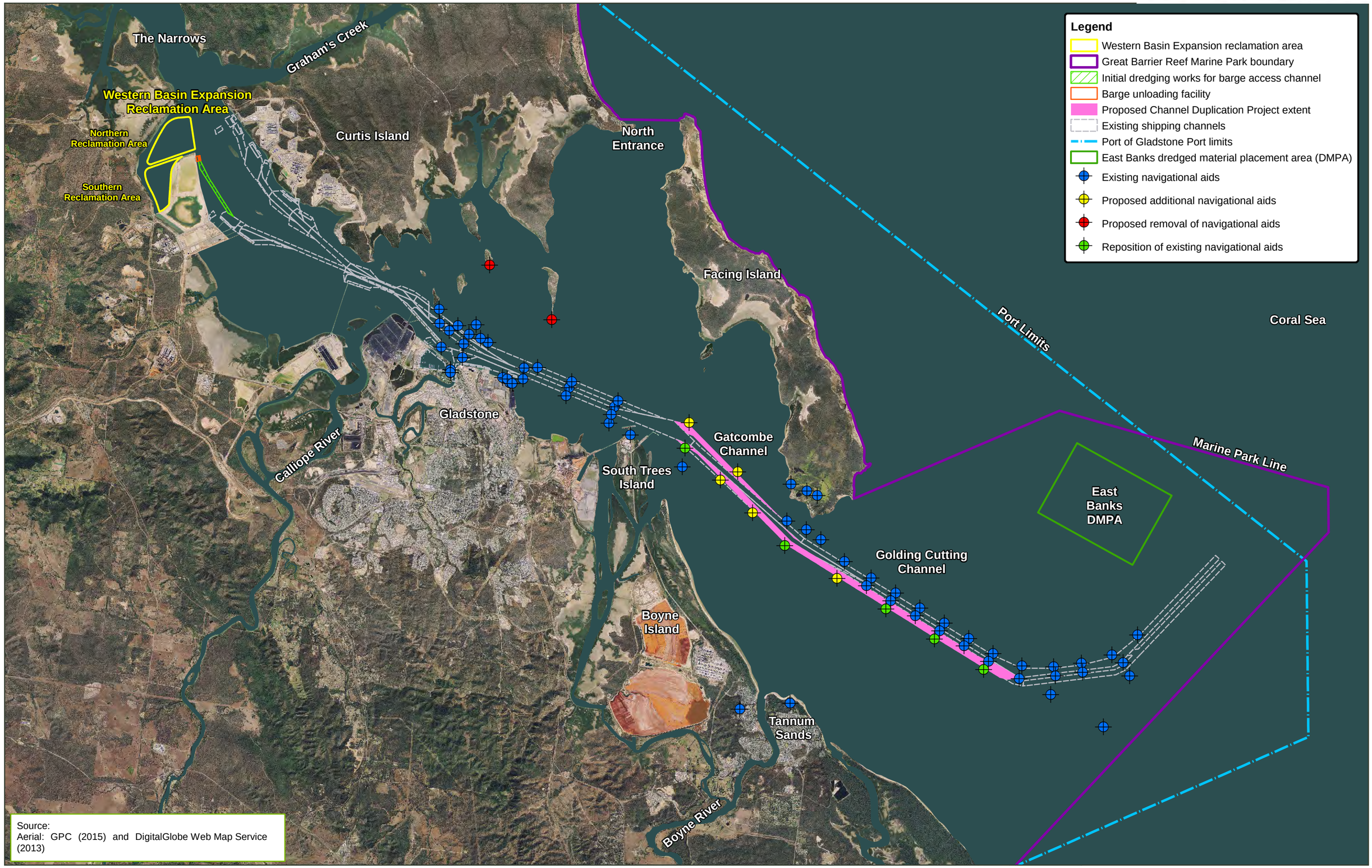

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Gatcombe and Golding Cutting Channel Duplication Project

Figure 1: Location of Project activities

2 Legislative context

2.1 Commonwealth

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

Overview

The EPBC Act provides that any action (i.e. a project, development, undertaking, activity or series or activities) that has, will have, or is likely to have a significant impact on a MNES, or other matters protected under the EPBC Act such as the environment of Commonwealth land, requires approval from the Commonwealth Environment Minister.

On 23 October 2012, the Project was declared to be a 'controlled action' for which an EIS is required under the EPBC Act. The controlling provisions for the Project are:

- World Heritage properties (Sections 12 and15A)
- National Heritage places (Sections 15B and 15C)
- Listed threatened species and communities (Sections 18 and 18A)
- Listed migratory species (Sections 20 and 20A)
- Commonwealth marine areas (Sections 23 and 24A)
- Great Barrier Reef Marine Park (Sections 24B and 24C).

Approval is required from the Commonwealth Environment Minister prior to any action in relation to the Project being undertaken. Assessment of the Project under the provisions of the EPBC Act is being undertaken at the same time as the Queensland Government EIS assessment under the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act), with one EIS covering the requirements of both assessments.

Environmental offsets may be required either under the Commonwealth conditions of the decision notice or in accordance with the Offsets Act. The Offsets Act identifies each of the controlling provisions above as 'prescribed environmental matters', for which offsets may be required. The Offsets Act cannot however impose the provision of an offset for a matter which is related to an area for which there is an existing Commonwealth condition (refer to Section 2.3 for further discussion).

EPBC Act Environmental Offsets Policy (October 2012)

The EPBC Act Environmental Offsets Policy outlines the Commonwealth Government's approach to the use of environmental offsets under the EPBC Act. Where appropriate, offsets are considered during the assessment phase of an environmental impact assessment (e.g. EIS) under the EPBC Act. Offsets are only required if residual impacts are 'significant' (DSEWPC 2012).

If determined that an offset is required under the EPBC Act, then an offsets package would be proposed.

2.2 Queensland

2.2.1 Environmental Offsets Act 2014

Overview

The Offsets Act and associated *Environmental Offsets Regulation 2014* (Qld) (Offsets Regulation) seek to *counterbalance the significant residual impacts of particular activities on prescribed environmental matters through the use of environmental offsets*. The Offsets Act establishes a framework to regulate the delivery of offsets in Queensland, integrating the previous multiple sets of policies in a manner which provides an outcome-based approach and reduces duplication.

Under the Offsets Act, an environmental offset is defined as *an activity undertaken to counterbalance a significant residual impact of a prescribed activity on a prescribed environmental matter*. The Offsets Act defines the type of activities for which offsets may be imposed (i.e. prescribed activities), where these activities are determined to result in a significant residual adverse impact, and requires that an environmental offset must achieve a conservation outcome for the impacted prescribed environmental matter.

To achieve the purpose of the Offsets Act, the Queensland Environmental Offsets Policy (Version 1.6, June 2018) (Offsets Policy) has been developed to provide further guidance on the requirements for the assessment of 'significant residual adverse impacts', and accepted methods for the delivery of offsets, where required.

Queensland Environmental Offsets Policy (Version 1.6, June 2018)

The purpose of the Offset Policy is to provide a decision-support tool to enable administering agencies to assess offsets proposed to ensure they meet the requirements of the Offsets Act.

The policy can be considered for all offsets:

- Where the offset proposal (notice of election) is submitted before an authority is granted, or
- Following granting of an authority containing a condition for an offset under the Offsets Act.

In addition, an environmental offset is only required if residual impacts from a prescribed activity constitute a significant residual adverse impact. In identifying whether an activity will or is likely to have a significant residual impact, an administering agency may refer to:

- The Queensland guideline that provides guidance on what constitutes a significant residual adverse impact for MSES
- The Commonwealth significant impact guidelines for what constitutes a significant residual adverse impact on MNES
- Any relevant local government significant impact guideline for matters of local environmental significance (MLES).

For staged offsets, the full extent of potential impacts on prescribed environmental matters from the entire proposal needs to be taken into account as part of the significant residual adverse impact test (DES 2018). For offsets to be provided in stages, the authority will need to include a condition that enables the project and offsets to be staged.

Relationship between Commonwealth and State government offsets

To avoid duplication of offset conditions between the Commonwealth and State agencies, the Offsets Act requires that the administering agency, in deciding whether to apply an offset condition, must consider any relevant offset condition that has already been imposed on an authority issued under another Act for the same or substantially the same prescribed impact on the same or substantially the same prescribed environmental matter.

2.3 Relevance to Project

'Prescribed environmental matters' for which offsets may be imposed are outlined in Section 5 and Schedule 2 of the Offsets Regulation, and include the following triggers applicable to the Project:

- MNES:
  - A threatened species within the meaning of the EPBC Act
  - A migratory species within the meaning of the EPBC Act.
- MSES
  - Protected wildlife habitat for an animal that is endangered wildlife or vulnerable wildlife or a special least concern animal
  - A wetland of high ecological significance (HES) shown on the map of referable wetlands
  - A marine plant within the meaning of the *Fisheries Act 1994* (Qld) (Fisheries Act).

Under the Queensland Offset framework an offset can only be imposed if the Commonwealth has not already considered impacts on the prescribed activity under the relevant Commonwealth Act.

Subsection 15 (1) of the Offsets Act states:

1. *An administering agency may impose an offset condition on an authority only if–*
   - a) *the same, or substantially the same, impact has not been assessed under a relevant Commonwealth Act; and*
   - b) *the same, or substantially the same, prescribed environmental matter has not been assessed under a relevant Commonwealth Act.*

This is relevant to the Project for those prescribed environmental matters subject to offsets which are listed as MNES and MSES (i.e. shorebird habitat, Green turtle foraging habitat and Dugong foraging habitat which is considered a MNES for listed threatened and migratory species and MSES for protected wildlife habitat) refer Section 5 for further details.

3 Types of offsets under the Commonwealth and State government policies

3.1 Commonwealth

In accordance with the EPBC Act Environmental Offsets Policy (2012), a proponent may provide:

- Direct offsets, or
- Other compensatory measures.

Each of these offset types are discussed below.

Offsets should align with conservation priorities for the impacted protected matter and be tailored specifically to the attribute of the protected mater that is impacted in order to deliver a conservation gain.

3.1.1 Direct offsets

Direct offsets are those actions that provide a measurable conservation gain for an impacted protected matter. A minimum of 90 percent of the offset requirements for any given impact must be met through direct offsets (DSEWPC 2012).

A conservation gain may be achieved by:

- Improving existing habitat for the protected matter
- Creating new habitat for the protected matter
- Reducing threats to the protected matter
- Increasing the values of a heritage place, and/or
- Averting the loss of a protected matter or its habitat that is under threat.

In the marine environment, a conservation gain may include improving protection of important protected species habitat, such as seagrass, or by addressing pressures on the protected matter or its habitat, such as removing derelict fishing nets and other marine debris.

3.1.2 Other compensatory measures

Other compensatory measures lead to benefits for the impacted protected matter, for example, funding for a research or education program, and should relate to the impacted aspect of the protected matter. The EPBC Act Environmental Offsets Policy (2012) Appendix A provides requirements for other compensatory measures.

3.2 Queensland

In accordance with the Offsets Policy (Version 1.6), a proponent may provide a:

- Proponent-driven offset
- Financial settlement offset, or
- Combination of either of the above
- Advanced offsets.

Each of these offset types are discussed below.

3.2.1 Proponent-driven offsets

A proponent-driven offset may take the form of a traditional land-based offset and be undertaken through actions under a Direct Benefit Management Plan or a combination of both. Under this option, the offset delivery liability remains with the proponent, and the offset must be delivered in accordance with an Offset Delivery Plan approved by the administering agency.

In this case, the offset is to result in a conservation outcome for the impacted prescribed environmental matters and is to be delivered on land that is either:

- Owned by the proponent, or
- Subject to contractual arrangement between the proponent and offset provider(s), and any other relevant third party for delivery of the offset.

Offset obligations for a proponent-driven offset would only cease once the administrating authority is satisfied that the offset has achieved its purpose in full, and that the offset has been secured for at least the same duration as the impacts upon the prescribed environmental matter arising from the prescribed activity (DES 2018).

It is important to note that the opportunities for proponent-driven offset options for the Project are likely to be minimal given the marine and intertidal nature of the ecological values required to be offset by the Project.

3.2.2 Financial settlement offset

A proponent can meet an offset requirement for impacts on marine or terrestrial environments by providing a payment in accordance with the Offsets Policy (Version 1.6).

The financial settlement payment amount must be calculated in accordance with the Financial Settlement Offset Calculation Methodology. The web-based Financial Settlement Offset Calculator on the Queensland Government website may be used to support this calculation. The calculator provides prospective financial offset amounts based on spatial impact (hectares (ha)) to prescribed marine areas, including fish habitat, protected marine park zones, fish passage areas, wetlands and marine plants (DES 2018).

Compensatory measures tend to be an important component of offsets for marine works given the difficulty and complexity of implementing direct offsets in the marine environment.

3.2.3 Advanced offsets and ‘credits’ from staged offsets

Where a proponent has undertaken a land-based offset for a staged project and it has resulted in an offset ‘credit’ at the end of the project, this excess may be registered as an advanced offset. A credit may be determined where the significant residual impact on the prescribed environmental matters was less than the offset provided. A credit can be registered with the Department of Environment and Science (DES). Where DES has approved and registered a credit as an advanced offset, the advanced offset can be used by the proponent, or another proponent, for future development.

This draft offset strategy will be finalised as part of the Project’s EIS commitments. The final offset strategy will include further detail on the nature and quantity of offsets to be provided by the Project. This will include additional information pertaining to potential advanced offsets held by GPC from the existing Western Basin Dredging and Disposal Project (WBDDP) (refer to Section 4 of this report) and their validity for the purposes of this Project. If the offset credit held by GPC from the existing WBDDP has not been formally registered as an advanced offset, the intent of the Offsets Policy’s provision of advanced offsets and credits should still be considered for this Project.

