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Request for Project Change
Wiggins Island Coal Terminal
WICET Pty Ltd

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C	13-Apr-2012	CG Review	TS/KH	NG/GK	APA	MA
O	23-May-2012	Final	TS/KH	NG/GK	APA	MA

Contents

Executive summary

Introduction

Wiggins Island Coal Export Terminal Pty Ltd (WICET) is proposing changes to the expansion phases of the Wiggins Island Coal Export Terminal (the Project) in the Port of Gladstone.

The proposed changes affect only the expansion phases of the Terminal, which are:

1) WICET Expansion Phase 1 (WEXP1): Construction of a stockyard (Stockyard Area B) with the development of a new stacker-reclaimer yard on the section of Reclamation Area B to the southwest of Golding Point, utilising available port land. Stockyard Area B is within an area that has been designated as a coal terminal stockyard area in the State approved Land Use Agreement, and the WICET Terminal Master Plan and Framework Deed

2) WICET Expansion Phase 2 (WEXP2): Revision of the expansion phase stockyard coal handling equipment on the eastern half of Golding point from bridge stackers, dozers and underground reclaim conveyors to more conventional stacker-reclaimer systems. The Stage 1 bridge stacker and dozer reclaimer will remain on the western half of Golding Point

The proposed configuration changes have resulted primarily from:

1) Expansion Shipper's blending requirements being less complex than those considered in deriving the original Terminal configuration

2) Clarity around the planned timing of the expansion phases to meet the expansion Shipper's requirements

The changes are in response to the needs of WICET's potential expansion Shippers and will offer improved capital efficiency, lower operating costs and consequently greater marketability of the Shipper's products.

This Change Request details the extent that the proposed changes to the Project's expansion phases, WEXP1 and WEXP2, vary from the Project approved under the Environmental Impact Statement and discusses potential impacts that may result from the changes. This request also updates the impacts of the entire Project, in line with the current legislation.

The Project as approved under the EIS nominated the three major stages of the coal terminal development and approximate construction timings to be:

- Stage 1 – 25 Mtpa (2007 to 2010)
- Stage 2 – 50 Mtpa (2013 to 2015)
- Stage 3 – Ultimate Capacity (2018 to 2020)

As part of the changes in response to WICET's potential expansion Shippers, and the WEXP1 and WEXP2 expansion phases, the new incremental capacity and approximate construction timings are:

- Stage 1 – 27 Mtpa (2011-2014)
- WEXP1 – 59 Mtpa (2013-2016)
- WEXP2 – 84 Mtpa (2014-2017)

The Project is located approximately 12 km northwest of the city of Gladstone and approximately 525 km north of Brisbane, Queensland. It is situated west of the existing RG Tanna Coal Terminal (across the Calliope River) and has been approved by Commonwealth, State and Local Governments with three (3) unloading streams, three (3) loading streams,

six (6) berths, 6.3 million cubic metres of dredging (excluding over-dredging) and an ultimate Terminal throughput capacity of 84 million tonnes per annum.

WICET is not seeking change to these key Project parameters, which are approved under the Environmental Impact Statement (EIS) and Supplementary Environmental Impact Statement (SEIS). Furthermore, the proposed changes associated with WEXP1 and WEXP2 are contained within the Project footprint approved under the EIS and SEIS. The proposed changes do not result in additional dredging, additional vegetation clearing, or additional shipping.

Legal Framework

An Environmental Impact Statement for the Project was prepared by Connell Hatch (now Aurecon Hatch) on behalf of Central Queensland Ports Authority (now Gladstone Ports Corporation), the initial proponent, under the State-Federal bilateral agreement. In November 2006, the Environmental Impact Statement was published and submitted to the Coordinator-General. A Supplementary Environmental Impact Statement was prepared in 2007 to address the issues raised during the public consultation period and the subsequent Project changes.

In January 2008, the Wiggins Island Coal Terminal Project Coordinator-General's Report evaluating the EIS pursuant to section 35 of the *State Development and Public Works Organisation Act 1971* was released. In April 2008, the Project was given 'controlled action' approval under the *Environment Protection and Biodiversity Conservation Act 1999*.

In October 2008, WICET and its parent, WICET Holdings Pty Ltd, were granted Preferred Proponent status by the Queensland Government to develop the Terminal. The arrangement set in place resulted in WICET financing and developing the terminal, with GPC to operate the Terminal and Queensland Rail responsible for the rail components of the approved project. In September 2011, the EPBC approval was transferred to WICET and Queensland Rail.

This request for project change has been prepared in accordance with Division 3A of the *State Development and Public Works Organisation Act* 1971 by Aurecon Hatch on behalf of Wiggins Island Coal Export Terminal Pty Ltd to address the proposed changes of WEXP1 and WEXP2.

The Coordinator-General evaluates the Change Request, prepares a report evaluating the project change and decides whether the changes to the Project should be approved (containing conditions and recommendations if required) or refused. The Coordinator-General's Report is given to the proponent.

The potential impacts of WEXP1 and WEXP2 are within the scope of the Commonwealth 'controlled action' approval and will not result in a change to the potential impacts on matters of national environmental significance under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC 2005/2374). This was confirmed in writing by the Department of Sustainability, Environment, Water, Population and Communities on 14 September 2011.

The majority of planning and environmental approvals have been obtained for the construction footprint of the ultimate 84 million tonnes per annum Project. Additional approvals for WEXP1 and WEXP2 will be obtained prior to their respective construction phases commencing.

Need for the Project

Global demand for coal has increased considerably in the past decade. It is the fastest growing fuel source of electricity due to its low cost, abundance and safe extraction and use, relative to alternative fossil fuels and is a fundamental ingredient in steelmaking. This demand is expected to remain strong with industrial development and population growth, particularly in emerging economies. The Bowen Basin (Blackwater/Moura region) and Surat Basin (Wandoan region) are expected to produce high quality metallurgical and thermal coals into the foreseeable future from the substantial reserves. The region is currently among the lowest cost producers of high quality metallurgical and thermal coals in the world, which are sold into many sectors of the international markets.

The expansion phases of WICET are key to the opening of the Surat Basin coal reserves and provide the export link to the recently approved Surat Basin Rail Project and the Wandoan Coal Project as well as to many other brownfield and greenfield mine developments.

The coal resources of Queensland are extensive and exceed the domestic needs of Australia in the foreseeable future. During the 2009/10 financial year, the Queensland coal industry exported a total of 183 million tonnes of coal, an increase of 14.9% from the previous year. The Port of Gladstone exported approximately 60 million tonnes of this coal.

Existing Capacity Constraints

The existing facilities within the Port of Gladstone (RG Tanna Coal Terminal and Barney Point Coal Terminal) are constrained in their ability to be expanded through a combination of congestion of the existing rail system, limited land for storage of coal at the terminals, the ability to expand their shiploading facilities, and environmental and social constraints, particularly at Barney Point where both noise and dust are of concern for the residential community.

RG Tanna Coal Terminal has a nominal export capacity of 70 million tonnes per annum, while the Barney Point Coal Terminal has a nominal capacity of 8 million tonnes per annum.

No Action Option

The inability to ship the volume of coal in demand would have significant financial implications for Australia and Queensland. Inaction to meet the demands of industry would curtail further proposed investment in the coal industry. The inability to address the expansion user's operating requirements would significantly affect the timing and efficiency of the Terminal's ability to provide export capacity to meet industry demand, also impeding proposed investment in the coal industry, including delays in the development of the Surat Basin coal reserves and associated rail infrastructure.

The export of additional coal through the Terminal as a result of the WEXP1 and WEXP2 Project will provide additional export revenue for Australia and increased State revenue. In addition, the proposal has significant employment opportunities at the local, regional and State level across all spectrums of the workforce.

Mine/Customer Requirements

Opportunities remain for further resource development in Central Queensland. The Surat Basin also has further potential for open-cut coal mines and has attracted international interest as a major source of high-volatile thermal coal.

The Wiggins Island Coal Export Terminal Pty Ltd consortium currently includes 8 coal companies with contracted capacity for Stage 1 totalling 27 million tonnes per annum. There is continuing strong demand for coal export capacity through the Port of Gladstone, including from the Surat Basin. Support for the Project was further strengthened from mid 2010, when WICET received expressions of interest from 22 coal companies (representing over 170

Mtpa) for additional (post Stage 1) export capacity through the Wiggins Island Coal Export Terminal for shipments in 2015 and 2016.

Stage 1 of the Project commenced construction in October 2011 and is expected to be operational from 2014.

The construction of WICET Stage 1 was originally due for completion in 2010. Due to the delay in commencement of construction of Stage 1, the eastern portion of Golding point is currently being utilised as a laydown area, and is not available for construction of the Stage 2 (Golding Point), required to satisfy 2015 capacity requirements. As a result, there is a requirement for concurrent construction of Stage 1, WEXP1 and WEXP2, in order to achieve user's export requirements.

Coal companies have funded the feasibility studies for the first and second expansion phases of the Terminal. The technical feasibility study for the first expansion phase (WEXP1) is now complete and commencement of detailed engineering is imminent. The technical feasibility study for the second expansion phase (WEXP2) is nearing completion.

Project Description

Approved Components

The Project scope, as previously approved, included the construction of six berths – four coal berths and two berths for other products. The approved nominal ultimate coal export capacity of the Project is 84 million tonnes per annum, which utilised the following primary components:

- Three rail dump stations and three overland conveyors
- Coal stockyard, and materials handling systems on Golding Point with automated travelling bridge stackers, with coal to be reclaimed to the shiploading stream from the stockpiles using dozers and stockpile dischargers (Drawing HQ98-SK-M-084, Appendix 1)
- Three outloading conveyors serving three shiploaders across the four coal berths (Drawing HQ98-SK-M-086, Appendix 1)
- Internal power distribution, control systems and communications
- Substations, workshops, administration, security, amenities and lighting for the coal Terminal
- Marine facilities including jetty, wharf and dolphins
- Berth pockets, departure/arrival channel and swing basin dredged to navigable depths (Drawing HQ98-SK-W-550, Appendix 1)
- Site water management and drainage infrastructure for the coal Terminal
- Site roads, services and infrastructure (Drawing HQ98-SK-C-495, Appendix 1)
- Landscaping and fencing

Stage 1 of the Project is being constructed on the basis of the Project description contained in the Supplementary Environmental Impact Statement.

Proposed Changes

The proposed changes to the Project described in the approved Environmental Impact Statement and Supplementary Environmental Impact Statement include:

- Development of a stacker-reclaimer stockyard (Stockyard Area B) on Reclamation Area B, including a new settlement pond at the western end of Reclamation Area B and a new operational stormwater outfall to the Anabranch
- Development of a stacker-reclaimer yard on the eastern half of Golding Point in lieu of the previously approved bridge stacker / dozer reclaim yard in this area. The western half of Golding Point will continue to be developed as a bridge stacker / dozer reclaim yard as per the approved EIS and SEIS

A general arrangement of WICET including Stage 1, WEXP1 and WEXP2 is provided in Drawing 0000-M-DT-0102 in Appendix 1.

The proposed changes to the Project do not result in:

- An increase in the Project footprint
- Additional dredging
- Change to the dredging methodology and disposal / reclamation areas
- Additional terrestrial vegetation clearing
- Additional marine piling within seagrass meadows
- An increase in the ultimate Terminal throughput
- Additional ship movements

Summary of proposed changes

A tabulated summary of the full Change Request findings is included in Table 1. The table indicates whether there is significant change from the conclusions derived in the approved Environmental Impact Statement and Supplementary Environmental Impact Statement.

The degree of change was determined using the potential impact findings derived from the Project, as approved under the Environmental Impact Statement process. These findings were compared with the potential impacts of the proposed changes associated with WEXP1 and WEXP2.

Potential impacts predicted to be unchanged, or a negligible change, from the approved Project were categorised as 'No Change' in Table 1. While the potential impacts predicted for WEXP1 and WEXP2 that result in a sufficiently material change were categorised as a 'Change' in Table 1.

Key findings are as follows:

- A minor increase in noise levels at two sensitive receptors during neutral weather conditions, and at 19 receptors in 'worst case' temperature inversion conditions is anticipated
- Key commitments proposed by WICET in respect of these findings include:
  - Investigation of mitigating measures should detailed design result in unacceptably high noise levels at sensitive receivers
  - Augmentation of WICET's Community Relations Plan to specifically address Change Request findings. WICET is committed to engaging with the community with regard to noise levels
- Air quality (particulate matter) impacts generated during construction and operation of WEXP1 and WEXP2 are expected to be similar to those assessed in the EIS and SEIS
- Additional stormwater settlement pond volume (including one new pond at the western end of Stockyard Area B and extension to the main Stage 1 south stormwater pond) will be required for capture of stormwater and maintenance of approved water quality discharge limits
- The changed Project remains consistent with existing Land Use agreements and the overall Gladstone land use context. Notwithstanding this, the development of Stockyard Area B as a coal terminal stockpile area is a change to the approved EIS / SEIS. WICET is committed to the amelioration of visual amenity through provision of visual screens (comprising landscape bunds and vegetation) around the perimeter of the new Stockyard Area B
- The Project changes will result in a reduction of cumulative lighting impacts on residents and motorists in the area as the stacker-reclaimer stockyards require very little artificial lighting compared with the approved bridge stacker / dozer reclaim stockyards
- The appearance of the wider WICET site will be changed with the use of Reclamation Area B (Stockyard B) for WEXP1. The appearance of WEXP1 and WEXP2 is not new to the Gladstone landscape, and will be consistent with that of the approved Project,

existing infrastructure and the Port of Gladstone, as well as the continued industrial focus of the region and the city of Gladstone

- On account of a reduction of the bulldozer fleet, diesel consumption during operation has reduced by 3.67 million litres per year. This is equivalent to a 14.68 kiloton annual CO2-e reduction

Table 1 Summary of key findings in Request for Change

Chapter	Change	No Change	Details
4 Topography, geology and soils	✓		Reference: Section 4 A revised Acid Sulfate Soil Management Plan is currently being developed to incorporate the management of potential risks from WEXP1 dredging (Berths 2 and 3). ASS sampling of Berth Pockets 2 and 3 did not identify ASS New settlement ponds will involve excavation of previously deposited dredged materials and the new outfall will require excavation of some soils, and associated Acid Sulfate Soil risks
5 Land use and project approvals	✓		Reference: Section 5 WEXP1 and WEXP2 comply with the State and Local Government land use and transport planning Policies, Strategies and Guidelines WEXP1 and WEXP2 will have minimal impact on adjoining existing and future land uses due to the industrial and port nature of the area Additional statutory approvals will be required, including a Material Change of Use and various Operational Works (Bulk Earthworks, Tidal Works and the Disturbance of Marine Plants)
6 Transport	✓		Reference: Section 6 No additional shipping movements, or impacts from shipping are expected as the overall Terminal capacity will remain the same as the approved Project It is intended that the Gladstone-Mount Larcom Road overpass will be constructed during the early works of WEXP1 Construction traffic is expected to impact on traffic in the wider area for a longer duration than that predicted in the WICT EIS and SEIS. This is largely due to an increase in construction intensity, with WICET Stage 1 and WEXP1 and WEXP2 occurring concurrently A detailed traffic management plan was prepared and approved by the Department of Transport and Main Roads as part of the WICET Stage 1 works. This plan will be implemented for future stages and updated as required

Chapter	Change	No Change	Details
7 Climate, climate change and sustainability	✓		Reference: Section 7 The changed Project presents a reduction of diesel consumption of 3.67 ML of diesel per year from the Approved Project. This is equivalent to a 14.68 kiloton annual CO2-e reduction Reporting under the *National Greenhouse and Energy Reporting Act 2007* is now required for energy consumption during the construction phase and greenhouse gas emissions of the operational phase of the Project The Project may be subject to the Carbon Price Mechanism and may therefore be financially liable for each tonne of CO_2-e emitted
8 Hydrology and hydraulics		✓	Reference: Section 8 It is expected that the proposed Project changes associated with WEXP1 and WEXP2 will not have any additional impacts to hydrology/hydraulics of the area to those addressed in the WICT EIS and SEIS
9 Water quality		✓	Reference: Section 9 Dredging remains consistent with the approved WICT EIS and all dredging activities will comply with approved DMP(s) Any potential water quality impacts from the proposed changes are considered minor and represent minimal to no change to the potential impacts addressed in the WICT EIS process
10 Groundwater		✓	Reference: Section 10 The addition of WEXP1 and WEXP2 to the WICET design proposed post WICT EIS and SEIS are not expected to result in significant impacts to groundwater resources within the area
11 Coastal environment		✓	Reference: Section 11 There is no change to the approved dredging, as included in the WICT EIS and SEIS
12 Air quality		✓	Reference: Section 12 Air quality impacts generated during construction and operation of WEXP1 and WEXP2 are expected to be similar to those assessed in the EIS and SEIS
13 Waste		✓	Reference: Section 13 A modest increase in waste (of that originally predicted in the EIS and SEIS) will be generated during construction. This is largely due to the expansion phases requiring a slight increase in construction intensity compared with that estimated in the EIS and SEIS
14 Noise and vibration	✓		Reference: Section 14 A minor increase in noise levels at two sensitive receptors during neutral weather conditions, and at 19 receptors in 'worst case' temperature inversion conditions is anticipated

Chapter	Change	No Change	Details
15 Terrestrial flora and fauna		✓	Reference: Section 15 No additional clearing (ie outside of the project footprint) is proposed as part of the WEXP1 and WEXP2 changes Potential impacts on the terrestrial ecology as a result of the WEXP1/WEPX2 changes will be limited to indirect impacts only, and are not expected to be significant
16 Aquatic ecology		✓	Reference: Section 16 Any potential aquatic ecology impacts from the proposed WEXP1 and WEXP2 changes are considered minor and represent minimal to no change to the potential impacts addressed in the WICT EIS process
17 Cultural heritage		✓	Reference: Section 17 The proposed changes will be wholly contained within the Project footprint approved under the EIS; therefore there are no additional cultural heritage requirements
18 Social	✓		Reference: Section 18 The estimated peak workforce for the changed Project is 1,100 employees inclusive of construction labour, engineering and management staff. This compares with 1,450 employees assessed during the EIS and SEIS, assuming Stage, 1, 2 and 3 (as defined in the EIS) were undertaken concurrently. The peak is expected to occur during WEXP1 construction as Stage 1 is completed and commences operation. Given the WEXP1 construction workforce is planned to ramp up as Stage 1 construction ramps down, it is expected that the 1,100 peak workforce will be sustained for a longer period than originally anticipated in the EIS and SEIS The impacts arising from increased workforce requirements and concurrent projects include a shortage of necessary skills, a decrease in accommodation availability and increased pressure on social infrastructure in the surrounding community Provision of rooms from WICET's allocation within the Maroon Group Accommodation Facility will cater for the majority of non-Gladstone based workers required for the Project
19 Health and safety	✓		Reference: Section 19 There is an elimination of hazard from mobile equipment (dozer) interaction with the bridge stacker, as this equipment will be replaced with stacker/reclaimers in the changed Project A minor increase in noise levels at two sensitive receptors during neutral weather conditions, and at 19 receptors in 'worst case' temperature inversion conditions is anticipated

Chapter	Change	No Change	Details
20 Economics	✓		Reference: Section 20 The Gross State Product and the total coal export earnings are expected to rise due to the increase in the marketability of coal. The projected earnings will be achieved earlier than originally anticipated
21 Hazard and risk		✓	Reference: Section 21 The construction and operation of WEXP1 and WEXP2 is not expected to significantly increase the hazards and risks that were approved for the construction and operation of the WICET Project
22 Visual amenity and landscape character		✓	Reference: Section 22 The appearance of the wider WICET site will be changed with the use of Reclamation Area B (Stockyard B) for WEXP1 and the change to the stacker-reclaimer yard on the eastern half of Golding Point for WEXP2 However, the appearance of WEXP1 and WEXP2 is not new to the Gladstone landscape, and will be consistent with that of the approved Project, existing infrastructure and the Port of Gladstone, as well as the continued industrial focus of the region and the city of Gladstone WICET is committed to the amelioration of visual amenity through provision of visual screens (comprising landscape bunds and vegetation) around the perimeter of the new Stockyard Area B

Conclusion

With the effective implementation of the Coal Terminal Management Plans during detailed design, construction and operation, this Change Request addressing the proposed modifications to the expansion phases WEXP1 and WEXP2 of the Wiggins Island Coal Export Terminal Expansion Phase 1 has identified no significant environmental impacts. All identified potential environmental impacts are able to be managed during design, construction and operation to acceptable levels, consistent with the original approvals and conditions.

This report has recognised that the proposed changes will result in a marginally increased impact on intertidal areas and marine plants with local and regional values due to the additional stormwater outfall to the Anabranch. In consultation with relevant agencies, a range of mitigation strategies will be developed to maintain the overall ecological values of Port Curtis. Cumulative impacts including a shortage of necessary skills, accommodation availability and increased pressure on social infrastructure will be mitigated through the allocation of rooms at the Maroon Group Accommodation Facility and the ongoing collaboration with concurrent projects in Gladstone.

WEXP1 and WEXP2 are expected to provide significant economic benefits for Gladstone and Queensland through the coal export industry and associated provision of government royalties, and will facilitate the opening up of the Surat Basin.

1. Introduction

1.1 Background

The Wiggins Island Coal Export Terminal Pty Ltd (WICET) is proposing changes to their greenfield coal terminal, the Wiggins Island Coal Export Terminal (the Project), in response to user requirements for proposed Terminal expansions. The changes do not affect the approved throughput of 84 Mtpa.

The Project is located approximately 12 km northwest of the city of Gladstone and approximately 525 km north of Brisbane, Queensland. It is situated west of the existing RG Tanna Coal Terminal (across the Calliope River) and has been preliminarily approved with an ultimate capacity of 84 million tonnes per annum (Mtpa). Figure 1.1 shows the location of the coal terminal.

An Environmental Impact Statement (EIS) for the Project was prepared by Connell Hatch (now Aurecon Hatch) on behalf of Central Queensland Ports Authority (CQPA), now Gladstone Ports Corporation (GPC), the initial proponent, under the State-Federal bilateral agreement. In November 2006, the EIS was published and submitted to the Coordinator-General. The EIS was subject to public consultation, which occurred from 13 November 2006 to 8 January 2007. During this period, 28 agency and stakeholder/community submissions were received. A Supplementary EIS (SEIS) was prepared in 2007 to address the issues raised during the EIS consultation period and the subsequent Project changes.

In January 2008, the Wiggins Island Coal Terminal Project Coordinator-General's Report evaluating the EIS pursuant to section 35 of the *State Development and Public Works Organisation Act 1971* was released. In April 2008, the Project was given approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (EPBC 2005/2374).

In October 2008, WICET and its parent, WICET Holdings Pty Ltd, were granted Preferred Proponent status by the Queensland Government to develop the Terminal. The arrangement set in place resulted in WICET financing and developing the terminal, with GPC to operate the Terminal and Queensland Rail responsible for the rail components of the approved project. In September 2011, the EPBC approval was transferred to WICET and Queensland Rail.

In accordance with Division 3A of the SDPWO Act, a request for project change has been prepared by Aurecon Hatch on behalf of WICET to address the proposed changes to the Project, known as WICET Expansion Phase 1 (WEXP1) and WICET Expansion Phase 2 (WEXP2). This Change Request details the extent that WEXP1 and WEXP2 varies from the approved Project and discusses additional impacts that may result from the changes. Additional mitigation and management measures are also included to avoid/reduce these impacts.

The Change Request is divided into the following sections:

- Executive Summary
- 1 Introduction (this section)
- 2 Project need
- 3 Project Description
- 4 Topography, Geology and Soils
- 5 Land Use
- 6 Transport
- 7 Climate, Climate Change and Sustainability
- 8 Hydrology and Hydraulics
- 9 Water Quality
- 10 Groundwater
- 11 Coastal Environment

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Legend

- Project Area
- Cadastre
- Port of Gladstone Limits
- Major Roads
- Rail

Source:
Cadastre: DERM, October 2011

Date: 24/08/2011 Version: 1

Map by: by: PIC P:\GIS\Projects\H337300_WICET_Change_Report\MEXP1_036.mxd 24/08/2011 10:43

A1 scale: 1:90,000

0 2 4 6 8Kilometers

Job No: H337300-B10-B330

Coordinate system: GDA_1994_MGA_Zone_56

Wiggins Island Coal Export Terminal - EIS Change Request

Figure 1.1 Locality Plan

- 12 Air Quality
- 13 Waste
- 14 Noise and Vibration
- 15 Terrestrial Flora and Fauna
- 16 Aquatic Ecology
- 17 Cultural Heritage
- 18 Social
- 19 Health and Safety
- 20 Economics
- 21 Hazard and Risk
- 22 Visual Amenity and Landscape Character
- 23 Coal Terminal Environmental Management Plan
- 24 Abbreviations
- 25 References

1.2 Project proponent

In October 2008, WICET was appointed by the Queensland Government as the preferred proponent to finance and build the Project. The Framework Deed with the State and GPC was executed in December 2009 and outlined the role of WICET as owner, developer and lessee of the Terminal, with GPC as the operator of the Terminal. The WICET consortium currently includes 8 coal companies who have contracted capacity in Stage 1:

- Aquila Resources
- Bandanna Energy
- Caledon Resources
- Cockatoo Coal
- Northern Energy Corporation
- Wesfarmers Curragh
- Yancoal
- Xstrata Coal

The contact details of WICET are as follows:

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1.3 Project description

1.3.1 Description of approved Project

The Project, as described in the SEIS and approved under the EIS process, included the construction of six berths – four berths for the coal Terminal and two for other non-coal related activities. The ultimate capacity of the four berth coal Terminal is 84 Mtpa, based on

a nominal capacity of 70 Mtpa with a throughput variation of up to 20%. The Project has been approved to ultimately contain the following primary components:

- Three rail dump stations and three inloading conveyors
- Coal stockyards and materials handling systems with automated travelling bridge stackers (situated on Golding Point) with coal reclaimed to the shiploading stream from the stockpiles using dozers and stockpile dischargers
- Three outloading conveyors serving three shiploaders across the four berths
- Internal power distribution, control systems and communications
- Substations, workshops, administration, security, amenities and lighting for coal terminal and rail yard
- Marine facilities including jetty, wharf and dolphins
- Berth pockets, departure/arrival channel and swing basin dredged to navigable depths
- Site water management and drainage infrastructure for the coal Terminal
- Site roads, services and infrastructure
- Landscaping and fencing

Other infrastructure approved to support the Project includes the following major components:

- Reclamation of areas north and south of Gladstone-Mount Larcom Road (formerly Hanson Road), including modifications to Reclamation Areas B and C
- A wharf/barge ramp facility on Golding Point, adjacent to the Calliope River and east of the stockyard
- Gladstone-Mount Larcom Road will be raised over the inloading conveyors with access provided to the coal Terminal
- Water supply and sewerage infrastructure, telecommunications and power supplies to service the coal Terminal
- Relocation/protection of existing services/utilities (eg gas pipelines, Ergon cables/equipment etc)

The detailed engineering design is largely complete for Stage 1 of the Project. WICET has obtained a range of Development Permits and/or submitted Development Applications in relation to the necessary planning and environmental approvals for the Project. Stage 1 of the Project comprises reclamation and dredging works, coal stockyard, one rail dump station, one conveyor, the jetty, one berth and associated infrastructure. Stage 1 construction works commenced in October 2011 and are proceeding on the basis of the SEIS. Stage 1 is expected to be operational in 2014.

The Project as approved under the EIS nominated the three major stages of the coal terminal development and approximate construction timings to be:

- Stage 1 – 25 Mtpa (2007 to 2010);
- Stage 2 – 50 Mtpa (2013 to 2015); and
- Stage 3 – Ultimate Capacity (2018 to 2020).

1.3.2 WICET Expansions

As a response to a change in the expansion user's operating requirements, expansion planning of the Project identified and assessed modified configurations for the Terminal. WEXP1 and WEXP2 contain several variations to the overall Project and are designed to take into account unanticipated changes to the coal industry in Gladstone including different operating requirements of WEXP1 and WEXP2 users compared to the users of Stage 1, resulting in less outbound blending than previously required. The eastern half of Golding Point is required to be used for laydown area during the construction of Stage 1, limiting site availability of the eastern portion of Golding Point for development in time to meet industry demand. Figure 1.2 shows an overlay of the approved project as per the EIS and the proposed project changes.


Port Curtis
Wharf Substructures For Other Products Berths 5 and 6
Coal Terminal Berths 1 to 4
Jetty
Mud Island
Wiggins Island
Potential Coal Terminal Switchyard
Construction Access Barge Ramp Facility
Stockyard Area A
Stockyard Area B
Golding Point
Reclamation Area B
Substation
Coal Terminal
Terminal Acesss Road
Reclamation Area C
Anabranch
Overland Conveyors
Gladstone Power Station
Callemondah Rail Yard
Gladstone Airport
Round Hill Lookout
Auckland Point Lookout
Gladstone Marina
Spinnaker Park
Auckland Inlet
Hanson Road
Gladstone
Dawson Highway
Calliope River
Receival Area
Legend
Source:
Project Footprint

The WICET expansion phase incremental capacity and approximate construction timings are:

- Stage 1 – 27 Mtpa (2011-2014)
- WEXP1 – 59 Mtpa (2013-2016)
- WEXP2 – 84 Mtpa (2014-2017)

This Change Request does not seek approval to increase ultimate capacity of 84 Mtpa. All the proposed project components are to occur within the Project footprint which includes areas approved under the EIS and areas subsequently approved for WICET Stage 1, such as the Gladstone-Mount Larcom Road overpass and the new outfall to the Calliope River Anabranch. Dredging, vegetation clearing and shipping all remain unchanged from that proposed in the approved Project.

WICET Expansion Phase 1 (WEXP1)

WEXP1 extends Stage 1 of the Project by developing a new stacker reclaimer yard on Reclamation Area B, (Stockyard Area B), to increase the throughput capacity utilising available port land. The following components are included WEXP1:

- Extension of the Stage 1 dump station to accommodate a second rail receival loop
- Three stockpile rows in Stockyard Area B
- Three stacker reclaimers operating in Stockyard Area B
- Addition of overland conveyor, inloading transfer conveyor, yard conveyors, reclaim transfer conveyors, surge bin conveyor, surge bin, jetty conveyor and wharf conveyor
- One additional shiploader and two additional berths (Berths 2 and 3)
- A new settlement pond at the south-western end of the Reclamation Area B (Stockyard Area B) and a new stormwater outfall to the Anabranch. The stormwater pond will require excavation of previously disposed dredge spoil from Stage 1 activities and subsequent re-use onsite
- Extension of the settlement pond on the southern part of Golding Point

WICET Expansion Phase 2 (WEXP2)

WEXP2 involves the development of a stacker-reclaimer yard on the eastern half of Golding Point in lieu of bridge stackers/dozer reclaimers that were previously approved for the Project.

The following components are included in WEXP2

- Extension on the dump station to accommodate a third rail receival loop
- Three additional stockpile rows on the eastern half of Golding Point
- Three stacker reclaimers operating in Stockyard Area A (Golding Point)
- Addition of overland conveyor, inloading transfer conveyors, yard conveyors, surge bin conveyor, surge bin and sample plant complex, jetty conveyor and wharf conveyor
- One additional shiploader and one additional berth (Berth 4)

WEXP2 will be developed in lieu of the approved bridge stacker/dozer reclaim yard in this area, with the Stage 1 bridge stacker with dozer reclaimer remaining on the western half of Golding Point.

Confirmation of User's Operation Requirements

The project description provided herein for WEXP1 and WEXP2 is current at the time of reporting, however it should be noted that the precise equipment arrangement remains subject to final confirmation of the user's operating requirements and the subsequent detailed design process. For example, should the final user requirements show a need for additional product blending, an additional stacker-reclaimer could be required. It is proposed that the assessment of equipment changes be undertaken as part of operational works

approvals. This may include additional modeling to assess any change to the dust and noise impacts.

1.3.3 Studies completed

Environmental and engineering studies and surveys undertaken to develop WEXP1 and WEXP2 and prepare the Change Request include:

Engineering

- Concept engineering and master planning
- Technical feasibility studies
- Geotechnical investigations

Environmental

- Air quality assessment and modelling
- Noise and vibration assessment and modelling
- Social impact assessment

1.3.4 Areas of investigation

- Project area/footprint – the area required for the Project construction and operation
- Study area – the larger area of influence relevant to consider the broader potential impacts of the Project

1.4 Project scope

Stage 1 of the Project is expected to be operational by 2014 and provides for the contracted capacity of 27 Mtpa. This stage will require reclamation, dredging works and the construction of one coal stockyard, one dump station, one conveyor, the jetty, one wharf/berth and associated infrastructure.

Construction of WEXP1 is anticipated to commence in mid 2012 and is expected to increase contracted capacity to approximately 59 – 60 Mtpa. WEXP2 is being planned to ship first coal in 2016, or as soon as possible thereafter.

1.5 The Change Request

1.5.1 Project status

The potential impacts of WEXP1 and WEXP2 are within the scope of the Australian Government 'controlled action' approval and will not result in a change to the potential impacts on matters of national environmental significance (NES) under the EPBC Act (EPBC 2005/2374). This was confirmed by the Department of Sustainability, Environment, Water, Population and Communities on 14 September 2011 (refer Appendix 1).

The Change Request is required under Division 3A of the SDPWO Act to assess the potential additional impacts of WEXP1 and WEXP2 as the changes no longer comply with the Project description originally approved by the Coordinator-General under the EIS process.

1.5.2 Objectives of the request for change report

The purpose of the Change Request is to provide information on the existing environment, social and economic situations and on the nature and extent of potential impacts that may arise from construction and operation of the changed Project. This process has assisted in the WEXP1 and WEXP2 concept engineering and master planning to avoid or minimise potential impacts where practicable and develop appropriate mitigation measures for impacts which are unavoidable.

In particular, the report provides:

- An understanding of WEXP1 and WEXP2 components and the variations from the approved Project
- The existing environment that WEXP1 and WEXP2 may potentially impact upon, including the environment in the project footprint and the broader study area
- The potential impacts that may occur as a result of WEXP1 and WEXP2 and the measures to be taken to avoid or mitigate potential impacts
- A framework for decision makers to consider the environmental aspects of WEXP1 and WEXP2 compared with the legislative and policy provisions in order to make an informed decision on whether WEXP1 and WEXP2 should proceed in the proposed form
- A source of information for interested parties to gain an understanding of WEXP1 and WEXP2, including the need for the Project, the alternatives, the environment it would affect, the impacts that may occur and the measures to be taken to avoid or reduce these impacts

1.5.3 Submissions

As per Section 35G of the SDPWO Act, it is the responsibility of the Coordinator-General to decide whether WICET is required to publicly notify of changes to the approved Project, the method of which is decided by the Coordinator-General.

1.6 Study team

The Change Request has been prepared by Aurecon Hatch with support from specialist sub-consultants. These consultants include Katestone, who prepared a report on air quality (refer Chapter 12) and SLR Consulting, who prepared a report on noise and vibration (refer Chapter 14).

1.7 Summary of Environmental Legislative Requirements

There are a number of State environmental legislative requirements to be addressed prior to the construction of WEXP1 and WEXP2. These are in addition to the approvals currently obtained or being obtained for Stage 1 construction and operational activities. A summary of approvals likely to be required and/or amended for WEXP1 and WEXP2 are displayed in Table 1.1. Further information regarding the regulatory framework and likely approvals for WEXP1 and WEXP2 are discussed in detail in Chapter 5.

Table 1.1 Summary of likely approvals required for WEXP1 and WEXP2

Legislation	Administering Authority	Trigger	WEXP1/WEXP2 Response
State Development and Public Works Organisation Act 1971	Coordinator-General	The Coordinator-General to assess the proposed change to a project after completion of the Coordinator-General's Report	Application for a 'Project Change' required (subject of this application)
Environmental Protection Act 1994 *Sustainable Planning Act 2009*	Department of Environment & Heritage Protection (DEHP)	Development Permit for MCU and Registration Certificates required for Construction and Operational Environmentally Relevant Activities (ERAs)	ERAs relating to Extractive Activities (ERA 16) and Bulk Material Handling (ERA 50) may require amendment/new approvals to include volumes associated with WEXP1 and WEXP2

Legislation	Administering Authority	Trigger	WEXP1/WEXP2 Response
Sustainable Planning Act 2009 *Coastal Protection and Management Act 1995* *Fisheries Act 1994*	Gladstone Ports Corporation/ DEHP / Department of Agriculture, Fisheries and Forestry (DAFF)	Development Permits for Operational Works that are Tidal Works and the Removal, Destruction or Damage to Marine Plants	Likely additional new and/or amendments to existing Development Permits to accommodate new conveyors and operational stormwater outfall
Sustainable Planning Act 2009	GRC	Development Permit for Operational Works (Bulk Earthworks)	Amendment of the existing Operational Works (Bulk Earthworks) approval required for works that remain within GRC's jurisdiction
Transport Infrastructure Act 1994	Gladstone Ports Corporation	Undertaking Port Assessable Development	Port Development Approval for works on Strategic Port Land

2. Project need and alternatives

This chapter describes the need of the proposed WICET Expansion Phase 1 (WEXP1) and WICET Expansion Phase 2 (WEXP2) and highlights any alternatives that have previously been considered. The need and alternatives for the original terminal were outlined in the WICT EIS and SEIS. This Change Request aims to provide an updated assessment to address potential changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and the Australian Government controlled action approval (April 2008).