4 Existing Western Basin Dredging and Disposal Project offset requirements

4.1 Background

4.1.1 Environment Protection and Biodiversity Conservation Act 1999 EIS approval

On 22 October 2010, the WBDDP EPBC Act controlled action was approved by the Commonwealth Minister for the Environment subject to conditions.

The WBDDP as approved by the Commonwealth Minister for the Environment is subject to the following dredging volume and dredged material placement conditions:

- Approval of Stages 1A and 1B dredging works with a total volume of no more than 25Mm^3 (in situ) (EPBC Act controlled action condition 1)
- Approval of Stages 2, 3 and 4 dredging works with a total volume of no more than 21Mm^3 (in situ) (EPBC Act controlled action condition 3)
- Approval of no more than 11Mm^3 offshore dredged material placement at the East Banks Dredged Material Placement Area (DMPA) (EPBC Act controlled action condition 2)
- The Western Basin land reclamation area must be not greater than 300ha in total and constructed generally in accordance with the design as shown in Annexure 2 of the EPBC Act controlled action approval and will not exceed 27m height above the LAT (EPBC Act controlled action condition 7) (refer Figure 2). This approved land reclamation area is to accommodate the dredged material volume (i.e. 25Mm^3 (in situ)) from Stages 1A and 1B (EBPC Act controlled action condition 1).

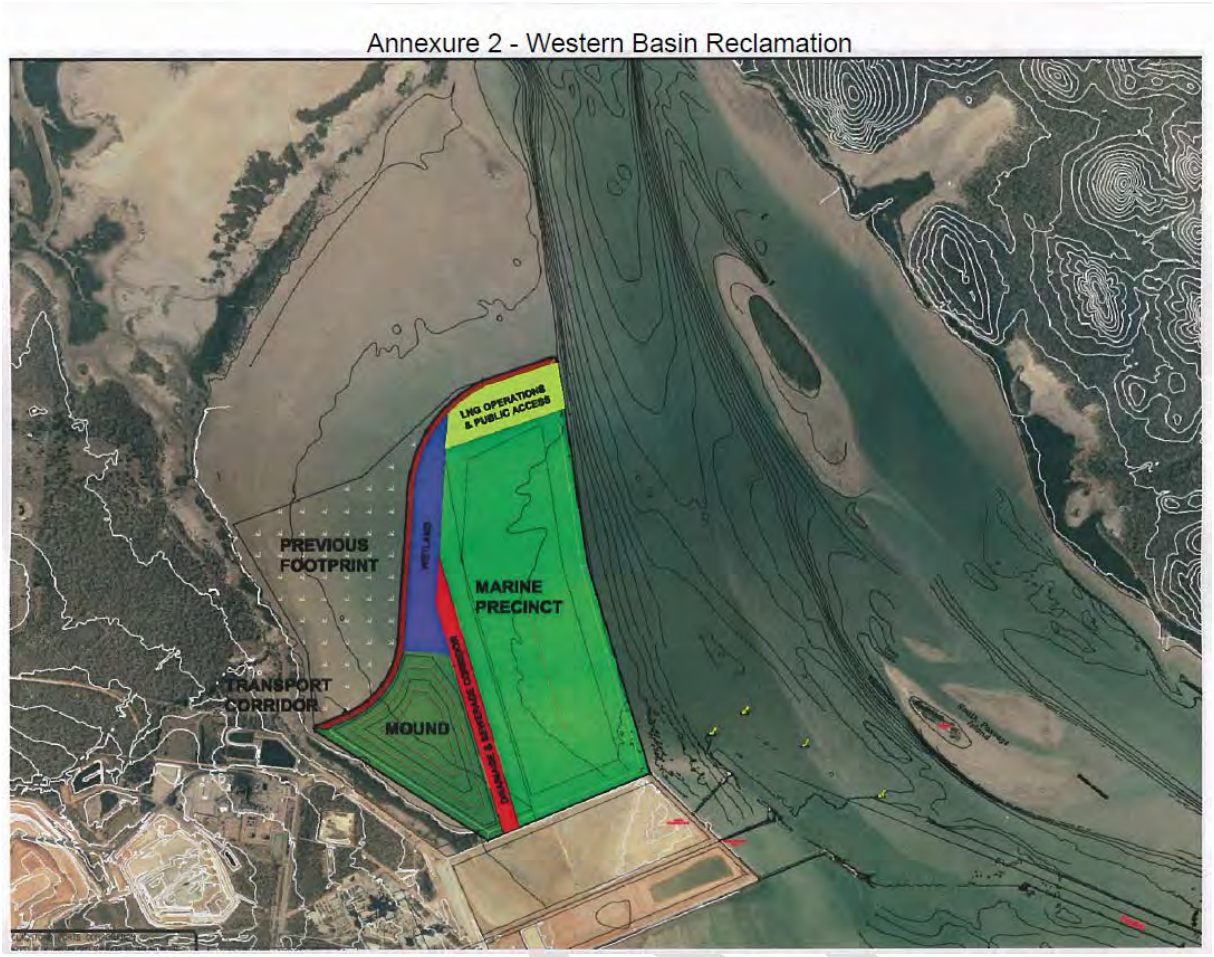

Figure 2 **Western Basin reclamation area EPBC Act controlled action approval Annexure 2**

4.1.2 State Development and Public Works Act 1971 EIS approvals

The WBDDP comprises two SDPWO Act significant projects for which an EIS was prepared, including:

- Fisherman's Landing Port Expansion Project – approved by the Coordinator-General on 25 May 2010
- Western Basin Dredging and Disposal Project – approved by the Coordinator-General on 23 July 2010.

Both significant projects involved the preparation of separate EISs and EIS Supplementary Information Documents (SIDs) which addressed the submissions received during the statutory public display of the EISs.

The Fisherman's Landing Port Expansion Project Coordinator-General's report for an EIS (FLPEP CG report), recommended that this project, as described in detail in the EIS and SID, and summarised in Section 2 of the FLPEP CG report, can proceed subject to the conditions and recommendations contained in Appendix 1 of the FLPEP CG report. The FLPEP CG report recognised the linkage between the two GPC reclamation area projects, and stated that the overall offset requirements for both projects will be included in the Western Basin Dredging and Disposal Project CG report (WBDDP CG report).

The WBDDP CG report, recommended that the WBDDP, as described in detail in the EIS and SID, and summarised in Section 2 of the WBDDP CG report, can proceed subject to the conditions and recommendations contained in Appendix 1 of the WBDDP CG report.

Section 2 of the WBDDP CG report contained the Western Basin reclamation area (the area approved under the FLPEP CG report and WBDDP CG report) shown in Figure 3.

Figure 3 **Western Basin reclamation area footprint shown in the Western Basin Dredging and Disposal Project CG report (July 2010)**

While the WBDDP CG report approved a larger reclamation area to be constructed (refer Figure 3), the WBDDP EPBC Act controlled action approval restricted the footprint of the reclamation area (refer Figure 2).

The reclamation area constructed as part of the WBDDP is approximately 287ha (refer Figure 4) which is consistent with the WBDDP EPBC Act controlled action condition 7 and Annexure 2, but smaller than the WBDDP CG report approved area, for which offsets have been provided. The

Western Basin reclamation area approved by the CG report, but not fully constructed, is part of the footprint of the proposed WBE reclamation area (southern area). Offsets have therefore already been provided by GPC for part of the proposed WBE reclamation area (southern area).

4.2 Offsets provided by Gladstone Ports Corporation for the Western Basin Dredging and Disposal Project

The WBDDP CG report and the EPBC Act controlled action conditions contain the offset requirements for the WBDDP (refer Appendix A).

GPC has provided offsets for the direct impact associated with the construction of the Western Basin reclamation area included in the WBDDP CG report (refer Figure 3).

The WBDDP CG report direct impact offset requirements for the Western Basin reclamation area are summarised in Table 1.

Table 1 Western Basin Dredging and Disposal Project direct impacts on marine fish habitat

CG report project	Direct impact (permanent loss)
Fisherman's Landing Port Expansion Project	Reclamation of 174ha of seabed including 90ha of seagrass and 84ha of 'potential' seagrass
Western Basin Dredging and Disposal Project	Reclamation/dredging affecting 259ha of seagrass

Source: WBDDP CG report, Section 6.3.1.1, Table 12 (refer Appendix A)

The WBDDP CG report Section 6.3.1.3 states that:

> *In consultation with DEEDI and DERM, I have determined that an appropriate offset package sufficient to acquit the requirements for impacts to marine fish habitat (described by Table 12) is as follows:*
>
> - *the protection of 5,000 ha of coastal land currently within the GPC's strategic port land at Port Alma*
> - *contribution of $5 million to support Fisheries Queensland initiatives for future research and studies and/or appropriate works for fish habitat rehabilitation and enhancement.*

In additional to Section 6.3.1.3, Appendix 1, Schedule 3, Condition 23 of the WBDDP CG report states that:

> *GPC shall provide additional offset measures for shorebirds and marine fauna to be included in the Flora and fauna management plan. These should consist of funding and/or in-kind contributions to the value of at least $2 million towards measures including, but not be limited to:*
>
> *a) enhanced understanding of the displacement of key marine fauna species from affected habitat areas in Western Basin and any associated effects on regional populations*
>
> *b) contribution to species protection programs in the region or the wider bioregion. This may include funding of additional boating and fisheries patrols, education campaigns for recreation fishers on risks of marine fauna boat strike and improved management of key shorebird habitat areas*
>
> *c) contribution to habitat enhancement/restoration actions in the region or the wider bioregion or the wider bioregion such as 'seagrass friendly' mooring systems, wetland rehabilitation projects and water quality improvement programs.*

GPC has addressed the above offset requirements contained in the WBDDP CG report.

Further details on the breakdown of the Western Basin reclamation area direct impacts on total benthic habitat and seagrass meadows are provided in Table 2. The Western Basin reclamation area direct impact on the 'total benthic habitat area' and 'seagrass meadow area' are based on the CG report and WBDDP EIS SID (GHD 2010).

Table 2 Western Basin reclamation area direct impact on marine fish habitat

Location of impact	Expected impact type	Impact area as constructed	Habitat type	Total benthic habitat area	Seagrass meadow area
Fisherman's Landing Port Expansion[1]	Direct – habitat removal	174ha[1]	Intertidal and subtidal soft substrate	174ha[1]	174ha[1]
Western Basin Dredging and Disposal[2]	Direct – habitat removal	113ha[3]	Intertidal and subtidal soft substrate	235.9ha[4]	221.6ha[4]
Western Basin reclamation area total direct impact		**287ha**		**409.9ha**	**395.6ha**

Table notes:

1 Location of impact and impact area as detailed in the Fisherman's Landing Port Expansion CG report
2 Location of impact as detailed in the WBDDP CG report
3 Based on the as constructed Western Basin reclamation area which is 287ha (i.e. 287ha - 174ha = 113ha)
4 Based on WBDDP EIS SID Table 10.1 (GHD 2010).

Appendix B provides a summary of the status of the WBDDP offsets provided by GPC.

4.3 Western Basin reclamation area direct impact offset area not disturbed by Western Basin Dredging and Disposal Project

As a result of the offsets provided by GPC as part of the WBDDP, to address the direct impact associated with the establishment of the Western Basin reclamation area (i.e. as detailed in the WBDDP CG report (refer Appendix A)), GPC has already provided offsets to address a portion of the proposed WBE reclamation area (southern area) direct impact on benthic habitat and seagrass meadows (refer Table 3).

Table 3 Summary of Western Basin Dredging and Disposal Project offsets already provided by Gladstone Ports Corporation and balance of offset area available for the Project reduction in offset requirements

WBDDP CG report area that has been already offset by GPC		Western Basin reclamation area constructed	Balance of the WBDDP offset available for a Project reduction in offset requirements
Marine fish habitat value	**Area**		
Seagrass meadows	395.6ha	287ha	**108.6ha**
Total benthic habitat	409.9ha	287ha	**122.9ha**

Figure 4 shows the location of the Western Basin reclamation area as constructed, the CG report WBDDP reclamation area footprint, and the balance of WBDDP direct impact offset area available for a Project reduction in offset requirements for total benthic habitat and seagrass meadows.

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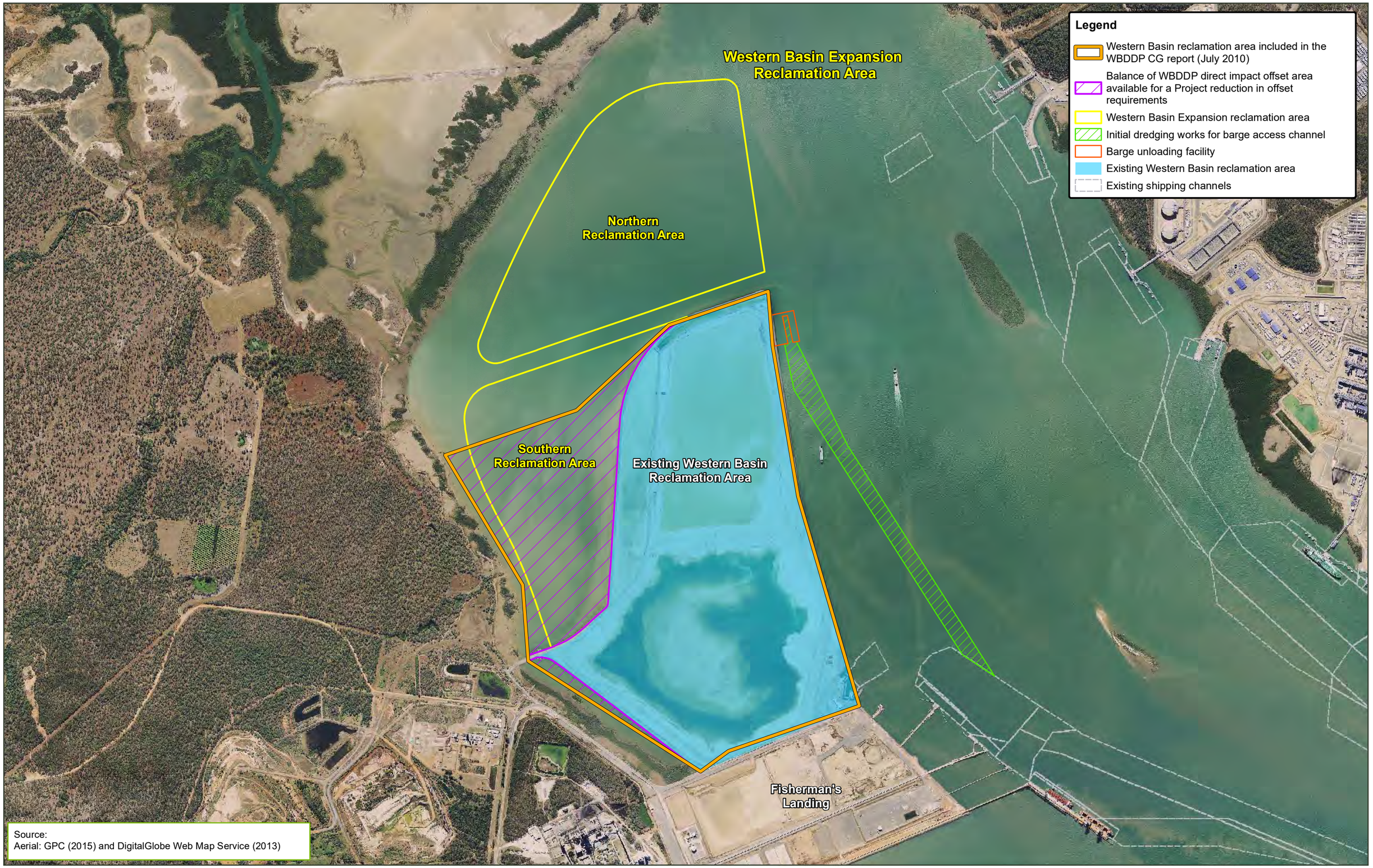

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Gatcombe and Golding Cutting Channel Duplication Project

Figure 4: Proposed Western Basin Expansion reclamation area and existing Western Basin reclamation area

5 Project offset requirements

5.1 Overview

Environmental values that require offsetting are defined in the relevant Commonwealth and Queensland Government offset policies. These values have been broadly grouped in the MNES (matters regulated by the Commonwealth Government) and MSES (matters regulated by the Queensland Government).

As defined by the EPBC Act, two MNES will be impacted by the Project and includes:

- Listed threatened species and communities
- Migratory species.

The MNES listed threatened species and communities, and migratory species are also a MSES (listed as protected wildlife habitat).

As defined by Schedule 2 of the Offsets Regulation, three MSES (i.e. prescribed environmental matters) will be impacted by the Project. These consist of the following:

- Wetlands and watercourses – a wetland of HES showed on the map of referable wetlands
- Protected wildlife habitat – a habitat for an animal that is endangered wildlife or vulnerable wildlife or a special least concern animal
- Marine plant – a marine plant within the meaning of the Fisheries Act.

5.2 Significant residual adverse impact assessments

Chapter 9 (nature conservation) of the AEIS provides a summary of the existing marine, coastal and terrestrial environmental values of Port Curtis that have the potential to be impacted by the Project.

A significant residual adverse impact assessment for ecological values considered to be MNES and/or MSES was undertaken. Chapter 9 (nature conservation) of the AEIS provides an assessment in accordance with the relevant Commonwealth guidelines (i.e. *Matters of National Environmental Significance Significant Impact Guidelines, Version 1.1* (DoE 2013)) and/or the state guidelines (i.e. *Queensland Environmental Offsets Policy Significant Residual Impact Guideline* (EHP 2014)). Each assessment was made against relevant criteria and a determination was made as to whether the Project is likely to result in a significant residual adverse impact (assuming mitigation measures are implemented).

The AEIS Sections 9.15.3 and 9.15.4 provides details on the Project activities and whether a significant residual adverse impact is likely to occur. Where the AEIS findings conclude that a significant residual adverse impact is likely to occur on a MNES and/or MSES, the Project will mitigate these impacts by providing offsets.

Table 4 summarises the Project activities that are likely to result in a significant residual adverse impact on MNES and/or MSES. Further the relevant WBDDP total benthic habitat and seagrass meadow values and offset value area that have already been offset by GPC are also provided in Table 4 to determine the total area of the impacted value that requires offsetting by the Project.

Figures 5 to 9 Figure 5show the location of the Project direct and indirect impact areas that are likely to result in a significant residual adverse impact on MNES and/or MSES.

Table 4 **Summary of Project activities likely to result in a significant residual adverse impact on matters of national environmental significance and/or matters of state environmental significance**

Value (MNES and/or MSES)	Project activity	AEIS section containing justification for area of impact	Total Project direct impact area to be offset	Total Project indirect impact area to be offset	Offset area already provided under the WBDDP that is yet to be developed[7]
MNES and MSES values[1]					
Listed threatened and migratory species (MNES) and Protected Wildlife Habitat (MSES) Shorebird foraging habitat ■ Beach stone curlew ■ Western Alaskan bar-tailed godwit ■ Curlew sandpiper ■ Eastern curlew ■ Great knot ■ Northern Siberian bar-tailed godwit ■ Red knot ■ Greater sand plover ■ Lesser sand plover	WBE reclamation area (southern area)	Sections 9.8.1 to 9.8.4	110.39ha	203.93ha	108.60ha
	WBE reclamation area (northern area)	Sections 9.8.1 to 9.8.4	164.98ha	N/A[2]	N/A
	Barge unloading facility (BUF)	Sections 9.8.1 to 9.8.4	0ha	0ha	N/A
	Initial dredging works (barge access channel)	Sections 9.8.1 to 9.8.4	0ha	0ha	N/A
	Channel duplication dredging (Stages 1 and 2 combined)	Sections 9.8.1 to 9.8.4	0ha	0ha	N/A
Total shorebird foraging habitat area (including Beach stone curlew (vulnerable under NC Act))			**275.37ha**	**203.93ha**	**108.60ha**
Listed threatened and migratory species (MNES) and Protected Wildlife Habitat (MSES) Green turtles foraging habitat[3]	Western Basin Expansion reclamation area (southern area)	Sections 9.10.2 to 9.10.9	110.48ha	99.41ha	108.60ha
	Western Basin Expansion reclamation area (northern area)	Sections 9.10.2 to 9.10.9	164.75ha	N/A[2]	N/A
	BUF	Sections 9.10.2 to 9.10.9	0ha[4]	0ha	N/A
	Initial dredging works	Sections 9.10.2 to 9.10.9	0ha[4]	0ha	N/A
	Channel duplication dredging (Stages 1 and 2 combined)	Sections 9.10.2 to 9.10.9	85.33ha	0ha	N/A
Total Green turtle foraging habitat area			**360.56ha**	**99.41ha**	**108.60ha**
Listed migratory species (MNES) and Protected Wildlife Habitat (MSES) Dugong foraging habitat[3]	Western Basin Expansion reclamation area (southern area)	Sections 9.11.4 and 9.11.6	110.48ha	99.41ha	108.60ha
	Western Basin Expansion reclamation area (northern area)	Sections 9.11.4 and 9.11.6	164.75ha	N/A[2]	N/A
	BUF	Sections 9.11.4 and 9.11.6	0ha[4]	0ha	N/A

Value (MNES and/or MSES)	Project activity	AEIS section containing justification for area of impact	Total Project direct impact area to be offset	Total Project indirect impact area to be offset	Offset area already provided under the WBDDP that is yet to be developed[7]
	Initial dredging works	Sections 9.11.4 and 9.11.6	0ha[4]	0ha	N/A
	Channel duplication dredging (Stages 1 and 2 combined)	Sections 9.11.4 and 9.11.6	35.65ha	0ha	N/A
Total Dugong foraging habitat area			**310.88ha**	**99.41ha**	**108.60ha**
MSES values					
Marine plants (MSES) Seagrass and macroalgae[5]	WBE reclamation area (southern area)	Sections 9.4.2 to 9.4.7	110.48ha	99.41ha	108.60ha
	WBE reclamation area (northern area)	Sections 9.4.2 to 9.4.7	164.75ha	N/A[2]	N/A
	BUF	Sections 9.4.2 to 9.4.7	0ha[4]	0ha	N/A
	Initial dredging works	Sections 9.4.2 to 9.4.7	0ha[4]	0ha	N/A
	Channel duplication dredging (Stages 1 and 2 combined)	Sections 9.4.2 to 9.4.7	85.33ha	0ha	N/A
Total marine plants area			**360.56ha**	**99.41ha**	**108.60ha**
Wetlands and watercourses (MSES) HES wetlands	WBE reclamation area (southern area)	Sections 9.2.4 to 9.2.7	47.47ha	24.98ha	108.60ha
	WBE reclamation area (northern area)	Sections 9.2.4 to 9.2.7	1.16ha	N/A[2]	N/A
	BUF	Sections 9.2.4 to 9.2.7	0ha	0ha	N/A
	Initial dredging works	Sections 9.2.4 to 9.2.7	0ha	0ha	N/A
	Channel duplication dredging (Stages 1 and 2 combined)	Sections 9.2.4 to 9.2.7	0ha	0ha	N/A
Total HES wetlands area			**48.63ha**	**24.98ha**	**108.60ha**

Table notes:

1 Under the Queensland Offset framework an offset will only be imposed if the Commonwealth has not already considered impacts on the prescribed activity under the relevant Commonwealth Act. This is relevant for prescribed environmental matters which are a MNES and a MSES.

2 The indirect impacts to seagrass in the WBE reclamation area (northern area) have been combined with the indirect impacts to the WBE reclamation area (southern area). The Project indirect impact area is based on erosion and sedimentation impacts due to changes in tidal velocities adjacent to the WBE reclamation area.

3 Green turtle and Dugong impact areas are calculated based on the Project seagrass meadow significant residual adverse impact areas.

4 Direct impact is considered to be negligible after consideration of existing indirect impact from the existing Western Basin reclamation area and is therefore excluded from the impact assessment.

5 The Project will not have a significant residual adverse impact on mangroves or saltmarsh. Mangroves and saltmarsh have not been included in the marine plant offset calculations.

7 The validity of this offset credit as an advanced offset and its applicability to this Project will be confirmed during the finalisation of this Offsets Strategy.

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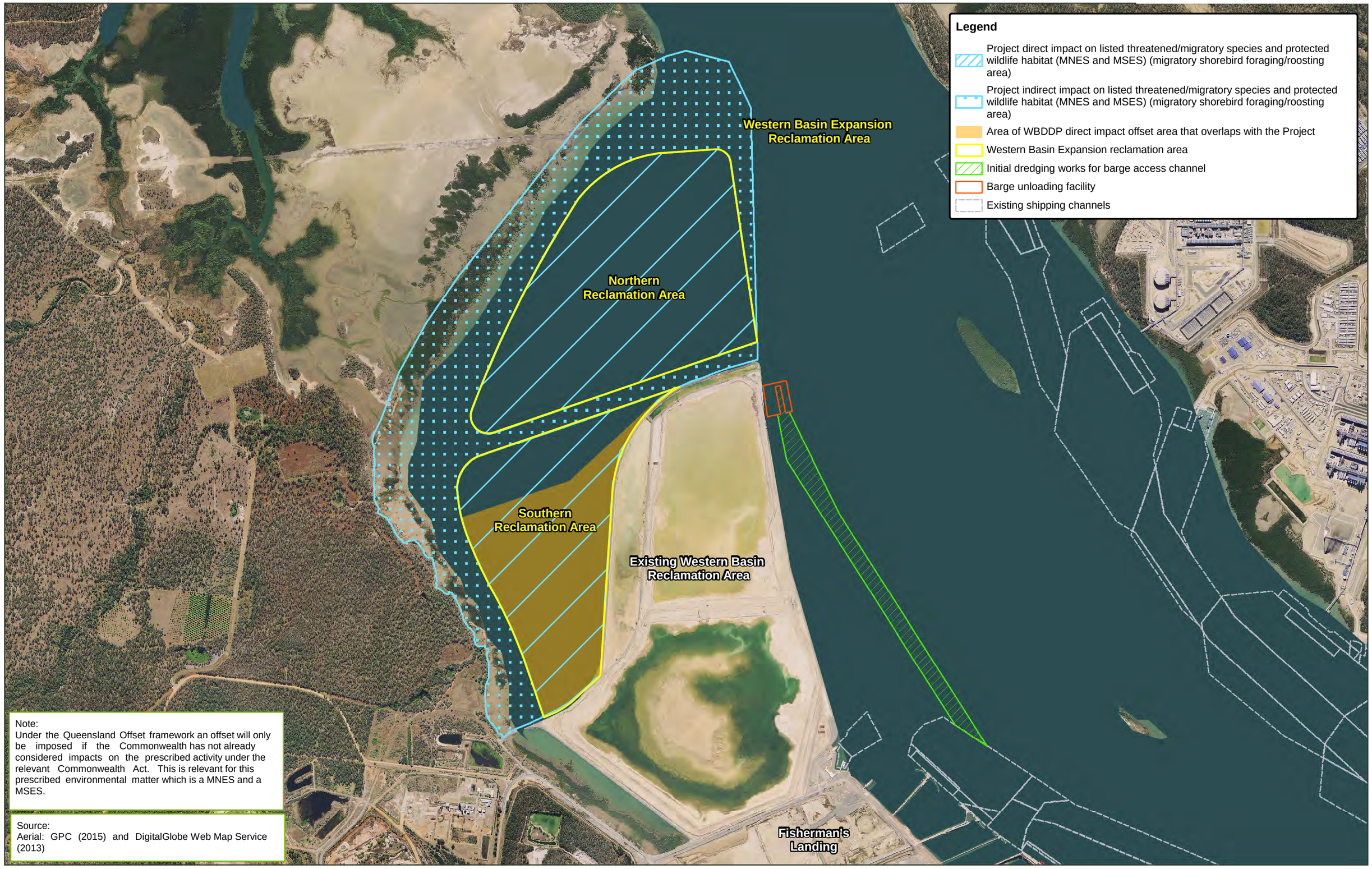

Note:
Under the Queensland Offset framework an offset will only be imposed if the Commonwealth has not already considered impacts on the prescribed activity under the relevant Commonwealth Act. This is relevant for this prescribed environmental matter which is a MNES and a MSES.