2.1 Proposed Changes to the Project

The proposed changes to the Project include:

- WEXP1: the development of a new stacker-reclaimer yard on Reclamation Area B to utilise available port land, including a new settlement pond at the western end of Reclamation Area B, and a new operational stormwater outfall to the Anabranch
- WEXP2: the development of a stacker-reclaimer yard on the eastern half of Golding Point in lieu of the approved bridge stacker/dozer reclaim yard in this area, with the Stage 1 bridge stacker and dozer reclaimer remaining on the western half of Golding Point

No changes to dredging, vegetation clearing or shipping are proposed to those outlined in the EIS and SEIS.

The Project has been approved by the Australian Federal and State Governments with an ultimate export capacity of 84 Mtpa. WEXP1 and WEXP2 will allow the Terminal to meet current coal export demands and allow for changes in the expansion user's operating requirements, while utilising available port land. WICET and GPC have determined that there is sufficient customer interest to initiate WEXP1 and WEXP2.

2.2 Project Justification

This chapter describes the need for the proposed expansion, which includes the current needs that the proposed WEXP1 and WEXP2 will fulfil, and the economic and social benefits.

Global demand for coal has increased considerably in the past decade. It is the fastest growing source of electricity due to its low cost, abundance and safe extraction and use, relative to alternative fossil fuels. This demand is expected to remain strong with industrial development and population growth, particularly in emerging countries. Therefore there is sufficient sustainable demand to trigger the expansion of the Terminal in the Port of Gladstone.

Queensland's Bowen Basin produces high quality coking coal, pulverised coal injection coal and thermal coal that is exported to Japan, Korea, Taiwan, China, India, Europe and Brazil. The region represents a significant driver for the State and national economy. Continuing improvements in mining techniques are occurring at existing coal mines, as well as the development of new mines in the area.

Furthermore, development of coal mines within the Surat Basin (to the south of the Bowen Basin) will act as a further driver of the State and national economy. The basin has been estimated as containing up to approximately 6.3 billion tonnes of coal reserves which is proposed to be mined and exported via a new rail network resulting in additional demand on the Port of Gladstone.

2.2.1 Existing Capacity Constraints

The existing coal terminals within the Port of Gladstone include the RG Tanna Coal Terminal (RGTCT) and Barney Point Coal Terminal (BPCT). These terminals are constrained in their

ability to be expanded through a combination of congestion of the existing rail system, limited land for storage of coal at the terminals, the inability to expand their shiploading facilities and environmental and social constraints, particularly at BPCT where both noise and dust are of concern for the residential community.

The RGTCT has a nominal export capacity of 70 Mtpa, while the BPCT has a nominal capacity of 8 Mtpa.

The RGTCT has reached its most cost effective development capacity as the inloading capacity of the terminal is constrained both in the ability to construct a fourth rail receival facility and to gain rail access through the rail yards at Callemondah. The shiploading capacity is constrained due to the inability to add a fourth shiploading stream or construct a fifth berth. The RGTCT has a maximum vessel capacity of 220,000 dead weight tonnes (DWT).

The BPCT has a limited capacity due to the constraint on the area available for stockpiling at the terminal. Environmental considerations also limit the ability to expand this terminal capacity beyond 8 Mtpa. Customer contracts have been established for this tonnage. The wharf of BPCT is also constrained as the maximum vessel capacity is 90,000 DWT (fully loaded) or 150,000 DWT (part loaded).

2.2.2 Export Coal Markets

Australia has more than 39.2 Gt of identified black coal reserves, enough to last well over 200 years at current rates of production. Economic resources occur in most Australian States, but are particularly abundant in Queensland and New South Wales, which account for 56% and 40% of Australia's black coal production respectively.

Most black coal in Queensland comes from the Bowen Basin, extending south from Collinsville to Blackwater and Moura, and at Newlands, Blair Athol and near Brisbane. Other large deposits include the Surat Basin in Central Queensland and the Galilee Basin in northern Queensland.

Black coal remains Queensland's largest commodity export, worth more than AUD$24.5 billion in the year to 30 June 2010 (or over $AUD2 billion per month).

In the year to 30 June 2010, black coal represented around 15% of Australia's total commodity exports. In the year to 30 June 2010, the Queensland coal industry recorded a total of 275.2 Mt of raw coal mined, from which 205.7 Mt of saleable coal was produced, an increase of 7.8% from the previous year. Coal exports totalled 183 Mt in the 2009/10 financial year, an increase of 14.9% from the previous year.

At the end of 2010 there were 54 coal mines in Queensland. The proportion of underground to open cut mines has changed markedly over the past 10 years, comprising 41 open cut and 13 underground mines. The Queensland coal industry also directly employed a workforce of 17,388 employees in 2010.

Total world trade in hard coal in the year ending 30 June 2010 was 955 Mt – comprising 684 Mt of thermal (steaming) coal (72%) and 271 Mt of metallurgical (coking) coal (28%). Australia is the world's largest coal exporter with exports of 298 Mt in the year ending 30 June 2010, or 31% of the world. In terms of thermal and metallurgical coal markets, Australia's share in the year ending 30 June 2010 represented 21% and 57%, respectively of total world trade.

As the world's largest coal exporter, Australia supplies markets in more than 30 countries around the world. Major markets are Japan and other Asian economies, which account for over 88% of Australian coal exports. Significant tonnages are also exported to Europe (7.9%) and Brazil (1.5%).

The International Energy Agency (UK) projects that the world will need almost 60% more energy in 2030 than in 2002 with fossil fuels (predominantly coal) still to meet most of its needs. Coal is the most widely used energy source in electricity generation and is an essential input to most steel production. Coal reserves are abundant and widely distributed around the world, providing an accessible and affordable energy source. Authoritative studies, such as the International Energy Agency's "World Energy Outlook" show that coal use is set to increase over the next 20 years as the world meets its growing energy needs. For many developing countries, affordable energy from coal is vital for building internationally competitive industries, and providing basic household services such as lighting, cooking and refrigeration. Unlike oil and gas, coal is easily obtained from a large range of suppliers operating in a competitive market.

Over the past few years, China has reversed its position from a net exporter of hard coking coal to a net importer, while at the same time China's exports of coke to the steel industry have been subject to fluctuation. The global steel industry has responded by planning significant additions to future domestic coke production capacity to replace Chinese coke imports. This is expected to increase global seaborne demand for hard coking coal from producers such as Australia.

Mining of black coal is one of Australia's most important industries, creating significant employment in regional Australia, fuel for low-cost electricity generation and steelmaking, and vital export income.

Australia is ideally positioned in terms of readily accessible reserves and quality to meet the current under supply and future demand increases. The proposed WEXP1 and WEXP2 will provide WICET with a strategic link in the coal supply chain ensuring reliability and continuity of supply of coal to the export market.

2.2.3 Mine/Customer Requirements

Motivated by the significant growth in steel production in China and India, and long-standing demand for energy producing (thermal) coal, the ongoing demand for good quality coal is forecast to remain robust. The Bowen Basin (Blackwater region) and Surat Basin (Wandoan region) are expected to produce good quality coal into the foreseeable future with substantial reserves of good quality coal product. The region is currently among the lowest cost producers of high metallurgical and thermal coal in the world.

Queensland is the world's largest exporter of seaborne coal. During the 2009/10 financial year Queensland produced 275.2 Mt of saleable coal – an increase of 7.8% over the previous financial year.

Opportunities remain for further resource development in the central and south west Bowen Basin within the Reids Dome Beds, which are known to contain vast, and as yet, undeveloped resources of high quality thermal and metallurgical coals. Recent exploration in the southern Bowen Basin has focused on thermal and semi-soft coals. This has led to several new mines being developed, and has located other significant coal resource areas for possible future development.

A significant and expanding world market exists for Bowen Basin coal due to its low sulphur and nitrogen levels and that it produces low carbon dioxide emissions. WEXP1 and WEXP2 are key to the opening of the Surat Basin coal reserves and provide the export link to the recently approved Surat Basin Rail Project.

All of Queensland's export coal is transported to port via the coal rail network operated by QR Network. The Port of Gladstone is critical to this logistics supply chain servicing QR National's Blackwater and Moura Systems and Surat Basin Rail.

The Queensland economy places a heavy reliance on revenue derived from coal industry royalties ensuring the support of the Queensland State Government.

2.3 Project Alternatives

There are a limited number of options available to accommodate the increased coal export requirements. WICET Stage 1 is currently under construction, which makes alternatives less feasible. Options are discussed below.

2.3.1 Utilising Alternate Coal Terminals

This option would involve securing export capacity of other Queensland coal terminals rather than expanding the capacity of the WICET Terminal. Coal terminals through which additional coal could be directed include:

- Hay Point Coal Terminal (this terminal is privately owned by the BHP Billiton Mitsubishi Alliance (BMA) to export BMA coal)
- Abbot Point Coal Terminal
- Dalrymple Bay Coal Terminal
- RG Tanna Coal Terminal
- Barney Point Coal Terminal
- Port of Brisbane Coal Terminal

The first three of these coal terminals are in the process of expanding their facilities to meet the current demands of their existing customers and to meet the demands of proposed mines. There are also major logistic/operational issues associated with the integration of the Central Queensland coal supply chains, which are currently subject to feasibility and market conditions. It is therefore considered unlikely that sufficient capacity to satisfy total demand could be secured at any of these terminals. Similarly, the ability to access these ports would be significantly more expensive due to the extensive haulage distances and cost.

The Moura Rail System and Surat Basin Rail only have potential to feed into RGTCR and BPCT. The capacity of existing coal terminals within the Port of Gladstone, RGTCT and BPCT, are constrained by rail congestion, limited land availability and environmental and social constraints. It is not feasible to expand these facilities beyond their current capacity to meet future coal export demand.

The Port of Brisbane Coal Terminal is limited in the size of vessel that may be handled at the port with the maximum vessel size of up to 90,000 DWT. This terminal is further constrained by the ability to provide for increased rail access through Brisbane to the facility on Fisherman's Island at the mouth of the Brisbane River.

The Balaclava Island Coal Terminal (BICET) (Xstrata Coal), Fitzroy Coal Terminal (Mitchell Group) and Dudgeon Point Coal Terminal are currently at preliminary design stage and EIS preparation.

2.3.2 Development of a New Terminal

The controlling factors for the development of a new coal terminal in the Port of Gladstone are:

- Ability to safely handle Cape Class vessels (up to 220,000 DWT)
- Ability to link to the existing rail infrastructure
- Sufficient land for the storage of coal at the port together with associated rail infrastructure

The current WICET Project location was selected based on these controlling factors listed below.

An alternative site considered during the initial scoping study was located at Hamilton Point on Curtis Island. However, while Hamilton Point met the requirement for access by Cape Class vessels and available land space, the ability to provide rail access for the required tonnages cannot be easily achieved. The rail corridor would be required to cross the mining

lease for the shale oil deposits and cross The Narrows between the mainland and Curtis Island.

Other opportunities for greenfield coal terminals outside of Gladstone have been identified in the past by other proponents. The new coal developments driving the development of this terminal are located in the southern Bowen Basin and Surat Basin. As such coal terminal options near Mackay are not practical due to the significant rail haulage required.

Tenement to Terminal Ltd (3TL) has made an agreement with Australian and Chinese coal companies MetroCoal and SinoCoal Resources to fund a new coal terminal at the port of Gladstone, with an estimated annual capacity of 30 Mtpa. It is proposed to be located to the north of WICET, in the intertidal region south of Fisherman's Landing. This further highlights the demand for coal export capacity in Gladstone Port.

Other options closer to the coal mine developments have been previously identified but all require significant infrastructure and have not been considered further.

The demand for growth is spread across the region with the ability to draw on existing rail infrastructure connecting to the Port of Gladstone. Alternative port sites require the provision of new rail infrastructure with a limited ability to cover the total market growth.

Port sites to the south of Gladstone may address the potential growth in the Surat Basin, however in addition to the dedicated infrastructure linking to the coast, issues will be encountered with providing a protected berth with minimal environmental impact. Among these sites are Coonarr Beach and Deepwater.

These alternative sites require offshore berthing provision with subsequent exposure to open sea conditions. These sites also require development in environmentally sensitive areas in the northern end of Hervey Bay and adjacent to Deepwater National Park.

2.3.3 No Action Option

The inability to ship the volume of coal in demand would have significant financial implications for Australia and Queensland. Further, inaction to meet the demands of industry would curtail further proposed investment in the coal industry. The inability to address the post Stage 1 user's operating requirements would significantly affect the export capacity of the Terminal, also impeding proposed investment in the coal industry.

The export of additional coal through the Terminal as a result of WEXP1 and WEXP2 will provide additional export revenue for Australia and increased State revenue.

In addition, the proposal has significant employment opportunities at the local, regional and State level across all spectrums of the workforce.

2.3.4 Summary of Alternatives

The alternatives to WEXP1 and WEXP2 have been summarised in Table 2.1.

Table 2.1 WEXP1 and WEXP2 alternatives summary

Option	Location	Issue
Alternate coal terminal	Hay Point Coal Terminal	• Privately owned (access by other coal shippers is an issue) • Capacity constraints on rail and terminal • Long rail haulage from southern Bowen Basin and Surat Basin mines • Expensive rail haulage • High cost of expanding the port beyond current proposals • Impacts on matters of national environmental significance (NES) likely to be similar to WEXP1/WEXP2
Alternate coal terminal	Abbot Point Coal Terminal	• Capacity constraints on rail and terminal • Long rail haulage from southern Bowen Basin and Surat Basin mines • Expensive rail haulage • Impacts on matters of NES likely to be similar to WEXP1/WEXP2
Alternate coal terminal	Dalrymple Bay Coal Terminal	• Capacity constraints on rail and terminal • Long rail haulage from southern Bowen Basin and Surat Basin mines • Expensive rail haulage • Currently expanding capacity to the maximum with all capacity allocated • Impacts on matters of NES likely to be similar to WEXP1/WEXP2
Alternate coal terminal	RG Tanna Coal Terminal	• Limited capacity to expand rail and coal terminal • Impacts on matters of NES likely to be similar to WEXP1/WEXP2
Alternate coal terminal	Barney Point Coal Terminal	• Limited capacity to expand rail and coal terminal • Located within the town of Gladstone (ie close to sensitive receivers) • Some expansion possible but at very high cost • Limited to Panamax class vessels • Impacts on matters of NES likely to be similar to WEXP1/WEXP2
Alternate coal terminal	Brisbane Coal Terminal	• Limited capacity to expand rail and coal terminal • Some expansion possible but at very high cost • Limited to Panamax class vessels • Impacts on matters of NES likely to be similar to WEXP1/WEXP2

Option	Location	Issue
Development of new coal terminal	Hamilton Point, Curtis Island (Gladstone)	• Requires significant extra rail infrastructure and bridge across The Narrows from mainland to Curtis Island • Will take longer to develop than WEXP1/WEXP2 • Expensive relative to WEXP1/WEXP2 • Option likely to have similar potential impacts on NES matters to WEXP1/WEXP2 • Potential incompatible land use with several LNG facilities operating on Curtis Island
Development of new coal terminal	Outside of Gladstone	• Significant infrastructure investment required • Environmental issues and potential impacts on NES matters uncertain • Likely to involve long timeframes to develop (ie land acquisition, infrastructure establishment)
Do nothing (no change)	Not applicable	• Damage Australia's reputation as reliable exporter of coal • Loss of export revenue and employment • Approved terminal unable to process post Stage 1 user's coal due to different operating requirements • Significant impact on the state and national economy by stalling the growth of the Surat Basin

3. Project description

3.1 Background

The Project was previously described in the WICT EIS, published in November 2006, and the WICT SEIS, published in July 2007 (refer Appendix 1). The Project was assessed by the Coordinator-General in January 2008 under the SDPWO Act and by the Commonwealth in April 2008 under the EPBC Act. Stage 1 of the Project is currently proceeding according to the SEIS and approval conditions, and is expected to be operational by 2014. Construction of Stage 1 works commenced in October 2011.

While not all aspects of the Project are proposed to vary from those approved under the WICT EIS, the Project Description in its entirety has been presented in this Chapter. This is to avoid potential ambiguity and to allow this Change Request to be a stand-alone document.

3.1.1 Proposed Changes

This Change Request relates to the proposed modifications to the approved Project for the first and second expansion phases (WEXP1 and WEXP2) of the Project. WEXP1 and WEXP2 are required to service the increased demand for coal exports from the region and the change in the operating requirements of the expansion users. Construction for WEXP1 and WEXP2 is anticipated to commence in mid 2012.

As outlined in the SEIS, the approved Project has an ultimate capacity of 84 Mtpa and involves the construction of six berths, including four coal berths and two for other industrial proponents, the operation of three rail dump stations, three inloading conveyors and three outloading conveyors and shiploaders. Stage 1 of the Project comprises reclamation and dredging works, coal stockyard, one rail dump station, one overland conveyor, one jetty, one wharf/shiploader and associated infrastructure. Stage 1 is proceeding on the basis of the SEIS.

The proposed changes to the Terminal are required to address changes to the expansion users operating requirements.

The proposed changes to the Project include:

- WEXP1 (replacing Stage 2 in the approved Project): the development of a new stacker-reclaimer yard on Reclamation Area B (Stockyard Area B) to utilise available port land, including a new settlement pond at the western end of Reclamation Area B, and a new operational stormwater outfall to the Anabranch
- WEXP2 (replacing Stage 3 of the approved Project): the development of a stacker-reclaimer yard on the eastern half of Golding Point in lieu of the approved bridge stacker/dozer reclaim yard in this area, with the Stage 1 bridge stacker/dozer reclaim yard remaining on the western half of Golding Point

These changes are considered to be relatively minor considering that this Request for Project Change will not exceed the ultimate capacity of 84 Mtpa, approved by Commonwealth and State Government, and will utilise the approved ultimate inloading and outloading systems and coal berths. No changes to rail infrastructure, dredging, vegetation clearing or shipping detailed within the WICT SEIS are proposed.

Figure 3.1 (adapted from Drawing 0000-M-DR-0102, Appendix 1) illustrates an aerial view of the proposed WICET layout indicating both the Golding Point stockyard (Stockyard Area A) and Reclamation Area B stockyard (Stockyard Area B). Drawings HQ98-SK-M-084, HQ98-SK-M-086 and HQ98-SK-C-496 (Appendix 1) present the concept design, as included in the EIS/SEIS.

WEXP1 summary

The major change from the SEIS Stage 2 arrangement to WEXP1 is the development of Reclamation Area B as a new stacker reclaimer stockyard, Stockyard Area B. The Stockyard Area B capacity is a nominal 30-35 Mtpa. This change also requires a new settlement pond at the south western end of Stockyard Area B and a new stormwater outfall to the Anabranch. The settlement pond will require excavation of previously disposed dredge spoil from Stage 1 activities and subsequent re-use onsite.

WEXP2 summary

The eastern half of Stockyard Area A, located on Golding Point, will utilise stacker reclaimers, in lieu of the previously approved bridge stacker/dozer reclaimer yard. This will allow the Terminal to achieve the approved ultimate export capacity of 84 Mtpa.

3.1.2 Predicted impacts

All the proposed components are to occur within the Project footprint which includes areas approved under the EIS and areas subsequently approved for WICET Stage 1, such as the Gladstone-Mount Larcom Road overpass and the new outfall to the Calliope River Anabranch.

WEXP1 and WEXP2 are expected to result in only minor changes to the predicted impacts contained in the EIS and the SEIS for the Project. However, the source location of potential impacts has now changed from those described in the SEIS. These potential impacts include dust, noise and vibration, lighting and visual amenity, which have been discussed further in Chapters 12, 14 and 22 respectively.

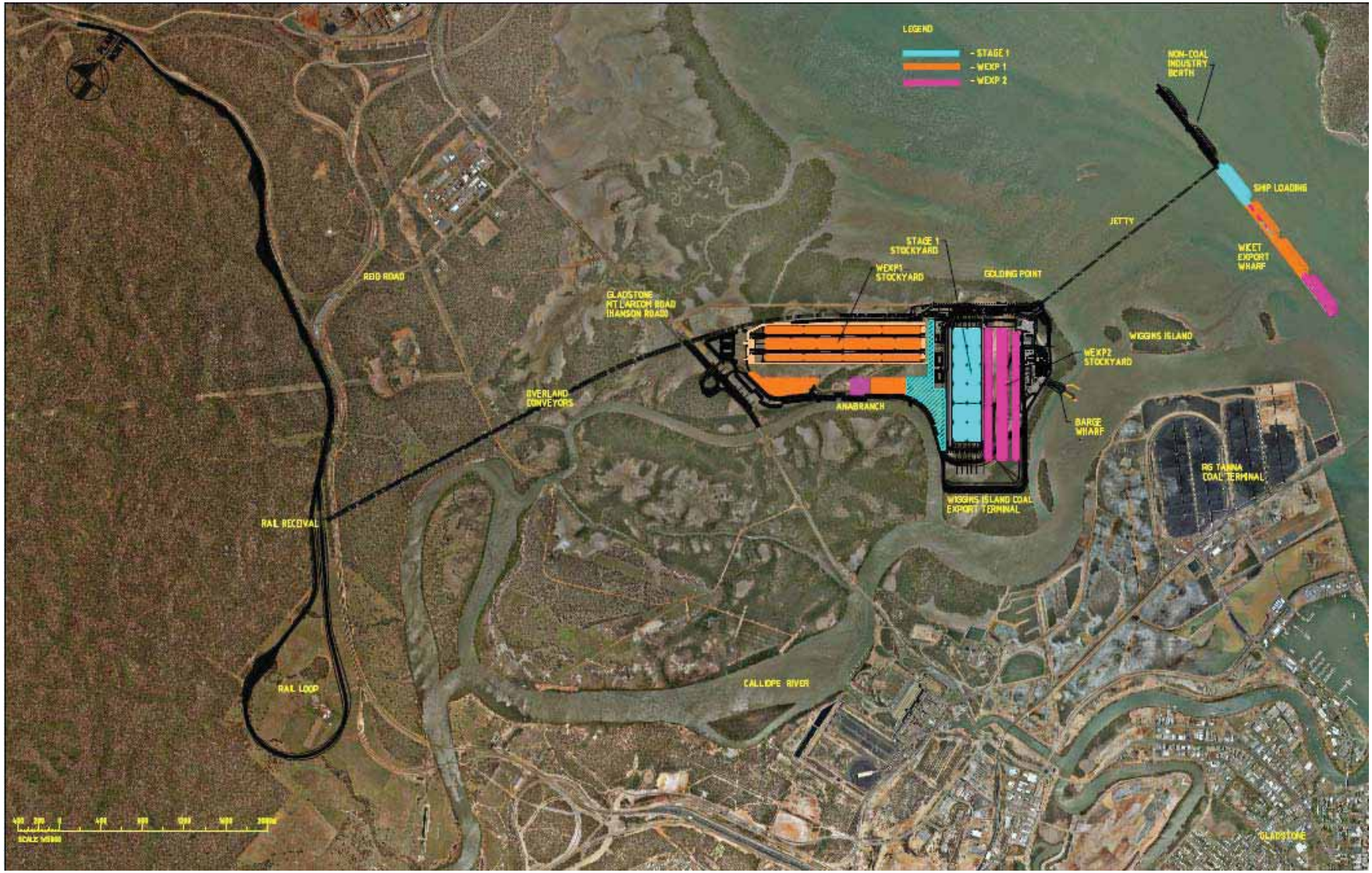


Figure 3.1 Aerial view of the Gladstone region with existing RG Tanna facility and proposed WICET facility

3.2 Overview of the Project

The Project scope, as described in the SEIS, includes the construction of six berths – four coal berths and two non-coal berths for other products. The approved nominal ultimate capacity of the Project is 84 Mtpa. Figure 3.2 shows the location of the Terminal and the Project area with Stage 1, WEXP1 and WEXP2 Infrastructure. Drawings HQ98-SK-M-084, HQ98-SK-M-086 and HQ98-SK-C-496 (Appendix 1) present the concept design, as included in the EIS/SEIS.

3.2.1 Regional Context

The Project is situated on the Port of Gladstone, approximately 525 km north of Brisbane and just south of the Tropic of Capricorn.

3.2.2 Local Context

The Project is located to the west and directly across the Calliope River from the existing RG Tanna Coal Terminal (RGTCT). The Project area is constrained to the south and east by the Anabranch, an estuary of the Calliope River, and by Gladstone Port to the north and west of Golding Point. Stockyard Area A is located on Golding Point, while the proposed Stockyard Area B is situated on the reclamation area to the west of Golding Point. The jetty runs in a northerly direction, to the west of the two outer islands (Wiggins Island and Mud Island). Berth 1, the initial berth to be constructed during Stage 1, is located approximately 2 km west of RGTCT. Additional coal berths will advance in an easterly direction advancing downstream from the jetty head.

3.2.3 Stage 1

Stage 1 of the Project is proceeding on the basis of the SEIS and is expected to be operational by 2014. Components of Stage 1 include a single dump station that receives coal by rail. A single overland conveyor transfers the coal to a stockyard on the western side of Golding Point. The stockyard contains two stockpile rows, serviced by a bridge stacker and dozer reclaim system with on ground storage totalling a nominal 1.7 Mt. Two reclaim conveyors transfer the coal to a surge bin (1,200 t) via a surge bin conveyor. A jetty/wharf conveyor transfers the coal to a shiploader, servicing a single berth, Berth 1. The jetty alignment intersects the wharf at the junction of the coal berths and the non-coal berths and allows the separation of coal from other bulk materials across the berth. This eliminates potential cross contamination of coal with other bulk materials. The nominal capacity of Stage 1 is 27 Mtpa.

The WICT SEIS contains further details on Project works associated with the Stage 1 construction (refer Appendix 1). Concept design drawings from the EIS/SEIS are also included in Appendix 1.

3.2.4 WEXP1 (approved components)

The WEXP1 Project scope comprises the elements below. Project details are current at the time of reporting, however these are subject to detailed design and user requirements. Referenced drawings are included in Appendix 3.

Unloading

- Dumpstation RR2 and tunnel with a continuous unloading rate of 8,500 tonnes per hour (tph)
- Belt feeder RR2-BF1 with a tramp metal removal magnet
- Overland unloading conveyor OC2
- Transfer tower TT15, TT17 and TT18 and transfer conveyor TC4

Legend

- Project Area
- Project Infrastructu

Source:
Project Footprint: Aurecon Hatch, July 201

Reclamation Area B (Stockyard Area B) and onshore loading

- Yard conveyors YC5, YC6 and YC7 (refer Drawing 2B281-M-DR-001 for the General Arrangement of the Reclamation Area B Stockyard including the locations of the Yard conveyors)
- Stacker-reclaimers SR1, SR2 and SR3 (refer Drawing 2B281-M-DR-001 for the location of the Stacker – reclaimer systems in Reclamation Area B and Drawing 2B281-M-DR-0002 for the Stacker – reclaimer cross-sections)
- Stockyard comprising three stockpile rows and a nominal 2.0 Mt storage
- Transfer towers TT21, TT22 and TT23 and reclaim transfer conveyors RC9 and RC10
- Surge bin loading conveyor SB2 including tramp metal removal magnet and modification to existing surge bin conveyor SB1
- Surge bin No.2 (2,000 tonne capacity) and belt feeders SB2-BF1 and BF2
- Sample station No.2

Offshore loading

- Dredging of Berths 2 and 3 (and associated departure channel) totalling approximately 1,040,000 m^3 of material to be disposed onshore within the Reclamation Areas B and C
- Approach jetty modifications including an extension of the Stage 1 single roadway to a two-way roadway
- Jetty conveyor JC2 with a nominal conveyor capacity of 10,500 tph
- Extension of wharf and dolphins to service berths 2 and 3
- Wharf conveyor WC2 (with a nominal capacity of 10,500 tonnes per hour (tph)) and extension to existing wharf conveyor WC1
- Shiploader SL2 with a nominal capacity of 10,500 tph servicing all 3 berths and a shiploader boom conveyor with nominal capacity of 10,800 tph
- Transfer tower TT12 and modification to existing transfer tower TT11

Bulk earthworks

- Dredge spoil bunds are proposed to be raised by up to 1.4 m
- Bulk earthworks
- Site roads and drainage including internal access roads and stormwater and recycled water drainage systems
- Settling ponds for stormwater and supply dams
- Ground improvement of dredge spoil and underlying soft clays in Reclamation Area B to enable the bund raise and stockyard construction

Infrastructure and services

- Water supply and distribution including dust suppression (raw, fire, process and potable)
- Fire systems
- Environmental monitoring facilities
- Lighting
- Communications
- Security
- Power supply and site distribution system
- Control system

3.2.5 WEXP2

The WEXP2 Project scope comprises the following elements. Project details are current at the time of reporting, however these are subject to detailed design and user requirements.

Unloading

- Dumpstation RR3 and tunnel with a continuous unloading rate of 8,500 tph

- Belt feeder RR3-BF1 with a tramp metal removal magnet
- Overland unloading conveyor OC3
- Modifications to the Golding Point transfer tower TT1, new transfer towers, TT2, TT9, TT10A and TT10B, and transfer conveyors TC1, TC2, TC6, and TC7

Stockyard A (eastern half of Golding Point) and onshore loading

- Yard conveyors YC10, YC11 and YC12 (refer Drawing 2A251-M-DR-0001 for the General Arrangement Stockyard)
- Stacker-reclaimers SR5, SR6 and SR7 (refer Drawing 2A251-M-DR-0002 for the Stacker – reclaimer cross-sections)
- Stockyard comprising 3 stockpile rows and a nominal 1.8 Mt storage
- Transfer towers TT7 and TT8
- Surge bin loading conveyor SB3 including tramp metal removal magnet and modification to existing surge bin conveyor SB1
- Surge bin No.3 (2,000 tonne capacity) and belt feeders SB3-BF1 and BF2
- Sample station No.3

Offshore loading

- Dredging of Berth 4 (and associated departure channel) totalling approximately 1,044,000 m^3 of material to be disposed onshore within the Reclamation Area C and Southern end of Golding Point
- Approach jetty modifications
- Jetty conveyor JC3 with a nominal conveyor capacity of 10,500 tph
- Extension of wharf and dolphins to service Berth 4
- Wharf conveyor WC3 and extension to existing wharf conveyor WC2 with a nominal capacity of 10,500 tph
- Shiploader SL3 with a nominal capacity of 10,500 tph servicing berths 3 and 4 and a shiploader boom conveyor with nominal capacity of 10,800 tph
- Transfer tower TT13

Bulk earthworks

- Dredge spoil bunds in Golding Point
- Bulk earthworks
- Site roads and drainage including internal access roads and stormwater and recycled water drainage systems
- Settling ponds for stormwater and supply dams
- Ground improvement of dredge spoil and underlying soft clays on Golding Point to enable the stockyard construction

Infrastructure and services

- Water supply and distribution including dust suppression (raw, fire, process and potable)
- Fire systems
- Environmental monitoring facilities
- Lighting
- Communications
- Security
- Power supply and site distribution system
- Control system

3.2.6 Project Cost, Staging and Timing

WEXP1 and WEXP2 are proposed to extend the Stage 1 works of the Project to allow the Terminal to achieve the approved ultimate export capacity of 84 Mtpa. This expansion will

utilise dump stations, overland conveyors, surge bins and conveyors, shiploaders and extra berths. Stockyard Area B (WEXP1) will be developed on Reclamation Area B and will contain three stockpile rows serviced by three stacker-reclaimers with a nominal on ground storage capacity of 2.0 Mt. A new stormwater settlement pond on the southern end of the Stockyard Area B and a new stormwater outfall to the Anabranch will be required. The Stage 1 stormwater pond at the northern end of Stockyard Area B will require extension in both WEXP1 and WEXP2.

Stockyard Area A (WEXP2) will also be extended to the eastern half of Golding Point with a stacker reclaimer yard, which will have a nominal on ground storage capacity of 1.8 Mt.

Table 3.1 indicates the components required for WEXP1 and WEXP2, compared with those in Stage 1.

Table 3.1 Staging of Project Infrastructure

	Stage 1	WEXP1/WEXP2	Total (Stage 1 and WEXP/WEXP2)	Predicted During the EIS
Nominal Capacity (Mtpa)	27	57	84	84
Dump stations	1	2	3	3
Overland Conveyors	1	2	3	3
Inloading transfer conveyors	0	5	5	3
Bridge Stackers	1	0	1	4
Stacker Reclaimers	0	6	6	0
Product storage (Mt)	1.7	3.7	5.5	4.8
Yard conveyors	3 (1 stacking 2 reclaiming)	6 (stacker-reclaimers)	9	12 (4 stacking, 8 reclaiming)
Surge bin complexes	1 (1,200 t)	2 (2,000 t each)	3 (5,200 t)	3
Jetty Conveyors	1	2	3	3
Wharf Conveyors	1	2	3	3
Shiploaders	1	2	3	3
Berths*	1	3	4	4

Note *the two non-coal berths have been excluded from this table

Current indications are that WEXP1 and WEXP2 are expected to be fully operational by Q4 2016 to meet current demand pressures for the export of coal. Early works construction for WEXP1 is expected to commence in Q2 2012, while construction for the major site activities is expected to commence in Q1 2013.

3.2.7 Construction and Operation Workforce

Table 3.2 summarises anticipated peak construction workforce and operations personnel for Stage 1 of the Project and WEXP1/WEXP2.

Table 3.2 Approximate Peak Workforce Numbers for Construction and Operation

	Stage 1	WEXP1/WEXP2	Predicted in EIS
Construction	800	1,100	1,450*
Operation	120	187**	300

***Peak site workforce for construction phases, assuming Stage, 1, 2 and 3 (as defined in the EIS) were undertaken concurrently.**

****Operation workforce for entire Terminal at the conclusion of WEXP2**

WEXP1 and WEXP2 are likely to have similar workforce requirements to Stage 1 and will follow the Stage 1 development by approximately 18 months. The peak workforce for WEXP1 and WEXP2 (in conjunction with Stage 1) is estimated to reach 1,100 workers, with the majority of the construction workforce transitioning from Stage 1.

In the absence of other projects occurring concurrently, the WEXP1 and WEXP2 workforce could be accommodated within the Gladstone region. The response to the case of concurrent projects is discussed in Chapter 18.

Transport of the workforce to site is expected to be by car and multi-passenger transport, as discussed in further detail in Chapter 6.

3.2.8 Environmental Controls

Details of environmental design features and proposed mitigation measures are discussed in detail in each of the respective impact assessment sections of the Change Request. A summary is also provided in the WICET Environmental Management Plan (EMP) (refer Chapter 23).

3.3 Description of WEXP1 and WEXP2 project changes

This section describes WEXP1 and WEXP2 in detail, including the materials handling plant from train unloading to shipping. It also describes the Terminal infrastructure and facilities. The components of WEXP1 and WEXP2 have been divided into two parts – changed and approved components. Changed components include those which have changed significantly or have been introduced since the EIS approval of the Project. Approved components are those which have remained unchanged since EIS approval, yet remain relevant to WEXP1 and WEXP2.

3.3.1 Changed Components

Stockyard Area A (WEXP2)

The extension of Stockyard Area A to the eastern half of Golding Point was approved under the EIS/SEIS utilising a bridge stacker and dozer reclaim. WEXP2 proposes to change the yard type of the eastern half of Stockyard Area A to utilise stacker-reclaimers due to the changes in the expansion users' operating requirements. The one bridge stacker and the dozer reclaim conveyors on the western half of Stockyard Area A, from WICET Stage 1, will remain in operation. The extension of Stockyard Area A will otherwise continue as per the Project approved under the EIS/SEIS.

The extension to Stockyard Area A is proposed to contain three stockpile rows serviced by three stacker-reclaimers with a product storage capacity of approximately 1.8 Mt. It would be graded toward both the southern and northern ends of Golding Point.

Drawing 2A251-M-DR-0001 shows the general arrangement of the extension to Stockyard Area A, and Drawing 2A251-M-DR-0002 illustrates a typical section through the extension to Stockyard Area A (refer Appendix 3).

Stockyard Area B (WEXP1)

The proposed development of a new stacker-reclaimer yard, Stockyard Area B, on Reclamation Area B is a change to the Project, designed for a nominal throughput of 30-35 Mtpa.

Reclamation Area B has previously been approved for the disposal of dredge spoil, predominantly for mixtures containing larger gravel percentages. Dredging works are planned to occur during 2012 prior to the commencement of construction for WEXP1. Upon completion of dredge spoil disposal and bulk earthworks, Reclamation Area B will be bulk filled and graded towards each end of the stockyard.

Stockyard Area B is proposed to contain three stockpile rows, serviced by three stacker reclaimers, with a nominal on ground storage of 2.0 Mt. This equates to approximately 6% of the expected WEXP1 yearly throughput. There will be a crest in the middle of the stockyard to allow drainage to either end of the stockpile rows into the two adjacent stormwater storage ponds, which would eliminate the ponding of water. The maximum stockpile height has been set at 18 m and the overall length of each stockpile row is nominally 1,250 m. The Stage 1 stormwater storage pond has been reconfigured to maximise the length of the stockpiles.

Maintenance areas and vehicle access will be located on the north and south sides of Stockyard Area B. An additional recycled water pond and raw water pond will be located south-west of Stockyard Area B.

The normal stacking rate of the stacker-reclaimers is 8,500 tph. The target reclaim rate (200 sec) is 10,500 tph and the instantaneous peak reclaim rate (3 sec) is 12,600 tph.

Each stacker-reclaimer will reclaim coal from the stockpiles and transfer coal to its corresponding yard conveyor. It is subsequently transferred onto a surge bin loading conveyor via the reclaim conveyors at the northern end of the yard.

Drawing 2B251-M-DR-0001 shows the general arrangement of the stockyard and the travel limits of each stacker reclaimer, and Drawing 2B281-M-DR-0002 illustrates a typical section through Stockyard Area B (WEXP1) (refer Appendix 3).

Stormwater Storage Pond

An additional sediment basin and stormwater storage pond is required for WEXP1 and is to be situated on the southern end of the proposed Stockyard Area B. Two sediment basins and two stormwater storage ponds, located on the northern part of Golding Point and on the southern side of Golding Point, have previously been designed for Stage 1. The latter of these stormwater storage ponds is also proposed to be extended during WEXP1 and WEXP2 to increase stormwater storage capacity as the stockyards are developed. The stormwater storage ponds will be designed for a minimum combined capacity for a 10 year average recurrence interval (ARI), 24 hour duration storm event.

Drainage from the proposed Stockyard Area B will be graded towards each end of the stockpile rows to feed into the sediment basins. The runoff will filter through rock filter wall material into the stormwater storage pond. The water will be recycled onsite and used as process water as required.

It is proposed to add an operational stormwater outfall to the Anabranch from the additional stormwater pond at the southern end of Stockyard Area B. The outfall will be used for controlled releases to avoid the stormwater storage ponds overflowing during significant rainfall events.

The additional stormwater storage pond and the proposed stormwater storage pond extension will require excavation of previously disposed dredge spoil from Stage 1 activities and subsequent re-disposal in Reclamation Area C.

The layout plan of Stockyard Area B, including the arrangement of the stormwater storage pond, is illustrated in Drawing 2B251-M-DR-0001 (refer Appendix 3).

Facilities and Infrastructure

Expansion to the following Stage 1 permanent buildings and facilities will be required to accommodate WEXP1 and WEXP2:

- Administration building
- Operations amenities
- Central stores building and compound
- External staff carpark (extra 90 spaces)
- Maintenance building, workshop and yard

With the exception of the maintenance and stores buildings which are likely to be larger to accommodate servicing of the stacker-reclaimers, these expansions are not materially different to those envisaged for Stages 2 and 3 under the approved EIS/SEIS.

3.3.2 Approved Components

The Project components below, included in WEXP1 and WEXP2, do not vary significantly from the Project approved under the EIS. They have been included in this Change Request to provide a complete overview of WICET Stage1, WEXP1 and WEXP2.

Site Access

Site access to the Terminal remains predominately unchanged from the Project approved under the EIS with the Terminal access road entering the facility off Gladstone-Mount Larcom Road between the Anabranch and the overland conveyors. The Terminal access road runs for 4 km along the south-east side of the proposed Stockyard Area B to provide public access to the Anabranch and the security gate at the administration area. While this road will be open to public access it is anticipated that traffic will be limited to vehicles associated with the operation of the Terminal, such as deliveries, maintenance, staff and visitor vehicles. Design speeds will vary from 60 to 80 km/h depending on site conditions.

The site facilities (ie administration area, car parking, site security etc) have been located on the north-east side of Golding Point to reduce the impact of windborne stockyard spray mist on workers and facilities (refer Drawing 2562-C-DR-0001 in Appendix 3).

For port security and workplace health and safety reasons, the number of entry points into secure areas have been minimised with entry restricted to those who require specific access. The point of entry into the secure area of the facilities and port will be located adjacent to the Terminal facilities on the north-east side of Golding Point resulting in controlled access to the Terminal and wharf.

Controlled access to the operation of the Terminal is restricted for the following:

- Emergency services
- Customs and port operations services
- Construction crews and construction equipment
- Operating and maintenance personnel and associated equipment
- Designated non WICET workers (eg samplers, inloading operations etc)

Access to all areas of the Terminal will be limited through provision of security barriers and fences, automatically controlled access methods and surveillance to prevent unauthorised activity from occurring on the site at any point. Internal access within the Terminal will be restricted to authorised vehicles only. Design speeds on the internal access roads will typically be restricted to 40 km/h.

Access to the dump stations will be provided from Reid Road for all heavy vehicles. Access from the Terminal to the dump station for light vehicles will be provided alongside the overland conveyor under Gladstone-Mount Larcom Road to Reid Road. Overland conveyor access will be via sealed roads with design speeds of 60 km/h and maintenance roads will be unsealed with design speeds of 40 km/h.

Dump Station

The Project was approved under the EIS with the ultimate facility utilising three bottom dump coal train receival stations (dump stations). Stage 1 is proceeding with a single dump station as per the SEIS. The second and third dump stations will be constructed for WEXP1 and WEXP2. There are no changes to the operation of the dump stations, with the process described in the SEIS summarised below.

The second and third dump stations will be extensions of the Stage 1 multi-level structure, extending approximately 11.5 m below ground level. An operator control room will be provided overlooking the dump operation. The facility above the rail level will be fully enclosed except at each end where the trains pass through. Amenities will be provided for the dump station operators.

The second and third dump stations will have a nominal feed rate of 8,500 tph. Received coal will feed onto the second and third overland conveyors for transport to the stockyards. The feed rate will be optimised at all times to maintain maximum throughput.

It is intended that coal will arrive wet from the mines and between 1.5 to 2% additional moisture will be added at each dump station through water sprays, as required. Mechanical dust extraction and bag filters will be installed at the dump station.

Inloading Conveyors

From the dump station, coal will be fed onto overland conveyors, which will climb from the bottom of the dump station via a tunnel under the North Coast Rail Line and Reid Road. Once clear of the tunnel, the conveyor will continue overland between the approved Gladstone Pacific Nickel Limited (GPN) site and the Calliope River. It will then pass under Gladstone-Mount Larcom Road and rise into a transfer tower in order to change direction.

A transfer conveyor will accept coal from the second overland conveyor at the southern end of Stockyard Area B and will then transfer onto any of the three yard conveyors, in Stockyard Area B. The third overland conveyor will continue to Stockyard Area A. A string of three transfer conveyors will accept coal from the third overland conveyor and will then transfer on to any of the three yard conveyors. Dust suppression sprays will be installed at all the transfer towers.

Outloading Conveyors

From the stockyards, reclaim conveyors (WEXP1) will feed onto either the existing surge bin conveyor or the additional second and third (WEXP2) surge bin conveyors. These conveyors will ultimately feed onto their corresponding jetty conveyor, via a surge bin. The reclaim and surge bin conveyors for WEXP1 and WEXP2 will operate at 10,500 tph, while the Stage 1 surge bin conveyor has a feed rate of 6,900 tph.

Surge Bin

The Project was approved under the EIS with the ultimate facility utilising three surge bins. Stage 1 is proceeding with a single 1,200 t surge bin. The second and third surge bins will be constructed for WEXP1 and WEXP2. Surge bins have been incorporated to allow the product to be profiled prior to transit over the marine environment and to reduce the potential for product spillage.

The capacity of the second and third surge bins will be 2,000 t and will be designed to discharge via twin belt feeders. The surge bin will be fully enclosed with a mechanical dust extraction and bag filter.

Jetty and Jetty Conveyors

The jetty is being constructed as a component of Stage 1 and will be approximately 1.8 km in length. It has a skeletal steel framed substructure (piles and headstock) with pre-cast concrete deck units for the roadways, with spacing not less than 20 m between jetty bents. Steel conveyor galleries will support the conveyors and will span between jetty bents. The ultimate facility of the Project was approved under the EIS utilising three jetty (coal) conveyors, with a single 8,250 tph jetty conveyor in Stage 1.

The second and third jetty conveyors to be constructed in WEXP1 and WEXP2 will operate at 10,500 tph (compared with an 8,250 tph feed rate for the Stage 1 jetty conveyor) and will be enclosed on three sides – the roof, bottom and one side.

Berths and Conveyors

The ultimate facility of the Project has four coal berths. Stage 1 is proceeding with a single coal berth as per the SEIS. Berths 2, 3 and 4 will be constructed in WEXP1 and WEXP2. There are no changes to the operation of the berths and corresponding conveyors, with the process described in the SEIS summarised below.

Each jetty conveyor will feed directly onto its corresponding berth conveyor which feeds its corresponding shiploader. The second and third berth conveyors will have a feed rate of 10,500 tph, compared with an 8,250 tph feed rate for the Stage 1 berth conveyor.

Shiploader

The ultimate facility of the Project approved under the EIS utilised three shiploaders. Stage 1 is proceeding with a single shiploader as per the SEIS. The second and third shiploaders will be constructed for WEXP1 and WEXP2 and will operate at 10,500 tph compared with 8,500 tph for the Stage 1 shiploader. There are no changes to the functionality of the shiploaders, with the process summarised below.

The shiploaders will be long travelling and luffing type and will be suitable for loading ships up to and including Cape Class vessels length over all (LOA) 320 m (220,000 dead weight tonne (DWT), 55 m beam). The minimum vessel size to be loaded is 40,000 DWT.

Power Supply and Reticulation

As described in the SEIS, a 132/66 kV substation will be provided by Ergon Energy and constructed in Stage 1. The substation will be located on the north-eastern corner of Stockyard Area A, as determined by Ergon Energy. There will be two secure 66 kV power supply routes from the Ergon substation into the Project main substation, which will run beside the overland conveyors, north of the proposed Stockyard Area B.

General Lighting

The general requirements for Project lighting is unchanged for WEXP1 and WEXP2 and includes:

- Outdoor lighting to be on ‘lumitrol’ control, with manual adjustment and override
- Minimal permanent access lighting to be installed on machines, transfer towers etc, with additional lighting on motion sensor control
- Emergency lighting will be installed in tunnels and other enclosed spaces

There will be no lighting along the Terminal access road, as per GPC’s request. The overland conveyor access and maintenance road will have lighting at intersections and route

lighting for the full length, as required by the Department of Transport and Main Roads (DTMR).

Stockpile Lighting

Stockpile lighting solution for Stage 1 will incorporate the following requirements:

- Minimum lighting levels will follow the recommendations of the International Commission on Illumination Technical Report, CIE (Commission Internationale de l'Eclairage) 129, 'Guide for Lighting Exterior Work Areas'. Lighting levels will be designed for end of life lamp output, a minimum of 20% lamp failure and once yearly cleaning
- Lighting levels will be computer modelled for various stockpile shapes and designed to minimise any possible shadows. Consideration will also be given to minimise glare to reclaim bulldozer operators
- Flood lighting towers around the perimeter of the Stage 1 stockpiles will include a system for safely lifting and lowering light fittings during high winds
- Stockpile lighting control will include two switching levels, one to achieve minimum safe access lighting levels during non-reclamation operational periods and the other at 100% for reclamation operations

The WEXP1 and WEXP2 stockpiles do not need the level of floodlighting that is required for the Stage 1 dozer operation as they utilise largely automated stacker reclaimer machines.

Communications

The Project's communication systems, which remain unchanged for WEXP1 and WEXP2, will provide voice communication between the dump station operators, the shiploader operators, the train drivers, maintenance and operations staff and the Terminal operations manager.

Alarm notification to emergency services will be implemented according to their requirements.

Telephone, fax and internet and email services will be provided to the offices and workshops as required.

Control Systems and Automation

Control systems and automation for WEXP1 and WEXP2 remains unchanged from those approved under the EIS for the Project.

The control system will be a highly automated fault tolerant system. The system will minimise the number of personnel needed to operate the plant.

The control system will be standardised on components, software and protocols across the site, using current software and hardware that is maintainable and supportable in the medium term.

Programmable logical controller (PLC) systems and control system hardware will be current design, sole sourced from a proven supplier with ongoing support in Australia. The chosen system shall be designed and selected to provide a fully integrated, homogeneous control solution to meet the requirements of the Terminal. It will be able to support a proven software control program matched to the selected site communication system, and with proven operational support and programming capability in Australia.

In principle, the control system will operate with a main control room for operators. Control and monitoring of inloading systems and stacking and outloading systems, including reclaiming and shiploading, will be from the main control room.

The level of automation at the Terminal will be maximised in order to limit the reliance on operator skills to maximise throughput and minimise risk of spillage. Areas where considerable automation is likely to be achieved include the following:

- Dump station:
  - Wagon vibrator for wagon discharge
  - Feeder control to maximise throughput
  - Train speed feedback to train driver
- Stacking:
  - Bridge stacker positioning and stacking pattern
  - Bridge stacker skew control system
  - Stacker reclaimer positioning and stacking pattern
- Stockyard Water Sprays:
  - Weather station control of stockyard sprays and misting systems to optimise water use and dust suppression
- Reclaim:
  - Reclaim feeder control to maintain blending accuracy
  - Stacker reclaimer positioning and reclaim method and rate
- Surge Bin Outload:
  - Feeder control to maintain desired outloading rate
- Moisture Content:
  - Moisture analysis and water addition throughout coal handling stream

Site Water Services

Site water services for WEXP1 and WEXP2 are unchanged from the Project approved under the EIS/SEIS and will include the following:

- Potable water supplied from the Stage 1 water treatment plant (expanded for WEXP1 and WEXP2) and stored in tanks at temporary and permanent cribs and ablutions to facilitate WEXP1 and WEXP2
- Raw water and recycled (non-potable) water supplied and distributed from the Gladstone Area Water Board (GAWB) raw water reticulation network
- Sewage disposal is required and is to be treated onsite and used for irrigation. WEXP1 and WEXP2 will utilise the sewage treatment plant from Stage 1

Fire Protection and Emergency Systems

Fire protection and emergency systems will comply with Australian Standards, local regulations and Insurance Company requirements. They will be incorporated in the site water supply reticulation system, but still maintain a fail-safe fire fighting capability.

The firewater for WEXP1 and WEXP2 will be the fire/process water supplied by Stage 1, with additional new firewater pumps and tanks located at the southern end of Stockyard Area B. A fire sprinkler system will be utilised for the dump stations, transfer towers, stacker reclaimer machines, surge bins and conveyors. The substations will be protected with gaseous fire suppression system due to the lack of accessibility. Fire hose reels and fire extinguishers will be located at various points around the site. Fire detectors and alarm systems will be fitted to provide a prompt, reliable and continual detection of developing fire hazards.

Facilities and Infrastructure

Onshore Facilities

The majority of the administration and service building required for the coal terminal are part of the Stage 1 activities and include the following:

- Administration building and corporate centre
- Central control room

- Operations amenities
- Site security office and gate
- Maritime security office and gate
- Central stores building and compound
- Conveyor belt yard
- Maintenance building, workshop and yard
- Central fuel storage facility
- Sample station building
- Internal and external vehicle washdown facilities
- External staff carpark (90 spaces)
- External visitors carpark
- Internal carparking facilities for site vehicles
- Central dozer service facility

Expansion to the following Stage 1 permanent buildings and facilities will be required to accommodate WEXP1 and WEXP2:

- Administration building
- Operations amenities
- Central stores building and compound
- External staff carpark (extra 90 spaces)
- Maintenance building, workshop and yard

With the exception of the maintenance and stores buildings which are likely to be larger to accommodate servicing of the stacker-reclaimers, these expansions are not materially different to those envisaged for Stages 2 and 3 under the approved EIS/SEIS.

Site access roads will be sealed between administration and workshop buildings near the Terminal entrance. All other onshore roads will be unsealed gravel pavement except on main routes inside the Terminal which are to be confirmed.

Offshore Facilities

Offshore facilities will include:

- Customs office
- Ablutions to be provided at a number of locations along berths

Barge Ramp/Construction Access Wharf

A barge ramp/construction access wharf provided primarily for construction access to the offshore facilities, has been approved as part of the Project and will be constructed in Stage 1. It is to be located to the north-east of Golding Point to provide access to the Calliope River. This facility will be utilised for the ongoing development of the Project marine facilities and for future industrial development within this section of the port.

Site Water Management and Treatment

The following water management criteria will be adopted for all stages of development including WEXP1 and WEXP2:

- Open, self-cleaning style drainage for aiding maintenance
- Cleanout pits to be self-draining where possible to facilitate dry clean out
- Cross drains to allow ease of cleanout
- A minimum pond size will be required (ie runoff from 24 hour, 10 year ARI storm event)
- Treated water reuse and capture stormwater to be considered for selected process and treated domestic wastewater for irrigation purposes
- Treatment to comprise cleanout pits at transfers (drain by gravity where possible), major sedimentation basins upstream of the reuse pond and/or final polishing pond/s

- Utilise gravity as much as possible in design of drains (use elevation of Golding Point and Reclamation Area B)
- Only very large rainfall events will necessitate overflow discharge into the Calliope River Anabranch from the coal terminal

The addition of proposed Stockyard Area B in WEXP1 requires the construction of a new stormwater storage pond (including the new stormwater outfall to the Anabranch) on the southern end of the stockyard and the extension of the Stage 1 stormwater storage pond south of Stockyard Area A. WEXP2 will require a further extension to this Stage 1 pond to accommodate additional runoff from the expanded Stockyard Area A on Golding Point.

Security

Site security requirements remain unchanged for WEXP1 and WEXP2 and will incorporate:

- Whole site fenced with electrically or manually operated gates
- Camera surveillance where required
- Wharf secure area which complies with the Department of Transport and Regional Services (DOTARS) security requirements for a port facility. All personnel on the wharf will need to hold an MSIC card
- Single point controlled access to the whole site, including the stockyard and wharf. Additional manual (normally locked) access points for maintenance or construction purposes as required
- Keyless access system using swipe ID cards in select locations

3.4 Description of Road Infrastructure

The Terminal access road provides 'non-secure' public access to the security gate at the administration area. It is to be constructed during Stage 1 activities and will be approximately 4 km long, running along the south-east side of the proposed Stockyard Area B. A tie-in of the Gladstone-Mount Larcom Road overpass to the Terminal access road will be required in WEXP1.

Internal perimeter roads on the WEXP1 and WEXP2 stockyards will be two coat bitumen spray sealed in alignment with Stage 1 internal roads. A 4 m wide single lane pavement is proposed for WEXP1 and WEXP2 internal roads (3 m lane, 0.5 m shoulders). Passing bays are proposed at intervals of 300 m along both perimeter roads to assist vehicle flow. Design speeds will typically be restricted to a maximum of 40 km/h.

The Beales Creek Bridge, to be constructed during Stage 1 activities, is proposed to be duplicated and triplicated to the south during WEXP1 and WEXP2 respectively to allow the overland conveyors and vehicle traffic to traverse across Beales Creek. The bridge will be 40 m long comprising two spans of 20 m with 40° skew.

Primary access between the stockyard and rail receival (approximately 5.2 km) will be via a sealed road on the western side of the first overland conveyor (Stage 1) with a design speed limit of 60 km/h. Maintenance roads for minor vehicle access will be provided between the overland conveyors and to the east of the third overland conveyor and be unsealed with a design speed limit of 40 km/h. The design speeds of these roads will drop to 15 km/h under Gladstone-Mount Larcom Road and over Beales Creek Bridge.

Entry to and exit from the conveyor access roads will only be possible at either end of the overland conveyor, with no allowance for exiting or changing roads along the way. The access beneath Gladstone-Mount Larcom Road is provided via an underpass bridge structure, sized to fit a conveyor and single lane road suitable for light vehicles only (ie hauling not permitted). The bridge work is to be completed in Stage 1. At the rail receival end, the access roads will pass over the top of the conveyor tunnels (which pass under Reid Road and the North Coast Railway) and connect to the proposed Reid Road upgrade from

the north. Design speeds along the overland conveyor access roads will be restricted to a maximum of 60 km/h, and the road will only be accessible by authorised terminal vehicles.

3.5 Construction

Construction of WEXP1 and WEXP2 is proposed to commence subsequent to Stage 1 with early civil works commencing in mid 2012. The construction works involve onshore and offshore works as well as the implementation of services including, but not limited to water supply, sewerage and telecommunications.

3.5.1 Onshore Construction

It is intended that the temporary facilities from Stage 1 will be utilised by WEXP1 and WEXP2 as they become available. These facilities include:

- Carparks
- Site facilities
- Security fences and gatehouses
- Sewerage
- Vehicle wheel wash
- Fuelling facilities
- Raw water supply infrastructure
- Sewerage treatment works
- Concrete slab for waste transfer facilities
- Water treatment works and potable water reticulation

The construction required for WEXP1 and WEXP2 onshore works will include:

- Disposal of dredge spoil within Reclamation Areas B and C from offshore dredging works for the additional berths
- Bulk earthworks on Reclamation Area B for the proposed Stockyard Area B, which will include excavation, filling, compaction and ground improvement works
- Excavation of previously disposed dredge spoil for construction of stormwater storage ponds in Stockyard Area B
- Major in ground concrete elements, including the dump station and overland conveyor tunnels
- Footings for conveyor galley trestles, transfer towers, surge bins, bund rails and other structures. These will be either piled or high level concrete footings. Nearly all high level footings will be above acid sulfate soils (ASS), however there will be some areas where ASS may be encountered and this will be managed

Civil works will require dump trucks, cranes, dozers, excavators, compactors, water carts, concrete trucks, and articulated trucks. Due to the quantity of concrete required in Stage 1, there is potential for a concrete batching plant to be established on site.

Steelwork for conveyors will be fabricated off site, transported to site and erected. Limited steel fabrication is proposed on site. Erection will involve the use of cranes of various sizes.

Mechanical and electrical equipment will be generally delivered by road, with the exception of pre-assembled elements (eg stacker-reclaimers) which may be delivered by barge.

The origin of materials delivered to site will be subject to contractor and supplier availability. Notwithstanding this, likely delivery origins have been assumed in the assessment of road impacts.

Onshore construction also includes the supply and installation of concrete and steel for various civil works components, including:

- Stockyard transverse drains

- Stockyard gantry bund drains
- Coal collection pits
- Pyealy Creek arch culvert
- Beales Creek Bridge
- Rock filter wall edge beams
- Stormwater ponds overflow weirs
- Reclamation Areas B and C tertiary pond outlet drop board structures

Other onshore components requiring steel include:

- Galvanised chain wire mesh in sediment pond rock filter walls
- Grated cage mesh in coal collection pit rock filter screens
- Galvanised top mounted handrails around coal collection pits
- Steel plate for concrete platform in steel piles for Beales Creek Bridge
- Steel walkway for Beales Creek Bridge
- Height clearance gauge structures
- Security gates and turnstiles
- Aluminium drop boards for Reclamation Areas B and C tertiary pond outlets

Land Reclamation

Stage 1 bund crest heights were determined based on the solids levels corresponding to the Berth 1, swing basin and arrival/departure dredging volume, and design decant and freeboard levels as set out in the Stage 1 design criteria.

The Stage 1 bund heights were also determined to be adequate for future dredging campaigns (up to Berth 4). This assumed the pause period between successive campaigns would be sufficient to achieve full primary consolidation of the previously deposited spoil, thus creating the necessary storage volume.

However, current estimated timeframes for the WEXP1 and WEXP2 expansions (Berths 2, 3 and 4) to meet industry demand are unlikely to allow the necessary pause/settlement periods between the successive dredging campaigns. In this event, raising of the Stage 1 bunds may be required to accommodate short term disposal volumes. Overall bund wall heights will not exceed RL8.5 m.

All drainage structures will also be raised as part of any bund raise. A typical section showing an internal and external bund raise is shown in Figure 3.3.

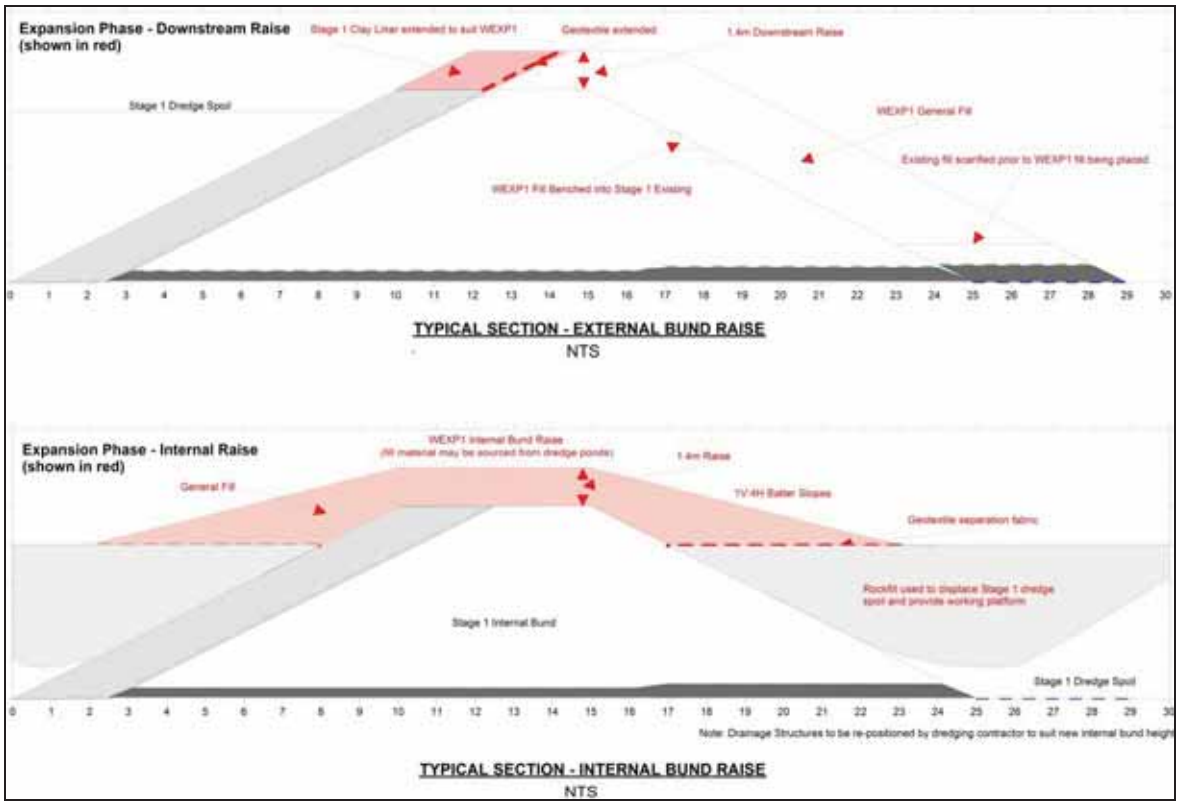


Figure 3.3 Typical Section - Internal and External Bund Raise

Dredge Spoil Disposal

A cutter-suction dredge (CSD) will discharge slurry via a pipeline, with the aid of one or two booster pumps to Reclamation Areas B and C. Typically, heavier material like gravel, sand and clay balls will be deposited into Reclamation Area B, while silt and clay fines will be directly pumped to Reclamation Area C.

The primary pond design allows for mounding up to RL14.15 m with a nominal 1V:10H beach profile. The mound height will maintain a minimum freeboard of 0.5 m with a 1 m decant water depth at the upstream face of the reclamation bund.

To achieve the mound height in the primary pond, the newly dredged sand and gravel materials from the expansion dredging will be discharged on top of or, if required, directly adjacent to the residual mounds produced from the Stage 1 dredging. To facilitate this, excavation and re-profiling of the residual mound, using dry earthmoving equipment would occur during the expansion dredging, as shown in Figure 3.4. These earthworks would continue in the primary pond up until a point where excavation equipment cannot traffic the pond.

Figure 3.4 illustrates the dredge material disposal methodology for Stockyard Area B.

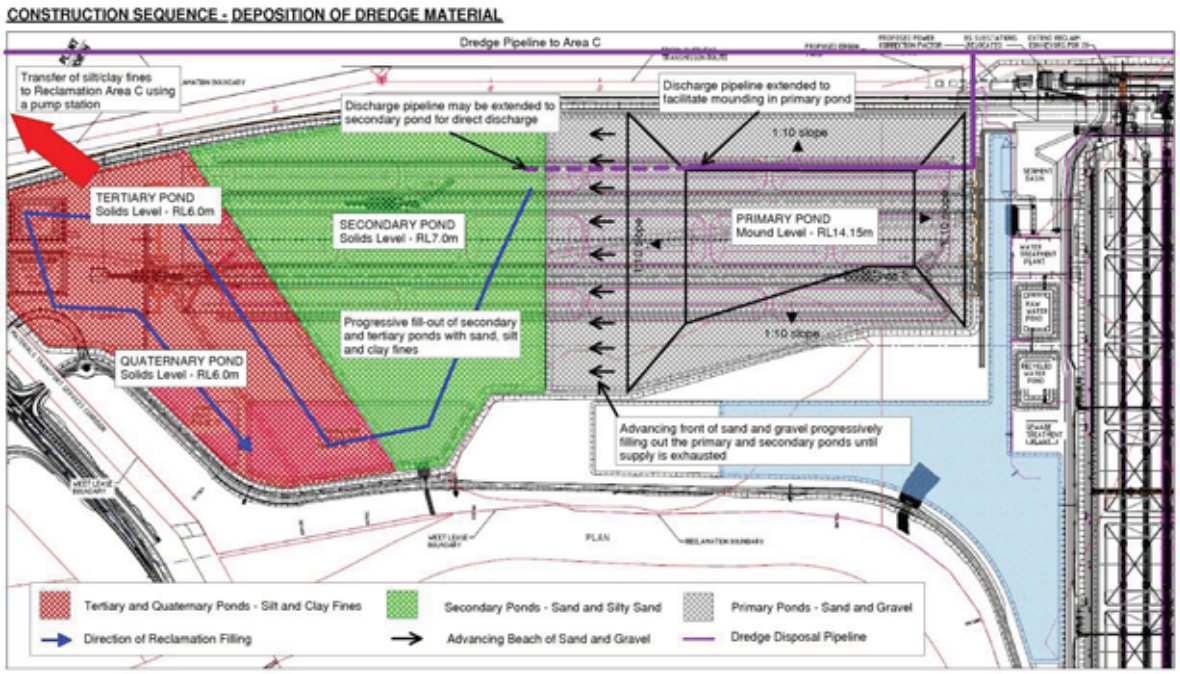


Figure 3.4 Construction Sequence – Deposition of Dredge Material on Stockyard Area B

The mound will be gradually built across the primary pond. Once the design mound height is reached in one location, the discharge pipes will be moved laterally along the bund walls to progressively fill the pond with sand and gravel until the supply is exhausted or dredging is complete. Dry earthmoving equipment will be used throughout the dredging period to facilitate this mounding and advance the discharge pipeline further into the reclamation area. This mound may be increased in height (with appropriate offsets from the bund crest to ensure geotechnical stability) and/or extend into the secondary pond should sufficient sand and gravel be available.

Once spoil disposal commences in the primary pond, the secondary pond of Reclamation Area B will be used initially as an overflow from the primary pond. This pond will be filled with sand, silt and clay, while decanting to the tertiary and quaternary ponds. The dredge pipelines may discharge directly into the secondary ponds during initial fill out by CSD operations and prior to steady state overflow conditions being achieved. Once this pond is full, reclamation will continue directly into the secondary pond until its capacity is reached. The tertiary and quaternary ponds will remain active for the entire dredging campaign.

To maximise the sand and gravel content in Reclamation Area B a small CSD or pump station may be required within the tertiary or quaternary pond to prevent overloading and/or re-dredge excessive accumulation of silt and clay fines. This dredge will pump directly to Reclamation Area C (refer Figure 3.5). The re-dredged fines will require a shorter residence time in Reclamation Area C due to the smaller discharge capacity of the small CSD which results in slightly higher densities of fines at the discharge point.

It is intended that Reclamation Area C be used primarily as a sedimentation pond for the majority of silt and clay fines.

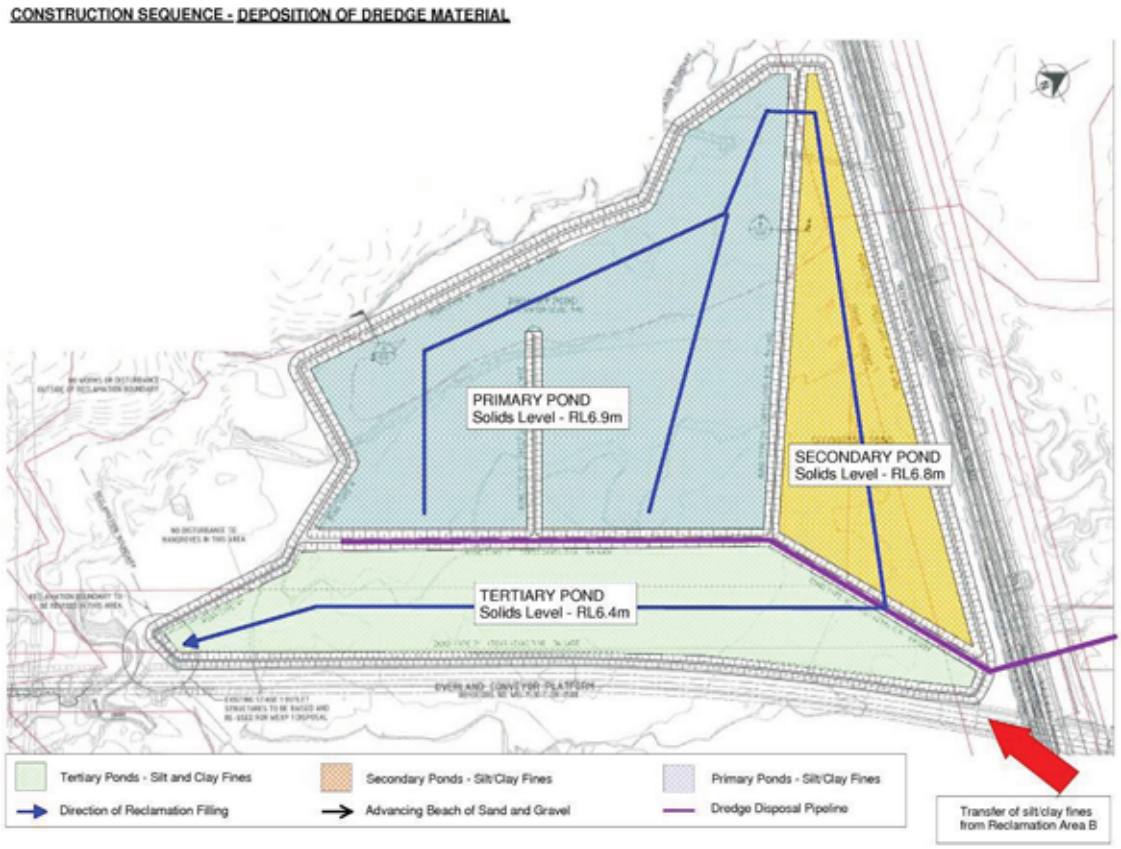


Figure 3.5 WEXP1 Construction Sequence – Deposition of Dredge Material on Reclamation Area C

All transport (slurry decant) water will be trained through the Reclamation Area B tertiary pond and all of the Reclamation Area C ponds. The settling ponds would be at least 3 m deep at the start of deposition and 1 m deep at the end of deposition, and will be used to drop out fines and clayey material in suspension before discharge into the Calliope River.

3.5.2 Offshore Construction

Offshore construction during WEXP1 and WEXP2 will be limited to that required for the additional berths and outloading streams.

It is expected that the shiploader will be constructed completely offsite, shipped to site with a heavy lift ship and lifted onto the wharf. Other alternatives the contractor may adopt include bringing the shiploader to site in two pieces (main frame and boom), or bringing it to site in several large pieces and assembling it on the wharf.

It is expected that the following equipment will be used for the offshore construction:

- Jack-up barges for pile installation
- Large jib crawler cranes at each work front supported on travelling bridge or crane beams
- Dumb barges and tug for supply of materials to the work front
- Tyre-mounted hydraulic cranes for follow-up work fronts (eg decking installation)
- Hydraulic or diesel pile driving hammers
- Welding equipment
- Painting equipment
- Grouting equipment

With the jetty and Berth 1 wharf being constructed in Stage 1, land based access to the construction fronts for the subsequent berths will be available.