Source:
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Date: 24/09/2019 Version: 4 Job No: 237374
Coordinate system: GDA_1994_MGA_Zone_56

Gatcombe and Golding Cutting Channel Duplication Project

Figure 5: Location of MNES and MSES ecological values (listed threatened/migratory species and protected wildlife habitat (Migratory shorebird foraging roosting area)) that require offsetting within and adjoining the Western Basin Expansion reclamation area

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Western Basin Expansion Reclamation Area

Northern Reclamation Area

Southern Reclamation Area

Existing Western Basin Reclamation Area

Fisherman's Landing

Legend

- Project direct impact on listed threatened/migratory species and protected wildlife habitat (MNES and MSES) (Green turtle foraging habitat)
- Project indirect impact on listed threatened/migratory species and protected wildlife habitat (MNES and MSES) (Green turtle foraging habitat)
- Area of WBDDP direct impact offset area that overlaps with the Project
- Western Basin Expansion reclamation area
- Initial dredging works for barge access channel
- Barge unloading facility
- Existing shipping channels

Note:
Under the Queensland Offset framework an offset will only be imposed if the Commonwealth has not already considered impacts on the prescribed activity under the relevant Commonwealth Act. This is relevant for this prescribed environmental matter which is a MNES and a MSES. The direct and indirect impact area for this value is the same area as marine plants (seagrass and macroalgae) and protected wildlife habitat (Dugong foraging habitat).

Source:
Aerial: GPC (2015) and DigitalGlobe Web Map Service (2013)

Map by: RB P:\GIS\Projects\237374_GPC_Channel_Duplication_EIS\237374_EIS_385_1_Fig6a.mxd 24/09/2019 10:12

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Date: 24/09/2019 Version: 4 Job No: 237374

Coordinate system: GDA_1994_MGA_Zone_56

Gatcombe and Golding Cutting Channel Duplication Project

Figure 6a: Location of MNES and MSES ecological values (listed threatened/migratory species and protected wildlife habitat (Green turtle foraging habitat)) that require offsetting within and adjoining the Western Basin Expansion reclamation area

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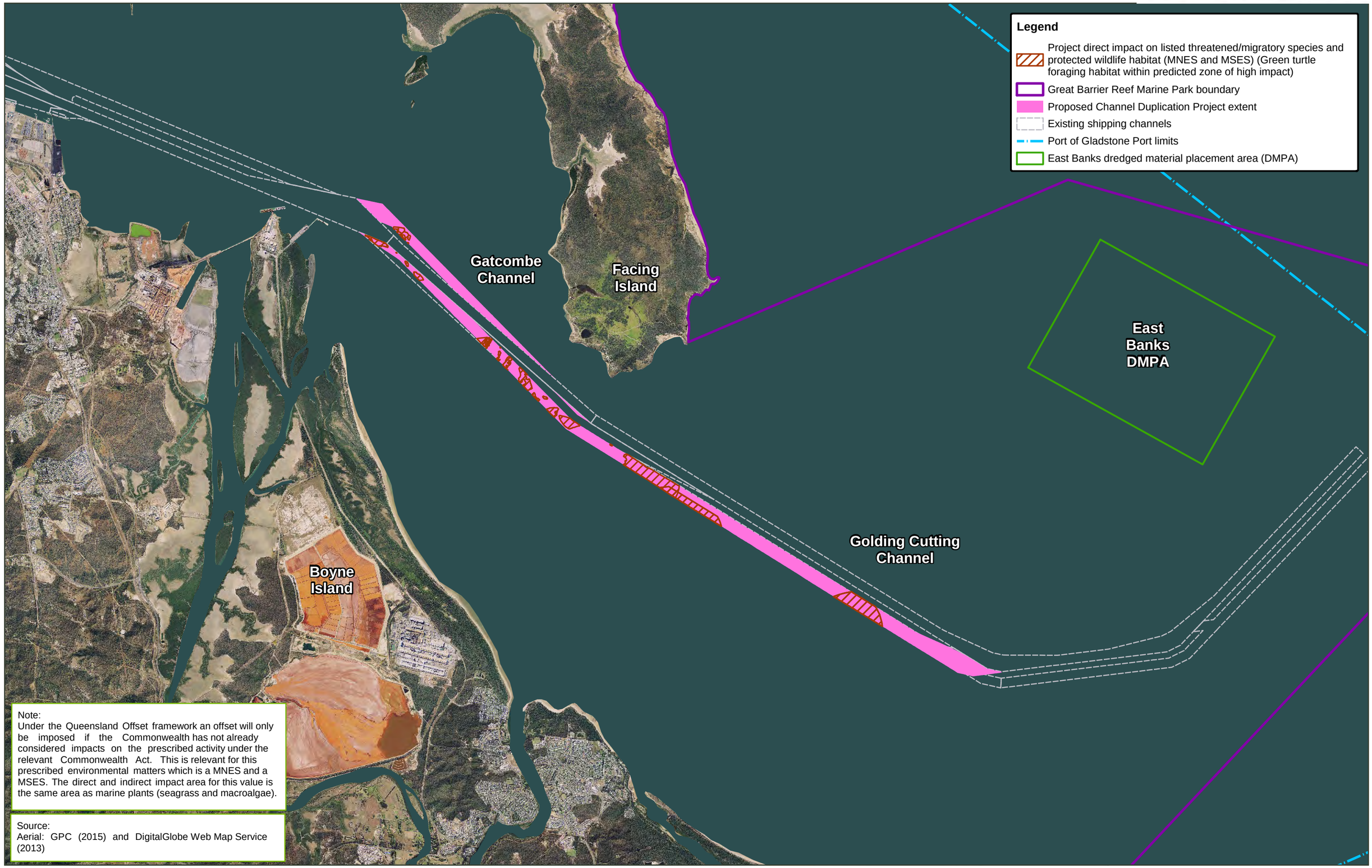

Note:
Under the Queensland Offset framework an offset will only be imposed if the Commonwealth has not already considered impacts on the prescribed activity under the relevant Commonwealth Act. This is relevant for this prescribed environmental matters which is a MNES and a MSES. The direct and indirect impact area for this value is the same area as marine plants (seagrass and macroalgae).

Source:
Aerial: GPC (2015) and DigitalGlobe Web Map Service (2013)

Map by: RB P:\GIS\Projects\237374_GPC_Channel_Duplication_EIS\237374_EIS_385_2_Fig6b.mxd 20/09/2019 11:22

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Date: 20/09/2019 Version: 3 Job No: 237374

Coordinate system: GDA_1994_MGA_Zone_56

Gatcombe and Golding Cutting Channel Duplication Project

Figure 6b: Location of MNES and MSES ecological values (listed threatened/migratory species and protected wildlife habitat (Green turtle foraging habitat)) that require offsetting within the channel duplication area to be dredged

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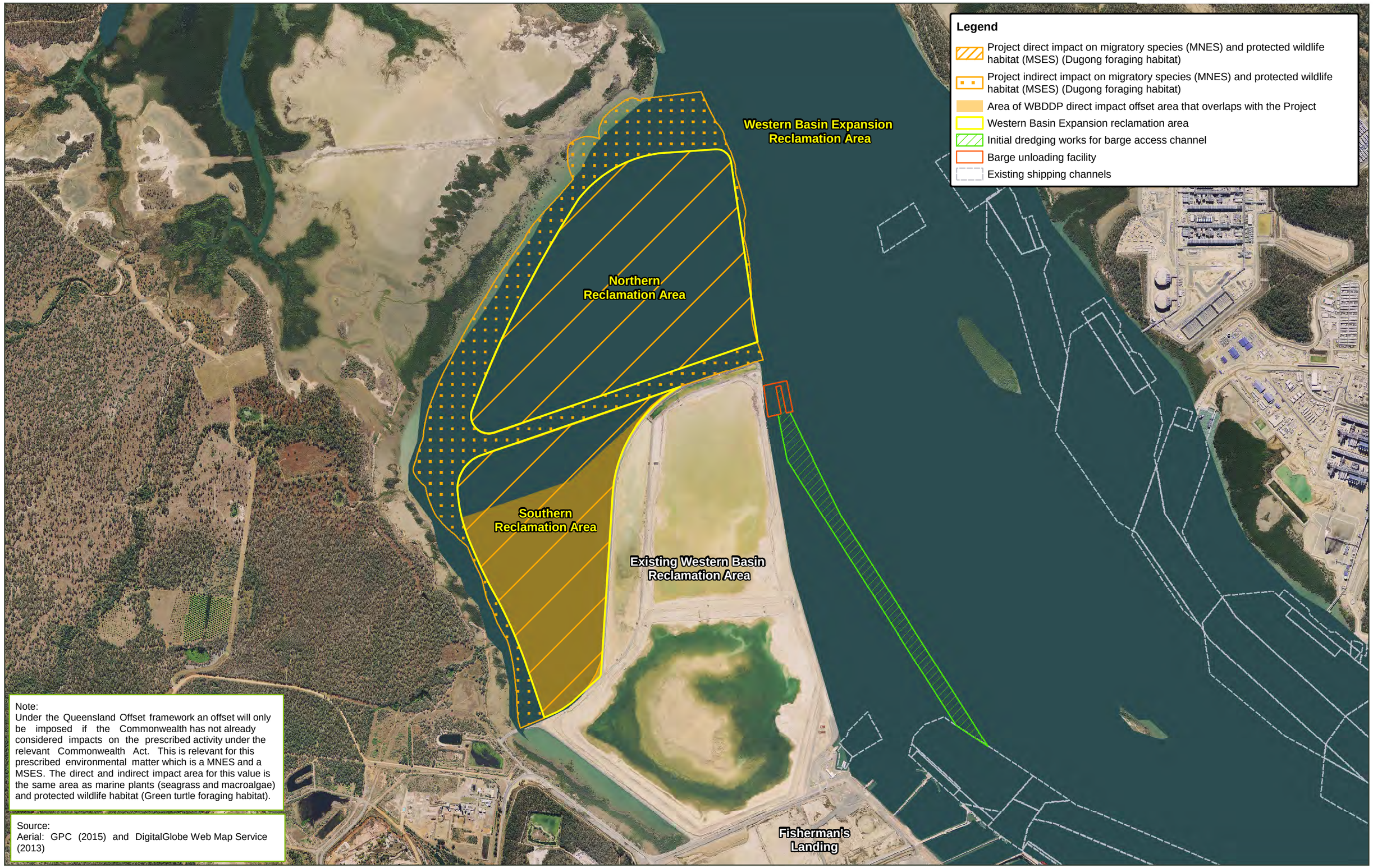

Note:
Under the Queensland Offset framework an offset will only be imposed if the Commonwealth has not already considered impacts on the prescribed activity under the relevant Commonwealth Act. This is relevant for this prescribed environmental matter which is a MNES and a MSES. The direct and indirect impact area for this value is the same area as marine plants (seagrass and macroalgae) and protected wildlife habitat (Green turtle foraging habitat).

Source:
Aerial: GPC (2015) and DigitalGlobe Web Map Service (2013)

Map by: RB P:\GIS\Projects\237374_GPC_Channel_Duplication_EIS\237374_EIS_385_1_Fig7a.mxd 24/09/2019 10:15

0 255 510 Metres

Date: 24/09/2019 Version: 4 Job No: 237374

Coordinate system: GDA_1994_MGA_Zone_56

Gatcombe and Golding Cutting Channel Duplication Project

Figure 7a: Location of MNES and MSES ecological values (listed threatened/migratory species and protected wildlife habitat (Dugong foraging habitat)) that require offsetting within and adjoining the Western Basin Expansion reclamation area