The barge ramp facility, located on the eastern side of the Terminal in the mouth of the Calliope River and constructed during Stage 1, will be used to launch all the offshore equipment and materials that are not supplied along the jetty roadway.

Table 3.2 gives an estimate of the materials required for the offshore marine works construction for WEXP1 and WEXP2.

Table 3.2 Marine Works Quantities

	1,200 mm Diameter Steel Piles	Steelwork	Pre-cast Concrete Deck Units
Berth 2 and 3 wharves	10,560 m, 264 piles	8,000 t	2000 deck units
Berth 4 wharf	4,920 m, 123 piles	5,300 t	700 deck units

3.5.3 Dredging and Dredged Material Disposal

There are no planned changes to the dredging as outlined in the approved Project. The proposed dredging activities do not exceed volumes (ie 6.3 Mm^3) outlined in the Project approved under the EIS. All dredging works for the Project will be addressed in Dredge Management Plans (DMPs) to be approved by the Commonwealth and State Governments prior to the commencement of the dredging works.

The dredge spoil deposition strategy as detailed in Section 3.5.1 allows for mounding of sands and gravels in the primary pond at Reclamation Area B. As a result, there is an opportunity to use a portion of the good quality granular dredge spoil as bulk fill for the WEXP1 earthworks programme.

3.5.4 Shipping

No additional shipping during operation is expected as the approved Terminal output remains unchanged. Details on shipping and the potential impacts are discussed in Chapter 6.

3.5.5 Road Use

Details of traffic generated during construction and operation are included in Chapter 6.

3.5.6 Energy

The coal terminal requires electricity and diesel fuel for operation. Diesel fuel will also be required for the operation of the dozers, with an estimated 7.6 ML of diesel fuel required for the construction of WEXP1 and WEXP2. Approximately 133 kL of diesel fuel will be required per year for the operation of WEXP1 and WEXP2 in addition to the 1.4 ML to be utilised for Stage 1. The SEIS estimated an operational consumption for the Ultimate Facility of 5.2 ML of diesel per year. The changed Project presents an estimated reduction of diesel consumption of 3.67 ML per year for the Ultimate Facility.

As a result of the WEXP1 and WEXP2 changes, estimated emissions of CO_2 from electricity and diesel consumption have had reduced by 14.68 kt CO2-e annually for the Ultimate Facility. Annual emissions for the Ultimate Facility as per the approved Project were estimated at 18.87 kt CO2-e, with the changed Project (Stage 1, WEXP1 and WEXP2) resulting in annual emissions of 4.19 kt CO2-e.

The coal terminal also requires a significant power supply to run the materials handling system from inloading through to the shiploaders. The annual electrical energy needs for Stage 1 is 15,230 kWh per annum with WEXP1 and WEXP2 requiring an estimated additional 20,095 and 20,620 kWh per annum respectively (a total of 55,945 kWh per annum). The SEIS estimated that the Ultimate Facility, including the rail infrastructure now being managed by QR National as 5,500,000 kWh.

Equipment will be selected to minimise energy consumption and overall life cycle costs. Further information regarding the energy requirements of WEXP1 and WEXP2 is described in Chapter 7.

3.5.7 Water Supply and Storage

The water supply and storage demands of the proposed changed Project (including Stage 1, WEXP1 and WEXP2) do not vary significantly from the Project approved under the EIS. There are two water demands for the Project, potable water and raw water. These can be defined as follows:

- Raw water – defined as water from the GAWB raw water distribution network. Water is not guaranteed fit for human consumption
- Potable water – water fit for human consumption

Raw water is required to fill water trucks, with above ground hydrants located at the dump stations and around the main site. The hydrants will have a fill rate of 15 L/s and will only be used when recycled sewage effluent is not available.

There will be two vehicle washdown facilities located close to the contractor facilities with daily flows of 50 m^3/s and a peak inflow of 2.3 L/s. Each washdown location will recycle water and discharge effluent to the stormwater storage ponds with an 80% recovery rate.

Other areas which will require raw water include:

- General washdown
- Moisture addition
- Stockpile dust suppression
- Conveyor dust suppression
- Fire systems

The water source for all phases of the development is from the existing GAWB raw water reticulation network, with an existing 375 mm diameter raw water main on the north side of Gladstone-Mount Larcom Road. A branch off this main, approximately 2.5 – 3 km in length, is to service the Terminal. Depending upon the pressure of the existing supply, storage and re-pressuring may be required. Raw water to the dump station will be provided via a long pipeline from the main along the conveyor formation.

Where feasible, water recycling will be implemented to reduce the total load on the raw water supply. The stockpile dust suppression system will be supplied by onsite storage, with raw water used only as a back-up supply. Additionally, most stormwater runoff from the stockyards will be harvested and stored in stormwater storage ponds. For WEXP1, the stormwater storage pond is located to the south of Stockyard Area B.

The estimated cumulative demands for potable water under the approved Project are summarised in Table 3.3. WEXP1 and WEXP2 are not expected to exceed the cumulative demand previously defined for Stages 2 and 3.

Table 3.3 Summary of Estimated Potable Water Demands (cumulative) from SEIS

	Peak Flow Rate (L/s)	Annual Demand (ML)
Stage 1	8	18
Stage 2	16	35
Stage 3	22	51

Onsite treatment of raw water using the Water Treatment Plant (WTP) installed in Stage 1 and expanded in WEXP2, will be used to provide the potable requirements for all phases of

the Project. Raw water and recycled water will be stored onsite in the relevant ponds prior to distribution around the Terminal as required.

The proposed source of potable water for the three dump stations is a connection into the existing water reticulation network serviced by the Reid Road WTP on Reid Road near the corner of Gladstone-Mount Larcom Road. This connection will be established in Stage 1 and includes a new 75 mm OD PE pipeline (approximately 1.5 km in length) along the Reid Road corridor to connect to the existing 150 mm pipeline along Reid Road.

3.5.8 Sewerage

The Project has previously gained a Development Permit for a Material Change of Use of premises for Environmentally Relevant Activity (ERA) 63 Sewage Treatment under the *Sustainable Planning Act 2009*. The Sewage Treatment Plant (STP) is located east of the proposed Stockyard Area B. The STP has been approved for the Project for the plant inflows and effluent irrigation areas described in Table 3.4. WEXP1 and WEXP2 are not expected to exceed the cumulative limits previously defined for Stages 2 and 3 in the Development Permit.

Table 3.4 Approved STP Details for Project (from SEIS)

	Maximum Plant Inflow over any 24 hour Period (kL)	Minimum Effluent Irrigation Area (m^2) (excluding necessary buffer zones)
Stage 1	11	7,500
Stage 2	22	20,000
Stage 3	33	30,000

3.5.9 Stormwater Drainage

As previously described, it is proposed that Reclamation Area B be utilised as a stacker-reclaimer yard, Stockyard Area B. As a result, a new stormwater storage pond will be constructed at the southern end of the stockyard and the stormwater storage pond on the eastern end (constructed in Stage 1) will be extended.

The area under the conveyors and transfer towers will generally be graded towards the stockyards. Stockyard Area B will be graded towards either end of the stockpile rows, to drain into the stormwater storage ponds. Drains will be sized to suit design flows and maintenance requirements. These sizes will be confirmed during detailed design.

Prior to entering the stormwater storage ponds, a major portion of sediment will be removed from the water through the sediment ponds with filter walls.

The stormwater storage ponds will be sized to store runoff from a 10 year ARI storm event with 24 hour duration. The ponds will also be used as a polishing treatment facility to further remove sediment from the runoff. Discharge of excess water from the storage ponds will be through an outlet into the Anabranch.

3.5.10 Telecommunications

Telstra own a fibre optic cable beside Gladstone-Mount Larcom Road. Telecommunications for the Project are being derived from this service.

3.6 Rehabilitation and Decommissioning

There are no changes in rehabilitation and decommissioning compared with the Project approved under the EIS.

Decommissioning from construction phases will involve demobilisation from laydown areas and areas dedicated to the construction offices and workshop areas. Demountable sheds and offices will be removed and if in good order used for other projects.

All areas will be thoroughly cleaned of debris and other containments. If landscaping of these areas is proposed these will be planted out and established with the appropriate vegetation. Decommissioning of the Terminal is unlikely to occur in the foreseeable future, as the minimum design life for the facility is 50 years.

Options that would be considered at decommissioning of the entire facility include:

- Handling of an alternative product through the facility. This would require retrofitting/modification of the entire facility to suit the alternative product
- Dismantle and change land use. The Terminal will be designed to achieve minimal contamination during operations. Decommissioning will involve removal of materials that could lead to contamination when the plant is no longer in operation. Rehabilitation of the site will be consistent with the proposed change in land use

3.7 Waste Management

Chapter 13 of the Change Request contains details on waste management. No changes to the WICET Stage 1 Waste Management Plan (WMP) are planned for the subsequent expansion phases, WEXP1 and WEXP2.

4. Topography, geology and soils

4.1 Summary

The changes proposed as part of WEXP1 and WEXP2 will not result in an increase to potential impacts on soils, including acid sulfate soils, land contamination and good quality agricultural land. Any potential impacts will be managed by implementing existing management plans during detailed design, construction and operation.

The excavation of previously deposited dredged materials to create a new settlement pond at the southern end of Reclamation Area B (WEXP1) and the construction of the new outfall may potentially expose ASS, however this will be managed via the approved Acid Sulfate Soil Management Plan (Appendix 23.4) or an amended version of this plan. Recent testing of Berth Pockets 2 and 3 did not identify the presence of ASS.

The new stockyard proposed for Reclamation Area B will require a ground improvement strategy. This process will be managed using the existing WICET Soil and Water Quality Management Plan (refer Appendix 23.15) or via an amended version, if required.

4.2 Introduction

This chapter describes the existing environment and potential impacts relating to topography, geomorphology, geology and soils for the changed Project. Potential impacts relating to topography, geology and soil were originally outlined in the WICT EIS and SEIS (refer Appendix 1).

This Request for Project Change provides an updated assessment to address changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and EPBC Act controlled action approval (April 2008). Proposed changes to the Project as part of WEXP1 and WEXP2 (previously Stage 2 and Stage 3) are wholly contained within the Project footprint approved under the EIS and areas subsequently approved for WICET Stage 1. It should be noted that the majority of construction impacts to topography, geology and soils will be addressed as part of Stage 1 works.

4.3 Methodology

The topographical and geological characteristics of the WICET Stage 1 area, along with the potential impacts to soils from Stage 1 works, are outlined in Chapter 4 of the WICT EIS. The assessment for this Change Request was based on a review of available information and field investigations.

Due to the large size of the Project footprint, the site has been divided into four areas:

- Golding Point
- Reclamation Area B (Stockyard Area B)
- Reclamation Area C
- Conveyor and dump station

Since the EIS was approved, all rail infrastructure works associated with the WICET Project development are now classified as an individual project (ie Wiggins Island Rail Loops Project) and under the responsibility of QR National. The changed WICET Project footprint is illustrated in Figure 4.1.

4.3.1 Topography and landforms

The topographical and landform patterns within the Project area were investigated during the EIS through a combination of reviewing the relevant aerial photographs and maps, and by undertaking a landform survey in accordance with the principles and intent of the guidelines outlined in Gunn *et al* 1988. Observations recorded during the landform survey were

Legend

Project Area

described in accordance with McDonald *et al* 1990. Field inspections were undertaken by the project team during May 2006 and September 2011.

The assessment of the existing environmental values for the topography and landforms involved the following activities:

- Review of existing information, including relevant maps, aerial photographs and previous reports
- Field inspection and landform survey of the Project area during May 2006, which included surface observations and soil profile descriptions at selected locations
- Field inspection of the Project area during September 2011

4.3.2 Geology and geomorphology

Onshore and offshore geotechnical investigations (including preliminary ASS investigations) for the Project area during the EIS were undertaken by Douglas Partners.

The following documents have been used to describe the soil properties of the Project area:

- Douglas Partners (May 2006) Report on Preliminary Onshore Geotechnical Investigation and ASS Evaluation
- Douglas Partners (October 2006) Draft Report on Geotechnical, Environmental and Acid Sulfate Soil Investigation, Proposed Offshore Works (Volumes 1 & 2)
- Connell Hatch (October 2006) Wiggins Island Coal Terminal Onshore Acid Sulfate Soil Investigation

Detailed information relating to methodologies adopted for the geotechnical and ASS investigations are contained within these documents and are attached to the WICT EIS (refer Appendix 1).

Further reports have been developed since the EIS was approved, including:

- The Douglas Partners “Report on Stage 2 Onshore Geotechnical Investigation, Wiggins Island Coal Terminal, Gladstone”, 4 April 2007
- The Butler and Partners “Geotechnical Investigation: Onshore Geotechnical Survey, Wiggins Island Coal Terminal, Gladstone”, 22 May 2009

4.3.3 Soils, good quality agricultural land and contaminated land

The following soil aspects are described in Chapter 4 of the WICT EIS:

- Soils - an overview of site soil descriptions, including ASS desktop review and preliminary investigations
- Good quality agricultural land
- Contaminated land
- Red Imported Fire Ants - a clearing programme has since been undertaken and the Fire Ants have been removed from the area with the restricted area no longer enforced

4.4 Description of environmental values

4.4.1 Topography and landforms

The Project area contains a range of topographical elevations and landform features. The major landform patterns within and surrounding the Project area are summarised as follows:

- Low hills and rises
- Plains
- Tidal flats and marine plains

Topographical elevations range between being below sea level (less than 0 m AHD) and 80 m AHD.

Review of *Land Systems of the Capricornia Coast Map 3 Calliope Area* (DPI 1995) indicated that a number of land systems occur within the Project area. These are summarised in Table 4.1 and illustrated in Figure 4.4 of the WICT EIS (refer Appendix 1).

Field observations for each precinct within the Project area are summarised in the Section 4.2.1 of the WICT EIS.

Geology and geomorphology

As mapped by the Australia 1:100,000 Geological Series – Gladstone Sheet 9150 the geological formations which occur in the Project area are presented in Table 4.2 and Figure 4.5 of the WICT EIS (refer Appendix 1).

These geological formations include two major bedrock formations that underlie the whole Project area, the Doonside and Wandilla formation. Overlying these bedrock formations is predominantly Quaternary age depositions and the Rundle Formation.

The dominant geological characteristics in the Project footprint are summarised below.

- Golding Point – Wandilla Formation with Coastal Plains and Dunefields on the edges
- Reclamation Areas B and C – Coastal Plains and Dunefields with some outcrops of the Wandilla Formation
- Conveyor and dump station – Alluvial Plains, Residual Deposits and, Coastal Plains and Dunefields

4.4.2 Geotechnical studies

An assessment of the general geotechnical properties is based on site visits conducted by Connell Hatch staff in May 2006 and geotechnical investigations undertaken by Douglas Partners between January and October 2006. The geotechnical investigation comprised test pits, Cone Penetration Tests (CPTs) and borehole drilling, performed at locations and frequencies generally corresponding with the main elements of the Project concept design.

A summary of the findings from the preliminary geotechnical investigations completed by Douglas partners for both the onshore and offshore areas are provided in Section 4.2.3 of the WICT EIS. Appendix 4.1 contains plans of the onshore and offshore geotechnical boreholes within the Project area. Drawing 1533-C-DR-0014 in Appendix 4.1 illustrates the boreholes, test pits and CPTs undertaken in near vicinity to the proposed WEXP1 stockyard.

A geotechnical investigation for the WEXP1 stockyard is scheduled to commence in early 2012. This investigation, once complete, will supplement the information gained from the preceding Stage 1 investigations. Once this information has been received, it will be used, where appropriate, to update the various ground models and analyses that have been included in the WEXP1 technical feasibility study.

The proposed infrastructure located within the WEXP1 stockyard will be designed to satisfy both the functional constraints and specified performance criteria, including:

- Design loads
- Stability performance criteria
- Settlement/movement performance criteria
- Construction programme
- Construction sequence

4.4.3 General soil properties

Investigations as part of the WICT EIS within the Project area included the following activities:

- Reconnaissance survey and site inspections along the extent of the Project area
- Surface observations and soil profile descriptions at selected locations
- Preliminary ASS investigation completed by Douglas Partners and Connell Hatch project teams for both onshore and offshore areas
- Survey observations recorded in accordance with the recommendations contained in the Australian Soil and Land Survey Field Handbook (McDonald et al 1990) and Australian Soil Classification (Isbell 2002)

Section 4.2.4 of the WICT EIS contains a description of site soils, land survey locations, and soil chemical analysis. Figure 4.8 of the WICT EIS (refer Appendix 1) illustrates soil and landform assessment locations.

4.4.4 Good quality agricultural land

The changed Project proposed is wholly contained within the existing Project footprint and will result in no change to potential impacts on good quality agricultural land.

4.4.5 Land contamination

Potential sources of soil contamination at the Project site were identified in the WICT EIS. An environmental baseline report was also developed by Gilbert and Sutherland in June 2011 which provided an assessment of baseline environmental conditions within the WICET Project area. This included a comprehensive soil contamination assessment (refer Appendix 4.2).

The WEXP1 and WEXP2 Project is wholly contained within the existing Project footprint approved under the WICT EIS and will result in no change to potential impacts to land contamination. Management of potential contamination during construction and operation will be undertaken as per the existing WICET SWQMP (refer Appendix 23.15).

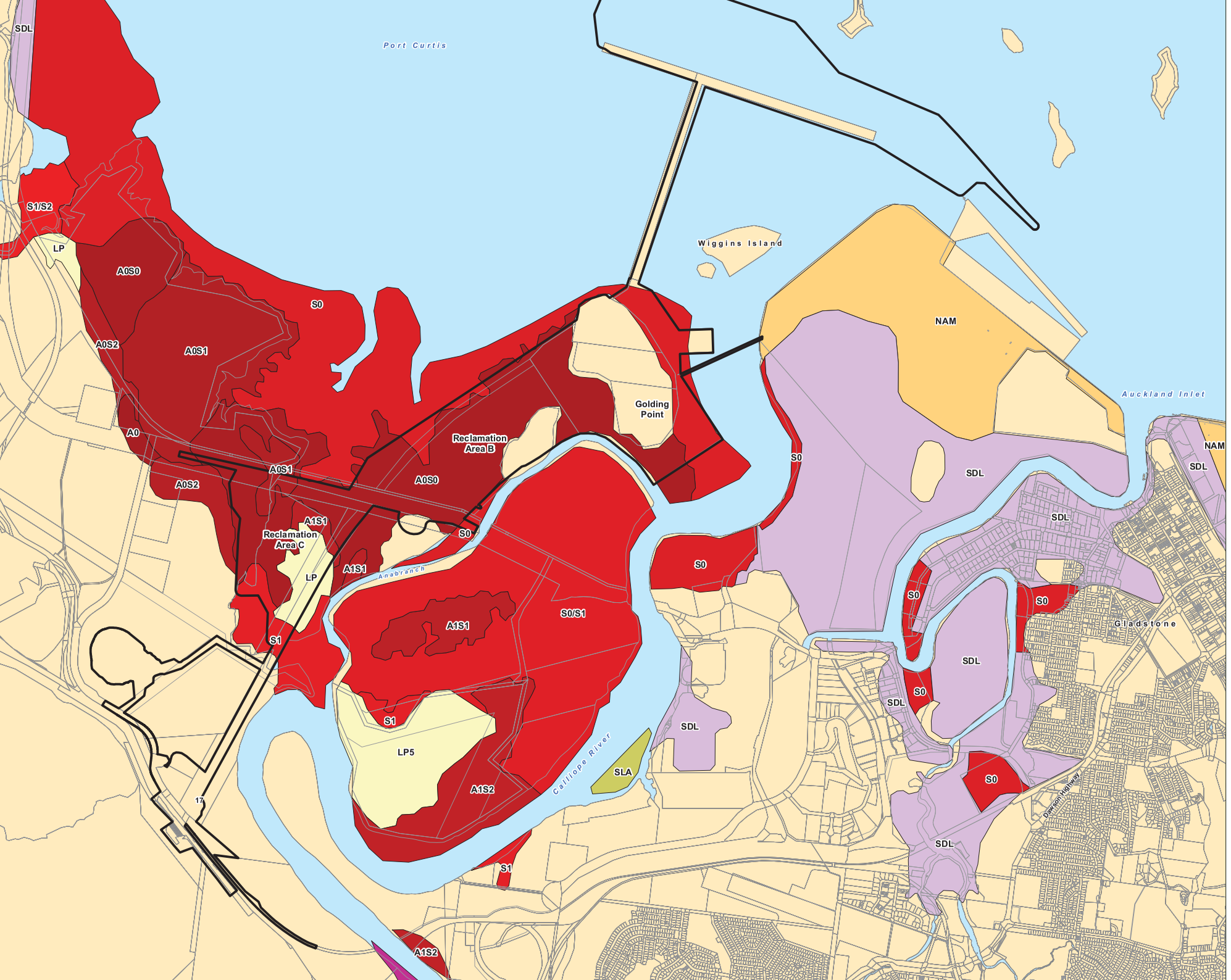
4.4.6 Acid sulfate soils

ASS are a characteristic feature of low lying coastal environments in Queensland, particularly where landform elevations are below 5 m AHD. ASS are comprised of iron sulfides generally in the form of pyritic material that is a product of the natural interaction between iron rich organic matter and sulfate rich seawater present in anaerobic low energy estuarine environments. Undisturbed, these soils are generally present in an anaerobic state within the subsurface profile (below the water table) of Holocene marine muds and sands in the form of potential acid sulfate soil (PASS). Actual acid sulfate soils (AASS) are the oxidised (disturbed) form, which may occur as the result of natural or anthropogenic disturbance from changes in groundwater levels and/or exposure to oxygen (Powell, B. & Ahern, C.R. *Nature, Origin and Distribution of Acid Sulphate Soils: Issues for Queensland* 1999).

The DNRMW (now DEHP) - Acid Sulfate Soils - Tannum Sands Gladstone Area Central Queensland Coast (2004) found the ASS in the survey area are almost exclusively associated with tidal lands or the tidal zone (refer Figure 4.2). The areas include:

- Perimeter areas of Golding Point
- Reclamation Areas B and C
- Area directly north of the Powerlink easement

Findings of the preliminary ASS investigation (Connell Hatch 2006) are provided in Appendix E3 of the WICT EIS (refer Appendix 1).



Legend

- Project Area
- Acid Sulfate Soils (ASS
  - A0S0
  - A1S1
  - A0
  - A0S1
  - A0S2
  - A1S2
  - A2S2
  - S0
  - S0/S1
  - S1
  - S1/S2
  - S2
  - SLA (ASS soil c
- ASS on Disturbed Land
  - SDL - Disturbe Aquaculture, Ur
- Land with a Low Probab
  - LP - Land predo with low probab
  - LP5 - Land pred with low probab
- Land Not Assessed
  - NAM - Land not
  - NA - Made land
- Cadastre

Source:
Acid Sulfate Soils Tannum S
Queensland Government , I
Mines and Energy, Ref.04-A
2006

An Acid Sulfate Soil Management Plan (ASSMP) (refer Appendix 23.4) for Stage 1 has been developed by Gilbert and Sutherland to define operational works and environmental protective measures required for the onsite handling and management of ASS and groundwater. The WICET ASSMP was approved by DEHP in February 2010. A revised ASSMP is currently being developed to incorporate the management of potential ASS risks from WEXP1 dredging (Berths 2 and 3). The testing undertaken as part of the Berths 2 and 3 assessment did not identify the presence of ASS. The ASSMP will be amended for future dredging works (Berth 4).

New settlement ponds will involve excavation of previously deposited dredged materials and the outfall will require excavation of some soils, and associated ASS risks.

4.5 WEXP1 and WEXP2 potential impacts

The majority of disturbance and soil potential impacts as a result of the Project have been addressed as part of Stage 1 works. The potential impacts to topography, geology and soils as a result of the proposed Project changes are as follows:

- The excavation of previously deposited dredged materials to create a new settlement pond at the southern end of Reclamation Area B (WEXP1) and the construction of the new outfall may potentially expose ASS (although this is not expected)
- A new stockyard proposed for Reclamation Area B will require a ground improvement strategy

4.6 Mitigation measures

Mitigation measures are proposed for preventing/minimising potential soil impacts during the design, construction and operational phases of the Project.

4.6.1 Design

To minimise the potential impacts resulting from the Project changes the following mitigation measures will be applied during design, in addition to the mitigation measures identified in the WICT SEIS:

- Design engineers will review the geotechnical model developed for the site as an outcome of the detailed geotechnical investigations that will be undertaken during detailed design
- Develop and implement design measures to ensure the safety and stability of stockyard and wharf infrastructure:
  - Barge ramp
  - Stockyard perimeters and bunding intercepting tidal drainage lines and mudflat areas
  - Footings of stockyard structures and subsurface structures
  - Ponds, buildings and structures associated with the wharf
- Geotechnical engineers will provide input into the design of geotechnical protection measures required to protect existing infrastructure in areas that have been identified as vulnerable to variable, excessive or long term settlement and/or subsidence. These will include:
  - Dredge spoil disposal areas (Reclamation Areas B and C)
  - Gladstone-Mount Larcom road corridor
  - High pressure gas pipeline
  - Water and electricity supply infrastructure
  - Southern end, eastern side and perimeter of stockyard
  - Coal terminal facility area
  - Overland conveyor route from dump station to coal terminal
- Design of temporary and permanent erosion control measures and surface drainage diversion systems associated with conveyor footings and laydown/storage areas will adopt the design principles specified in the erosion control and landscape plans

- A specific ground improvement strategy has been developed to address areas of unconsolidated, incompetent and/or weak geological features, to be adopted prior to and/or during site preparation activities
- Consideration of further assessment of the contaminant status of sites where contaminated soil is required to be relocated between land parcels within the Project area
- Updating/amending WICET SWQMP to incorporate Project changes

4.6.2 Construction

The WICET SWQMP, approved by DEHP in June 2011 (refer Appendix 23.15) outlines environmental management requirements to address potential impacts of construction works involving or impacting the topography, geology and soils of the site, including:

- Bulk earthworks
- Excavation works
- Stockpiling
- Contaminated spoil management
- Vegetation clearing

As part of developing a bulk earthworks borrow source strategy for the WEXP1 feasibility study, consideration has been given to securing fill material from a number of different sources. Details of the bulk fill sourcing strategy are contained in the WEXP1 Technical Feasibility Study.

The WICET Construction Phase ASSMP for Stage 1 will be amended to address any changes as a result of WEXP1 and WEXP2 prior to construction of WEXP1 and WEXP2 commencing, and will be implemented during construction.

4.6.3 Operation

To minimise the potential impacts resulting from the Project changes the following mitigation measures will be applied during operation and maintenance activities, in addition to the mitigation measures identified in the WICT SEIS:

- Settlement and geotechnical conditions will be monitored throughout the nominated settlement period for specific areas of the site and/or structures
- Temporary erosion control measures will be monitored and maintained until the area of direct disturbance has been stabilised
- Temporary erosion control measures will be removed once the disturbed area has been stabilised
- Temporary erosion control and surface water diversion systems will be installed during maintenance activities
- Permanent erosion control measures and surface water diversion systems/structures will be monitored and maintained throughout operation of the coal terminal facilities

4.7 Conclusion

Potential impacts relating to topography, geology and soil were originally outlined in the WICT EIS and SEIS. The proposed WEXP1 and WEXP2 changes are wholly contained within the Project footprint approved under the WICT EIS and areas subsequently approved for WICET Stage 1. It should be noted that the majority of impacts to topography, geology and soils will be addressed as part of Stage 1 works.

The WICET Soil and Water Quality Management Plan (SWQMP) (refer Appendix 23.15) has been prepared to mitigate construction impacts associated with erosion, sedimentation and the transportation of soils. The WICET SWQMP will be reviewed and amended during the detailed design phase to mitigate impacts from WEXP1 and WEXP2 works.

The most significant potential impact to soils as a result of WEXP1 and WEXP2 changes is the excavation of materials that may contain ASS, although it should be noted that testing to date (Berths 2 and 3) has not identified ASS. New settlement ponds on Reclamation Area B will require excavation of previously deposited dredged materials. All material excavated from ASS risk areas will be managed in accordance with the WICET Stage 1 ASSMP (refer Appendix 23.4), which was approved by DEHP in November 2009. The WICET Stage 1 ASSMP will be amended to mitigate impacts from WEXP1 and WEXP2 during construction.

A new stockyard area is proposed for Reclamation Area B as part of WEXP1. A ground improvement strategy has been developed as part of the WEXP1 Technical Feasibility Study to treat the sediment (both residual and reclaimed) that have inadequate geotechnical strength for the safe construction and/or operation of the stockyard.

Overall the potential impacts to soils as a result of WEXP1 and WEXP2 changes are considered minor and manageable by implementing existing and proposed management plans during detailed design, construction and operation.

Conclusion 1: The changed Project is wholly contained within the existing Project footprint approved under the WICT EIS and will result in no change to potential impacts on good quality agricultural land.

Conclusion 2: The changed Project is wholly contained within the existing Project footprint approved under the WICT EIS and will result in no change to potential impacts to land contamination.

Conclusion 3: A revised ASSMP will be developed to incorporate the management of potential ASS risks for future dredging (Berths 2, 3 and 4). ASS sampling of Berth Pockets 2 and 3 did not identify ASS.

5. Land use and project approvals

5.1 Summary

The proposed changed Project will be wholly contained within the Project footprint which includes areas approved under the EIS and areas subsequently approved for WICET Stage 1 and will not impact on any additional State or privately owned land.

WEXP1 and WEXP2 complies with the future development intent of the immediate area and wider Central Queensland region, as well as the relevant statutory land use instruments for this area. All additional approvals for the Project will be obtained prior to the commencement of works and / or operations.

5.2 Introduction

The proposed changes to the Project are consistent with the Project approved under the EIS, as the changes will not exceed the ultimate nominal capacity of 84 Mtpa, nor the three inloading systems, three outloading systems and four coal berths. The proposed Project components are to occur within the Project footprint and will not impact on any additional State or privately owned land.

The Project remains consistent with the land use designations and surrounding land uses of the area. The changes proposed in WEXP1 and WEXP2 will, however, require a number of additional statutory approvals, including a land use permit and an Operational Works (Bulk Earthworks) permit associated with the expansion of the land use coverage within Reclamation Area B of the Project footprint, as well as additional Operational Works Permits for Tidal Works, the Disturbance of Marine Plants and Waterway Barrier Works associated with the new outfall to the Anabranch.

It should be noted that the offshore components of the Project are not impacted by physical changes under this application for a project change, which remains within the nominal ultimate capacity of the Project approved under the EIS. Similarly, there are to be no physical changes to the rail portion of the WICET Project located south of the GSDA, and the infrastructure associated with the Project is now being managed by QR National.

As such, the land use and project approval issues dealt with in this chapter have been limited to the overland conveyors and coal terminal which are managed by WICET.

5.3 Land Tenure and Jurisdiction

The WEXP1 and WEXP2 Project will not impact on additional land holdings. While tenure (being tenure types and descriptions) and jurisdictions within the Project area have changed since the issuing of EIS ‘Significant Project’ and ‘Controlled Action’ approvals in 2008, tenure arrangements remain conducive to the development of the Project.

Current tenure and jurisdictional arrangements are summarised in Table 5.1 and illustrated in Figure 5.1. Tenure arrangements at the time of the WICT EIS (November 2006) and SEIS (August 2007) (refer Appendix 1) are shown in Figure 5.2 for comparison.

The areas likely to be affected by changes from WEXP1 and WEXP2, including both stockyard arrangements, the additional discharge outlet and the overpass, are as follows:

- Golding Point
- Reclamation Area B (Stockyard Area B)

Legend

- Project Area
- Cadastre

Refer to Table 5.1 for the la
the WEXP1 and WEXP2 pr

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Project Area (N

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consequential damage) re
Data must not be used for
breach of the privacy laws.

Table 5.1 Current land tenure and jurisdiction of properties within the WEXP1 and WEXP2 Project area

Area	Lot	Plan	Tenure	Ownership/Lessee	Jurisdiction	Implications of WEXP1 and WEXP2 proposed project change
Wiggins Precinct						
Offshore	105	SP228177	Leasehold	Owned by the State of Queensland (Represented by Department of Natural Resources and Mines (DNRM)) and leased to Gladstone Ports Corporation Ltd (GPC), subleased to WICET Pty Limited	Strategic Port Land	No change
Offshore	104	SP228177	Leasehold	Owned by the State of Queensland (Represented by DNRM) and leased to GPC	Strategic Port Land	No change
Reclamation Area B and Calliope River	1	SP224171	Leasehold	Owned by the State of Queensland (Represented by DNRM) and leased to GPC	Strategic Port Land	Lot for the approved Calliope River Cable Crossing (no longer anticipated as part of the Approved Project or WEXP1/WEXP2)
Golding Point	107	SP241807	Leasehold	Owned by the State of Queensland (Represented by DNRM) and leased to GPC	Strategic Port Land	Impacted by WEXP2 stockyard arrangement
Golding Point	98	CTN279	Freehold	Owned by GPC and subleased to WICET Pty Limited	Strategic Port Land	Impacted by WEXP2 stockyard arrangement
Golding Point	99	CTN279	Freehold	Owned by GPC and subleased to WICET Pty Limited	Strategic Port Land	Impacted by WEXP2 stockyard arrangement
Golding Point	100	CTN279	Freehold	Owned by GPC and subleased to WICET Pty Limited	Strategic Port Land	Impacted by WEXP2 stockyard arrangement
Hanson Road Precinct						
Reclamation Area B	28	CTN279	Freehold	Gladstone Ports Corporation	Strategic Port Land	Impacted by WEXP1 stockyard arrangement

Area	Lot	Plan	Tenure	Ownership/Lessee	Jurisdiction	Implications of WEXP1 and WEXP2 proposed project change
Overland Conveyors/ Reclamation Area B	106	SP238408	Leasehold	Owned by the State of Queensland (Represented by DNRM) and leased to GPC, subleased to WICET Pty Limited	Strategic Port Land	May be impacted by WEXP1 stockyard arrangement
Reclamation Area B/Gladstone Mt Larcom Rd overpass/Terminal Access Rd	108	SP238408	Leasehold	Owned by the State of Queensland (Represented by DNRM) and leased to GPC, subleased to WICET Pty Limited	Strategic Port Land	Impacted by WEXP1 stockyard arrangement, additional discharge outlet and overpass
Reclamation Area B	1	SP225917	Freehold	Owned by GPC	Gladstone State Development Area	Impacted by WEXP1 stockyard arrangement
Gladstone-Mt Larcom Road (State-controlled road)				Owned by the State of Queensland (Represented by DTMR)		No change
Overland Conveyors/ Reclamation Area C	109	SP238409	Leasehold	Owned by the State of Queensland (Represented by DNRM) and leased to GPC, subleased to WICET Pty Limited	Gladstone State Development Area/ Strategic Port Land	No change
Reclamation Area C / Gladstone Mt Larcom Rd overpass	110	SP238409	Leasehold	Owned by the State of Queensland (Represented by DNRM) and leased to GPC, subleased to WICET Pty Limited	Gladstone State Development Area/ Strategic Port Land	No change for Reclamation Area C.
Reclamation Area C	4	SP200842	Leasehold	Owned by the State of Queensland (Represented by DNRM) and leased to GPC	Gladstone State Development Area	No change
Reclamation Area C	5	SP200840	Leasehold	Owned by the State of Queensland (Represented by DNRM) and leased to GPC	Gladstone State Development Area	No change
Overland Conveyors (underneath Gladstone-Mt Larcom Road) (Volumetric)				Owned by the State of Queensland (Represented by DTMR)	Future Strategic Port Land	No change for overland conveyor.
Gladstone Mt Larcom Rd overpass (Materials Transport Corridor)				Owned by the State of Queensland (Represented by DTMR)		No change

Area	Lot	Plan	Tenure	Ownership/Lessee	Jurisdiction	Implications of WEXP1 and WEXP2 proposed project change
Forest Precinct						
Reclamation Area C (Portion) and GPN Borrow Source	1	SP245935	Freehold	The Minister for Industrial Development of Queensland	Gladstone State Development Area	No change
Overland Conveyors	4	SP218648	Freehold	Owned by GPC and subleased to WICET Pty Limited	Gladstone State Development Area/ Strategic Port Land	No change
Overland Conveyors	2	SP245935	Freehold	The Minister for Industrial Development of Queensland	Gladstone State Development Area	No change
Overland Conveyors and Access Overpass	1	SP225922	Freehold	Owned by GPC and subleased to WICET Pty Limited	Gladstone State Development Area/ Strategic Port Land	No change
Access Overpass	1	SP235967	Leasehold (Volumetric)	Owned by the State of Queensland (Represented by DNRM) and leased to GPC, subleased to WICET Pty Limited	Strategic Port Land	No change
Overland Conveyor	2	SP235968	Leasehold (Volumetric)	Owned by the State of Queensland (Represented by DNRM) and leased to GPC, subleased to WICET Pty Limited	Strategic Port Land	No change
Reid Road				Owned by the State of Queensland (Represented by DNRM)		No change
	7	SP239676	Leasehold	Owned by the State of Queensland (Represented by DNRM) and leased to GPC, subleased to WICET Pty Limited	Strategic Port Land	No change

Area	Lot	Plan	Tenure	Ownership/Lessee	Jurisdiction	Implications of WEXP1 and WEXP2 proposed project change
	51	SP239654	Leasehold	Owned by the State of Queensland (Represented by DNRM) and leased to DTMR, sub leased to: • QR Network Pty Limited • Queensland Rail Limited	Gladstone Regional Council	No change
	2	SP239654	Leasehold		Gladstone Regional Council	No change

5.4 Land Use

5.4.1 Existing Land Uses

Gladstone is a centre for large-scale minerals and resource processing in Queensland, providing industries with a major strategic industrial hub for large-scale operations and access to raw minerals, energy supply, physical infrastructure, and service and support industries.

The land and water uses surrounding the Project are predominantly industrial, rural or conservation uses (eg Byellee Wetland, Forest Reserves), with the exception of rural residential properties to the south east of the Project.

Stockyard Area A is sited on Golding Point, and is subject to earthwork activities associated with the Stage 1 of the Project. Wiggins Island and Mud Island are located offshore from Golding Point, which are undeveloped and covered by dense mangrove communities.

Gladstone-Mount Larcom Road (formerly Hanson Road) separates Reclamation Areas B and C, and provides the main access to the western sections of Gladstone City and the major industries within the Gladstone State Development Area (GSDA). These include:

- Yarwun Alumina Refinery
- Mount Miller Rail Yard
- Orica
- GRC Wastewater Treatment Plant
- Gladstone Area Water Board Water Treatment Plant

Reclamation Area B is located to the north of Gladstone-Mount Larcom Road, and Reclamation Area C to the south, both of which are predominantly intertidal flats. Reclamation (Tidal Works) approvals have been obtained for these areas for future industrial / port-related development. Reclamation works have commenced with these areas as part of the Stage 1 Project.

The conveyor and dumpstation area includes the area along the North Coast Line, a 275 kV powerline from the Gladstone Power Station and the Yarwun Precinct of the GSDA.

5.4.2 Future Land Uses

The proposed changed Project remains within the Project area approved under the EIS and subsequently approved for Stage 1, and much of the surrounding area has either been developed, or identified, for future industrial development.

There are a number of proposed new industries and expansions of existing industries within the GSDA and surrounding areas, including:

- Yarwun Alumina Refinery expansion
- Queensland Alumina Refinery
- Queensland Curtis LNG
- Gladstone LNG
- Shell LNG
- Australia Pacific LNG
- RG Tanna Coal Terminal expansion
- Orica expansion

From a regional perspective, the Central Queensland Regional Growth Management Framework (CQRGMF) (2002) recognises the region for its major contribution to the Australian and Queensland economies, and the many natural assets of State and National significance. The CQRGMF identifies the regional drivers for Central Queensland as future economic growth, as well as social and environmental growth, and the need to capitalise on its competitive advantages for the benefit of the region.

Gladstone is recognised as a major urban centre with its future prosperity generated by its port, infrastructure, and the high level of major industrial development, both existing, and planned.

The Project is consistent with existing and future surrounding land uses of the area. Providing for the expansion of operations associated with the Project will ensure that the economic advantage of the area is retained and that the Port of Gladstone remains a world class port that is able to satisfy the transport demands of the rapidly increasing coal export market.

5.5 Compliance with Planning Framework

The Project will continue to traverse land under a number of planning jurisdictions:

- Gladstone State Development Area (GSDA)
- Gladstone Regional Council (GRC)
- Gladstone Ports Corporation (GPC)

Figure 5.3 identifies the Project area's current zoning from the relevant land use planning instruments.

Development within the GSDA is subject to the Development Scheme for the Gladstone State Development Area 2010 (the GSDA Development Scheme), amended to replace the 2006 version referred to in the WICT EIS, with only minor changes that do not impact the Project.

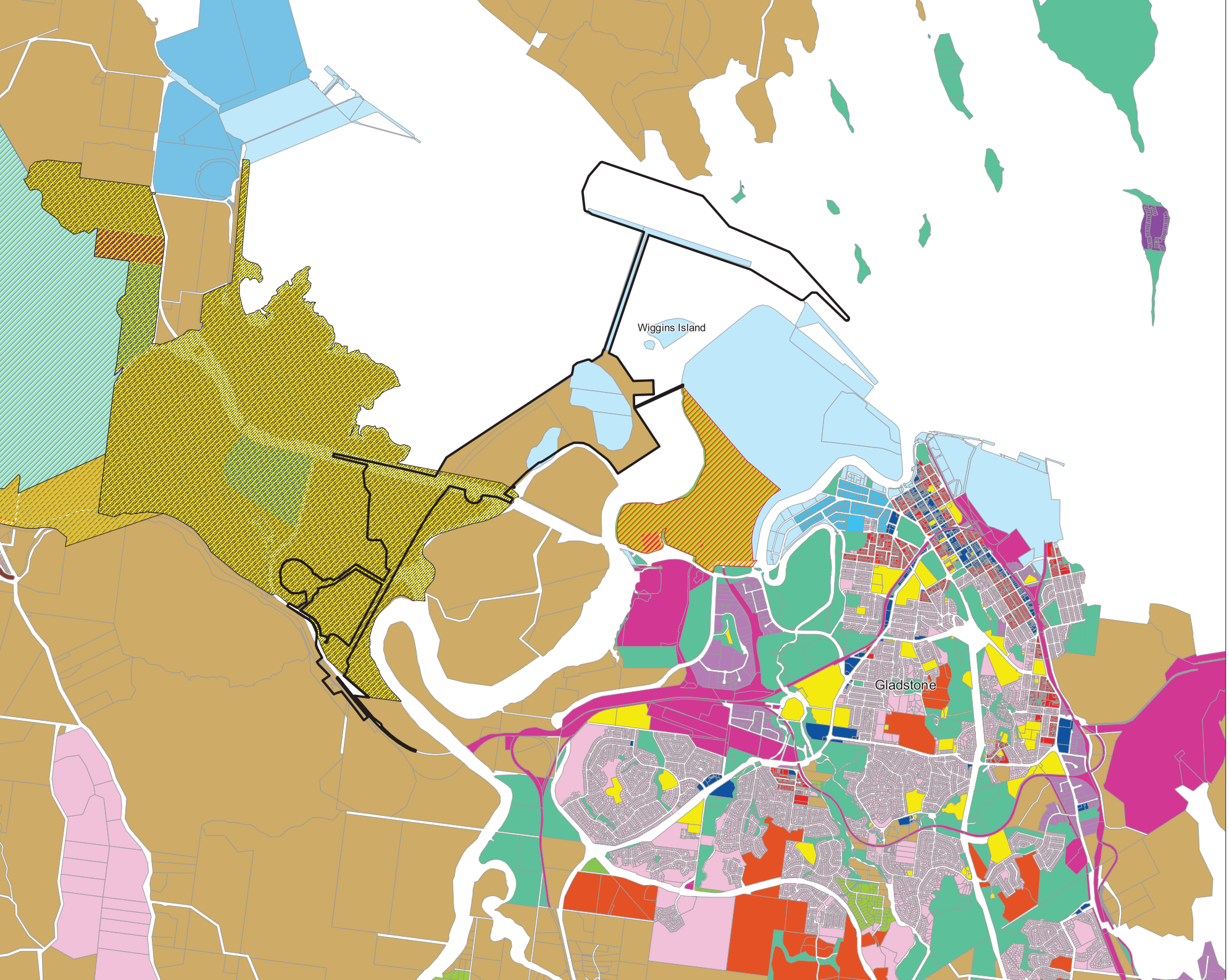
Following the Queensland local government amalgamations in March 2008, the former local government areas of Gladstone City, Calliope Shire and Miriam Vale Shire Councils were brought together to form the GRC. Whilst GRC is currently drafting a single planning scheme to encompass the amalgamated Council areas within the region, until such time as this is finalised and adopted, each component council area remains subject to the provisions of their respective former planning schemes.

GPC is a Government Owned Corporation responsible for the operation and management of the Port of Gladstone. Previously the Central Queensland Port Authority (CQPA), GPC is the relevant port authority for the Port of Gladstone and has statutory management authority, established under the *Transport Infrastructure Act 1999* (TIA) over its Strategic Port Land (SPL). GPC as a landowner and land manager, manages development on its SPL within the Port of Gladstone through the Port of Gladstone Land Use Plan 2012.

The Project remains compliant with the relevant statutory documents of each planning jurisdiction, as outlined below. Assessment requirements within this framework are discussed in Section 5.6.

5.5.1 Compliance with the GSDA Development Scheme

The GSDA Development Scheme applies to the portions of the Project that lie within the area that is bounded by the Materials and Transport Services Corridor located immediately to the north and parallel to, Gladstone-Mt Larcom Road, and the rail dump station to the south. Raising of the Reclamation Area C bundwalls may be required in this area, with overall bund height not exceeding RL8 m. The conveyors will be used to transfer the increased product throughput from approximately 27 Mtpa (Stage 1) to 84 Mtpa (approved development).



Legend

- Project Area

Gladstone Planning S

- Commercial
- Community Pur
- Major Industry &
- Gladstone State
- Heavy Industry
- Island Settleme
- Local Industry
- Mixed Industry
- Not Known
- Open Space
- Park Residentia
- Reserve
- Residential (Hig
- Residential
- Rural
- Rural Residenti
- Special Facilitie
- Special Purpos
- Strategic Port L
- Urban Expansio
- Village

Gladstone State Devel

- Aldoga Precinct
- Clinton Precinct
- Materials, Trans
- Targinnie Precin
- Yarwun Precinc

Source:
Gladstone Planning Schemes int
the latest Gladstone Planning Ma
4/10/2011.

Under the previous GSDA Scheme, the Project was captured under the broad definition of a '*Public Utility*'. Although the type of development has not changed, the current GSDA Scheme has modified a number of definitions, and the elements of the Project within the GSDA are now defined as:

> *"Materials transport infrastructure*
>
> *a) Means infrastructure used to transport materials*
>
> *b) Includes pipes used to transport materials (other than for utility gas) and conveyors used to transport raw material and products."*

The Project traverses the GSDA through the designated 'Yarwun Precinct' and the 'Materials Transportation and Services Corridor (Boat Creek Corridor Sub-Precinct)'.

The 'Yarwun Precinct' and 'Materials Transportation and Services Corridor Precinct (Boat Creek Corridor Sub-Precinct)' have several purposes under the GSDA Scheme, including:

> "*To provide for infrastructure that may or may not be associated with activities in the GSDA*".

The 'Consistent Use Tables' for both GSDA precincts identify development that is defined as 'materials transport infrastructure' (ie WEXP1 and WEXP2) as 'uses that are considered highly likely to meet the Objectives of the Gladstone State Development Area'.

Further, development in the 'Materials Transportation and Services Corridor Precinct (Boat Creek Corridor Sub-Precinct)' also seeks:

> *"To provide an efficient and effective route for infrastructure and utility services to link the Port of Gladstone with GSDA precincts and areas external to the GSDA."*

The Project remains consistent with the purposes of these precincts within the GSDA.

5.5.2 Compliance with the Gladstone Port Land Use Plan 2012

The Gladstone Port Land Use Plan 2012 (LUP 2012) applies to the portion of the Project located on land designated as SPL. The LUP 2012 was adopted by the Minister for Transport under TIA and gazetted on 9 March 2012, replacing the previous Gladstone Port Land Use Plan 1999 (referred to in the WICET EIS) and the Port of Gladstone Draft Land Use Plan 2010.

The LUP 2012 identifies new areas of SPL, with the majority of the Project footprint, and the physical infrastructure of the Project including WEXP1 and WEXP2, with the exception of a portion of Reclamation Area C, being within SPL.

The LUP 2012 identifies the Wiggins Island Locality, which is intended to provide for

> *'A new coal export terminal, rail infrastructure and supporting infrastructure to service the increasing demand for the export of coal from the Queensland coalfields. The facility will provide six new berths at Wiggins Island to cater for Cape size vessels. Stage 1 of the Wiggins Island Coal Export Terminal has been approved and development has commenced'*

Furthermore, the LUP 2012 notes the future intent of the locality as representing site for future industrial and port development, and identifies an area of Future SPL associated with the overland conveyor underneath Gladstone-Mt Larcom Road.

The LUP 2012 divides the Wiggins Island Locality into a number of precincts, these being 'Port Industry', 'Wharves (Off-Shore)', 'Port Operations Support' and 'Marine Industry'. Figure 5.4 illustrates the proposed new SPL boundaries within the Wiggins Island Locality, in relation to the Project footprint.

Legend

- Project Area
- Strategic Port L
- Future Strategic

Source:
Strategic Port Land: Data c
Gladstone Land Use Plan 2
http://www.gpcl.com.au/Por
Draft_Land_Use_Plan_201

Overall, the Project is consistent with the intent of the LUP 2012.

5.5.3 Compliance with the Gladstone Plan 2006

Prior to the LUP 2012 coming into effect, and as described in the EIS, The Gladstone Plan 2006 (Gladstone Plan) applied to the majority of the Project area north of Gladstone-Mt Larcom Road.

Since the adoption of additional areas of SPL under the LUP 2012, only the portion of the Project that relates to the Gladstone Plan is Lot 1 on SP225917, which has not been gazetted as SPL (refer Table 5.1). The Project remains defined by the Gladstone Plan as:

> *"Major Infrastructure (Industry (High Impact)) means the use of premises for the purpose of the provision of facilities and services providing services such as electricity, gas, raw water, transport (air, rail, road and sea), rail terminals, pipelines and conveyors, and telecommunications which is likely to have a notable impact."*

The Project traverses land within the 'North West Locality', zoned as 'Major Industry / Infrastructure' under the Gladstone Plan.

In the assessment of a development application for 'Major Infrastructure (Industry (High Impact))' in this locality, the provisions of the whole planning scheme would be applied. From the perspective of a broad compliance assessment, the Gladstone Plan provides several codes which apply to the Project, predominantly the North West Locality Code.

This Code seeks to promote and protect industrial development in the locality, ensuring that:

> "*the character of the North West Locality as an area dominated by major industry activities and major infrastructure is protected by keeping these activities separated and protected from other activities…* "

Other applicable codes within the Gladstone Plan include:

- Airport Noise and Safety Overlay Code
- Acid Sulfate Soils (ASS) Overlay Code
- Coastal Management Overlay Code

These codes provide development/design-specific outcomes, compliance with which was demonstrated in the EIS/SEIS, and will be continued in the detailed design and development of the Project.

Overall, the Project remains consistent with the intent of the Gladstone Plan.

5.5.4 Compliance with the Calliope Shire Planning Scheme

The former Calliope Shire Planning Scheme 2007 (Calliope Planning Scheme) applies to the portions of the Project that are predominately south of Gladstone-Mt Larcom Road and which have not been gazetted as SPL under the LUP 2012 (portion of Reclamation Area C).

The Project remains defined by the Calliope Planning Scheme as 'Major infrastructure (Industry (High Impact))' which is consistent with the definition under the Gladstone Plan

The Project traverses land within both the 'Calliope Rural Locality' and the 'Gladstone State Development Area Locality' under the Calliope Planning Scheme.

In the assessment of a development application for 'Major Infrastructure (Industry (High Impact))' in this locality, the provisions of the whole planning scheme would be applied. From the perspective of a broad compliance assessment, the Calliope Planning Scheme provides several codes which apply to the Project, predominantly the Gladstone State Development Area Locality Code.

The Gladstone State Development Area Locality Code seeks to promote industrial development by providing for the following:

> *"Industrial development of regional, State and national significance within the Gladstone State Development Zone"*

Other applicable codes within the Calliope Planning Scheme include:

- Airport Noise and Safety Overlay Code
- Acid Sulfate Soils (ASS) Overlay Code
- Bushfire Management Overlay Code
- Coastal Management Overlay Code

These codes provide development/design-specific outcomes, compliance with which was demonstrated in the EIS/SEIS, and will be continued in the detailed design and development of the Project.

Overall, the Project remains consistent with the intent of the Calliope Planning Scheme.

5.5.5 Queensland Coastal Plan

The Queensland Coastal Plan (the Coastal Plan) was introduced by the Queensland Government on 9 February 2012, replacing the State Coastal Management Plan (2001) and associated regional coastal management plans. The Coastal Plan seeks to manage coastal resources and protect infrastructure and livelihoods from coastal hazard impacts. The Coastal Plan applies to the 'coastal zone' and comprises two parts:

- State Policy for Coastal Management; and
- State Planning Policy 3/11: Coastal Protection (SPP 3/11)

The State Policy for Coastal Management details a suite of management policies to assist the managers of coastal land and owners of private coastal land in their decision-making processes, including EIS assessments (and Change Request Assessments) and decisions under Part 4 of the *State Development and Public Works Organisation Act 1971* (SDPWO Act).

The impact of the Project on the coastal environment was assessed by the State and Commonwealth through the EIS/SEIS. The changes proposed in WEXP1 and WEXP2 will not result in any additional adverse impacts on these coastal elements, as all physical works and accommodation of the increased throughput will be located within the Project footprint approved under the EIS.

SPP 3/11 applies to development in the coastal zone and seeks to manage coastal hazards and resources, in addition to the preferential allocation of coastal land for coastal-dependant development.

The Project is located within the Central Queensland region of the Coastal Plan. As a statutory instrument, the State Government will be required to consider SPP 3/11 when making decisions relating to coastal development assessment that are assessable under the *Sustainable Planning Act 2009* (SPA).

5.6 Project Approvals

In January 2008, the Wiggins Island Coal Terminal Project Coordinator-General's Report evaluating the EIS pursuant to section 35 of the *State Development and Public Works Organisation Act 1971* was released. In April 2008, the Project was given 'controlled action' approval under the *Environment Protection and Biodiversity Conservation Act 1999*.

A number of statutory approvals were also required for the Project through the State's Integrated Development Assessment System (IDAS) under the SPA.

Table 5.2 identifies these approvals, and provides commentary on the status of these applications, as well as any changes or new development applications required to accommodate the changes associated with WEXP1 and WEXP2. The changes or new development approvals required for WEXP1 and WEXP2 are preliminary, and subject to detailed design.

As above, it should be noted that the rail and offshore portions of the Project are not impacted by physical changes under this application for a project change. As such, the land use and project approval issues dealt with in this section have been limited to the overland conveyors and coal terminal infrastructure.

Table 5.2 Environmental approvals associated with WEXP1 and WEXP2

Applicable legislation	Approval required	Approval status (as at March 2012)	Implications of WEXP1 and WEXP2 proposed project change
General high level approvals (EIS and Land Use Approvals)			
Environment Protection and Biodiversity Conservation Act 1999	'Controlled Action' Approval	Approval issued by the Commonwealth in April 2008 (EPBC No 2005/2374)	SEWPaC has confirmed that the changes to the Project do not require amendment to the existing controlled action approval (refer Appendix 5)
State Development and Public Works Organisation Act 1971	'Significant Project' Declaration	Coordinator-General evaluation report issued in January 2008	Application for a 'Project Change' required **SUBJECT OF THIS APPLICATION**
State Development and Public Works Organisation Act 1971	Development Permit for a Change of Land Use within the Gladstone State Development Area (GSDA) assessable against the GSDA Development Scheme	Development Approval issued by the Coordinator-General in August 2009 (Department of State Development, Infrastructure and Planning (DSDIP) reference: 09/20395/T6394/TR15/DIP)	None WEXP1 and WEXP2 may proceed under existing approval
Sustainable Planning Act 2009	Development Permit for a Material Change of Use (MCU) for a Greenfield Coal Terminal assessable under the Calliope Shire and Gladstone City Council Planning Schemes	Approval for Stockyard Area A issued by GRC in December 2010 (DA/33/2009)	None WEXP1 and WEXP2 may proceed under existing approval where consistent with the Port of Gladstone Land Use Plan 2012
Environmental Approvals			
Aboriginal Cultural Heritage Act 2003	Aboriginal Cultural Heritage Investigation and Cultural Heritage Management Plan required under s87 of the Act	A Cultural Heritage Investigation was undertaken as part of the EIS; a Cultural Heritage Management Plan was agreed between the relevant parties on 8 February 2010	None The Cultural Heritage Investigation and Cultural Heritage Management Plan encompass the WEXP1 and WEXP2 area
Coastal Protection and Management Act 1995 ***Sustainable Planning Act 2009***	Development Permit for a MCU involving ERA 16 – Extractive Activities and an approved Dredge Management Plan (DMP) for the WICET Staged Dredging Works	DMP submitted to DEHP and currently in the Decision Stage	None WEXP1 and WEXP2 will not alter dredging operations. The current DMP seeks approval to undertake additional dredging works associated with WEXP1. Additional approval will be required to undertake dredging works associated with WEXP2

Applicable legislation	Approval required	Approval status (as at March 2012)	Implications of WEXP1 and WEXP2 proposed project change
Dangerous Goods Safety Management Act 2001	Permit to establish a large dangerous goods location	To be obtained / notified prior to commencement of operations based on volumes of fuel / chemical storage	None WEXP1 and WEXP2 does not change approval requirement
Environmental Protection Act 1994 ***Sustainable Planning Act 2009***	Development Permit for MCU and Registration Certificates required for: Construction Environmentally Relevant Activities (ERA): • ERA 8: Chemical storage • ERA 16: Extractive and screening activities (dredging) • ERA 17: Abrasive blasting • ERA 43: Concrete batching Operational ERAs: • ERA 50: Bulk material handling • ERA 21: Motor vehicle workshop • ERA 57: Regulated waste transport • ERA 63: Sewage treatment plant	ERA 16 application currently in the Decision Stage of assessment ERA50 Development Permit Application for Stage 1 to be lodged in Q2 2012 Approval for ERA 63 obtained August 2010 (DEHP Reference SPDE00684110) Development Permits and Registration Certificates to be obtained prior to commencement of activities	Amendment to the MCU for Bulk Material Handling (ERA 50) will be required to include volumes associated with WEXP1 and WEXP2
Gladstone Port Corporation Landuse Plan 2012	Approval for undertaking development on Strategic Port Land	To be obtained.	Application for Development Permits within Strategic Port Land for development associated with: • Reclamation Areas B and C and part of Haul Road (within SPL) • Rail Receival and Overland Conveyor Crossing, Reid Road • Overland Conveyor Crossing • Hanson Road Overpass • North of Hanson Road • Marine structures (jetty upgrade, Berths 2 and 3 etc) • Bund raise for Reclamation Area B and C (within SPL)

Applicable legislation	Approval required	Approval status (as at March 2012)	Implications of WEXP1 and WEXP2 proposed project change
Harbours Act 1955/ Sustainable Planning Act 2009	Amendment of existing Reclamation Approval issued under Section 91 of the *Harbours Act 1955* (repealed) to extend the relevant period	Amendment Approval issued 13 July 2011 granting extension of the relevant period until 5 October 2021	None
Integrated Planning Act 1997 / Sustainable Planning Act 2009 ***Coastal Protection and Management Act 1995*** ***Fisheries Act 1994***	A number of Development Permits for Operational Works (Tidal Works), Operational Works (Removal, Destruction or Damage to Marine Plants) and Operational Works (Waterway Barrier Works)	A number of approvals issued: • IPDC01748109 • 2006DB0084 • IPCD01239908 • IPCD01273908 • 04S0DB0287 • DA2009/20 • ROK5262 • SPDC00470910 • SPDC00428810 • SPDC00419210 • SPDC00682310	Additional and/or amendments to existing Development Permits for Operational Works (Tidal Works) and Operational Works (Removal, Destruction or Damage to Marine Plants) are likely to be required, including: Operational Works Tidal Works and Marine Plants Disturbance for: • Beales Ck Bridge Stage 2 • Additional stormwater discharge outlet (Stockyard Area B) • Excavation of Rec Area B for new settlement pond • Pyeally Ck overland conveyor culvert extension • Hanson Road Overpass • Marine Structures (jetty upgrade, Berths 2 and 3) • Dredging of Berths 2 and 3 Waterway barrier works: • Beales Ck Bridge extension • Pyeally Ck overland conveyor culvert extension • Additional stormwater discharge outlet (Stockyard Area B)

Applicable legislation	Approval required	Approval status (as at March 2012)	Implications of WEXP1 and WEXP2 proposed project change
Nature Conservation Act 1992	Permit for the taking, using, keeping or interfering with a protected fauna or flora (Sections 88 and 89)	Approval issued in March 2012 for a six month relevant period (Permit No WICL10900912)	None WEXP1 and WEXP2 does not require additional works impacting protected fauna or flora. Extension of the permit validity period and minor amendments to address agency conditions/requirements may be required
	Species Management Plan (SMP)	SMP was approved by the Department of National Parks, Recreation, Sport and Racing (DNPRSR) in November 2011	None WEXP1 and WEXP2 does not require additional works impacting protected fauna or flora
Sustainable Planning Act 2009	Development Permit for Operational Works ((Excavation and Filling) associated with the Stage 1 Bulk Earthworks	Approval issued 6 January 2012 (GRC Reference OPW/171/2011)	Additional Operational Works (Bulk Earthworks) approval required for works that remain within GRC's jurisdiction (Reclamation Area C)
Transport Infrastructure Act 1994	Port Development Approval	-	Port Development Approval is likely to be required to carry out additional Operational Works on Strategic Port Land
Sustainable Planning Regulation 2009 ***State Planning Policy 2/02 – Planning and managing development involve Acid Sulfate Soils***	Development Permit where the works are assessable against a Planning Scheme and where the surface of the land is at or below 5 m AHD or the development involves filling the development site with 1,000 m³ or more of material	Acid Sulfate Soil Management Plan (ASSMP) was approved by DEHP in January 2010	ASSMP to be updated to reflect WEXP1 and WEXP2 and submitted to DEHP for review and approval
Vegetation Management Act 1999 ***Sustainable Planning Act 2009***	Development for Operational Works for the removal of Regional Ecosystems (RE) as defined by the DEHP under the Act	Development Permit obtained in May 2011 (DEHP Reference 2009/011262)	None WEXP1 and WEXP2 does not require additional clearing of protected RE vegetation

5.7 Conclusions

The proposed changed Project will be wholly contained within the Project footprint which includes areas approved under the EIS and areas subsequently approved for WICET Stage 1 and will not impact on any additional State or privately owned land.

WEXP1 and WEXP2 complies with the future development intent of the immediate area and wider Central Queensland region, as well as the relevant statutory land use instruments for this area. All additional State approvals for the Project will be obtained prior to the commencement of works and / or operations.

Construction and operation of WEXP1 and WEXP2 as part of the overall Project will ensure that the economic advantage of the area is enhanced, and will allow the Port of Gladstone to remain a world class port that is able to satisfy the transport demands of the rapidly increasing coal exports market.

Conclusion 1: The proposed changed Project will be wholly contained within the Project footprint approved under the EIS and will not impact on any additional State or privately owned land.

Conclusion 2: WEXP1 and WEXP2 comply with the State and Local Government land use and transport planning Policies, Strategies and Guidelines.

Conclusion 3: WEXP1 and WEXP2 will have minimal impact on adjoining existing and future land uses due to the industrial and port nature of the area.

Conclusion 4: Additional statutory approvals will be required, including a Material Change of Use and various Operational Works (Bulk Earthworks, Tidal Works and the Disturbance of Marine Plants)

6. Transport

6.1 Summary

The changes proposed as part of WEXP1 and WEXP2 may result in a potential increase to impacts on transport in the Gladstone area, primarily due to construction traffic.

Construction traffic as a result of the changed Project is expected to impact on traffic in the wider area for a longer duration than that predicted in the WICT EIS and SEIS. It is important to note that the daily traffic counts/intensity is not expected to be increased as a result the WEXP1 and WEXP2 works. This is due to the programming of the Expansion Phases, ie WEXP1 and WEXP2.

A detailed traffic management plan has been prepared and approved by the Department of Transport and Main Roads for Stage 1 to manage potential impacts. The traffic management plan will be updated for subsequent expansion phases prior to construction of the expansion phases commencing. The construction of the Gladstone-Mt Larcom Road overpass is planned to be accelerated to further manage traffic and reduce risk.

No additional shipping movements or impacts from shipping are expected as part of the proposed changes, as the overall Terminal capacity will remain the same as the approved Project.

There are no changes proposed for the rail infrastructure detailed and approved in the WICET EIS and SEIS.

6.2 Introduction

This chapter provides a description of the potential impacts of the Project changes associated with WEXP1 and WEXP2 on the existing road network, shipping and rail infrastructure. Potential transport impacts associated with the WICET Project were originally outlined in the EIS and SEIS (refer Appendix 1).

This Request for Project Change provides an updated assessment to address changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and EPBC Act controlled action approval (April 2008). Proposed changes to the Project as part of WEXP1 and WEXP2 (previously Stage 2 and Stage 3) are wholly contained within the Project footprint approved under the EIS and areas subsequently approved for WICET Stage 1.

6.3 Description of Existing Infrastructure

6.3.1 Roads

The WICET site is serviced by a high standard road network connecting to the Gladstone urban area and the wider region via the Bruce Highway (north and south) and the Dawson Highway (west). The main connecting roads of Gladstone-Mount Larcom Road and Reid Road are under the control of Department Transport and Main Roads (DTMR) Central District Office and the Gladstone Regional Council (GRC), respectively. The supporting road network comprises GRC roads, namely Calliope River Road, Blain Drive, Don Young Drive and Red Rover Road.

Coordination with the key stakeholders affected by the Project development was conducted during the EIS/SEIS and Stage 1 detailed design to confirm that the current capacity of existing public roads and their future term planning were taken into account in the proposed development staging of the Project.

A Road Impact Assessment was undertaken as part of the EIS process, which identified and assessed the impact of heavy vehicle movements on the road network, with the following principal roads identified for heavy vehicle movements, namely:

- Gladstone-Mount Larcom Road
- Bruce Highway
- Dawson Highway (excluding section Glen Lyon Road to Don Young Drive)
- Port Access Road
- Blain Drive
- Red Rover Road
- Don Young Drive
- Reid Road

With the origin/destination routes identified as:

- Movements to and from south and west (Calliope area) of Gladstone – Bruce Highway, Dawson Highway, Don Young Drive, Red Rover Road, Gladstone-Mount Larcom Road
- Movements to and from north of Gladstone – Bruce Highway, Gladstone- Mount Larcom Road
- Movements to and from Gladstone – Gladstone-Mount Larcom Road, Port Access Road, Blain Drive, Red Rover Road

The extent of the traffic impact is dependent on a number of factors, some within the control of the Project and others external to the Project. Project controlled factors comprise:

- Provision for construction workforce – the impact has been assessed on the basis that the majority of the workers will be housed within the Gladstone urban area and that they will be bussed to the site of work, similar to the system implemented by Comalco Alumina Refinery (CAR) for their recent project implementation. The WICET Traffic Management Plan (TMP) identifies a target of a minimum of two thirds (67%) of the workforce to utilise this service
- Provision for construction materials and general freight movements – the project proponents shall nominate within supply and construction contracts specific routes for the delivery of materials to the site

Gladstone-Mount Larcom Road is a major public road (state controlled) that passes through the Project site. Significant upgrade works are required for Gladstone-Mount Larcom Road during Stage 1, which include:

- Raising and duplicating the existing alignment
- Construction of two bridges to provide through access for overland conveyors
- Providing safe turn-off access into the Terminal and other works to satisfy EIS approval conditions

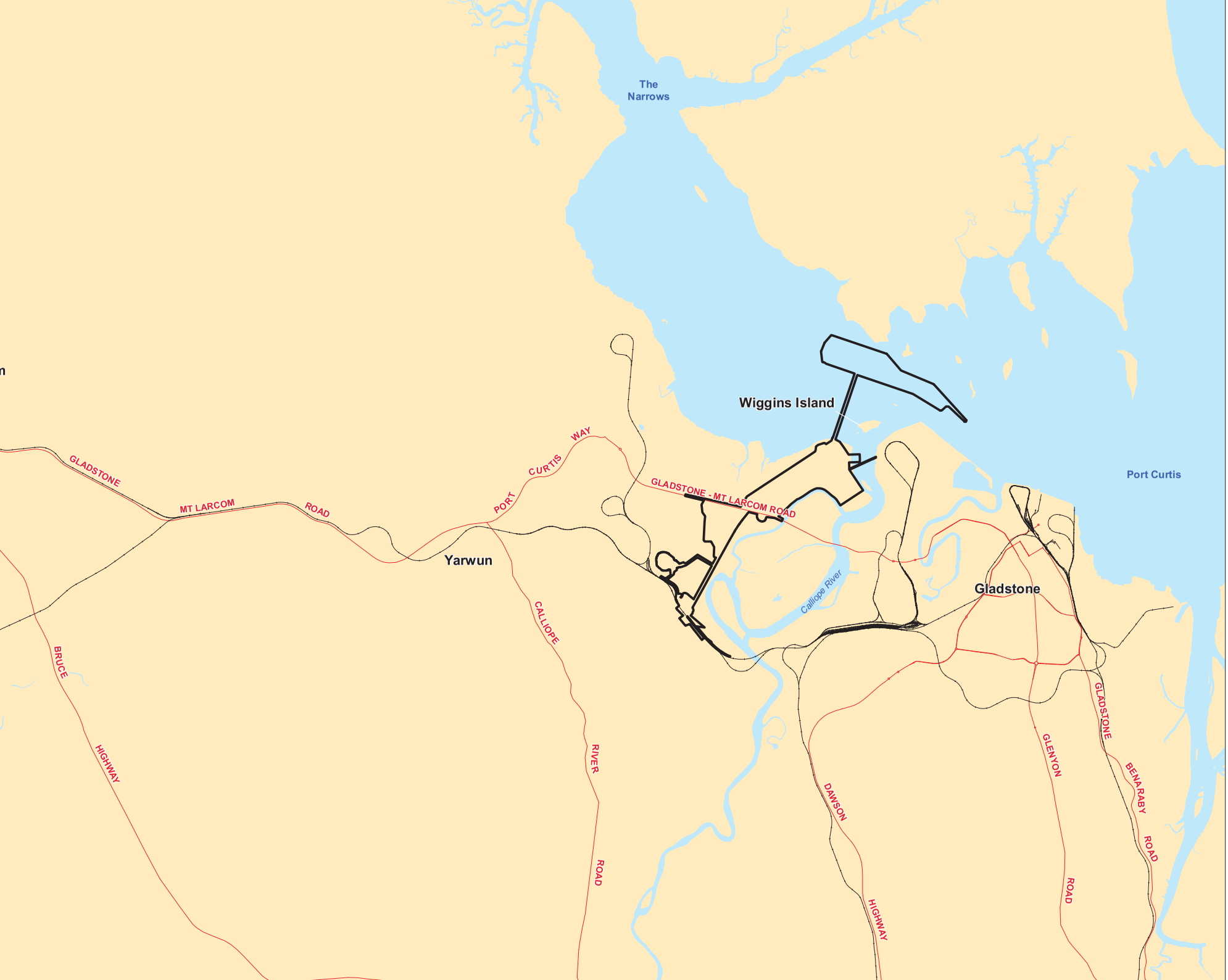
The existing road network in the Gladstone area is shown in Figure 6.1. Further details of the roads expected to be effected by the Project are included in the WICT EIS and SEIS. The road network surrounding the proposed development site and key major links are described in detail in the Supplementary Traffic Report, included in Appendix G2 of the WICT EIS (refer Appendix 1). A Supplementary Traffic Report was also completed and issued as an Addendum to the SEIS.

The construction of the Gladstone-Mt Larcom Road overpass is planned to be accelerated to further manage traffic and reduce risk.

6.3.2 Rail

There are no changes proposed for the rail infrastructure detailed and approved in the WICET EIS and SEIS.

The existing rail network in the vicinity of the WICET Project area comprises three sections. These are described as the North Coast Line, the Moura Line and the Callemondah Rail Yards. The existing rail network in the Gladstone area is shown in Figure 6.1. Further information on the existing rail network can be found in the WICT EIS and SEIS.



Legend

- Project Area
- Cadastre
- Rail
- Major Roads

Source:
Cadastre: DERM, October

Based on or contains da
Queensland (Department
Management) 2011. In
permitting use of this data
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of the data. Data must not
be used in breach of the pri

It should be noted that the WICT EIS (Appendix 1) scope and approvals for the WICET Project included the additional rail infrastructure (ie rail east of Yarwun inclusive of the unloading loop, to supply coal to the Rail Receival Area) with QR National as the party responsible for the delivery and operation of the rail support infrastructure.

WICET / QR National Interface

Given that the coal terminal and rail infrastructure components will utilise the same road network to support their project construction activities, and that they shall be constructed in parallel, the two projects may have a cumulative impact on parts of the road network. The principal road affected by the joint construction activities will be Reid Road, which will be utilised by both projects to access their projects areas south of Gladstone-Mount Larcom Road.