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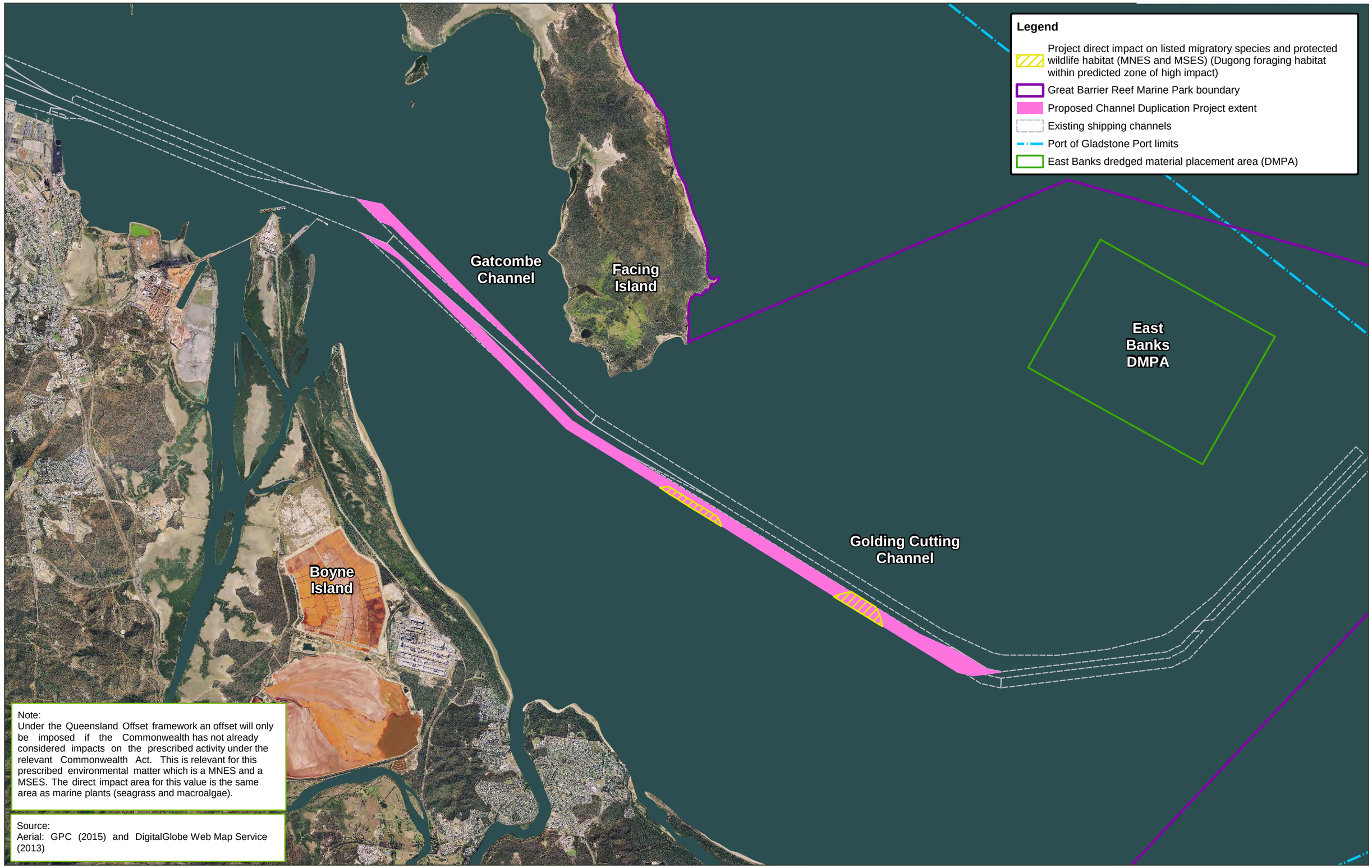

Note:
Under the Queensland Offset framework an offset will only be imposed if the Commonwealth has not already considered impacts on the prescribed activity under the relevant Commonwealth Act. This is relevant for this prescribed environmental matter which is a MNES and a MSES. The direct impact area for this value is the same area as marine plants (seagrass and macroalgae).

Source:
Aerial: GPC (2015) and DigitalGlobe Web Map Service (2013)

Map by: RB P:\GIS\Projects\237374_GPC_Channel_Duplication_EIS\237374_EIS_385_2_Fig7b.mxd 20/09/2019 11:07

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Date: 20/09/2019 Version: 3 Job No: 237374

Coordinate system: GDA_1994_MGA_Zone_56

Gatcombe and Golding Cutting Channel Duplication Project

Figure 7b: Location of MNES and MSES ecological values (migratory species and protected wildlife habitat (Dugong foraging habitat)) that require offsetting within the channel duplication area to be dredged

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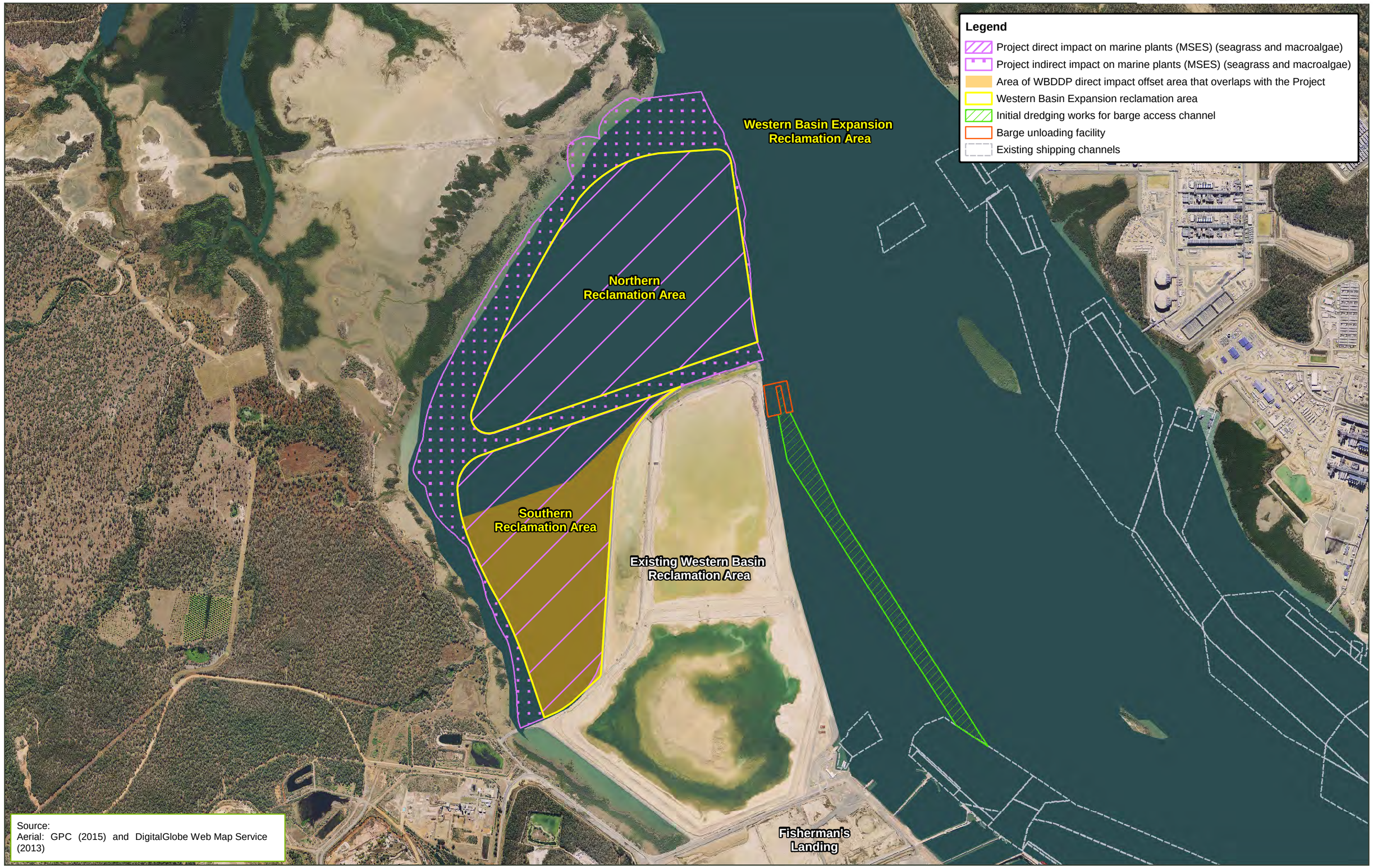

Source:
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Date: 24/09/2019 Version: 4 Job No: 237374

Coordinate system: GDA_1994_MGA_Zone_56

Gatcombe and Golding Cutting Channel Duplication Project

Figure 8a: Location of MSES ecological values (marine plants) that require offsetting within and adjoining the Western Basin Expansion reclamation area

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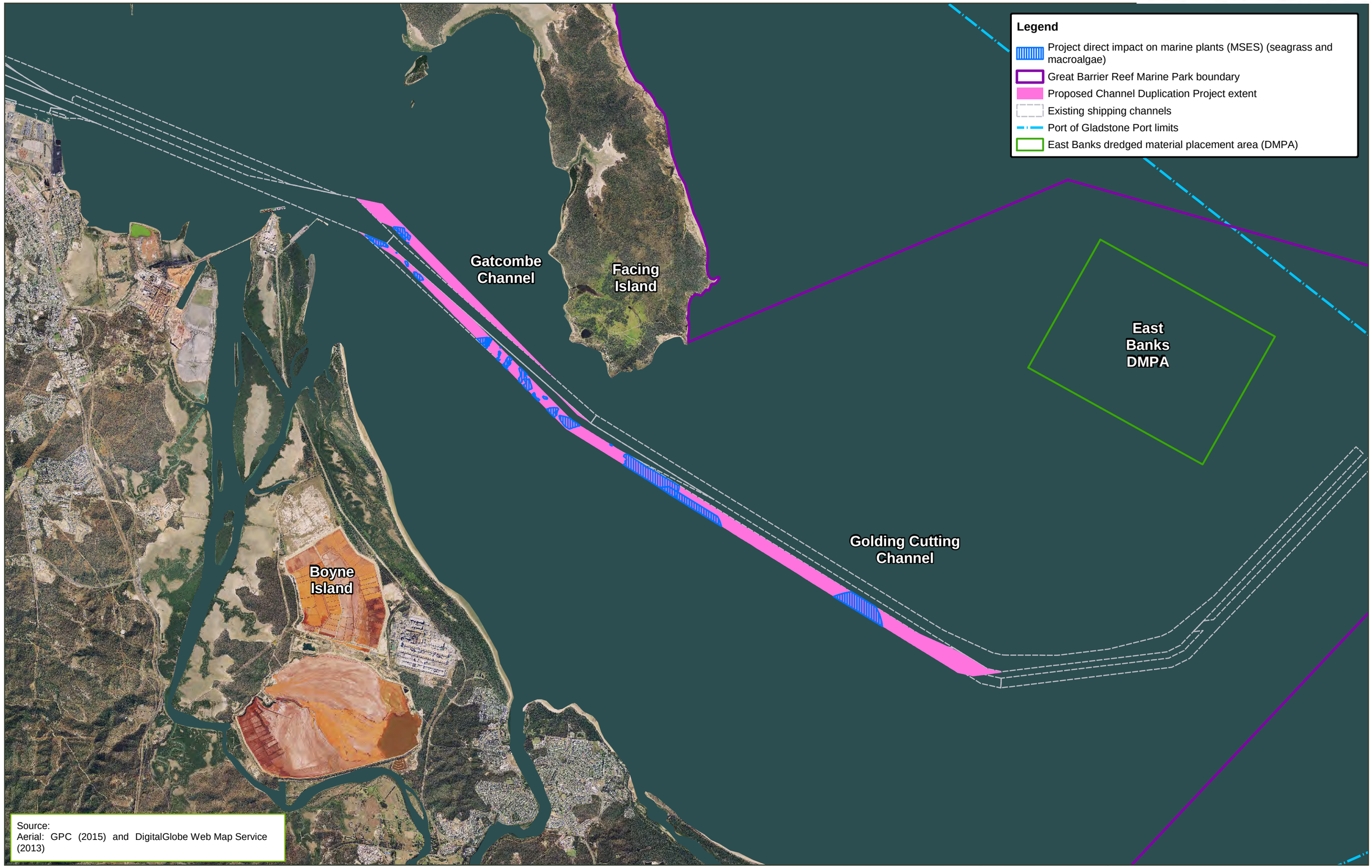

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Date: 20/09/2019 Version: 3 Job No: 237374

Coordinate system: GDA_1994_MGA_Zone_56

Gatcombe and Golding Cutting Channel Duplication Project

Figure 8b: Location of MSES ecological values (marine plants) that require offsetting within the channel duplication area to be dredged

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Western Basin Expansion Reclamation Area

Northern Reclamation Area

Southern Reclamation Area

Existing Western Basin Reclamation Area

Fishermans Landing

Legend

- Project direct impact on wetlands and watercourses (MSES) (high ecological significance wetlands)
- Project indirect impact on wetlands and watercourses (MSES) (high ecological significance wetlands)
- Area of WBDDP direct impact offset area that overlaps with the Project
- Western Basin Expansion reclamation area
- Initial dredging works for barge access channel
- Barge unloading facility
- Existing shipping channels

Source:
Aerial: GPC (2015) and DigitalGlobe Web Map Service (2013)

Map by: RB P:\GIS\Projects\237374_GPC_Channel_Duplication_EIS\237374_EIS_385_1_Fig9.mxd 20/09/2019 11:26

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Date: 20/09/2019 Version: 3 Job No: 237374

Coordinate system: GDA_1994_MGA_Zone_56

Gatcombe and Golding Cutting Channel Duplication Project

Figure 9: Location of MSES ecological values (wetlands and watercourses (high ecological significance wetlands)) that require offsetting within the Western Basin Expansion reclamation area

6 Project draft offset options

In accordance with the EPBC Act Environmental Offsets Policy (2012) and the Queensland Offsets Policy (Version 1.6), it is proposed that the Project will use a combination of direct offsets, advanced offsets (associated with the WBDDP) and other compensatory measures.

Table 5 provides a summary of the MNES and MSES values requiring offsets and potential draft offset options for the Project to be considered during the development of the final Project offset strategy and implementation plan. The validity of the GPC WBDDP offset credit as an advanced offset and its applicability to this Project will be confirmed during the finalisation of this Offsets Strategy.

Table 5 Summary of potential offset draft options for the Project

Value	Draft offset strategy options for the Project	
	Direct offsets	**Other compensatory measures**
MNES and MSES values[1]		
Listed threatened and migratory species (MNES) and Protected Wildlife Habitat (MSES) Shorebird foraging habitat (including Beach stone curlew)	■ In conjunction with the outcomes of GPC's Sustainable Sediment Management Project, investigate the possibility to create additional shorebird habitat within Port Curtis through using maintenance dredged material through engineering design (i.e. using pre-dredged material (already dried material) and/or expand existing mud islands) ■ Investigate the opportunities for any potential direct offset habitat/land and undertake feasibility studies to determine if proposed areas are suitable ■ Provide feral animal control within areas adjoining shorebird habitat within the Port of Gladstone (subject to obtaining land owners agreement) ■ Investigate during the WBE reclamation area detail design the optimum habitat for shorebirds (i.e. required sediment and water depth) to enable the design to include a dedicated shorebird habitat within the WBE reclamation area ■ Investigate during the design of bund walls between the northern and southern WBE reclamation areas the opportunity to include intertidal mangroves (e.g. working with nature).	■ Provide a financial contribution to appropriate parties for research programs to improve the knowledge of shorebird usage and foraging within the region ■ Provide a financial contribution to Reef Trust and/or the Queensland Government Offset Fund Management and Delivery Unit.