6.3.3 Shipping

No additional shipping movements, or impacts from shipping are expected as part of the changed Project, as the overall Terminal capacity will remain the same as the approved Project.

Details of the existing shipping capacity in 2006 of the Port of Gladstone, as well as the impacts of the growth of trade through the port are described in Section 6.2.3 of the WICET EIS.

6.3.4 Proposed Road Changes

Gladstone-Mount Larcom Road

It is intended that the Gladstone-Mount Larcom Road overpass will be constructed during the early works of WEXP1 (refer Appendix 6.1), in order to minimise the impact of construction traffic and improve traffic safety.

Reid Road

The initial intent was to upgrade the existing gravel section of the road to standard sealed bitumen with an approximate distance of 2.0 km to the proposed dumpstation. This option was replaced with a new road alignment for a low standard sealed road from the existing bitumen surfacing, past the Mt Miller Rail Siding for an approximate distance of 1.4 km. The proposed new road alignment was derived to negate the potential issues with the Gladstone Area Water Board (GAWB) existing raw water mains and future raw water duplication.

GPC and QR National have advised that the service road will have minimal and intermittent traffic and a high standard road is not necessary. Required standards were derived after consultations with GRC and GAWB considering the impacts to existing road and services and their future term planning.

Mandatory conditions for road access to the dump station include:

- Provision of new road alignment with a design speed of 60-80 km/h
- Road standards shall be in accordance with GRC Road and Transport Standard 2005
- Allowance for Mt Miller Raw Water Main Duplication
- Access to the rail loop and dump station from the Reid Road extension was to be an “At Grade” crossing of the NCL. This was changed late in the original Feasibility Study to a grade separated crossing
- GRC advised that the design traffic volume for the intended road upgrade will determine the required design criteria

6.4 Potential Impacts

6.4.1 Previous Impact Assessments

Cardno Eppell Olsen, a specialist traffic consultant, undertook a detailed Road Impact Assessment, for the original WICT EIS, under the DMR Guidelines for the Assessment of Road Impacts of Development Proposals (November 2000). This is included as an Appendix to the WICT EIS. A Supplementary Traffic Report was also completed and issued as an Addendum to the SEIS in September 2007.

6.4.2 Impacts on Local Road Networks

WICET Stage 1 potential impacts to the local road network are outlined in the SEIS including:

- Intersection assessment
- Mid-block link capacity assessment
- State controlled road network
- Council controlled road network
- Pavement impact assessment
- Pedestrian and cycle networks
- Mitigation measures for transport and traffic during construction and operational phases

6.4.3 Site Access

Access to the Terminal is provided during WICET Stage 1 works via a new publicly accessible road connecting Gladstone-Mount Larcom Road to the administration area. This road will be sealed, and is formed on a raised embankment primarily over mud flats. Within the secure Terminal area, a network of internal access roads allows for vehicular traffic through the administration area, jetty and wharf, transfer tower area and around the stockyard. An unsealed road will be provided adjacent to the overland conveyor for maintenance access between the Terminal and the rail receival. An overpass bridge will be provided to allow access from the overland conveyor, over Reid Road and the NCL railway and into the rail receival.

It is intended that during WEXP1 and WEXP2 the site access for WICET Stage 1 will continue to be used for site access, and the new Gladstone-Mt Larcom Road overpass be dedicated to haulage of bulk fill material as a safety measure.

The WICET TMP (refer Appendix 6.2) includes further details on site access. Section 4 of the TMP also includes specific impacts that Stage 1 works are expected to have on the wider road network, along with proposed mitigation measures.

6.4.4 Rail

There has been no change in predicted impacts on the rail network as a result of the Project, from those assessed in the WICT EIS and SEIS (refer Appendix 1).

6.4.5 Shipping

No additional shipping movements, or impacts from shipping are expected as part of the changed Project, as the overall Terminal capacity will remain the same as the approved Project.

6.4.6 Construction Impacts

WEXP1 works involve the development of a stockyard facility on Reclamation Area B (Stockyard Area B). It is intended that Reclamation Area B will be used as a dredge spoil deposition area for both the Stage 1 and WEXP1 dredging campaigns. The combination of existing foundation conditions and proposed dredge spoil deposition means that a significant

ground improvement and earthworks programme has been proposed for Reclamation Area B as part of WEXP1 works.

A significant volume of imported fill is required to complete WEXP1 earthworks. An increase in earthworks, as well as construction traffic in general, is expected to have an impact on traffic in the wider area. According to the current earthworks schedule for the WEXP1 stockyard area, supply and placement of bulk fill will start in July 2013 and run for a duration of approximately 13 months.

WEXP2 works involve the development of a stacker-reclaimer yard on the eastern half of Golding Point in lieu of the approved bridge stacker/dozer reclaim yard in this area, with the Stage 1 bridge stacker with dozer reclaimer remaining on the western half of Golding Point.

Construction traffic is expected to impact on traffic in the wider area for a longer duration than that predicted in the WICT EIS and SEIS (refer Appendix 1). Daily traffic counts/intensity is not expected to increase as a result of the WEXP1/2 works due to a proposed staged works programme (excluding bulk fill importation).

A traffic management study will be undertaken in consultation with DTMR and GPC to assess potential impacts and management measures.

Other potential traffic impacts as a result of construction and hauling of materials are outlined in the SEIS. This includes potential impacts on road users, along with general impacts on road safety.

The general waste contractor will either transport general waste to the Gladstone transfer station or directly to the Benaraby landfill, or in line with the WICET Waste Management Plan (refer Appendix 23). The small increase in waste from expansion operations is expected to have negligible impact on traffic in the area due to the transporting of waste.

6.4.7 Mitigation

The WICET Project has the potential to impact upon a number of State and Council Controlled Roads during the construction and operational phases of the development as detailed fully within the Supplementary Traffic Report. WICET has entered into an Infrastructure Agreement with the relevant road authorities to address impacts identified by the WICT EIS and SEIS (refer Appendix 1). The WICET TMP has also been developed by WICET to address the potential impacts that WICET Stage 1 construction and operation will have on the traffic of the Gladstone area. This TMP was approved by the DTMR in April 2011. The TMP will be updated for subsequent expansion phases.

6.5 Conclusion

The Project is expected to have some impact on the local traffic for the surrounding road network. As identified in the WICT EIS this includes:

- Increased construction vehicle traffic on surrounding road networks
- Disruption, general safety and access issues, including temporary and permanent road closures during construction
- Potential need for increased road maintenance, due to increased traffic over time

Overall it is expected that traffic in the Gladstone area will be affected for a longer time period (of that predicted in the WICT EIS and SEIS), given the staged construction schedule of Stage 1, WEXP1 and WEXP2. It is important to note that the daily traffic counts/intensity is not expected to be increased as a result the WEXP1 and WEXP2 works. This is due to the programming of the Expansion Phases, ie WEXP1 and WEXP2.

The construction of the Gladstone-Mt Larcom Road overpass is planned to be accelerated to further manage traffic and reduce risk.

Since the EIS was approved, all rail infrastructure works associated with the WICET Project development are now classified as a separate project (ie Wiggins Island Rail Loops Project) and the responsibility of QR National.

A TMP has also been developed by WICET to address the potential impacts that Project construction and operation will have on the traffic of the Gladstone area. This was approved by DTMR in April 2011.

Conclusion 1: No additional shipping movements, or impacts from shipping are expected as the overall Terminal capacity will remain the same as the approved Project.

Conclusion 2: It is intended that the Gladstone-Mount Larcom Road overpass will be constructed during the early works of WEXP1.

Conclusion 3: Construction traffic is expected to impact on traffic in the wider area for a longer duration than that predicted in the WICT EIS and SEIS.

Conclusion 4: A detailed traffic management plan has been prepared and approved by the Department of Transport and Main Roads for Stage 1. The traffic management plan will be updated for subsequent expansion phases.

7. Climate, climate change and sustainability

7.1 Summary

The proposed Project changes associated with WEXP1 and WEXP2 represents a reduction in impact on climate and climate change from the approved Project.

The changes as part of WEXP1 and WEXP2 result in an estimated reduction in diesel consumption of 3.67 ML per year, and a corresponding reduction in CO_2 emissions of 14.68 kt CO_2-e per year, from the Approved Project. Sustainability elements were factored into the WEXP1 and WEXP2 design, and have been developed to ensure that the Project continues to adopt sustainability measures across the construction and operation of the Project.

Reporting under the NGER Act is now required for energy consumption during the construction phase and GHG emissions of the operational phase of the Project. The Project may also be subject to the Carbon Price Mechanism and may therefore be financially liable for each tonne of CO_2-e emitted.

7.2 Introduction

This chapter provides an update of the existing climatic conditions within the Gladstone region, using Bureau of Meteorology (BoM) data. Potential impacts to the existing climate were originally outlined in the WICT EIS and SEIS (refer Appendix 1). However, it should be noted that since then, climate change and sustainability assessments are becoming a common requirement to include in Terms of Reference for EISs. This chapter provides an updated assessment of the existing climate, including identifying the potential risks to the Project as a result of climate change, and a sustainability assessment of the Project, where opportunities to incorporate sustainability measures into the Project are considered.

The potential climate change risks to the Project are discussed in this chapter and a Project climate change risk assessment was undertaken. Data was drawn from the BoM, the Intergovernmental Panel on Climate Change (IPCC), the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Queensland Office of Climate Change (QOCC) to determine the potential climate change impacts that may occur within the Gladstone region. The chapter also provides a summary of the sustainability elements that have been incorporated into the changed Project design and the sustainability measures that may be considered for implementation during construction and operation by the Construction Contractor and the Operator of the changed Project.

This Request for Project Change provides an updated assessment to address changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and EPBC Act controlled action approval (April 2008). Proposed changes to the Project as part of WEXP1 and WEXP2 (previously Stage 2 and Stage 3) are wholly contained within the Project footprint approved under the EIS and areas subsequently approved for WICET Stage 1

7.3 Climatic conditions

7.3.1 Meteorological data

Updated climate data for Gladstone has been sourced from the BoM from two monitoring sites shown (refer Table 1 in Appendix 7.1). The Gladstone Airport site has been in operation the shortest time but is only 4 km south of the Project and is closer in elevation. This site has been used for temperature, relative humidity and wind and speed direction. The Radar Hill site is located 6 km east of the Project and has been operational since 1957. Rainfall data has been obtained from this site. The Gladstone Post Office site was in operation from 1872 – 1958, and has not been used in this Change Request.

7.3.2 Rainfall

The average monthly rainfall over the period from December 1957 to June 2011 (refer Table 2 in Appendix 7.1). The mean annual rainfall at the Radar Hill site is approximately 887 mm/year with the highest maximum annual rainfall of 1,731.6 mm occurring in 1971 and the lowest minimum annual rainfall occurring in 1965, with 432.5 mm. Gladstone has a sub-tropical climate with a wet season that occurs during the summer months and a dry season during winter. The months of December, January and February account for 47.6% of the mean annual rainfall while June, July and August account for only 11.7% (refer Figure 1 in Appendix 7.1).

7.3.3 Temperature

From 1993 to 2011, the mean annual maximum and minimum temperatures were 27°C and 18.1°C, respectively. The highest mean maximum temperature at Gladstone Airport occurred in January (30.7°C), while the lowest mean minimum temperature occurred in July (13.4°C) (refer Figure 2 in Appendix 7.1). The highest recorded maximum temperature occurred in March 2007 with 42.0°C and the lowest recorded minimum temperature occurred in July 1960 with 4.4°C.

Diurnal variation in air temperature recorded between 1993 and 2011 at the Gladstone Airport was the greatest in winter with the mean maximum and minimum temperatures varying from 23.3°C to 12.6°C, a difference of 10.7°C. During summer, the temperatures ranged from 30.4°C to 22.7°C, a difference of 7.7°C (refer Table 3 in Appendix 7.1).

7.3.4 Wind

Wind speed and direction is generally measured 10 m above the ground and averaged over 10 minutes prior to the time of observation. Observations of wind speed and direction are taken at 9 am and 3 pm and these are averaged over each month. Monthly mean wind speeds at 9 am and 3 pm are indicates that wind speed varies with the month and the time of day (refer Figure 3 in Appendix 7.1). Wind speed is lower during winter than summer and is also lower in the morning hours (9 am) compared with the afternoon (3 pm). The mean wind speeds experienced at Gladstone range from 12.1 to 17 km/h at 9 am and 16.8 to 24.1 km/h at 3 pm.

The mean annual wind roses for 9 am and 3 pm for the Gladstone Airport between 1993 and 2010 have been recorded (refer Figures 4 and 5, respectively in Appendix 7.1) (BoM 2011). The temporal dependence of the wind speed and direction is clear in these figures. At 9 am, wind speeds between 20 and 30 km/h were recorded mainly from a south-easterly direction while at 3 pm, wind speeds between 20 and 30 km/h were recorded from a north-easterly direction and speeds between 30 and 40 km/h were recorded from an easterly direction. These winds tend to be coastal winds, as the Port of Gladstone is located east of the Gladstone Airport.

7.3.5 Relative Humidity

Relative humidity indicates the moisture content in the air and is presented as a percentage of the saturated moisture content. At saturation, the relative humidity would be 100%. Monthly mean relative humidity at 9 am and 3 pm at the Gladstone Airport from 1993 to 2011 have been reported (refer Figure 6 in Appendix 7.1). While there is little variation in the mean 9 am relative humidity, the mean 3 pm relative humidity was lower in the colder months, denoting drier afternoons in winter compared with summer.

7.3.6 Extreme Events

Tropical Cyclones

An average of two to four cyclones affect Gladstone every 10 years, based on 36 years of data from 1969 to 2005 (BoM 2010). BoM identified five tropical cyclones that passed within

100 km of Gladstone between 1956 and 2006 (refer Figure 7 in Appendix 7.1). Omitted from this is Tropical Cyclone Hamish, which passed near the Gladstone coastline in March 2009. While not crossing the coast, Tropical Cyclone Hamish closed down the Port of Gladstone temporarily due to severe weather conditions (GPC 2009).

Floods

The Project is situated beside the Calliope River, which is subject to flood events, usually resulting from tropical cyclones or associated rain depressions (Connell Hatch 2006). Further information relating to the flood history of the Calliope River can be found in Chapter 8 (Hydrology and Hydraulics).

Droughts

The Gladstone region experienced long-term droughts during the years:

- 1964 – 1967
- 1969 – 1970
- 1984 – 1985
- 1993 – 1995
- 1997 – 2003
- 2007 – 2010

Due to the drought between 1997 and 2003, water restrictions were implemented in Gladstone in 2002. In January 2007, the northern part of the Gladstone Regional Council (north of the Calliope River) became 'drought declared' by the Queensland Government (DERM 2011). The region remained 'drought declared' or 'partly drought declared' until April 2010.

Thunderstorms

BoM, for Connell Hatch (2006), reports the following frequencies of thunderstorms in the Gladstone region (based on data available up to 1999):

- 15 days of thunderstorms per year (based on 10 years of data from 1990 to 1999)
- One ground strike of lightning per square kilometre per year (based on approximately five years of data)

7.4 Climate Change

Since the development and approval of the EIS and the SEIS in 2006 and 2008, respectively, the Queensland Government now requires a more detailed consideration of climate change and sustainability issues in relation to their assessments of major projects. Often, as part of a Terms of Reference for an EIS, a climate change risk and sustainability assessment is required. This preliminary climate change assessment is based on the latest iteration of the Project and therefore considers all activities up to the approved 84 Mtpa output of the Project, including WICET Stage 1, WEXP1 and WEXP2.

A range of legislative and policy instruments addressing climate change are relevant to the Project (refer Appendix 7.2). A review of the potential impacts of climate change on the Project, including a description of the vulnerability of the Project to seasonable conditions, extremes of climate and natural hazards and a preliminary climate change risk assessment has been outlined in this section.

7.4.1 Climate change in Central Queensland

Climate change is a well-recognised trend occurring on a global scale, with specific trends in certain regions, which has been recognised by the IPCC in its Fourth Assessment Report (AR4). In the report, *ClimateQ: toward a greener Queensland* (QOCC 2008a), the average

annual temperature in Central Queensland has increased 0.5°C over the last decade (from 21.6°C to 22.1°C). Projections indicate an increase of up to 4.5°C by 2070, leading to annual temperatures well beyond those experienced over the last 50 years. A summary of climate projections for Central Queensland as presented in the report *Climate Change in Queensland – what the science is telling us* (DERM 2010), based on information provided by CSIRO & BoM (2007), is detailed in Table 7.1.

Annual and seasonal average rainfall is strongly influenced by natural variability, local factors such as topography and vegetation, and broader scale weather patterns, for example El Nino-Southern Oscillation (ENSO) events (QOCC 2008a). The dominant summer rainfall pattern between 1961 and 1990 was around 300 mm, compared to an autumn average of around 170 mm. Summer average rainfall has declined by 14%, however, there has been a fairly consistent decrease since the 1970s with only eight summers in this period above the 1961-1990 average (QOCC 2008a).

Projected southward shifts in the primary regions of cyclone development through the coming century (QOCC 2008a; Abbs *et al* 2006) could result in a greater cyclone impact in the Central Queensland region. With projected increases in future cyclones and projected rise in mean sea levels (CSIRO & BoM 2007), storm surges are likely further inland, increasing the risk to coastal infrastructure. The 1-in-100-year storm tide event is projected to increase by 51 cm in Gladstone if certain conditions eventuate. These conditions include a 30 cm sea-level rise, a 10% increase in cyclone intensity and frequency, as well as a 130 km shift southwards in cyclone tracks (Hardy *et al* 2004; QOCC 2008a).

Table 7.1 Summary of climate change projections for Central Queensland

Temperature			Rainfall			Evaporation		
Baseline mean (°C)	2050		Baseline mean (mm)	2050		Baseline mean (mm)	2050	
	Low (°C)	High (°C)		Low (%)	High (%)		Low (%)	High (%)
21.6	+1.2	+2.0	692	-4	-7	1997	+4	+7

- More regular bleaching and mortality of corals of the Great Barrier Reef due to increased temperature
- Increased acidification of sea water and resultant decrease in coral growth and coral reef maintenance
- Increased spread of disease (eg malaria, dengue) due to more favourable conditions for vectors
- Increased pressure on water supplies
- Increased heat-related illness
- Increased risk and intensity of bushfires

7.4.2 Climate change in Gladstone

The GRC's Local Disaster Management Plan (LDMP) details the potential hazards within the area. These include:

- Severe storms – the risk is confined to the summer months, with effects usually being localised with torrential rain to wind and/or causing structural/impact damage (GRC 2010)
- Floods – caused by continual rain and/or storm surge
- Earthquake – a 10% chance in 100 years of the Gladstone/Calliope area experiencing an earthquake exceeding velocity of 90 mm per second (GRC 2010). An earthquake of this magnitude is predicted to result in large scale property damage and some loss of life (GRC 2010)
- Cyclone – the risk of cyclone is generally considered to occur during summer months, predominantly between November and March and within 50 km from the coast (GRC 2010)

The impacts of these potential hazards are likely to intensify as a result of climate change effects. Sea level rise and storm surges are considered to be the most significant of potential risks to the Project as a result of climate change.

7.4.3 Project climate change adaptation strategy

Responding to climate change involves mitigation to address the cause and adaptation through planned responses to the changes. The Strategy aims to reduce GHG emissions and to implement mitigation measures and adaptation actions. The preliminary climate change risk assessment of the Project was undertaken to identify key risks to the Project and achieve the Strategy aims.

Based on the climate change predictions and projections detailed in Section 7.4.1 of this request, the key climate change risks to the Project were identified to arise from:

- The effect of increased extreme heat days on construction and operational workers
- Inundation of critical infrastructure due to more intense storm systems, such as cyclones and intense rainfall events
- Impacts to soil stability causing erosion and slips as a result of increasing rainfall intensity
- The speed and direction of winds, affecting the level of wind-blown dust impacts of sea level rise and storm surges on critical infrastructure

A number of smaller risks were also considered during the risk assessment process.

Climate change risk assessment methodology

The climate change risk assessment process examines the potential hazards associated with the detailed design, construction and operation of the Project, and assesses the likelihood and consequences of risks associated with each potential climate change hazard (refer Appendix 7.2).

Design components, mitigation and adaptation strategies

The climate change risk assessment in (refer Table 4 of Appendix 7.2) has identified potential mitigation and adaptation options to be adopted to reduce the level of risk identified for each potential environmental impact.

The following design components were identified and incorporated into the climate change risk assessment process:

- Relevant Australian Standards were incorporated into the design of the Project infrastructure
- The Project infrastructure has been designed with an allowance for a temperature range either side of the mean temperature experienced at the Project site (eg 23°C below and +44°C above the mean temperature)
- Opportunities for energy efficiency measures have been incorporated into the design, for example lighting, motors, variable speed drivers, low glare lights, shielding of lights, low noise sirens and minimisation of use of devices across the site, wherever possible
- The Project has been designed taking into account relevant criteria to address the potential impact of sea level rise on Project infrastructure

Many of the mitigation and adaptation measures identified during the climate change risk assessment (refer Table 4 of Appendix 7.2) have already been incorporated into the design of the Project, or will be able to be implemented through the EMP (refer Chapter 23).

7.5 Greenhouse Gas Emissions Assessment

A greenhouse gas (GHG) emissions assessment has been completed to provide a preliminary quantitative and qualitative investigation of potential GHG emissions associated with the Project.

7.5.1 Description of existing environment

The latest overview of GHG emissions estimates for Australia was published by the Department of Climate Change and Energy Efficiency (DCCEE) in April 2011 for the financial year ending June 2009. Estimates for Australia, Queensland and for the sectors relevant to this Project for the 2009 financial year are provided in Table 7.2.

Table 7.2 Total greenhouse gas emissions for Australia and Queensland

	Australia	Queensland	
	Emissions (Mt)	Emissions (Mt)	% Contribution to national emissions
Total Net Emissions[1]	564.5	155.1	27.5
Manufacturing and Construction	44.5	11.2	25.2

[1]including emissions from land use, land use changes and forestry activities
Source DCCEE 2011a

This data provides a general indication of the GHG emissions reported for the manufacturing and construction industry (which is what this Project is considered to represent) within Queensland. It was not possible to generate data for Central Queensland, where the Project is proposed to be located.

7.5.2 Project review against the *National Greenhouse and Energy Reporting Act 2007*

It is considered that the Project is likely to meet one of the thresholds specified in the *National Greenhouse and Energy Reporting Act 2007* (NGER Act), during construction and operation (Refer Table 1 of Appendix 7.3). The GHG and energy thresholds which trigger the requirement for registration and reporting obligations by corporations are shown in Table 7.3 below. However, registration is mandatory for corporations with facilities under their operational control which exceed any of the values in Table 7.4 below.

The GHG emissions and total energy consumed by the Project during construction and operation has been calculated as per the methods detailed in the *National Greenhouse Accounts Factors (NGA)* workbook (DCCEE 2011b) and the *National Greenhouse and Energy Reporting (Measurement) Determination 2011* (the Determination). Specific data for the Project was collected on GHG emissions from combustion of fuel, energy production and energy consumption (refer Appendix 7.3).

Table 7.3 Whole of Corporation Greenhouse gas and energy thresholds

Year Beginning	GHG Emissions (kt)	Energy Produced (TJ)	Energy Consumed (TJ)
1 July 2008	125	500	500
1 July 2009	87.5	350	350
Subsequent years	50	200	200

Table 7.4 Facility greenhouse gas emissions and thresholds

GHG Emissions	Energy Produced	Energy Consumed
25 kt	100 TJ	100 TJ

Identification of GHG sources

Sources of GHG emissions that have been identified for the Project are:

- Scope 1 (direct emissions): Diesel fuel consumption of on-site machinery (bulldozers, heavy vehicles, light vehicles), fugitive emissions (CH_4 emissions from post mining activities) (NB: refers to fugitive emissions from exposed coal in the coal stockpiles at the Terminal)
- Scope 2 (indirect emissions): Stationary combustion (consumption of purchased electricity)

The NGA factors workbook provides a method of calculation of GHG emissions from coal mines, however, this is focused on the fugitive emissions associated with the coal extraction at the mine itself and it is unclear from this document whether fugitive emissions apply to a coal terminal facility. It is also unclear where the coal to be temporarily stored and handled at the coal terminal facility has been sourced from, and the portion, if any, is associated with gassy underground mines. DCCEE should be contacted to determine if fugitive emissions need to be reported. However, to determine a worst case emissions estimate, fugitive emissions from post mining activities have been estimated.

Estimation of GHG emissions

Estimated GHG emissions are summarised for Stage 1, WEXP1 and WEXP2 in Table 7.5. Estimates for the Ultimate Facility (84 Mtpa) with the changed components compared with the Ultimate Facility as per the SEIS have been provided in Table 7.6. A number of assumptions have been made for the Project to estimate GHG emissions (refer Table Notes below).

Table 7.5 Estimate of GHG emissions for Stage 1, WEXP1 and WEXP2 independently

Emission Source	Annual Activity Level[1]			Emissions Factor (CO_2-e per unit of activity)	Emissions (kt CO_2-e)		
	Stage 1[6]	WEXP1	WEXP2		Stage 1	WEXP1	WEXP2
Construction							
Diesel consumption	-	4 ML	3.6 ML	69.9 kg/GJ[2]	-	10.7926	9.7133
Electricity consumption	-	800 kWh	800 kWh	0.88 kg/kWh[3]	-	0.0007	0.0007
Construction Total					-	**10.7933**	**9.714**
Operation							
Diesel consumption	1.4 ML	0.083 ML	0.05 ML	69.9 kg/GJ[2]	3.7774	0.2239	0.1349
Electricity consumption	15,230 kWh	20,095 kWh	20,620 kWh	0.88 kg/kWh[3]	0.0134	0.0177	0.0181
Fugitive methane[5]	1.7 Mt	2 Mt	1.8 Mt	0.014 tonnes CO_2-e/ tonnes coal[4]	23.8	28	25.2
Operation Total					**27.59**	**28.24**	**25.35**

Table Notes: **1** The activity level refers to the quantity of consumption on an annual basis.
2 The emission factor for diesel consumption includes an oxidation factor and allows for CO_2 and non-CO_2 gases. The energy content of the diesel considered is 38.6 GJ/kL.
3 The emission factor for electricity consumption is based on Scope 2 emissions only and allows CO_2 and non-CO_2 gases.
4 Since the source of coal is unknown, the emissions factor for fugitive emissions is based on gassy underground mines to provide a worst case scenario.
5 The estimation of fugitive methane has assumed that the Terminal will be running at full capacity. The emission factor for methane calculates the quantity of methane released as a post mining activity for each tonne of raw coal.
6 Annual activity levels for Stage 1 are only available for the operational phase of the Project.

Table 7.6 Comparison of GHG emissions estimates of the changed Ultimate Facility against the Ultimate Facility as described in the SEIS

Operation Emission Source	Annual Activity Level[1]		Emissions Factor (CO_2-e per unit of activity)	Emissions (kt CO_2-e)	
	Ultimate Facility (Stage 1 + WEXP1 + WEXP2)	Ultimate Facility (as per SEIS)		Ultimate Facility (Stage 1 + WEXP1 + WEXP2)	Ultimate Facility (as per SEIS)
Diesel consumption	1.53 ML	5.2 ML	69.9 kg/GJ[2]	4.14	14.03
Electricity consumption	55,945 kWh	5,500,000 kWh[5]	0.88 kg/kWh[3]	0.049	4.84
Total[4]				**4.19**	**18.87**

Table Notes: **1** The activity level refers to the quantity of consumption on an annual basis.
2 The emission factor for diesel consumption includes an oxidation factor and allows for CO_2 and non-CO_2 gases. The energy content of the diesel considered is 38.6 GJ/kL.
3 The emission factor for electricity consumption is based on Scope 2 emissions only and allows CO_2 and non-CO_2 gases.
4 The storage capacity of the ultimate facility as per the SEIS is not available. As such, fugitive methane emissions have not been calculated.
5 Electricity consumption of the ultimate facility as per the SEIS includes the rail infrastructure, which is now being managed by QR National.

Estimation of energy consumption

In addition to reporting of GHG emissions, the NGER Act requires reporting of energy consumption. Energy consumption for the Project includes the consumption of diesel and the consumption of electricity. The quantity of energy consumption is summarised in Table 7.6 for Stage 1, WEXP1 and WEXP2. The quantity of energy consumption of for the Ultimate Facility (84 Mtpa) with the changed components compared with Ultimate Facility as per the SEIS has been provided in Table 7.8. The Project will not produce energy (refer Appendix 7.3).

Table 7.7 Estimate of annual energy consumption for Stage 1, WEXP1 and WEXP2 independently

Emission Source	Annual Energy Consumption[2]			Annual Energy Consumption (TJ)		
	Stage 1[3]	WEXP1	WEXP2	Stage 1	WEXP1	WEXP2
Construction						
Diesel[1]	-	4 ML	3.6 ML	-	154.4	138.96
Electricity	-	800 kWh	800 kWh	-	0.0029	0.0029
Construction Total				**-**	**154.40**	**138.96**
Operation						
Diesel[1]	1.4 ML	0.083 ML	0.05 ML	54.04	3.2	1.93
Electricity	15,230 kWh	20,095 kWh	20,620 kWh	0.0548	0.07	0.07
Operation Total				**54.09**	**3.28**	**2.00**

Table Notes
1 The energy content of the diesel considered is 38.6 GJ/kL.
2 Assumes the data supplied is for diesel and electricity consumption on an annual basis for Stage 1, WEXP1 and WEXP2.
3 Annual activity levels for Stage 1 are only available for the operational phase of the Project.

Table 7.8 Estimate of annual energy consumption of the changed Ultimate Facility against the Ultimate Facility as described in the SEIS

Operation Emission Source	Annual Energy Consumption[2]		Annual Energy Consumption (TJ)	
	Ultimate Facility (Stage 1 + WEXP1 + WEXP2)	Ultimate Facility (as per SEIS)	Ultimate Facility (Stage 1 + WEXP1 + WEXP2)	Ultimate Facility (as per SEIS)
Diesel[1]	1.53 ML	5.2 ML	59.17	200.72
Electricity	55,945 kWh	5,500,000 kWh[3]	0.2014	19.80
Operation Total			**59.38**	**220.52**

Table Notes
1 The energy content of the diesel considered is 38.6 GJ/kL.
2 Assumes the data supplied is for diesel and electricity consumption on an annual basis for Stage 1, WEXP1 and WEXP2.
3 Electricity consumption of the ultimate facility as per the SEIS includes the rail infrastructure, which is now being managed by QR National.

7.5.3 Recommendations regarding registration and reporting requirements

The calculation results for GHG emissions summarised in Table 7.5 indicate the following:

- During construction of WEXP1, diesel and electricity consumption is approximately 10.79 kt CO_2-e, which does not exceed the 25 kt threshold for a facility
- During construction of WEXP2, diesel and electricity consumption is approximately 9.71 kt CO_2-e, which does not exceed the 25 kt threshold for a facility
- During the operation of Stage 1, diesel and electricity consumption and fugitive methane emissions was calculated to be approximately 27.59 kt CO_2-e, which exceeds the 25 kt threshold for a facility
- During the operation of WEXP1, diesel and electricity consumption and fugitive methane emissions was calculated to be approximately 28.24 kt CO_2-e, which exceeds the 25 kt threshold for a facility
- During the operation of WEXP2, diesel and electricity consumption and fugitive methane emissions were calculated to be approximately 25.35 kt CO_2-e, which exceeds the 25 kt threshold for a facility

Therefore, reporting under the NGER Act is required for the GHG emissions of the operational phase of the Project as the Project will exceed the 25 kt threshold for a facility. Table 7.6 indicates that GHG emissions from the operation of the changed Project will be significantly less than the emissions from the operation of the Ultimate Facility as described in the SEIS.

The calculation results for energy consumption summarised in Table 7.7 indicate the following:

- The WEXP1 and WEXP2 changes result in an estimated reduction of diesel consumption of 3.67 ML per year for the Ultimate Facility
- As a result of the WEXP1 and WEXP2 changes, estimated emissions of CO_2 from electricity and diesel consumption have reduced by 14.68 kt CO2-e annually for the Ultimate Facility
- Annual energy consumption for diesel and electricity during construction of WEXP1 and WEXP2 is 154.4 TJ, and 138.96 TJ respectively, both of which exceed the 100 TJ threshold for a facility
- Annual energy consumption for diesel and electricity during operation of Stage 1, WEXP1 and WEXP2 is approximately 54.09 TJ, 3.28 TJ and 2.00 TJ respectively. However, this does not exceed the 100 TJ consumption threshold

Reporting under the NGER Act is required for the energy consumption of the construction phases of the Project, as each phase will exceed the 100 TJ consumption threshold. Table 7.8 indicates that the annual energy consumption from the operation of the changed Project will be significantly less than that of the Ultimate Facility described in the SEIS. This difference is from a lower estimated consumption of diesel during the changed Project operation when compared to that predicted in the SEIS.

Clean Energy Bill 2011

The *Clean Energy Bill 2011* was passed by the House of Representatives on 12 October 2011 along with 17 other bills which make up the legislative framework for the 'Clean Energy Future Plan'. The Bill was then passed by the Senate on 8 November 2011 and is expected to be implemented in July 2012 introducing a 'Carbon Price Mechanism' (CPM) which is proposed to consist of two stages (Mondaq 2011):

i) A fixed price on carbon for an initial period (first three years of implementation)
ii) A flexible price period governed by a price cap and trading system (proposed from the 1 July 2015)

The GHG emissions data presented in this section suggests that the Project may be subject to the CPM and may therefore be financially liable for each tonne of CO_2-e emitted.

7.5.4 Mitigation measures addressing GHG emissions

Construction

GHG emissions from the construction of the Project will be minimised through:

- Maintaining construction equipment in good working order so fuel efficiency of equipment is maximised
- Fuel saving initiatives on site such as implementing efficient driving practices has the potential to reduce GHG emissions
- The potential to switch to the use of bio-fuels for the onsite machinery should be investigated to reduce GHG emissions
- Improve energy efficiency with intelligent light approaches, light dimmers, light spacing, solar lighting and directional lighting

Operation

Aspects of the Project design which reduce energy demand and reduce GHG emissions include:

- A range of energy efficiency measures adopted across all stages of the Project such as:
  - The design team has considered all forthcoming ideas to achieve effective and efficient use of resources
  - Identifying the most appropriate energy type and/or source for the application
  - Implement systems to drive effective and efficient use of resources whilst providing a means to measure, monitor and benchmark for continuous improvement. Such systems will also assist resource management to achieve effective waste minimisation
  - Addressing plant energy efficiency level to meet the intent of the *Energy Efficiency Opportunities Act 2006* (EEO Act)
  - Measuring and monitoring systems and processes that capture energy usage at the equipment level and achieve an accuracy level of ±5% (EEO Act requirement)
  - Energy and materials balance models to an accuracy level of ±5% (to support achieving EEO Act requirement)
  - If appropriate, use construction materials that have lower environmental impacts than other materials, where such options exist and are feasible
  - Select and use water at quality levels most suitable for the application and reduce, reuse and recycle water wherever practical
- An Energy and Water Use Management Plan will be developed for the construction, operational and decommissioning phases of the Project
- Adopt a commitment across the Project to minimise electricity and water use
- Coal terminal lighting design to minimise visual impact on adjacent sensitive receptors (eg directional lighting, low pressure sodium bulbs, shrouding etc)
- Lighting design to limit the escape of light from the facility, minimising the visual impact on adjoining habitats
- Intelligent control of lighting to minimise the effects of light pollution in areas with no operational activity

These measures will be incorporated into the Project through the EMPs and relevant design documentation.

7.6 Sustainability

This section provides an overview of how the Project to date has addressed sustainability and how sustainability considerations would be incorporated into construction and operational phases of the Project. A review of the relevant sustainability policy and legislation and its applicability to the Project has been provided (refer Appendix 7.4).

7.6.1 Sustainability tool development

A preliminary sustainability tool has been developed for the Project, which has enabled a sustainability review of the Project to be undertaken. The tool aims to track the progress of the proposed sustainability measures throughout the Project. A number of indicators have been developed based on the three themes of environmental, social and economic. The sustainability tool identifies implementation actions, project phase, implementation ownership and further actions required (refer Figure 1 of Appendix 7.4).

The sustainability tool was developed as a result of the sustainability workshop that was held during the WEXP1 and WEXP2 design process. The workshop process involved identifying those design elements which contribute to, or have the potential to contribute to, the achievement of the sustainability goals and objectives. Measures were identified as “already incorporated into the design of the Project”, “ongoing” and “for future consideration”.

7.6.2 Sustainability outcomes for the Project

Sustainability elements factored into the Project design

Sustainability elements factored into the design have been developed to ensure that the Project continues to adopt sustainability measures across the construction and operation of the Project. This section lists the actions which have been committed to in the design process and those actions which require further investigation at a later stage of project delivery.

Agreed actions

Sustainability measures which will be addressed in the design include:

- Measures to reduce energy demand and minimise energy consumption
  - Monitoring site energy use across the life of the Project by undertaking an energy report across the site for WEXP1 and WEXP2
  - Investigation of energy efficiency measures in temporary site offices during construction and permanent office buildings during operation, including opportunities to utilise energy saving technologies such as energy saving lighting and air conditioning
  - Implementation of energy efficiency measures during construction phase activities
- Measures to ensure water reduction and efficiency is maximised throughout the Project, by minimising use of potable water during construction and operational phases, and protecting the quality of existing resources through:
  - Assessing the potential for treated stormwater to wet down stockpiles on site, particularly during extreme weather events or on windy days
  - Adoption of groundwater and surface water quality mitigation measures as detailed in the EIS/SEIS and Project-specific EMPs
  - Investigation of potential water efficiency measures and review all designs in order to incorporate these measures
- Measures that protect existing and proposed Project assets from the risk of sea level rise and storm tide inundation through:
  - Designing the Project to take account for the risk of sea level rise and storm tide inundation, including climate change allowance
  - All Project infrastructure to meet the 0.8 m 2100 sea level rise scenario
- Measures that promote the use of sustainably sourced materials and minimise the use of materials required for the design through:
  - The use of supply contracts to source materials as close as possible to the Project area
  - Pre-fabricate segments used for the Project, wherever possible
  - Re-use of dredged material onsite
- Actions that promote effective waste management beyond regulatory compliance (EPP(Waste)) by applying the principles of the waste management hierarchy by:

  - Identifying the waste streams applicable to the Project and developing a waste management plan which complies with the waste management hierarchy
- Actions that allow for infrastructure upgrades which are beneficial for wider community use by:
  - Undertaking an upgrade of Gladstone-Mt Larcom Road as part of the Project
- Measures which increase health and wellbeing of residents on site and sensitive receptors within proximity to the Project by:
  - Implementing coal terminal lighting that minimises visual impact on adjoining sensitive receptors (eg directional lighting, low pressure sodium bulbs, shrouding, low glare lighting etc)
  - Implementing the use of low noise alarms across the site
- Measures which minimise the Project's contributions towards climate change by reducing GHG emissions through:
  - Undertaking a preliminary GHG emissions assessment for construction and operation of the Project (refer Section 7.4)
  - Undertaking a preliminary climate change risk assessment to identify risks and management options (refer Section 7.3.3)

Future actions

Further actions to be considered and developed where viable during detailed design, construction and operation are as follows:

Detailed design

- Investigate feasible renewable energy alternatives to determine their suitability for implementation during construction and operation of the Project
- Local suppliers will be assessed and selected on the basis of cost-competiveness and sustainability (must occur prior to procurement)
- Avoid/reduce consumption of materials during construction and operation, by finding alternatives appropriate for the same use
- Identify suitable locations for revegetation of native vegetation (ie where it will not interfere with Project facilities, operations etc)
- Biodiversity values incorporated into landscape designs
- Comply with the relevant components of the carbon price mechanism (once implemented)

Construction

- Use supply contracts to source sustainably accredited materials
- Prior to construction, review and update as required the existing WICET Waste Management Plan for implementation during WEXP1 and WEXP2 construction and operation of the Project
- Implement all fauna protection measures presented in the WICET Management Plans and this Change Request
- Implement all vegetation mitigation measures presented in the WICET Management Plans and this Change Request
- Implement all nuisance avoidance measures presented in the WICET Management Plans and this Change Reuest
- Ensure that site supervision is provided during construction to minimise risk of damage to cultural heritage items within the Project area
- Undertake a revised GHG emissions assessment with updated diesel and electricity consumptions details for the construction phase of the Project, to ensure that the Construction Contractor complies with the relevant legislation
- Comply with the relevant components of the carbon price mechanism (once implemented)
- Use local workforce where possible
- Develop and implement a local procurement policy for goods and services
- Generate economic benefits for the local community, providing access to employment opportunities on the Project

Operation

- Undertake a revised GHG emissions assessment with updated diesel and electricity consumption details for the operational phase of the Project, to ensure that the Operator complies with the relevant legislation
- Comply with the relevant components of the carbon price mechanism (once implemented)
- Prepare and implement a Carbon Management Plan for the operational phase of the Project
- Seek accreditation for the Carbon Management Plan (if deemed necessary)

7.6.3 Sustainability review and reporting

The management of sustainability issues through the sustainability tool allows for an ongoing review process at regular intervals to allow refinement of implementation actions and future actions during construction and operation of the Project. The EMP (refer Chapter 23) provides a summary of the WICET Management Plans and mitigation measures to be incorporated across all stages of the Project.

7.7 Climate change and sustainability commitments for the Project

Since the development of the EIS and SEIS in 2006 and 2007, respectively, climate change and sustainability assessment has become an important consideration of the environmental impact assessment process. This chapter has provided a review of the Project as it stands in 2011 in relation to climate change and sustainability policies and has undertaken a climate change risk assessment for the Project. A preliminary sustainability assessment tool has been developed and is recommended to be further developed and monitored through the construction and operational phases of the Project.

A range of mitigation and adaptation measures for the Project have been identified (refer Section 7.3.3 and 7.5.2 of this request). To ensure favourable climate change and sustainability outcomes for the subsequent phases of the Project, the Construction Contractor and Operator are responsible for making final commitments to the measures recommended previously in Section 7.5.2.

Mitigation and adaptation responses will need to be reviewed and updated over time, given that research in climate change science and sustainability is continuously evolving.

Conclusion 1: The changed Project results in an estimated reduction in diesel consumption of 3.67 ML per year from the Approved Project.

Conclusion 2: The changed Project results in an estimated reduction in CO_2 emissions of 14.68 kt CO2-e per year from the Approved Project.

Conclusion 3: Reporting under the NGER Act is now required for energy consumption during the construction phase and GHG emissions of the operational phase of the Project.

Conclusion 4: The Project may be subject to the Carbon Price Mechanism and may therefore be financially liable for each tonne of CO_2-e emitted.

Conclusion 5: Sustainability elements factored into the design have been developed to ensure that the Project continues to adopt sustainability measures across the construction and operation of the Project.

8. Hydrology and hydraulics

8.1 Summary

The changes proposed as part of WEXP1 and WEXP2 are not expected to result in an increase to potential impacts on hydrological resources or hydraulics in the surrounding area.

Reclamation heights previously modelled as part of the hydraulic modelling scenario undertaken for the EIS and SEIS were in excess of 100 year ARI flood event. WEXP1 and WEXP2 reclamation heights will remain at this height, or slightly higher (not exceeding 8 m AHD), and will therefore remain above the 100 year ARI flood event.

The changed Project is not expected to alter the flooding impacts predicted in the modelling undertaken as part of the EIS and SEIS as no additional blockages of flow or loss of flood storage will occur.

8.2 Introduction

This chapter describes the existing environment and potential impacts related to the potential changes to the hydrological resources and hydraulics as a result of the Project changes associated with WEXP1 and WEXP2. The assessment has been based on a review of available information and field investigations. Potential impacts to hydrological resources and hydraulics were originally outlined in the WICT EIS and SEIS (Appendix 1)

This Request for Project Change provides an updated assessment to address changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and EPBC Act controlled action approval (April 2008). Proposed changes to the Project as part of WEXP1 and WEXP2 (previously Stage 2 and Stage 3) are wholly contained within the Project footprint approved under the EIS and areas subsequently approved for WICET Stage 1

8.3 Existing environment

The proposed WICET Project and associated overland conveyor infrastructure are located adjacent to the downstream reaches of the Calliope River. The proximity of the Project area to both the Calliope River and Gladstone Harbour requires assessment of flooding and fluvial geomorphology.

The sections below address the following:

- A description of the Calliope River catchment
- Hydraulic modelling and results for existing case flooding and developed case flooding
- Potential impacts of the development and mitigation options
- Local catchment flows
- Fluvial geomorphology assessment

8.3.1 Catchment description

Calliope River Catchment

The Calliope River catchment is bounded by the Mount Alma and Mount Larcom Ranges in the north, the Calliope Range in the west and the Boyne Range in the south. The river has the following tributaries:

- Alma Creek
- Harper Creek
- Paddock Creek
- Larcom Creek

- Pyealy Creek
- Beales Creek
- Lost Spring Creek
- Tom Creek
- Double Creek
- Leixlip Creek
- Clyde Creek
- Other unnamed tributaries

Total catchment for the Calliope Basin, including coastal streams that discharge directly to the coast, is estimated to be 2,255 km^2. Excluding the minor coastal catchments, the catchment area is estimated at 1,860 km^2 (Connell Hatch 2006).

Elevations range from approximately sea level at the mouth of the river, to greater than 800 m AHD at the head of the catchment.

Project Area Sub-catchment

Figure 8.1 illustrates the location of watercourses within and adjoining the Project area. Each crossing location has been identified with a number. The extent of the sub-catchment boundaries, which drain to these crossings, is also shown. The delineation of the catchment areas was based on the topographic information extracted from 1:25,000 scale Queensland Topographic Maps (Sheets 9150-31 and 9150-32) together with some more recent aerial photos and detailed survey of the area.

The existing catchments, upstream of and through the proposed works, typically consist of a well-defined system of small watercourses. The catchment surface slopes range from very steep, immediately downstream of the ridgelines to the west of the existing north coast mainline, to flat in the vicinity of the Calliope River and the coastline.

8.4 Hydraulic modelling

Hydraulic modelling for various flood and tide scenarios was undertaken during the WICT EIS (2006) process by WBM using the TUFLOW modelling software. Additional flood modelling was undertaken after the EIS to assess the potential flooding impacts of the development with incorporated Project design changes (ie no Calliope River Bridge crossing). For this study, four combinations (1, 2, 4 and 6) of inflows and storm tide were used to estimate the flood behaviour in a 100 year Average Recurrence Interval (ARI) flood event (refer Table 8.1).

The WICT EIS also simulated the developed case for an additional four combinations (3, 5, 7 and 8), however for impact assessment and design level assessment purposes the four combinations (1, 2, 4 and 6) were used.

Table 8.1 presents the criteria that have been used in the simulations. These combinations provide the necessary information for the purposes of impact assessment and design.

Table 8.1 Simulation Combinations

Combination	Inflow	Tide / Storm Surge	Greenhouse Allowance
1	100 year ARI event	50 year ARI event	No
2	100 year ARI event	50 year ARI event	Yes
3	100 year ARI event	HAT	No
4	100 year ARI event	MLWS	No
5	20 year ARI event	100 year ARI event	Yes
6	20 year ARI event	MLWS	No
7	500 year ARI event	100 year ARI event	Yes

Legend

- Project Area
- Catchment Bou
- Drainage Line
- Proposed Culve

Source:
Cadastre: DERM, August, 2

Combination	Inflow	Tide / Storm Surge	Greenhouse Allowance
8	2000 year ARI event	100 year ARI event	Yes

Table Notes: HAT = Highest Astronomical Tide
MLWS = Mean Low Water Spring
The 2000 year ARI inflow has been extrapolated from the available design flows

Results reported in Chapter 8 of the WICT EIS and the SEIS are still considered valid as the Project changes proposed for WEXP1 and WEXP2 will be wholly contained within the Project area approved under the EIS, and modelling was undertaken with the assumption that no overtopping or flooding of the Project area would occur. Furthermore, a raise in height of Reclamation Area B by up to 1.4 m is likely to reduce overland flooding, subsequently reducing in stream sedimentation. The WICT EIS and SEIS (Appendix 1) contain further details of the hydraulic modelling scenarios.

8.5 Potential flooding impacts associated with Project changes

No further flood impact modelling has been undertaken for the proposed Project changes associated with WEXP1 and WEXP2. The WICT SEIS reported that flooding associated with the original proposed footprint was mainly due to the following two reasons:

- Filling of Reclamation Areas above 100 year ARI flood levels would result in blockage of a flowpath that conveys up to 540 m^3/s in the base case. The blockage of this flow would result in a redistribution of flow and result in an increase in flow in the Calliope River
- Filling of the Reclamation Areas above 100 year ARI flood levels would cause a loss of storage on site, with an area of up to 4 km^2 west of the Anabranch lost from available floodplain storage. As peak flood levels are higher for Combinations 1 and 2, the loss of storage in terms of volume is more significant, and as a consequence impacts are greater than for Combination 4 (100 year ARI inflow with mean low water spring (MLWS)) or Combination 6 (20 year ARI inflow with MLWS)

The changed Project is not expected to alter the impacts predicted in the modelling undertaken as part of the EIS and SEIS as no additional blockages of flow or loss of flood storage will occur.

8.6 Fluvial geomorphology

The WICT EIS (Appendix 1) contains a detailed summary of the fluvial geomorphology assessment undertaken by Hydrobiology addressing the following:

- Review of existing literature
- Past and current flow regimes
- Past and current sediment transport processes
- Current riparian vegetation condition, particularly in reference to its influence on erosion rates
- Past and current erosion rates and processes

8.7 Conclusions

The proposed changes will be wholly contained within the Project footprint approved under the EIS and is not expected to have any additional impacts to hydrology/hydraulics of the area. The potential impacts from changes associated with WEXP1 and WEXP2 are considered minor in relation to hydrology and hydraulics, and manageable by implementing the WICET Management Plans.

Flood modelling post construction of the WICET Project indicated that an increase in flood heights, flow velocities and stream powers within the Calliope River catchment is unlikely to occur. Instead, it indicated that restricting this portion of floodplain flow to the channel would not cause major changes to any of the hydrological attributes, due principally to the wide channel that exists in the Calliope River estuary (with exception of the reach immediately

south) in both the existing and developed scenarios. Modelling predictions reported in the WICT EIS and SEIS are still valid as reclamation areas will be above the flood levels for all combinations of hydrological and flooding events, and a proposed increase in bund height by 1.4 m as a result of the Project changes will not influence these scenarios.

As such, it is expected that the proposed Project changes associated with WEXP1 and WEXP2 will not significantly alter expected outcomes during each hydraulic modelling scenario outlined in the WICT EIS and SEIS (Appendix 1).

Minor changes to the hydrological regime within the Calliope River catchment may exacerbate past instabilities (tidal scour and associated failure mechanisms) especially within proximity to the Oxbow bend and the Calliope River Anabranch. As a result, conveyor infrastructure has been positioned far enough away from the banks to minimise impacts from potential hydrological instabilities. However, it may be necessary to provide bank stabilisation works to protect this infrastructure from fluvial processes. The need and timing of these works will be investigated during detailed design.

Raised water levels, regardless of their magnitude, particularly in the more confined reaches upstream of the Project area, should be monitored during and after construction phases of the Project to ensure that model predictions are accurate and no commensurate increases in stream power and erosion potential occur.

A Soil and Water Quality Management Plan (refer Appendix 23.15) has been developed, including stormwater management measures, to ensure that flood return water and runoff from the development is returned to the river in a controlled fashion in order to prevent gullying and erosion of the banks from the top, subsequently contributing to in stream instabilities.

Conclusion 1: It is expected that the proposed Project changes associated with WEXP1 and WEXP2 will not significantly alter expected outcomes during each hydraulic modelling scenario previously conducted. Reclamation heights previously modelled were in excess of the 100 year ARI flood event.

9. Water quality

9.1 Summary

The changes proposed as part of WEXP1 and WEXP2 will not result in an increase to potential impacts on water quality. There are no planned changes to the dredging as outlined in the approved Project.

The additional minimal excavation associated with Stockyard Area B infrastructure is offset by the reduced volume of excavation in Stockyard Area A, due to omission of the stockyard reclaim tunnels on the eastern half of Golding Point. Potential erosion and sedimentation impacts will be managed in accordance with the WICET SWQMP approved by DEHP.

Potential impacts to water quality resulting from the additional stormwater outfall will be managed in accordance with mitigation measures outlined in the SWQMP.

9.2 Introduction

This chapter describes the existing environment and potential impacts relating to water quality for the changed Project. Potential impacts relating to water quality were originally outlined in the WICT EIS and SEIS (refer Appendix 1).

This Request for Project Change provides an updated assessment to address changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and EPBC Act controlled action approval (April 2008). Proposed changes to the Project as part of WEXP1 and WEXP2 (previously Stage 2 and Stage 3) are wholly contained within the Project footprint approved under the EIS and areas subsequently approved for WICET Stage 1.

9.3 Environmental values

The Environmental Protection (Water) Policy 2009 (EPP (Water)) under the *Environmental Protection Act 1994* identifies Environmental Values (EVs) and Water Quality Objectives (WQOs) for waters within Queensland. The EPP (Water) serves to protect Queensland's environment, while allowing for ecologically sustainable development. Part 2, Section 5 of the Policy states:

> ***How purpose of policy is achieved***
> *The purpose of this policy is achieved by:*
>
> *(a) identifying environmental values and management goals for Queensland waters*
>
> *(b) stating water quality guidelines and water quality objectives to enhance or protect the environmental values*
>
> *(c) providing a framework for making consistent, equitable and informed decisions about Queensland waters*
>
> *(d) monitoring and reporting on the condition of Queensland waters*

Part 3, Section 6 of the policy states that:

Environmental values to be enhanced or protected

> *(1) The environmental values of waters to be enhanced or protected under this policy are:*
>
> > *(a) for water mentioned in schedule 1, column 1-the environmental values stated in the document opposite the water in schedule 1, column 2*
> >
> > *(b) for other water-the environmental values stated in subsection (2)*

(2) For subsection (1)(b), the environmental values are as follows:

(a) for high ecological value waters-the biological integrity of an aquatic ecosystem that is effectively unmodified or highly valued

(b) for slightly disturbed waters-the biological integrity of an aquatic ecosystem that has effectively unmodified biological indicators, but slightly modified physical, chemical or other indicators

(c) for moderately disturbed waters-the biological integrity of an aquatic ecosystem that is adversely affected by human activity to a relatively small but measurable degree

(d) for highly disturbed waters-the biological integrity of an aquatic ecosystem that is measurably degraded and of lower ecological value than waters mentioned in paragraphs (a) to (c)

(e) for waters that may be used for producing aquatic foods for human consumption-the suitability of the water for producing the foods for human consumption

(f) for waters that may be used for aquaculture-the suitability of the water for aquacultural use

(g) for waters that may be used for agricultural purposes-the suitability of the water for agricultural purposes

(h) for waters that may be used for recreation or aesthetic purposes, the suitability of the water for:

(i) primary recreational use

(ii) secondary recreational use

(iii) visual recreational use

(i) for waters that may be used for drinking water-the suitability of the water for supply as drinking water

(i) for waters that may be used for drinking water-the suitability of the water for supply as drinking water

(j) for waters that may be used for industrial purposes-the suitability of the water for industrial use

(k) the cultural and spiritual values of the water

(3) In this section-

***cultural and spiritual values**, of water, means its aesthetic, historical, scientific, social or other significance, to the present generation or past or future generations.*

***primary recreational use**, of water, means full body contact with the water, including, for example, diving, swimming, surfing, waterskiing and windsurfing.*

***secondary recreational use**, of water, means contact other than full body contact with the water, including, for example, boating and fishing.*

***visual recreational use**, of water, means viewing the water without contact with it.*

Chapter 9, Table 9.1 in of the WICT EIS identified the EVs for the watercourses and receiving environment downstream of the Project. The number of watercourses and water bodies potentially affected by this Project has been reduced since the WICET EIS and SEIS were submitted and approved, this is due to the rail component of the Project now being managed and delivered as a separate project by QR National.

Watercourses and water bodies downstream of the WICET Project are presented in Table 9.1. These watercourses are defined by the EPP (Water) as being a modified aquatic ecosystem. In the absence of specific WQOs for the watercourses, EVs have been

determined from the EPP (Water). Major watercourses and catchment boundaries are illustrated in Figure 9.1.

Table 9.1 Environmental values for the watercourses and receiving environment of the Project area

Environmental Values	Supporting Details	Calliope River and Tributaries	Port Curtis
Aquatic Ecosystem	Slightly to moderately disturbed ecosystem	✓	✓
Primary Industries	Irrigation	✓	
	Farm Water Supply	✓	
	Stock Watering	✓	
	Aquaculture	✓	✓
	Human Consumers of Aquatic Food	✓	✓
Recreation and Aesthetics	Primary Recreation	✓	✓
	Secondary Recreation	✓	✓
	Visual Recreation	✓	✓
Drinking Water			
Industrial Uses		✓	✓
Cultural and Spiritual Values		✓	✓

The EVs of these systems are related to adjacent land use, as the systems are primarily used for agricultural purposes (grazing and horticulture). The ecological value is variable depending on catchment location and size, adjacent land uses and overall complexity and health of the system.

9.4 Water quality guidelines

The Australian and New Zealand Environment and Conservation Council (ANZECC) Guidelines provide guideline values or descriptive statements for different indicators to protect aquatic ecosystems and human uses of waters (eg primary recreation, human drinking water, agriculture, stock watering). The ANZECC Guidelines (2000) are a broad scale assessment and it is recommended that, where applicable, locally relevant guidelines are adopted.

The Queensland EPA (now DEHP) Queensland Water Quality Guidelines 2009 (QWQG) are intended to address the need identified in the ANZECC Guidelines by:

- Providing guideline values (numbers) that are tailored to Queensland regions and water types
- Providing a process/framework for deriving and applying local guidelines for waters in Queensland (ie more specific guidelines than those in the ANZECC Guidelines)

Further information on the water quality guidelines use for the Project are outlined in Section 9.2 of the WICT EIS, as well as Section 9.3 of the SEIS (refer Appendix 1).

9.5 Freshwater existing environment

Chapter 9, Section 9.3 of the WICT EIS addresses freshwater systems within the Project area. Only one defined watercourse occurs within the Project footprint; that being Pyealy Creek. Several other drainage lines occur within the area.

Section 9.3 of the WICT EIS (refer Appendix 1) addresses the following:

- A description of the freshwater wetlands, including natural and constructed watercourses, surface drainage patterns and flows of the freshwater wetlands
- An assessment of the existing water quality of the freshwater wetlands

Legend

- Project Area
- Catchment Bou
- Drainage Line

Source:
Cadastre: DERM, August, 2

- An assessment of the environmental values of the freshwater wetlands

9.6 Tidal influenced waters existing environment

A summary of the tidally influenced waters within and adjacent to the Project area can be found in the Chapter 9, Section 9.4 of the WICT EIS. This section addresses the tidally influenced waters within and adjacent to the Project area. Areas addressed include:

- A description of the tidal influenced watercourses, including surface drainage patterns
- An assessment of the existing water quality of the tidal influenced watercourses
- An assessment of the environmental values of the tidal influenced watercourses

Chapter 9, Section 9.4 of the WICT EIS (refer Appendix 1) contains detailed descriptions of the Calliope River, Calliope River Anabranch, and near shore environments associated with Port Curtis. The Port Curtis Ecosystem Report 2008-2010, prepared by Vision Environment QLD (refer Appendix 9.1), provides an updated assessment of the water quality of various regions in Port Curtis, based on data collected from July 2008 to November 2010.

9.7 Water quality potential impacts

A number of potential impacts to water quality were highlighted during the WICT EIS and SEIS. This includes fresh and marine waters within the Project area and the surrounding receiving waters. These impacts may threaten EVs of the area as identified by the EPP (Water) and outlined in Table 9.1. This section updates potential impacts to water quality that may have changed since the submission and approval of the WICT EIS and SEIS (refer Appendix 1) as a result of the changes to the Project.

Mitigation measures to manage these potential impacts are outlined in Section 9.8.

9.7.1 Construction impacts

The potential impacts of the Project on water quality and EVs during the construction phase are provided below. The additional minimal excavation associated with construction of Stockyard Area B infrastructure is offset by the reduced volume of excavation in Stockyard Area A, due to omission of the stockyard reclaim tunnels on the eastern half of Golding Point. Potential erosion and sedimentation impacts will be managed in accordance with the WICET SWQMP approved by EHP.

Dredging

There are no planned changes to the dredging as outlined in the approved Project. The proposed dredging activities do not exceed volumes (ie 6.3 Mm^3) outlined in the Project approved under the EIS.

Further details of the potential impacts from the initial campaign of the WICET dredging works are contained in the WICET Dredge Management Plan (DMP) (refer Appendix 23.18) (approved by DEHP in April 2012). Potential impacts will be addressed by implementing mitigation measures contained in Section 9.8 and the DMP.

Future dredging campaigns will be addressed through updates of the existing DMP or preparation of new DMP(s).

Infrastructure works

The majority of the Project excavation earthworks will be undertaken during Stage 1 construction activities. If WEXP1 dredging is undertaken directly after the Stage 1 dredging (as planned), the bunds of both Reclamation Areas B and C may require raising to accommodate the short term disposal volume. This is discussed in detail in Section 3.6.1.

Soil erosion and sedimentation impacts are summarised in Section 9.5.1 of the WICT EIS and Section 9.6.1 of the SEIS (refer Appendix 1). WEXP1 and WEXP2 infrastructure works are not expected to have further impact on water quality within the area. The new settlement pond works will involve excavation of previously deposited dredged materials and the outfall will require excavation of some soils, however these will be managed through the implementation of the existing EMP.

The Stage 1 south stormwater pond will be extended twice in WEXP1 and WEXP2. This will involve excavation of fill placed in Stage 1 for the temporary facilities platform.

The following potential impacts are discussed in other chapters of the Change Request:

- ASS and contaminated soils (refer Chapter 4)
- Groundwater quality (refer Chapter 10)
- Downstream aquatic values (refer Chapter 16)

Mitigation measures will be implemented during construction works to minimise water quality impacts (refer Section 9.8).

9.7.2 Operational impacts

The key locations where potential impacts may occur from operation are areas where runoff and/or discharge waters from the Project, including discharge from the new stormwater outfall system associated with the new stormwater storage pond to be constructed in Reclamation Area B during WEXP1, can enter waterways and drainage lines.

The potential impacts of the changed Project on water quality during operation are consistent with those identified in Section 9.5.2 of the WICT EIS and Section 9.6.2 of the SEIS which include:

- Stormwater discharge and flow redirection

9.8 Mitigation measures

The mitigation measures below will assist in the management of potential impacts to water quality. These are described in Section 9.6.1 of the WICT EIS (refer Appendix 1) in terms of design, construction and operational mitigation measures for the coal Terminal. Discharge water quality targets are identified and mitigation measures will be designed to achieve these targets.

9.8.1 Design

Dredging and dewatering

Remains consistent with the approved WICT EIS and all dredging activities will comply with the approved DMP.

Dewatering

Potential dewatering impacts are addressed within the WICET DMP (refer Appendix 23.18) which includes the following:

- Measures to prevent the loss of any values of receiving waters or significant threat to those values
- Measures to minimise harm to native vegetation, or erosion of structures or services
- Measures to minimise soil erosion and local flooding
- Measures to ensure that discharges to the Anabranch comply with guidelines detailed in Table 9.3 and approval conditions
- Management of any pre-discharge treatment including flocculation
- Monitoring and reporting requirements

- Measures to minimise nuisance to the local community (eg odours, noise impact on nearby residents and fauna)
- Measures to minimise the loss or reduction of flows in public or private water sources

Sedimentation and runoff

Sedimentation and runoff mitigation measures remain consistent with the following:

- WICT EIS/SEIS commitments (refer Appendix 1)
- Acid Sulfate Soils Management Plan (refer Appendix 23.4)
- Dredge Management Plan (attached in Appendix 23.18)
- Stormwater Management Plan (now Soil and Water Quality Management Plan – attached in Appendix 23.15)
- Waste Management Plan (refer Appendix 23.17)

9.8.2 Construction

Dredging

The WICET DMP (refer Appendix 23.18) specifies the performance objectives, actions and procedures to be carried out to minimise and mitigate identified potential environmental impacts of dredging activities and meet WICT EIS commitments and approval requirements. The WICET DMP is currently being assessed by DEHP.

In accordance with the Western Basin Water Quality Monitoring Plan (WQMP), the WICET DMP adopts an adaptive management approach based on turbidity as an indicator of water quality, with limits set for key environmentally sensitive locations that trigger an operational response. At the present time, there are a number of factors restricting this style of water quality management being implemented. These include:

- The light requirements and stress thresholds of seagrass species is not clearly known. Preliminary studies conducted by the Department of Agriculture, Fisheries and Forestry (DAFF) – Fisheries Queensland have produced initial values of Photosynthetically Active Radiation (PAR) that seagrass require to survive, however these values need to be validated through further research. Fisheries Queensland's research has also indicated that light requirements vary over seasons and time, potentially giving multiple light values for management purposes
- Indicators for seagrass stress that can be used as part of a reliable proactive management approach

Until these factors can be verified they cannot be used reliably, in a water quality monitoring programme. As such, the Western Basin Project dredging works and the WICET dredging works are proceeding with using trigger values based on the analysis of background water quality data. Further details are included in Appendix 23.18.

Dewatering

The discharge limits outlined in Table 9.3 were adopted from the approved WICET DMP (refer Appendix 23.18). Discharge will occur from the outfall systems associated with both stormwater storage ponds proposed to be located in Reclamation Area B (the Stage 1 southern stormwater storage pond and the new WEXP1 stormwater storage pond).

Table 9.3 Stormwater outfall discharge limits

Monitoring point	Quality characteristics	Alert level	Release limits		Monitoring frequency
			Minimum	Maximum	
Interior of Reclamation Areas B and	Turbidity	TBA	-	TBA	Interior of Reclamation Areas B and

Monitoring point	Quality characteristics	Alert level	Release limits		Monitoring frequency
			Minimum	Maximum	
C Discharge Outlets					C Discharge Outlets
	Suspended solids	80 mg/L	-	100 mg/L (including background)	Weekly
	Turbidity	TBA		TBA	Hourly
	pH	<6.5 or > 9.0	6.5	9.0	Hourly
	Metals	Refer ERA 16 Development Permit Conditions			

Mitigation measures for construction activities have also been included in the existing WICET Soil and Water Quality Management Plan (SWQMP) (refer Appendix 23.15) which has been approved by DEHP. This includes site water retention and treatment measures to achieve water quality guidelines before release and ongoing monitoring for compliance with discharge criteria, during construction and operation. New stormwater ponds have also been designed on the new stockyard proposed for Reclamation Area B as part of WEXP1 to account for sedimentation and runoff. In addition the southern stormwater pond for WICET Stage 1 will be extended twice for WEXP1 and WEXP2 as the stockyard catchment areas progressively expand.

Sedimentation and runoff

Measures to mitigate sedimentation and runoff are outlined in the approved WICET SWQMP (refer Appendix 23.15).

Hydrocarbon and chemical management

Hydrocarbon and chemical management are outlined in the approved WICET Dangerous Goods Management Plan and WICET Waste Management Plan (refer Appendix 23.9 and Appendix 23.17, respectively).

9.8.3 Operational

The alteration of the expanses phases for the WICET Project will not impact on the operational mitigation measures outlined in the SEIS. These mitigation measures are already in place and include:

- Maintenance dredging
- Infrastructure
  - The inclusion of a new stockyard on Reclamation Area B will require erosion and sedimentation controls.
- Stormwater discharge and flow redirection
  - Stormwater on Reclamation Area B will be mitigated by the inclusion of new stormwater sedimentation ponds (refer Section 9.8)
  - Also see attached SWQMP (refer Appendix 23.15)
- Abrasive blasting (consistent with the WICT SEIS and ERA approval conditions)

Water storage and dewatering

Stage 1 reclamation areas have designed bunds and settlement basins where water will be monitored prior to discharge. The WEXP1 stockyard will be drained by a system of concrete lined open channels, consisting of four lines of longitudinal drains feeding into two main transverse drains. There will be a drain along the bottom edge of the stacker reclaimer

bunds as shown on Drawing H337300-2B534-C-DR-0322 (refer Appendix 9.2). Water collected in the transverse drains will then flow through sedimentation basins before entering a stormwater storage pond. The northern half of the WEXP1 stockyard grades to the south stormwater pond while the southern half grades to the WEXP1 stormwater pond. Water from both ponds will be recycled and used as process/dust suppression water as required.

9.9 Monitoring and reporting

Water discharged from the Project area to the receiving environment will be monitored and reported in accordance with the requirements of the WICET DMP and SWQMP (refer Appendix 23.18 and Appendix 23.15, respectively) which have been approved or currently being assessed by DEHP.

9.10 Conclusion

The altered expansion phases for the Project will be wholly contained within the Project area approved under the EIS and are not expected to impact on additional watercourses, or introduce any additional impacts on watercourses/receiving waters not already discussed in the WICT EIS and SEIS.

These works will involve minimal additional excavation and associated erosion and sediment control risks, however, this is offset by the reduced volume of excavation in Stockyard Area A, due to omission of the stockyard reclaim tunnels on the eastern half of Golding Point. Any potential water quality impacts from the proposed changes to the expansion phases are considered minor and represent minimal to no change to the potential impacts addressed in the WICT EIS process.

The potential impacts of dredging works on water quality have been outlined in the WICET DMP (refer Appendix 23.18) which was approved in April 2012 by DEHP. The DMP specifies the performance objectives, actions and procedures to be carried out to minimise and mitigate identified potential environmental impacts of dredging activities and meet WICT EIS commitments and approval requirements for the WICET staged dredging works.

Mitigation measures for construction activities have been included in the existing WICET SWQMP (refer Appendix 23.15) which has been approved by DEHP. This includes site water retention and treatment measures to achieve water quality guidelines before release and ongoing monitoring for compliance with discharge criteria, during construction and operation.

Conclusion 1: Dredging remains consistent with the approved WICT EIS and all dredging activities will comply with the approved DMP.

Conclusion 2: The additional minimal excavation associated with Stockyard Area B infrastructure has potential to increase erosion and water quality degradation. However, this is offset by the reduced volume of excavation in Stockyard Area A, due to omission of the stockyard reclaim tunnels on the eastern half of Golding Point. Any impacts will be managed in accordance with the WICET SWQMP approved by DEHP.

Conclusion 3: Potential impacts to water quality resulting from the additional stormwater outfall will be managed in accordance with mitigation measures outlined in the SWQMP.

10. Groundwater

10.1 Summary

The changes proposed as part of WEXP1 and WEXP2 will not result in an increase to potential impacts on groundwater quality.

The addition of the new stormwater storage pond and outfall within Stockyard Area B and the proposed extension of the southern stormwater storage pond in Stockyard Area B will not intrude upon the water table and as such are unlikely to impact upon the groundwater regime in the region.

The change in yard type at Golding Point from a Bridge Stacker, to a Stacker-Reclaimer will reduce previously proposed impacts to the water table as the reclaimer tunnels will no longer be required.

10.2 Introduction

This chapter describes the groundwater within the Project area and potential impacts as a result of the Project changes associated with WEXP1 and WEXP2. Potential impacts to groundwater quality were originally outlined in the WICT EIS and SEIS (Appendix 1). Based on a review of available information and field investigations, this Change Request aims to provide an updated assessment to address potential changes to the Project.

This Request for Project Change provides an updated assessment to address changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and EPBC Act controlled action approval (April 2008). Proposed changes to the Project as part of WEXP1 and WEXP2 (previously Stage 2 and Stage 3) are wholly contained within the Project footprint approved under the EIS and areas subsequently approved for WICET Stage 1

10.3 Existing environment

10.3.1 Regional Setting

Topography and drainage

The topography of the site has been described in detail in Chapter 4 and is summarised below.

The south-western extremity of the site consists of undulating to hilly terrain featuring north-west trending ridges of resistant cherts that rise to elevations of about 150 m AHD.

The terrain grades gently to the south-east to coastal plains which vary between 1 m and 3.5 m AHD and form the majority of the Project area. There are also minor alluvial floodplains associated with the Calliope River.

The coastal plains which occur to the west and north-west of the Calliope River are predominantly composed of estuarine channels and banks, supratidal flats and coastal grasslands. Areas adjacent to the mouth of the river comprise of mangrove swamps, fringed by areas of salt couch.

Areas of elevated land (5 m to 43 m AHD) comprising shallow bedrock form "islands" within the coastal plain. These "islands" include Wiggins Island and Golding Point.

The alluvial floodplains are located either side of the river at the southern end of the Project area and grade seawards into the coastal plains. There are also two sets of alluvial terraces at the southern end of the Project area associated with down-cutting of the river and deposition over geological time.

A number of previous studies were undertaken in the vicinity of the Project area that has previously addressed groundwater issues, including:

- Comalco Alumina Refinery EIS (Dames and Moore Pty Ltd 1998)
- Stuart Oil Project EIS (SKM 2002)
- Gladstone Pacific Nickel (GPN) groundwater assessment (URS Australia Pty Ltd 2006)

Chapter 10 of the WICT EIS (refer Appendix 1) contains further details on the findings of these studies.