Value	Draft offset strategy options for the Project	
	Direct offsets	**Other compensatory measures**
Listed threatened and migratory species (MNES) and Protected Wildlife Habitat (MSES) Green turtle foraging habitat	■ Improve turtle nesting beaches on Facing Island and Curtis Island in accordance with the national turtle recovery plan (e.g. pest control) ■ Investigate the need for seagrass habitat creation through using maintenance dredged material to create viable seagrass meadows (e.g. west side of Facing Island) and foraging habitat for Green turtles.	■ Research to confirm the frequency and nature of Green turtle and other marine turtle utilisation of the seagrass meadows and intertidal areas within the Port of Gladstone. This information will be incorporated into the final Project offset strategy to ensure the offsets target the key values and impacts to Green turtles. ■ Provide a financial contribution to appropriate parties to fund improvement projects on turtle nesting beaches within the region ■ Provide a financial contribution to appropriate parties for turtle conservation research programs and other research programs (i.e. appropriate government agencies and research agencies to undertake studies, for example nest protection) ■ Provide a financial contribution to the Queensland Government Offset Fund Management and Delivery Unit.
Listed migratory species (MNES) and Protected Wildlife Habitat (MSES) Dugong foraging habitat	■ In conjunction with the outcomes of GPC's Sustainable Sediment Management Project, investigate the need for seagrass habitat creation through using maintenance dredged material to create viable seagrass meadows and foraging habitat for dugongs.	■ Research to confirm the frequency and nature of dugong's utilisation of the seagrass meadows and intertidal areas within the Port of Gladstone. This information will be incorporated into the final Project offset strategy to ensure the offsets target the key values and impacts to dugongs. ■ Provide a financial contribution to appropriate parties for dugong conservation research programs and other research programs (e.g. appropriate government agencies and research agencies to undertake studies) ■ Provide a financial contribution to the Queensland Government Offset Fund Management and Delivery Unit.
MSES values		
Marine plants (MSES) Seagrass and macroalgae[2]	■ Review and investigate the recommendations of the Port of Gladstone studies on resilience of seagrass and determine if there are any actions that can be implemented for the Project.	■ In conjunction with the outcomes of GPC's Sustainable Sediment Management Project, investigate the need for research into: - Seagrass meadow creation/expansion (such as intertidal and coastal seagrass), and if natural dispersal can propagate - Seagrass habitat creation through using maintenance dredged material to create viable seagrass meadows - The possibilities of keeping viable seedbank and if it is possible to reuse these seedbanks if/when flood events occur and determine if the seed would take and grow.

Value	Draft offset strategy options for the Project	
	Direct offsets	**Other compensatory measures**
		■ Research to confirm the type, frequency and nature of fauna species utilising the seagrass meadows in and adjoining the proposed WBE reclamation area (i.e. review Dugong feeding trails). This information will be incorporated into the final Project offset strategy to ensure the offsets target the key values and impacts. ■ Provide a financial contribution to the appropriate parties for research of programs to improve seagrass resilience. Funded research programs must endeavour to increase the scientific knowledge base on seagrass communities and their impact response, resulting in knowledge which can be applied to seagrass management and contribute to achieving a conservation gain for the impacted matter ■ Provide a financial contribution to the Queensland Government Offset Fund Management and Delivery Unit.
Wetlands and watercourses (MSES) HES wetlands	■ Investigate, during the design of bund wall between the northern and southern WBE reclamation areas, the opportunity to include intertidal mangroves (e.g. working with nature) which will improve fish foraging habitat and wetland values.	■ Provide a financial contribution to the appropriate parties for research of programs to improve wetlands ■ Provide a financial contribution to the Queensland Government Offset Fund Management and Delivery Unit.
Other		
Other environmental matters Water quality and wider ecosystem values	■ Undertake a whole catchment wide assessment to reduce upstream sediment sources (e.g. gully erosion) that results in sediment contributions into the Great Barrier Reef Wold Heritage Area (GBRWHA) during rainfall events ■ Investigate marine coastal corridors for protection ■ Investigate opportunity to enhance the overall value and long term protection of Boat Creek or Graham's Creek due to the ecological values and potential water quality improvements ■ Investigate Mount Larcom as a source of erosion and weed and pest issues, and consider opportunities to reduce erosion and enhance the area's social benefit to the Gladstone community and tourism, to further enhance the area's contribution to the local expression of the outstanding universal value of the GBRWHA, as defined under the priority Port of Gladstone master plan 2018 ■ Investigate opportunities to contribute into land management plans as part of the priority Port of Gladstone Master Plan (i.e. Inshore Islands, Curtis Island, Facing Island and Mount Larcom)	■ Investigate the need for research into coral habitat creation (reef hectare increase) within Port limits ■ Provide financial contribution to appropriate parties for researching innovative techniques for ongoing monitoring of marine fauna values (e.g. non-invasive techniques) ■ Investigate the utilisation of the Port shipping channels by the Flatback and Loggerhead turtles after completion of Project activities.

Value	Draft offset strategy options for the Project	
	Direct offsets	**Other compensatory measures**
	■ Assessment of the presence of marine megafauna in the Port (as per the Reef 2050 Long-Term Sustainability Plan (Reef 2050)).	

Table notes:

1 Under the Queensland Offset framework an offset will only be imposed if the Commonwealth has not already considered impacts on the prescribed activity under the relevant Commonwealth Act. This is relevant for prescribed environmental matters which are a MNES and a MSES.

2 The Project will not have a significant residual adverse impact on mangroves or saltmarsh and will not be subject to Project offsets. Draft offset strategy options have not been included for mangroves or saltmarsh.

Other considerations to be included in the final Project offset strategy and implementation plan include:

- The complexity of developing offsets for the marine environment and the need for greater consideration to be given to the financial component of the offset
- Research programs to consider the ecosystem as a whole and how values link (i.e. seagrass, migratory shorebirds, marine turtles and dugongs). Research programs will work towards a conservation gain for the impacted matter, which may include objectives such as improving the protection of important areas of habitat or addressing pressures on the protected matter. Research programs will endeavour to improve the viability of the impacted protected matter and be targeted toward key research and education activities as identified in the relevant Commonwealth approved recovery plan, threat abatement plan, conservation advice, ecological character description, management plan or listing document.
- Delivery of the offsets in stages to correspond to the timing of Project disturbance
- Traditional Owner groups to be included in the implementation where appropriate
- Incorporate relevant Reef 2050 water quality targets, including looking outside of Port catchments to broader GBRWHA catchment, where appropriate
- Investigate linkages and integration with the following programs:
  - Reef 2050
  - Reef 2050 Integrated Monitoring and Reporting Program (RIMReP)
  - Priority Port of Gladstone master plan 2018
  - Recovery Plan for Marine Turtles in Australia
  - Queensland Marine Turtle Conservation Strategy
  - Overarching Great Barrier Reef improvement programs
  - Other GBRWHA programs.
- The consideration of offsets already provided by GPC, as part of the WBDDP (for part of the same Project impact area).

7 Conclusion

It has been identified that the Project is likely to result in a significant residual adverse impact on MNES and/or MSES values (e.g. shorebird foraging habitat, marine plants, HES wetlands and Green turtle and Dugong foraging habitat). This draft offset strategy has provided a range of Project draft offset options for the significant residual adverse impacted MNES and/or MSES values.

Following the EPBC Act controlled action and SDPWO Act EIS decisions by Government, GPC in consultation with regulators, will develop the final Project offset strategy and implementation plan. This will include a legally binding offset agreement with the relevant regulatory agencies to document the offset commitments and a timetable and implementation plan for delivery.

GPC will engage an independent reviewer to review the final Project offset strategy and implementation plan prior to submission to the Commonwealth and Queensland Government.

As part of finalising the implementation plan, consideration will be given to the extent of offsets already provided by GPC as part of the WBDDP, for the Project impact area that is common to both the WBDDP and the Gatcombe and Golding Cutting Channel Duplication Project.

8 References

Department of Environment 2013, *Matters of National Environmental Significance Significant Impact Guidelines 1.1*, Australian Government.

Department of Environment and Heritage Protection 2014, *Queensland Environmental Offsets Policy Significant Residual Impact Guideline*, December 2014, Queensland Government.

Department of Environment and Science 2018, *Queensland Environmental Offsets Policy*, Version 1.6, June 2018, Queensland Government.

Department of Sustainability, Environment, Water, Population and Communities 2012, *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*, October 2012, Australian Government.

GHD 2010, *Port of Gladstone Western Basin Dredging and Disposal Project EIS Supplementary Information Document*, April 2010.

Gladstone Ports Corporation 2010, *Gladstone Ports Corporation Whole of Port Offset Strategy*.

A

Western Basin Dredging and Disposal Project offset requirement

Appendix A

Western Basin Dredging and Disposal Project offset requirements

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.

In addition, taking into account the extent of the potential net adverse impacts on recreational and indigenous fishing **I have imposed** a condition (Appendix 1, Schedule 3, Condition 22) that requires GPC to provide financial contributions to DTMR's recreational boating infrastructure program for the Gladstone region of up to $1.5 million.

6.3 Environmental offset requirements

As defined by the Queensland Government Environmental Offsets Policy (QGEOP), an environmental offset is an action taken to counterbalance unavoidable, negative environmental impacts that result from an activity or a development. An offset may be located within or outside the geographic site of the impact. Environmental offsets are only applicable when the impacts cannot be avoided or minimised, and if all other environmental standards have been met.

The QGEOP provides an overarching framework for deciding and implementing environmental offsets. Specific-issue offsets policies provide detailed direction for offsets that address specific environmental matters. These policies are developed from requirements of the various pieces of controlling legislation.

I have considered offsets in two parts: mitigation of the predicted impacts on marine fish habitat; and additional requirements for potential effects on shorebirds and marine fauna.

6.3.1 Offsets for loss of marine fish habitat

The specific-issue offset policy that applies to the WBDD Project relates to the *Fisheries Act 1994*. It has been developed by DEEDI to detail mitigation measures for the conservation and enhancement of Queensland's fisheries resources and fish habitats. The current version of the policy is *Fish Habitat Management Operational Policy FHMOP 005 – Mitigation and Compensation for Works for Activities Causing Marine Fish Habitat Loss*.

6.3.1.1 Combined GPC project impacts

GPC submitted an offset proposal (updated March 2010 and April 2010) addressing the coastal environmental impacts associated with four projects currently under its consideration, namely:

- Fisherman's Landing Port Expansion
- Western Basin Dredging and Disposal
- Wiggins Island Coal Terminal
- Gladstone LNG Stage 1 channel dredging.

The combined impacts of the projects on marine fish habitat estimated by GPC at that time are summarised in Table 12.

Table 12—Combined impacts of the projects on marine fish habitat

Project	Permanent loss	Temporary disturbance
Fisherman's Landing Port Expansion	Reclamation of 174 ha of seabed including 90 ha of seagrass and 84 ha of 'potential' seagrass	Indirect effects on up to 180 ha of seagrass
Western Basin Dredging and Disposal	Reclamation/dredging affecting 259 ha of seagrass	Indirect effects on up to 1406 ha of seagrass
Wiggins Island Coal Terminal	Reclamation of 260 ha including intertidal wetland and 10 ha seagrass	Indirect effects on up to 200 ha seagrass
Gladstone LNG Stage 1 channel dredging		Approx 0.12 ha of seagrass and other marine plants on the pipeline route
Total	443 ha of seagrass and 250 ha of intertidal wetland	See discussion below

6.3.1.2 Temporary disturbance to marine fish habitat

Although the likely impacts on seagrass areas cannot be accurately predicted until the detailed design of dredging programs is completed, **I am satisfied** that the extent of indirect impact on seagrass areas in Table 12 is an over estimate, as follows:

- the areas of seagrass in Table 12 for each project have been double counted in some cases when considering the overall impacts
- impact assessment in the EIS assumed a large proportion of TSHD rehandling in the vicinity of Fisherman's Landing. GPC has committed to minimise the use of rehandling and to relocate operations to North China Bay therefore reducing the impacts of turbid plumes.

As discussed in section 6.2.2, the extent of the cumulative temporary disturbance to seagrass areas in the Western Basin is estimated to be no greater than:

- moderate to severe impact (highly degraded or complete loss of seagrass cover for the duration of dredging works) of 350 ha of seagrass
- minor to moderate impact (decreased production or reduced seagrass cover sustained over the duration of dredging works) of an additional 1000 ha of seagrass.

6.3.1.3 Agreed GPC marine fish habitat offset

In consultation with DEEDI and DERM, **I have determined** that an appropriate offset package sufficient to acquit the requirements for impacts to marine fish habitat (described by Table 12) is as follows:

- the protection of 5000 ha of coastal land currently within the GPC's strategic port land at Port Alma
- contribution of $5 million to support Fisheries Queensland initiatives for future research and studies and/or appropriate works for fish habitat rehabilitation and enhancement.

Policy principles of the QGEOP require that offsets must achieve an equivalent or better environmental outcome and that offsets must provide environmental values as similar as possible to those being lost. In determining an appropriate outcome, **I have considered** the following:

- the nature (type, quality etc.) of marine fish habitat and coastal environmental values that would be lost compared to those in the offset site(s)
- the practical constraints of providing like-for-like offsets for particular types of marine plants—in this case seagrass
- the time lag between development impacts and the provision of offsets
- the geographic separation between the area of impacts and the offsets
- the likelihood of successful recovery of seagrass areas that may be significantly affected by dredging and reclamation works.

I have also noted that components of the proposed works would provide a substantial fish habitat benefit particularly the creation of artificial rocky habitat in the toe section of revetment structures enclosing the proposed reclamations.

The Port Alma offset site is located east of Balaclava Island and comprises estuarine wetlands with significant fish habitat values—although no areas of seagrass. The site includes an estimated 330 ha of terrestrial area (above the level of the highest astronomical tide) adjacent to the Rundle Range National Park. Approximately 70 per cent of the site lies within the Habitat Protection Zone of the (state) Great Barrier Reef Coast Marine Park and therefore can be considered to be already under a level of protection. In addition, given the new port capacity proposed in the Port of Gladstone Western Basin, the potential development horizon of the Port Alma site would be in the order of 20+ years. This reduces the value of the site as an offset although its development potential is clearly defined by its SPL designation. This development potential would be removed in perpetuity by taking it out of the SPL designation and including the terrestrial portion in the protected area estate. In addition, it is proposed the marine areas be included in the adjacent declared Fitzroy River Fish Habitat Area and/or state marine park.

The offset site comprises extensive areas of mangrove communities and intertidal wetlands. The site represents valuable fish habitat including nursery and recruitment areas. Marine megafauna (including dugongs, dolphins and turtles) are known to inhabit the tidal waterways within the site.

The $5 million funding contribution is intended to be staged over a five year period. The funding would be directed to a range of projects aimed at enhancing marine fish habitat resources in the region. Some of the work would involve scientific research and investigation however a large proportion would fund rehabilitation and enhancement projects in the Port Curtis region. An indicative list, developed by DEEDI, includes:

- creation of additional fish habitats $0.2 million
- rehabilitation works $0.7 million
- implement marine plant management plans $0.3 million
- declared fish habitat area (FHA) investigations $0.7 million
- enhanced FHA management $1.1 million
- applied fish habitat research $0.5 million
- fish habitat mapping $0.8 million.

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 site. **I acknowledge that** providing a 'like for like' offset for loss of seagrass is impractical.

6.3.1.4 Additional impacts of LNG projects on marine fish habitat

Section 6.2 of this report discusses cumulative impacts predicted to occur from other activities in Port of Gladstone western basin that are not addressed by GPC's offset proposal, including:

- smaller scale dredging works adjoining Curtis Channel for access to LNG project sites
- dredging and excavation works for the pipeline crossing of The Narrows.

I have concluded that the additional impacts of the site access works for the GLNG and QCLNG projects are relatively minor in comparison to those associated with the adjacent WBDD channel dredging and would not contribute significantly in a cumulative sense. Construction of these marine facilities for GLNG and QCLNG were not considered in my evaluation reports for the projects therefore a separate approvals process will be followed. **I am satisfied** that any requirements for a marine fish habitat offset would be determined through that process and, for the purposes of determining an offset, that each can be considered as a stand-alone proposal.

The additional dredging proposed for access to the APLNG project site is more extensive than that proposed for GLNG and QCLNG and is located in a relatively sensitive area close to The Narrows and Graham Creek. As my evaluation of the APLNG project is not complete, **I have not** had the opportunity to fully assess the implications although in section 6.2 of this report I have noted the potential cumulative effects of the proposed dredging for APLNG. **I will include** any requirements for an additional marine fish habitat offset taking into account likely cumulative impacts as part of my evaluation of the APLNG project.

In my evaluation of the GLNG and QCLNG projects, **I considered** the proposed pipeline crossing of The Narrows and its potential impacts. As an outcome of my evaluation **I have required** proponents to prepare a specific EMP for that component of their projects, including an appropriate offset.

6.3.1.4 Coordinator-General's conclusion—offsets for loss of marine habitat

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 the present project **I am satisfied** that GPC has adequately investigated project options and alternative designs that would lead to reduced impacts.

The intention of GPC's proposal is to establish a strategic offset that is sufficient for all four projects. **I agree** with this approach as it potentially offers advantages over a series of smaller and independent offsets in terms of environmental outcomes and ongoing management.

In the event that temporary impacts are not as extensive as initially predicted by GPC, **I state** that a reduction in the offset would not be considered.

To ensure the required offset is appropriately secured, **I have imposed** a condition (Appendix 1, Schedule 3, Condition 19) that must attach to a development permit for the proposed works.

6.3.2 Additional biodiversity considerations

In addition to marine fish habitat considerations, several policies of the State Coastal Management Plan and the Curtis Coast Regional Coastal Management Plan apply. These specify that coastal development projects in sensitive areas should generally show a net increase in coastal environmental values. A specific-issue offset policy under the QGEOP has not been developed for coastal management plans however the broad principles have been considered.

The agreed strategic offset package 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 primarily aimed at marine fish habitat conservation and enhancement, also have benefits for the overall marine environment of the region.

I consider that further extension to the agreed offset package is necessary to address the likely worst-case impacts on marine 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. Potential impacts on shorebird habitat have also been identified.

In section 5.2.7 of this report **I have specified** the requirement for GPC to prepare and implement a flora and fauna management plan (FFMP) for the WBDD Project. **I have imposed** additional conditions (Appendix 1, Schedule 3, Part 4.4) that provide additional offset measures for shorebirds and marine fauna to be included in the FFMP (as provided for by conditions stated in Appendix 1, Schedule 2, Part 4). These could include, but not be limited to:

- enhanced understanding of the displacement of key marine fauna species from affected habitat areas in Western Basin and any associated effects on regional populations
- contribution to species protection programs in the region or the wider bioregion. This may include funding of additional boating and fisheries patrols, education campaigns for recreational fishers on risks of marine fauna boat strike and improved management of key shorebird habitat areas
- contribution to habitat enhancement/restoration actions in the region or the wider bioregion such as 'seagrass friendly' mooring systems, wetland rehabilitation projects and water quality improvement programs.

Assessment of applications for maritime infrastructure on Curtis Island for LNG projects (dredging/construction of access facilities and construction of export terminals) should recognise the potential for impacts on marine species and include requirements for appropriate mitigation and offsets, if required.

FFMPs (or equivalent) that are required for other projects in the Western Basin should comprise measures that are compatible with the FFMP for the WBDD Project. Preferably, all projects should contribute toward an overall strategic package.

Given the potential for reduced opportunities for fishing in Western Basin **I am concerned** that displaced fishing effort doesn't impact on key species in other areas, for example Rodds Bay. This matter will be addressed in the FFMP and in the consideration of any mitigation for commercial fishing operations.

6.3.3 Summary of recommendations for future development approvals

1. **I have required** that the management of the WBDD Project includes the development of a reactive monitoring program that incorporates consideration of light availability to seagrass areas

and seagrass health. In terms of managing cumulative impacts, **I recommend** that this approach be adopted for all future DMPs for the various dredging operations in the Western Basin.

2. The EIS notes that the WBDD reclamation area will include water bodies that may provide a beneficial habitat for shorebirds. **I recommend that** opportunities to provide shorebird habitat within the WBDD Project should be maximised where practicable particularly where concurrent impacts are occurring in the vicinity of Friend Point for the pipeline crossing works.
3. The effects of concurrent piling operations, such as jetty construction, should be carefully considered. In particular, **I considered** that pile driving activities for construction of LNG export facilities should be scheduled to not occur while similar work is underway for the WICT project or the installation of navigation beacons in the vicinity of Fisherman's Landing.
4. **I recommend that** assessment of applications for maritime infrastructure on Curtis Island for LNG projects (dredging and construction of access facilities and construction of export terminals) should recognise the potential for impacts on marine species and include requirements for appropriate mitigation and offsets, if required.
5. **I recommend that** FFMPs (or equivalent) that are required for other projects in the Western Basin should comprise measures that are compatible with the FFMP for the WBDD Project. Preferably, all projects should contribute toward an overall strategic package.
6. **I recommend that** outcomes of a commercial fishing impact mitigation program should minimise the potential for displaced fishing effort to affect key marine species in nearby sensitive areas, for example Rodds Bay.

6.3.4 Summary of Coordinator-General's future actions

1. The timing of the APLNG access dredging coincides with commencement of the main Curtis Channel dredging, including TSHD works. In order to avoid significant cumulative effects, the co-location of dredging activities in this area is to be carefully considered as part the evaluation of the APLNG project. This would include further modelling of turbid plumes likely to be generated by the works and their interaction with other dredging activities.
2. The evaluation report for the APLNG project is to include an update to this cumulative impact assessment.
3. The potential timing of dredging operations for the proposed pipeline crossing of The Narrows is to be carefully considered to avoid interaction with any concurrent dredging operations located in the vicinity of the APLNG project site. Preferably, concurrent dredging operations in this area would be avoided unless a detailed investigation demonstrates that cumulative impacts can be avoided.
4. The Gladstone Logistics Plan will include consideration that appropriate routes through sensitive marine areas and associated speed limits for fast ferries and construction barges will be established.

6.3.5 Summary of offset requirements

1. Marine fish habitat offset for combined GPC projects within the Western Basin comprising:
    - the protection of 5000 ha of coastal land currently within the GPC's strategic port land at Port Alma
    - contribution of $5 million to support DEEDI (Fisheries Queensland) initiatives for future research and studies and/or appropriate works for fish habitat rehabilitation and enhancement.

Note: GPC has committed to a further contribution of up to $5.0 million over ten years to support fish habitat enhancement projects within the Gladstone Port area.

2. Additional biodiversity offsets for combined GPC projects to be included in the flora and fauna management plan (FFMP) for the WBDD Project. These could include, but not be limited to:

- enhanced understanding of the displacement of animals from key habitat areas in Western Basin and any associated effects on regional populations
- contribution to species protection programs in the region or the wider bioregion. This may include funding of additional boating and fisheries patrols, education campaigns for recreational fishers on risks of marine fauna boat strike and improved management of key shorebird habitat areas
- contribution to habitat enhancement and/or restoration actions in the region or the wider bioregion such as 'seagrass friendly' mooring systems, wetland rehabilitation projects and water quality improvement programs.

Note: these requirements are additional to the following measures specified for the FFMP:

- establish pre-development baseline data of relevant marine and terrestrial flora, fauna and ecological communities within the project area
- continue annual long term seagrass monitoring surveys of seagrass distribution and abundance in the Western Basin
- more frequent additional monitoring of seagrass areas during the construction period and for a minimum of three years following completion of dredging
- monitoring of marine megafauna at the localities immediately impacted by the reclamation area
- additional monitoring of migratory shorebirds.

3. Offsets for Curtis Island LNG projects to be determined on a site specific basis as part of assessment of applications for maritime infrastructure development permits (dredging/construction of access facilities and construction of export terminals). Offset requirements would cover impacts to marine fish habitat, shorebirds and marine species. Preferably, impact mitigation for shorebirds and marine species would be in the form of a contribution towards GPC combined offset package.
4. Offsets for the proposed pipeline crossing of The Narrows to be determined as part of the environmental management plan for the works.
5. Recreational fishing and boating in the Western Basin:
    - Prior to the completion of stage 1 of WBDD, GPC shall contribute funding and/or works to the value of $1 million towards new or upgraded recreational fishing infrastructure within the Gladstone region
    - A further $0.5 million will be paid at the completion of stages 2 and 3 of WBDD.
6. Commercial fisheries:
    - GPC must mitigate all reasonable financial losses to existing commercial fishing operators attributable to the maritime development in the Western Basin of the Port of Gladstone. This is to cover temporary and permanent loss of access to fishing areas and marine fish habitat.
    - GPC must meet all costs associated with the investigation, negotiation and administration of any compensation package.

8.6 Potential environmental offsets for MNES

8.6.1 Context

The draft Commonwealth policy statement *Use of environmental offsets under the Environment Protection and Biodiversity Conservation Act 1999* provides guidance on projects that may trigger consideration of an offset by the Commonwealth Government. The policy states:

Environmental offsets are not applicable to all approvals under the EPBC Act. Each approval must be assessed on a case-by-case basis and must take into account the scale and intensity of impact from the development on the site and the potential for conservation outcomes through offsets. They should not be applied when the impacts from the development are considered to be minor in nature or could reasonably be mitigated.

Based on the findings of the EIS, **I consider** the proposed project would cause a degree of unavoidable impact to matters of national environmental significance relating to the project area, in particular, the direct loss of 902 ha of benthic habitat (including 258.8 ha of seagrasses) due to dredging and construction of the reclamation area. An additional 5416 ha of benthic habitat (including 1406 ha of seagrasses) may be indirectly lost in the short to medium term due to turbidity plume impacts such as light attenuation and sedimentation.

The loss of marine habitat would have a consequential impact upon the feeding and breeding behaviour of marine megafauna, notably turtles, dugongs and dolphins. Also, the additional obstruction of the northern Western Basin due to construction of the reclamation area, and an increase in vessel traffic associated with dredging, may impede the migratory pathways of marine fauna using The Narrows and Port Curtis. Disturbance to the intertidal foreshore in the vicinity of the reclamation area may also impact upon the feeding, breeding and transit of migratory shorebirds. However, the mitigation measures identified in the EIS and SID, for inclusion in the EMP, DMP and other operational management plans aim to reduce the extent of loss.

In accordance with the Queensland Government Environmental Offsets Policy (QGEOP), the State Government requires an environmental offset to counterbalance unavoidable negative environmental impacts that result from an activity or a development. The specific-issue State Government offset policy that applies to marine habitat is the *Fish Habitat Management Operational Policy FHMOP 005 – Mitigation and Compensation for Works for Activities Causing Marine Fish Habitat Loss*, under the Fisheries Act. This policy, administered by DEEDI (Fisheries Queensland), details mitigation measures for the conservation and enhancement of fisheries resources and fish habitats.

8.6.2 Coordinator-General's conclusion—potential environmental offsets for MNES

I acknowledge that the dredging operation would result in the temporary generation and propagation of turbidity plumes, and potentially mobilise contaminants that are within the marine sediments, and that this may adversely impact upon, and result in the loss of benthic ecosystems, including seagrasses, by sedimentation and light attenuation.

I also acknowledge that construction of the reclamation area would result in the direct loss of benthic habitat.

Therefore, **I consider** that any direct or indirect impact on or loss of loss of benthic ecosystems, including seagrasses, may have consequential adverse effects upon the feeding and breeding behaviour of marine megafauna that use these resources, notably turtles, dugongs and dolphins.

As part of the EIS, GPC investigated and calculated a series of offset opportunities in the local area for cumulative loss of marine fish habitat associated with the WBDD Project, the FLPE project and the WICT project. The proposed offsets also factor the dredging components (e.g. of MOFs) for those LNG projects proposed for the Western Basin that were considered with the WBDD Project. These potential offsets are discussed in detail in chapter 6 of this report.

I note the Commonwealth Government may require an offset, in accordance with Commonwealth policy, for the residual impacts, including the net loss of benthic habitat within the reclamation area.

I have stated conditions (Appendix 1, Schedule 3, Part 4) that requires the proponent to submit a package of offsets for the loss of marine habitat. Specifically, **I have imposed** a condition (Appendix 1, Schedule 3, Part 4.4) that requires additional offset measures for shorebirds and marine fauna to be included in the FFMP. Measures could include, but not be limited to:

- enhanced understanding of the displacement of key marine fauna species from affected habitat areas in Western Basin and any associated effects on regional populations
- contribution to species protection programs in the region or the wider bioregion. This may include funding of additional boating and fisheries patrols, education campaigns for recreational fishers on risks of marine fauna boat strike and improved management of key shorebird habitat areas
- contribution to habitat enhancement/restoration actions in the region or the wider bioregion such as 'seagrass friendly' mooring systems, wetland rehabilitation projects and water quality improvement programs.

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

3.2 Sterilisation of mineral resources

Condition 18 The proponent shall maintain satisfactory communication with QER and DIP during the WBDD Project to sure that QER's interests are not adversely affected.

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

Part 4. Environmental offsets

4.1 Marine habitat offset

Condition 19 Prior to the commencement of dredging works for the WBDD Project, GPC must:

a) submit documentation to the satisfaction of the Coordinator-General that the agreed offset for marine fish habitat, as referenced in section 6.3 of the WBDD Project CG's report dated July 2010 has been secured

b) if condition 19(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 Officer of GPC is the entity with jurisdiction for these conditions.

4.2 Commercial fisheries offset

Condition 20 GPC must mitigate all reasonable financial losses to existing commercial fishing operators attributable to the maritime development in the Western Basin of the Port of Gladstone. This is to cover temporary and permanent loss of access to fishing areas and marine fish habitat.

Condition 21 GPC must meet any costs associated with the investigation, negotiation and administration of any compensation package, including all costs incurred by DEEDI in the management of development of any compensation package.

The Chief Executive Officer of DEEDI is the entity with jurisdiction for these conditions.

4.3 Recreational fishing and boating offset

Condition 22 Prior to the completion of stage 1 dredging works, GPC shall contribute funding and/or works to the value of $1 million towards new or upgraded recreational fishing infrastructure within the Gladstone region as determined by DTMR. A further $0.5 million of funding will be provided for all tide public boat ramps within the Western Basin area prior to the completion of the stages 2 and 3 dredging.

The Chief Executive Officer of DTMR is the entity with jurisdiction for these conditions.

4.4 Marine and coastal biodiversity offset

Condition 23 In addition to the provisions required for a flora and fauna management plan (FFMP) stated by conditions in Appendix 1, Schedule 2, Part 4 of this report, GPC shall provide additional offset measures for shorebirds and marine fauna to be included in the FFMP. These should consist of funding and/or in-kind contributions to the value of at least $2 million towards measures including, but not be limited to:

a) enhanced understanding of the displacement of key marine fauna species from affected habitat areas in Western Basin and any associated effects on regional populations

b) contribution to species protection programs in the region or the wider bioregion. This may include funding of additional boating and fisheries patrols, education campaigns for recreational fishers on risks of marine fauna boat strike and improved management of key shorebird habitat areas

c) contribution to habitat enhancement/restoration actions in the region or the wider bioregion such as 'seagrass friendly' mooring systems, wetland rehabilitation projects and water quality improvement programs.

Part 5. Complaint monitoring, management and response

5.1 Noise complaint monitoring management and response

Condition 24 In the event of a complaint, the proponent will:

a) in the first instance change procedures to reduce the noise that is the cause of the nuisance complaint

b) liaise with DERM and/or complainant over remedial action.

Condition 25 Where the actions of condition 19 do not resolve the noise issue, and when requested by the administering authority, noise monitoring will be undertaken to investigate any complaint of environmental noise nuisance and the results notified within 7 days to the administering authority. Monitoring must include:

a) LAmax, adj T

b) LAN, T (where N equals statistical levels of 1, 10, and 90)

c) the level and frequency of occurrence of impulsive or tonal noise

d) atmospheric conditions including temperature, relative humidity and wind speed and direction

e) effects due to extraneous factors.

The method of measurement and reporting of noise levels must comply with the latest edition of the DERM Noise Measurement Manual.

5.2 Managing complaints

Condition 26 If the administering authority advises the holder of a complaint alleging nuisance (e.g. caused by light, dust or noise), the holder must investigate the complaint and advise the administering authority of the action proposed or undertaken in relation to the complaint.

Condition 27 If the administering authority is not satisfied with the proposed or completed action, the holder must undertake monitoring or other action requested by the administering authority.

Condition 28 Maintain a record of complaints and incidents causing environmental harm, and actions taken in response to the complaint or incident. Retain the record of complaints required by this condition for five (5) years.

5.3 Complaint response

Condition 29 The holder of this authority must record the following details for all complaints received and provide this information to the administering authority on request:

a) time, date, name and contact details of the complainant

b) reasons for the complaint

c) any investigations undertaken

d) conclusions formed

e) any actions taken.

- water quality reduction
- decreased access to intertidal foreshore habitat
- increased sedimentation
- displacement

(k) The person taking the action must fund activities (conditions 33(g) to (j) above) to an amount of no less than $2 million for the duration of the ERMP, expenditure of which is to be detailed in the ERMP.

Seagrass

(l) Annual long term seagrass monitoring surveys of seagrass distribution and abundance in the Western Basin

(m) Monitor survival and recovery of seagrass and other marine communities in the project area during the construction period and for a minimum of five years following completion of dredging.

Reporting

34. The person taking the action must publish the ERMP Program on their website within two weeks of approval in writing by the Department.

35. The person taking the action must make the findings, including related data, of any or all of these studies publicly available upon request by any interested parties.

36. The person taking the action must submit to the Minister an annual Environmental Performance Report covering the following topics:

    (a) Dolphins, dugong and marine turtles, and other megafauna;

    (b) Migratory shorebirds; and

    (c) Seagrass.

37. The date of the first Environmental Performance Report must be 12 months from the date of this approval, with each subsequent report 12 months from the date of the previous environmental report. The Environmental Performance Report must include proposed environmental management improvements to be implemented through the DCMP, WQMP and other Plans as relevant.

Offsets

38. The person taking the action must submit a Biodiversity Offset Strategy to the Minister for approval in order to offset unavoidable impacts to the values of the Great Barrier Reef World Heritage Area and National Heritage Place, and EPBC Act listed threatened and migratory species. The strategy must include as a minimum the following requirements:

    (a) measures funded to not less than $5 million including, but not limited to:

        i funding for listed threatened and migratory species protection, habitat enhancement and restoration actions in the region or the wider bioregion such as 'seagrass friendly' mooring systems, wetland rehabilitation projects and water quality improvement programs;

        ii actions to reduce fisheries netting pressure in Port Curtis and in adjacent waters; and

        iii actions to reduce potential for coastal impacts such as commercial development in adjacent areas.

(b) Details of the management arrangements and a map of the 3,000 hectares of land at Port Alma proposed for protection in perpetuity as an Environment Preservation Area;

(c) A Strategic Vessel Management plan for Port Curtis that must include, but not be limited to:

i measures that will regulate boating speeds and movement in Port Cutis in perpetuity, including ongoing funding for enforcement of the program;

ii the establishment of 'go slow' zones; and

iii establish roles and responsibilities for implementation of the Plan.

(d) Development of a seagrass conservation plan that must include, but not be limited to:

i a map clearly illustrating the areas to be protected including the Wiggins/Mud lsland seagrass beds, seagrass beds east of Quion Island and seagrass beds in Pelican Banks;

ii measures to ensure that the seagrass beds within the Port are protected from ongoing and future Port activity; and

iii commitments to ensure no further direct seagrass removal of the areas referred to in 38(d)i above, accounting for any increases in size of the mapped seagrass areas.

(e) The strategy must include key milestones, performance indicators, actions and timeframes for the completion of all offsets outlined in the strategy.

(f) The strategy must be prepared with the advice of the Water Quality technical reference panel and the Ecosystem Research and Monitoring Program research advisory panel. The person taking the action must provide the written advice of these panels when submitting the strategy for approval.

39. The person taking the action must make the findings, including related data, of any or all of these studies and activities publicly available upon request by any interested parties.

40. The Biodiversity Offset Strategy referred to in condition 38 must be submitted to the Minster for approval by the Minister within 12 months of the date of this approval.

41. After 18 months from the date of this approval, the person taking the action must not undertake any dredging activities, land reclamation or construction activities unless the Minister has approved the Biodiversity Offset Strategy in writing. The approved Plan must be implemented.

Conditions - Other

42. The person taking the action must ensure that all relevant staff and contractors and any other persons working on the action receive comprehensive training in relation to the requirements of this decision and comply with all requirements of this decision relevant to their duties prior to commencing action on the project.

43. Upon the direction of the Department, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Department. The independent auditor must be approved by the Department prior to the commencement of the audit. Audit criteria must be agreed by the Department and the audit report must address the criteria to the satisfaction of the Department.

B

Western Basin Dredging and Disposal Project offset status summary

Appendix B

Western Basin Dredging and Disposal Project offset status summary

Western Basin Dredging and Disposal Project Coordinator-General's report for an environmental impact statement summary of offsets

Condition number	Offset requirement	Status
Section 6.3.5-Summary of offset conditions	The protection of 5,000ha of coastal land currently within the GPC's strategic port land at Port Alma	Completed. Land management plan is available for this option.
Section 6.3.5-Summary of offset conditions	Contribution of $5 million to support Fisheries Queensland initiatives for future research and studies and/or appropriate works for fish habitat rehabilitation and enhancement.	Completed. $5M was provided to DAFF.
Condition 22	Recreational fishing and boating in the Western Basin: - Prior to the completion of stage 1 of WBDDP, GPC shall contribute funding and/or works to the value of $1 million towards new or upgraded recreational fishing infrastructure within the Gladstone region - A further $0.5 million will be paid at the completion of stages 2 and 3 of WBDDP.	Boat ramp $1M provided and $0.5M in balance for future stages of dredging
Section 6.3.5-Summary of offset conditions	Enhanced understanding of the displacement of key marine fauna species from affected habitat areas in Western Basin and any associated effects on regional populations	Still ongoing under the ERMP under various programs (refer https://www.gpcl.com.au/environment/ermp)
Section 6.3.5-Summary of offset conditions	Contribution to species protection programs in the region or the wider bioregion. This may include funding of additional boating and fisheries patrols, education campaigns for recreational fishers on risks of marine fauna boat strike and improved management of key shorebird habitat areas.	As part of the commitment under BOS and ERMP, $5M has been to committed to the ERMP refer https://www.gpcl.com.au/environment/ermp) $5M has been committed to BOS programs as stipulated in GPC's Biodiversity offset Strategy (refer https://www.gpcl.com.au/environment/bos). The current status and spent (as at October 2018) of the ERMP and BOS programs is provided in the following Current WBDDP Annual Compliance Report (October 2018). the total expenditure on migratory shorebirds as at 31 October 2018 was $1,898,516.
Section 6.3.5-Summary of offset conditions	Contribution to habitat enhancement/restoration actions in the region or the wider bioregion such as 'seagrass friendly' mooring systems, wetland rehabilitation projects and water quality improvement programs.	Commitment under the BOS: (refer https://www.gpcl.com.au/environment/bos).
Section 6.3.5-Summary of offset conditions	Establish pre-development baseline data of relevant marine and terrestrial flora, fauna and ecological communities within the project area	Completed under the ERMP (refer https://www.gpcl.com.au/environment/ermp)

Condition number	Offset requirement	Status
Section 6.3.5- Summary of offset conditions	Continue annual long term seagrass monitoring surveys of seagrass distribution and abundance in the Western Basin	Commitment under the Water Quality Monitoring program. 5 years of post dredging annual seagrass monitoring was completed in November 2018.
Section 6.3.5- Summary of offset conditions	More frequent additional monitoring of seagrass areas during the construction period and for a minimum of three years following completion of dredging	Completed under the WBDDP Water Quality Monitoring program
Section 6.3.5- Summary of offset conditions	Monitoring of marine megafauna at the localities immediately impacted by the reclamation area	Continuing under the ERMP. Latest status provided in the Annual Performance Report - dated December 2018.
Section 6.3.5- Summary of offset conditions	Additional monitoring of migratory shorebirds	Continuing under the ERMP. Latest status provided in the Annual Performance Report - Dated December 2018. 2018 marked the completion of the single annual summer surveys, to be replaces by comprehensive surveys (5 surveys each year) in 2019 and 2020.

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