10.3.2 Geological setting

The stratigraphic sequence across the Project area comprises three distinct geological units as indicated by the "Gladstone Special" 1:100,000 geological maps. In summary, these include:

- Quaternary alluvial sediments associated with the Calliope River floodplain and river terraces
- Quaternary coastal sediments associated with estuarine channels and banks, supratidal flats, mangrove flats and coastal grasslands
- The Late Devonian/Early Cretaceous Curtis Island Group of meta-sediments that form the basement or bedrock. They underlie, or protrude through, the alluvial and coastal sediments and outcrop in the hilly terrain along the western margin of the Project area and beyond

Chapter 10 of the WICT EIS (refer Appendix 1) contains further information regarding the geological setting of the region.

10.4 Groundwater use

A search of the DNRMW (now DNRM) database of registered bores and wells within a radius of 6 km of the Project area was undertaken during the WICT EIS process. The data indicated that there are about 67 registered bores in the area. A search of the DNRM database undertaken in September 2011 indicated that these bores are still registered with no new additional bores being registered in the interim period. The locations of these registered bores are displayed in Figure 10.1.

A summary of information obtained from each registered bore within the region is contained in Chapter 10 the WICT EIS (refer Appendix 1).

10.5 Groundwater regime and groundwater quality

10.5.1 Current background monitoring

As a requirement of the CG Report and the Stage 1 ASS Management Plan for the WICET Project, background groundwater monitoring is currently being conducted onsite for groundwater levels and water quality. A total of five bores are currently being monitored for water levels to determine the likelihood of oxidation of PASS due to potential lowering of the water table during construction activities. It is a condition of the CG Report that groundwater level monitoring be continued during construction.

The following parameters are currently being monitored as part of the background groundwater monitoring process:

- pH
- Dissolved anions
- Dissolved cations
- Dissolved metals

Legend

- Project Area
- DERM Ground

Source:
Bore Locations: DERM 200

10.5.2 Groundwater regime description

The WICT EIS (Appendix 1) indicated that two types of aquifer systems existed within the Project area and surrounds.

The recognised aquifer system types are:

- Alluvial aquifers consisting of Quaternary sediments associated with the Calliope River floodplain and river terraces, and of Quaternary coastal sediments associated with the estuarine channels and banks, supratidal flats, mangrove flats and coastal grasslands
- Fractured rock aquifers associated with the Late Devonian/Early Carboniferous Doonside and Wandilla Formations that underlie the site at depth and outcrop on the western side and as “islands” protruding through the coastal plain

The data obtained during the WICT EIS process indicated that groundwater in the alluvial sediments (that covers the majority of the Project area) is brackish to highly saline, with a pH varying from slightly acidic to slightly alkaline. In comparison, the water in the Calliope River adjacent the Project area, has a consistent electrical conductivity (EC) of about 64,000 μS/cm, indicating that it is sea water.

Groundwater in the alluvium is of generally poor quality due to the proximity of the Project area to the coast, the presence of tidal creeks that cross the site and the general marine environment of deposition of the aquifer sediments. In some locations the groundwater is of slightly better quality, although brackish, probably due to local recharge or groundwater flow conditions. Chapter 10 of the WICT EIS (Appendix 1) contains a detailed summary of the groundwater regime and groundwater quality within the region.

Based on the data available, it is believed that there are no industrial users of groundwater adjacent the Project area.

Industrial users generally have the capital required to drill and equip bores and if necessary to treat the water before use. However, industry tends to require large volumes of groundwater, which is not available from the aquifers in the area.

10.6 Potential impacts

10.6.1 New Stacker-Reclaimer yard and settlement ponds

A new Stacker-Reclaimer yard is proposed to be constructed on Reclamation Area B (Stockyard B) as part of the Project changes during the WEXP1. This Stacker-Reclaimer will require the construction of a new stormwater storage pond at the south-western extent of Stockyard B. The Stage 1 southern stormwater storage pond will be constructed on the northern extent of Stockyard B and will be extended twice during WEXP1 and WEXP2.

Description

The southern stormwater storage pond is proposed to be constructed to the north-eastern end of Stockyard B during the WICET Stage 1 process. The design for this stormwater storage pond has changed due to the proposed Project changes for the construction of the WEXP1. The new and existing approved (southern) stormwater storage ponds have similar design parameters. Both ponds will be constructed with a base existing surface at approximate RL 2.0 m and surrounding bund wall heights between RL 4.3 m to 5.4 m and will be clay lined to prevent dispersion of settled material.

Table 10.1 contains a list of drawings for various components of Reclamation Area B including information on the stormwater storage ponds and bund designs.

Table 10.1 Drawing references for Project Components within Reclamation Area B

Drawing Number (refer Appendix 2)	Project Component
1530-C-DR-0316_rev1	WICET Stage 1 (southern) stormwater storage pond design
2B251-M-DR-0001_revA	Stage 1 stormwater storage pond extension design/design of the stormwater outfall systems
2B534-C-DR-0313_revA	WEXP1 (new) stormwater storage pond design
2B534-C-DR-0301_revA	Stockyard B design including the locations of the two stormwater storage ponds
2B534-C-DR-0383_revA	Bund design for the internal wall of the new stormwater storage pond
2B534-C-DR-0384_revA	Bund design for the external wall for the new stormwater storage pond
2B534-C-DR-0321_revB	Bund design for the southern stormwater storage pond
2B534-C-DR-0280_revB	General expansion during WEXP1 construction
153-C-DR-0220_rev1	Tertiary stormwater storage pond outfall section

Impacts to groundwater regime

The Stacker-Reclaimer stockyard on Stockyard B will be constructed on existing fill material disposed to the area during the Stage 1 dredging and WEXP1 (Berths 2 and 3) campaigns. Excavation for ground improvement may be required during the construction of the Stacker-Reclaimer system, and may intrude upon the water table within the area.

Any potential environmental impacts associated with excavations and construction that may impact upon groundwater will be managed in accordance with mitigation measures outlined in the WICET CEMP (refer Appendix 23.2).

Both stormwater storage ponds will be lined with a clay material and are envisaged to be semipermeable preventing dispersion of settled material.

The base of the each pond will be constructed at RL 2.0 m and as such, will not intrude upon the water table. The relative levels (RLs) of each stormwater storage pond wall are contained in Drawings: 2B534-C-DR-0210_revA, 2B534-C-DR-0230_revB, 2B534-C-DR-0301_revA, 2B534-C-DR-0313_revA and 2B534-C-DR-0314_revA (refer Appendix 2).

The storage ponds will be designed to store a 10 year; 24 hour runoff event and the maximum water level in the pond will be 3.5 m AHD (ie the water in the pond will have a maximum depth of 1.5 m). The water may be slightly acidic as much of it will be derived from runoff and seepage from the coal stockpiles.

It is concluded under this scenario that construction of the Stacker-Reclaimer Stockyard Area B and the stormwater storage ponds within Reclamation Area B will have no impact on the groundwater regime.

Any unforseen impacts arising from construction of the Stacker-Reclaimer Stockyard Area B on Reclamation Area B or from the development of the stormwater storage ponds will be managed in accordance by measures outlined in the existing Construction Environmental Management Plan (CEMP) for the WICET Project (refer Appendix 23.2).

10.6.2 Development of a Stacker-Reclaimer yard on Golding Point

Description

A change in yard type on the eastern half of Golding Point from a Bridge Stacker to a Stacker-Reclaimer yard is proposed. This change does not alter the disturbance footprint that was approved under the WICT EIS (refer Appendix 1).

It is envisaged that this change will require minimal additional excavation to accommodate the footings for the Stacker-Reclaimer stockyard. However, the proposed reclaimed tunnels

in the original EIS are no longer required on the eastern half of Golding Point and hence, disturbance to groundwater in this area will decrease.

Impacts to groundwater regime

Excavation for ground improvement on the stockyard may intrude upon the water table during construction at Golding Point. Any potential environmental impacts associated with excavations and construction that may impact upon groundwater will be managed in accordance with mitigation measures outlined in the WICET CEMP (refer Appendix 23.2).

10.6.3 Placement of dredge spoil

Description

During Stage 1 dredging, dredged material will be pumped into the reclamation areas. The spoil and borrow material will raise the level of the mud flats from approximately RL 2 m to RL 5-7 m. The WEXP1 dredging and disposal is proposed to occur immediately after completion of the Stage 1 dredging and disposal to ensure scheduled Project milestones are achieved.

Compartmentalised reclamation during Stage 1 and WEXP1 is proposed to occur within Reclamation Area B. Up to four internal ponds per disposal area within Reclamation Area B (including Golding Point) will be constructed during the reclamation process, these being:

- Primary Pond
- Secondary Pond
- Tertiary Pond
- Quaternary Pond

Ponds within Reclamation Area C are proposed to be constructed in a similar process to Reclamation Area B, and will typically include three internal ponds; the primary, secondary and tertiary ponds. Drawing 2B534-C-DR-0210_revB and Drawing 2B534-C-DR-0211_revB in Appendix 2 show the layout of typical internal bund systems within Reclamation Areas B and C, respectively.

The primary and secondary ponds within Reclamation Area B will be primarily filled with gravel and sand. The tertiary and quaternary ponds will be filled with a mix of silt, sand and clay fines. All ponds within Reclamation Area C will be primarily filled with silt and/or clay fines.

Compartmentalised reclamation allows for a staged filling process of the primary and secondary ponds allowing dewatering to occur in each pond after they are filled. Dewatering allows for the consolidation of silts and fines, reducing ground improvement volumes.

Further detail on the dredge spoil disposal methodology is included in Section 3.6.1.

Impact on groundwater regime

Saline water that does not infiltrate to the water table will run off as surface flow across the Reclamation Areas. It is envisaged that channels will be constructed with sediment traps to collect and direct the surface runoff to well-located discharge areas. Surface water quality and management is further discussed in Chapter 9 of this request.

Any seepage that may infiltrate through to the water table from the stormwater storage ponds will move with the normal groundwater flow and discharge to the mud flats and mangrove areas to the north, and to the Anabranch of the Calliope River to the south. The envisaged impact of this saline seepage to the water table is:

- The water table in the area will be temporarily raised from its existing level

- The brackish groundwater beneath the mud flats impacted by the seepage will become more saline
- Groundwater discharge to the mangroves, coast and estuary will increase in the short term

It is considered that there should be no adverse impact as the environment is naturally saline. The increase in groundwater discharge flux will be minimal in comparison to the tidal flushing volumes that occur in the groundwater discharge zones.

10.6.4 Summary of potential impacts

It is expected that construction of the WEXP1 and WEXP2, in addition to Stage 1, will have a relatively minor impact on the groundwater regime. The extent of impact with respect to groundwater levels will generally be confined to less than 50 m from each excavation. The sections below provide a summary of the potential construction impacts of the WICET Project on specific aspects of the groundwater regime.

Significance with respect to groundwater depletion and recharge

Recharge of the groundwater system occurs primarily by infiltration through the mud flats during periods of tidal inundation and by direct rainfall infiltration to the soils in topographically higher areas. The construction of the WICET Project will have minimal impact on recharge with the exception of the stockyard area at Golding Point, where a large expanse of impervious cover will prevent infiltration. Groundwater levels in this area however, will be maintained at approximately 0 m AHD by inflow from the surrounding estuaries and the sea.

Construction of the new Stacker-Reclaimer and storage pond on Stockyard Area B is not expected to impact upon groundwater recharge in the region. It is likely that stormwater within the storage pond will infiltrate the water table in this region, but this effect is expected to be minimal as storage levels within the pond will be managed by the stormwater release system into the Calliope River Anabranch and the stormwater ponds are designed to be semi-permeable.

In summary, it is assessed that the WEXP1 and WEXP2 will have little impact on groundwater depletion and recharge.

Groundwater dependent ecosystems (aquatic ecosystems)

It is considered unlikely that there are any aquatic ecosystems in the area that are totally dependent on groundwater. Rather the aquatic ecosystems will be dependent on the general saline environment of the mudflats and mangroves, and tidal inundations.

There are no recorded natural springs in the higher topographic area to the west that would support groundwater dependent ecosystems. The colluvial deposits that have developed at the foot of the hills are generally dry with the exception of short periods after rainfall and runoff.

Groundwater contamination

The WICET Project footprint (including Stage 1, WEXP1 and WEXP2) prior to Stage 1 WICET construction was relatively undeveloped and therefore unlikely that historical land use activities have been undertaken that would result in contamination of groundwater.

Potential contaminants will be stored or handled during construction and operation with the potential to spill, leak or leach and impact the groundwater regime.

Any potential impacts arising from construction and excavation will be avoided, mitigated or managed in accordance with measures outlined in the CEMP for the WICET Project (refer Appendix 23.2).

Management of acid sulfate soils

The low-lying alluvial areas of the Project area, particularly the mudflats, are PASS (refer Chapter 4). Dewatering of an excavation will locally lower the water table leading to the potential oxidation of ASS in the area of depletion. This may in turn lead to acidification of groundwater that comes in contact with the oxidised material. Groundwater inflow to the excavations during dewatering and groundwater flow through the oxidised zone post dewatering is therefore likely to have a low pH.

The pH of groundwater that flows into the dewatering operations within the bunded areas will be monitored as part of the surface water monitoring program detailed with the WICET DMP (refer Appendix 23), The relatively small fluxes of discharge to the estuary and ocean post dewatering should be neutralised by the large volume of saline water.

The WICET CEMP and DMP contains further measures that will be implemented during excavation and dewatering activities onsite to prevent contamination of the water table from ASS/PASS.

Impacts on other groundwater users

There are no registered bores on the DNRMW (now DNRM) bore database within the WICET footprint, primarily due to the saline environment of the coastal flats and the low yield of the rock formations that form the western hills. It is therefore assessed that construction of the WICET Project will not impact on groundwater users.

10.7 Summary of potential impacts resulting from Project changes

10.7.1 Change to include Stacker-Reclaimer yard on Stockyard B

The proposed new Stacker-Reclaimer yard will be wholly contained within the approved Project footprint. The works will involve minimal excavation and is not expected to result in interception of groundwater and as such, will not impact upon the groundwater regime in the area.

10.7.2 New settlement pond and stormwater outfall from Stockyard B to the anabranch

The new stormwater settlement pond and stormwater outfall will be contained within the approved Project footprint. The settlement pond works will involve excavation of previously deposited dredged materials and the outfall will require excavation of some soils however, the potential impacts from this change are considered minor, and are not expected to impact upon the groundwater regime within the area.

Construction of both stormwater settlement ponds within Stockyard B are not proposed to intrude upon the water table within the region and is therefore unlikely to result in impacts to the water table level or potential contamination. Furthermore, the settlement ponds are proposed to be lined with a clay lining material which will prevent the redistribution of settled material from the pond base.

10.7.3 Change in yard type on eastern half of Golding Point from Bridge - Stacker to Stacker-Reclaimer

The change in yard type on the eastern half of Golding Point will wholly be contained within the approved EIS footprint. This change will result in fewer disturbances within the region as the reclaim tunnels are no longer proposed. Construction of the Stacker-Reclaimer within this location will require minimal excavation of previously laid dredge material. It is unlikely that excavation will impact upon the water table within the region.

Any potential impacts arising from construction of the Stacker-Reclaimer stockyard Golding Point during WEXP2 will be avoided, mitigated or managed in accordance by measures

outlined in the Construction Environmental Management Plan (CEMP) for the WICET Project.

10.8 Mitigation measures

On the basis of the groundwater assessment undertaken, the overall potential impact of construction of the modified Project expansions (WEXP1 and WEXP2), in addition to the unmodified Stage 1 of the Project, on the groundwater regime is expected to be minor.

As it has been assessed that there will be no impact on groundwater dependent ecosystems or other groundwater users, management and mitigation options are only considered to be required with respect to groundwater drawdown and ASS, and for monitoring of potential contamination post construction.

The CEMP contains the mitigation measures that will be implemented onsite during construction and excavation activities to prevent causing environmental harm to the water table as a result of the overall WICET Project.

Current background groundwater monitoring will be continued throughout construction to monitor groundwater levels and to determine the potential for oxidation of PASS. Should oxidation of PASS occur as a result of construction activities, ASS material will be treated in accordance with the Project ASS Management Plan (refer Chapter 4 and Appendix 23.4).

10.9 Conclusions

The groundwater regime of the WICET footprint and surrounds consists of two broad aquifer types; alluvial aquifers and fractured rock aquifers. The majority of the Project area is low lying and consists of coastal alluvial sediments, generally clayey in nature, but with minor sandy and gravely lenses. These sediments contain brackish to saline groundwater. Groundwater also occurs in floodplain and river terrace alluvium associated with the Calliope River. These deposits are also generally very clayey, and as the river is tidally influenced in the area, groundwater in these deposits is also saline to brackish.

Fractured rock aquifers, which are of generally low permeability, outcrop at Golding Point and form the hills to the west. They also underlie the whole of the alluvial area. Groundwater quality in the fractured rock aquifers forming the western hills is probably fresh to slightly brackish, whereas in the Golding Point area, it is expected to be brackish.

The proposed changes, associated with WEXP1 and WEXP2, to the WICET design proposed post WICT EIS and SEIS are not expected to result in increased disturbance to groundwater resources within the area, as the expansion phases are wholly contained within the Project footprint approved under the WICT EIS (refer Appendix 1).

The addition of the new stormwater storage pond and outfall within Stockyard Area B and the proposed extension of the southern stormwater storage pond in Stockyard Area B will not intrude upon the water table in the region and as such are unlikely to impact upon the groundwater regime in the region.

A change in yard type at Golding Point from a Bridge Stacker, to a Stacker-Reclaimer will reduce previously proposed impacts to the water table as the reclaimer tunnels will no longer be required.

Conclusion 1: Changes to the WICET Project as a result of WEXP1 and WEXP2 are not expected to significantly alter the potential impact upon groundwater regimes in the region.

11. Coastal environment

11.1 Summary

The changes proposed as part of WEXP1 and WEXP2 will not result in an increase to potential impacts on the coastal environment.

There is no proposed change to the approved dredging, as included in the WICT EIS and SEIS. It is therefore expected that proposed changes will not alter the findings and conclusions of the impact assessment undertaken as part of the WICT EIS and controlled action approval process.

Total volume of sediment dispersal and settlement during construction and operation of the change Project is not expected to significantly alter potential impacts upon aquatic communities. It should be noted that the majority of impacts to the coastal environment will be addressed as part of Stage 1 works.

11.2 Introduction

This chapter provides a description of the potential impacts of the changed Project on the coastal environment. Potential impacts of the WICET Project on the surrounding coastal environment were originally outlined in the WICT EIS and SEIS. This assessment focuses on the tidal hydrodynamics, marine sediments and coastal processes of the Port Curtis coastal region. Proposed changes to the Project as part of WEXP1 and WEXP2 are wholly contained within the Project footprint approved under the WICT EIS. It should be noted that the majority of impacts to the coastal environment will be addressed as part of Stage 1 works.

11.3 General description

The Port Curtis region (refer Figures 16.1 and 16.3 in Chapter 16) is situated at the transition between the tropics and subtropics in Central Queensland on the eastern coast of Australia. The region is characterised by extensive areas of tidal flats that become exposed at low tide and large areas of mangroves fringing the estuary which act as a storage buffer for water at high tide. These mangroves and tidal flats have ecological significance, being home to numerous aquatic fauna and flora. The region also contains stands of seagrass beds, notably Rodds Bay in the south, which attracts marine mammals such as dugongs to feed. Further details of the marine and coastal ecology and potential impacts are discussed in Chapter 16.

The Port Curtis area has a very large tidal range (in excess of 4 m for large spring tides) and extensive mangrove and tidal flats which become available for tidal storage at higher tidal levels as outlined above. This generates significant current velocities particularly within the main channel, with associated tidal flushing which leads to particularly well mixed waters.

The Port of Gladstone has been established in the naturally sheltered waters of Port Curtis behind Facing and Curtis Islands to the east and north. Port Curtis is connected to the ocean via a major opening to the south of Facing Island (South Channel), a smaller opening between Facing and Curtis Islands (North Channel) and The Narrows which extend some 40 km to the north behind Curtis Island. Port Curtis is a naturally protected deep water harbour and as such, is the largest port in Queensland. The bathymetry in the harbour has been modified by the development of shipping channels, land reclamation and coastline armouring. Maintenance dredging of the shipping channels occurs regularly, with the dredged material being disposed of ashore or deposited at a location approximately 9 km south east from Facing Island. Gladstone Ports Corporation (GPC) is the governing body responsible for the management of all dredging projects within the port.

The interchange of tidal waters between the estuary and the ocean varies greatly between extreme neap and extreme spring tides. In the area between Curtis Island and Facing Island

there are large tidal flats which become exposed at low water. For very low tides, the whole area reduces to several narrow meandering channels connecting to North Entrance and to Facing Channel.

Holocene aged estuarine deposits overlying rock of the Wandilla Formation of Early Carboniferous age underlie the coastal flats on which the onshore facilities are located. The tidal flats that skirt the coastline feature mangrove swamps and muds comprised of soft organic silts and clays. Those locations situated within the proposed WICET offshore jetty, berthing and channel facility areas consist of alluvial sediments carried down the Calliope River. These typically consist of alluvial sand and gravel deposits and older silts and clays.

Geotechnical surveys commissioned to inform the design of the Project (Douglas Partners 2006) demonstrated that the gravels within the sediments are predominantly hard rock in origin and that the upper levels are likely to be alluvial. The geotechnical results are discussed in Section 11.4.1, while ASS and the potential impacts of their release to the system are included in Chapter 4.

11.4 Investigations and hydrodynamic modelling

For the purpose of the proposed development a number of geotechnical, ASS, hydrodynamic and plume dispersion modelling studies were commissioned as part of the WICT EIS and detailed design process for the Project. Additional dredging plume dispersion modelling was also undertaken in 2011 as part of the Gladstone Western Basin Dredging and Disposal Project (WBDDP). Cumulative impacts of dredging from the WICET Project and the WBDDP were contained in the EIS (refer Appendix 1). Reports relating to the coastal environment of the Project are outlined in Table 11.1.

Table 11.1 Coastal reports relevant to the WICET Project

Name	Date
Connell Hatch: Preliminary Onshore Acid Sulfate Soil Investigation and Management Plan - Wiggins Island Coal Terminal	8 November 2006
Douglas Partners: Report on Geotechnical, Environmental and Acid Sulfate Soils Investigation, Proposed Offshore Works Wiggins Island Coal Terminal Gladstone, prepared for Central Queensland Ports Authority (Volume 1&2)	24 October 2006
Douglas Partners: Report on Geotechnical, Environmental and Acid Sulfate Soils Investigation, Proposed Offshore Works – Stage 2 Wiggins Island Coal Terminal Gladstone, prepared for Gladstone Ports Corporation	18 March 2009
WBM: Numerical Modelling – Hydrodynamic, Plume Dispersion, Sediment Transport and Waves	2006
WBM: Gladstone Western Basin (including WICET Project) Dredging Plume Dispersion Modelling	25 January 2011

11.5 Description of environmental values

The proposed WICET Project is located to the north and west of the Calliope River near its downstream connection with Port Curtis. The proposed coal terminal berths are located adjacent to Targinnie Channel in the main body of Port Curtis to the north west of the Calliope River entrance. Dredging will be required for the approaches, berths and swing basin as described in Section 11.6. The proposed jetty extends out across the intertidal flats, while the dredging dewatering bunds, coal stockyards and conveyors occur predominately on the upper intertidal saltpan regions adjacent to the anabranch of the Calliope River.

Marine sediments

Section 11.3.4 of the WICT EIS focuses on the physical and chemical characteristics of marine sediments and potential impacts resulting from the dredging and operational aspects of the development. Geotechnical and environmental investigations were undertaken by Douglas Partners in 2006 and 2008.

A Dredge Management Plan (DMP) for the WICET Project has been prepared (WICET DMP Rev6, 21 September 2011, refer Appendix 23.18) for the dredging works and has recently been amended to include changes to dredging methodology, including proposed WEXP1 dredging. The DMP was approved by DEHP on 13th April 2012.

11.6 Dredging

11.6.1 History of Dredging Projects

Knowledge of the history of dredging and siltation is important with respect to the potential mobility of the sediments and likely future siltation rates. There is a long history of dredging and dredged material disposal in both onshore and offshore locations at the Port of Gladstone. All material to be dredged in recent years has had sampling and analysis undertaken prior to dredging and all material has been determined as suitable for its intended disposal location. The most recent dredging programmes were:

- Capital dredging Targinnie Channel, Berth 2 and approach apron at Fisherman's Landing
- Capital dredging of the Fourth Berth at RG Tanna Coal Terminal (2005)
- Capital dredging of Berth 1 and approach channel at Fisherman's Landing (2008 and 2009)
- Maintenance dredging of the shipping channels, swing basins and berths (annually in October/November; most recent sampling 2006)
- Maintenance dredging for the Gladstone Marina (2009)
- Western Basin Dredging and Disposal (Onshore and Offshore) Project (2011-currently ongoing, refer Section 11.6.2)

Maintenance dredging is typically carried out in the port on an annual basis in different areas as needed. From 1996 maintenance dredging of 100,000 m^3 has occurred every year (Source: Gladstone Ports Corporation). Historical dredging volumes within the Gladstone Port are summarised in Table 11.6.

Table 11.6 Historical Dredging Volumes

Date	Location	Volume
1960-66	Auckland Point berths, Barney Point berths and harbour channel	A significant volume
1968	Entrance channel	Further deepening
1980-82	Approach channels to Clinton and Fisherman's Landing, as well as the Marina	20 Mm^3
1986-87	Inner harbour channels widened and berths deepened	3 Mm^3
1987	Outer channel	2.5 Mm^3
1997	Fisherman's Landing	1 Mm^3
1997	Outer channel	1 Mm^3
1998	Inner channel swing basin	2 Mm^3
1999	Inner channel	2 Mm^3
2001-03	Berth 3 at RG Tanna Coal Terminal and Fisherman's Landing including deepening of Targinnie Channel and Clinton Bypass Channel	2 Mm^3
2005	RG Tanna Coal Terminal berth 4	0.75 Mm^3
2008-09	Fisherman's Landing berth pocket and approach	0.66 Mm^3
2009-10	Gladstone Marina	350,000 m^3

Source Gladstone Ports Corporation

The relatively small quantities of maintenance dredging results in minimal siltation. This in turn is an indicator that there is limited sediment transport and/or that the currents/ship movements are sufficient to keep the sediments in suspension and not settle out in the

dredged areas. Examination of historical hydrographic surveys also confirms minimal siltation.

11.6.2 Western Basin Dredging

GPC is currently working to establish facilities to support the emerging Liquefied Natural Gas (LNG) industry that are to be located in the Gladstone region (including APLNG, QCG, and GLNG projects). This includes the inner harbour dredging associated with deepening and widening of existing channels and swing basins, and the creation of new channels, swing basins and berth pockets.

The Western Basin Dredging and Disposal (onshore and offshore) Project (Western Basin Project) will accommodate the long term dredging and dredged material disposal required to provide safe and efficient access to the existing and proposed port facilities in Gladstone Harbour. The Western Basin Project, as approved by Commonwealth and State Governments in October 2010, specifically involves:

- The inner harbour dredging associated with deepening and widening of existing channels and swing basins, and the creation of new channels, swing basin and berth pockets
- Approximately 25 Mm³ of dredge material will be dredged from the Western Basin Project dredge area
- Disposal of the dredged material from the above dredging works in the Fisherman's Landing Northern Expansion (FL153) and Western Basin Reclamation Area
- Disposal of up to 11 Mm³ of the dredge material discussed above in the existing GPC approved offshore East Banks Sea Disposal Site (EBSDS)

11.6.3 Proposed WICET dredging works

There are no changes proposed to the approved dredging, as included in the WICT EIS and SEIS as part of the WEXP1 and WEXP2 changes.

The staged dredging works will involve the initial dredging of approximately 3.32 Mm^3 of material (excluding over-dredging) from within the Port of Gladstone, to allow for the construction of the coal terminal, comprising of three berth pockets, swing basin and departure/arrival channels for the three berths. Dredging for Berth 1 is included within the WICET Stage 1 works package. The dredging of Berths 2 and 3 and departure/arrival channels are part of WEXP1 works. The dredging of Berth 4 and departure channel is part of the WEXP2 works.

Table 11.7 details the dredge quantities for the initial dredging campaigns.

Table 11.7 Dredge quantities in relation to the Project component

Dredging component	Description	Volume (Mm³)
Stage 1	Berth 1 including swing basin and departure/arrival channel	2.28
WEXP1	Berths 2 and 3 including departure and arrival channels	1.04
WEXP2	Berth 4 including arrival channel widening	1.2
Total (excluding over-dredging)		**4.5**

Future dredging works for Berths 5 and 6 (non-coal berths), giving an ultimate dredging volume of 6.3 Mm^3, are approved through the WICT EIS and EPBC Act controlled action approvals. In the event of future dredging works, separate DMPs will be submitted to DEHP and SEWPaC for approval.

11.7 Conclusion

There is no change to the approved dredging, as included in the WICT EIS and SEIS. The staged dredging works proposed as part of the Project will involve the initial dredging of

approximately 4.8 Mm^3 of material (excluding over-dredging) from within the Port of Gladstone, to allow for the construction of the Stage 1 and WEXP1 components of the coal terminal. Dredging for Berth 1 is included in the WICET Stage 1 works package. Dredging for Berths 2, 3 and 4, including arrival and departure channels, is part of WEXP1 and WEXP2 works. Future dredging works include the Industry (non-coal) Berths 5 and 6.

The WICET DMP was approved by DEHP on 13th April 2012 and outlines potential impacts that the initial dredging works will have on the surrounding coastal environment and mitigation measures to manage these impacts. The future dredging works will be addressed through separate DMP(s).

The proposed new changes to the Project will not result in changes to the approved dredging footprint, dredged material volumes or placement location. It is therefore expected that proposed changes will not alter the findings and conclusions of the impact assessment undertaken as part of the WICT EIS and controlled action approval process.

Conclusion 1: There is no change to the approved dredging, as included in the WICT EIS and SEIS.

Conclusion 2: Total volume of sediment dispersal and settlement during construction and operation of the change Project is not expected to significantly alter potential impacts upon aquatic communities.

12. Air quality

12.1 Summary

The changes proposed as part of WEXP1 and WEXP2 are not expected to result in an increase impacts to air quality (particulate matter) with in the Gladstone region.

Air quality monitoring undertaken as part of the EIS Change Request process predicted that cumulative 24-hour average ground-level PM_{10} concentrations are predicted to exceed the EPP (Air) objective of 50 µg/m³ at the Gladstone Marina, located 2.5 km east of WICET, on seven occasions. However, this is due to existing industries and background concentrations. The contribution of the WICET Project to the exceedences is predicted to be between 0.02% and 4.1% This presents a minor increase (1.1%) in the Project contribution from the modelling undertaken in the WICET SEIS, which predicted a contribution of <3% to maximum 24-hour average PM_{10} concentrations in Gladstone.

No further cumulative exceedances of particulate matter are expected as a result of construction or operation of the changed Project (including Stage 1, WEXP1 and WEXP2).

Any impacts associated with the changes to the Project will be managed in accordance with the AQMP approved by DEHP.

12.2 Introduction

Katestone Environmental was commissioned to undertake an air quality assessment to inform the WICET Project Change Request (Appendix 12.1, Katestone Environmental: Air Quality Assessment of the Wiggins Island Coal Terminal Expansion Project (Draft), October 2011).

Katestone Environmental previously prepared an air quality assessment for the WICT EIS in 2006, and an additional assessment in the SEIS (2007) to incorporate changes to the design of the WICET.

The air quality assessment undertaken by Katestone Environmental for the Project Change Request assessed the approved WICET Stage 1 facility and the WEXP1 and WEXP2 expansion phases collectively. The air quality assessment also outlines the changes in potential air quality impacts between the Project assessed under the EIS process and WICET Project described in this Change Request. A summary of the assessment is provided below.

This Request for Project Change provides an updated assessment to address changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and EPBC Act controlled action approval (April 2008).

12.3 Air Quality Assessment

The air quality assessment has used a meteorological and dispersion modelling assessment to investigate the potential for air quality impacts associated with the Project. Emission rates of TSP, PM_{10} and $PM_{2.5}$ from the Project have been calculated using emission factors published by the US-EPA and NPI and operational parameters provided from the Project Technical Feasibility Study. CALPUFF dispersion modelling has been conducted to predict the ground-level concentrations of TSP, PM_{10} and $PM_{2.5}$ and dust deposition rates at nearest sensitive receptors and across a Cartesian grid.

A cumulative assessment has been conducted to assess the impacts of the Project in conjunction with emissions from the existing RGTCT, BPCT, the coal stockpiles at Gladstone Power Station, and ambient background levels based on representative monitoring data in the region. Emissions from RGTCT, BPCT and Gladstone Power Station were modelled explicitly in the CALPUFF dispersion model.

Predicted cumulative ground-level concentrations of TSP, PM_{10} and $PM_{2.5}$ and dust deposition rates at nearest sensitive receptors were compared against the relevant Queensland air quality objectives.

An assessment of the dispersion meteorology has shown the following:

- The site is dominated by moderate to strong winds, with an average wind speed of 3.8 m/s. Approximately 46% of winds between 2 and 4 m/s and a further 34% of winds are between 4 and 6 m/s
- Dust emissions from fugitive sources are essentially zero at low wind speeds and will remain so until the wind speed exceeds a threshold that is specific to the particular source but is generally found to be above about 5 to 6 m/s. Approximately 9% of the winds at the site are predicted to be greater than 6 m/s (12 Kts)
- The prevailing wind direction at the site is from the east-northeast to south-southeast, with 66% of winds predicted to occur from these sectors

The cumulative air quality impact assessment of the WICET Stage 1, WEXP1 and WEXP2, that included emissions from the existing RGTCT, BPCT and Gladstone Power Station operations as well as ambient background levels based on monitoring data in the region, has shown the following:

- The cumulative 24-hour average ground-level PM_{10} concentration is predicted to exceed the EPP (Air) objective of 50 µg/m³ at the Marina, located 2.5 km east of WICET, on seven occasions
- The exceedances of the 24-hour average PM_{10} EPP (Air) objective of 50 $\mu g/m^3$ at the Marina are attributed to the existing industries and elevated background concentrations. The contribution of the Project to the exceedances is predicted to be between 0.02% and 4.1%. This presents a minor increase (1.1%) in the contribution to exceedences from the modelling undertaken in the WICET SEIS, which predicted a contribution of <3% to maximum 24-hour average PM_{10} concentrations in Gladstone
- The predicted cumulative maximum (6^{th} highest) 24-hour average ground-level concentrations of PM_{10} at all remaining sensitive receptors are well below the EPP(Air) objective
- The predicted cumulative annual average ground-level concentrations of TSP at all receptors are well below the EPP (Air) objective of 90 µg/m³
- The predicted cumulative maximum 24-hour and annual average ground-level concentrations of $PM_{2.5}$ at all receptors are well below the EPP (Air) objectives of 25 $\mu g/m^3$ and 8 $\mu g/m^3$, respectively
- The predicted contribution of the Project to ground-level concentrations of TSP, PM_{10} and $PM_{2.5}$ at the nearest sensitive receptors is between 0.2% and 10.7%
- The predicted cumulative maximum monthly and annual average dust deposition rates at all sensitive receptors are well below the DEHP recommended guideline of 120 mg/m^2/day (monthly average) and NSW OEH amenity guideline of 4 g/m^2/month (133 mg/m^2/day) (annual average)
- The predicted contribution of the Project to dust deposition rates at the nearest sensitive receptors is between 0.1% and 2.3%

Air quality assessment results for WICET Stage 1, WEXP1 and WEXP2 are similar to those of the assessment undertaken in the EIS and SEIS, which included assessment of the maximum capacity of 84 Mtpa.

12.4 Mitigation Measures

The proposed WICET Project (including WEXP1 and WEXP2) will employ a range of best practice measures for controlling dust emissions. These have been accounted for as far as is possible in the emissions estimation given the availability of emissions data.

12.4.1 Design

Mitigations measures that have been included as part of WEXP1/WEXP2 or are to be investigated during detailed design include, but are not limited to:

- Reclaiming system at Stage 1 facility designed to minimise bulldozing
- Stacking and reclaiming at WEXP1 and WEXP2 expansion areas to occur via rail mounted long travelling, slewing and luffing boom type stacker reclaiming machine with a rotary bucket wheel reclaim system, removing the need for bulldozing. The design of the luffing boom will minimise dust emissions from stacking by reducing effective drop height of the coal to the stockpile. Water sprays to product discharge will also be used
- Surge bins will be fully enclosed with mechanical dust extraction and bag filter. Water addition stations will also be used on elevating section prior to sample station and surge bins
- Enclosure of all transfer points and installation of dust suppression sprays. Partial enclosure of all elevated conveyors
- Extendable dust shroud or telescopic chute for stacking at Stage 1 facility. The extendable dust shroud will minimise dust emissions from stacking by reducing the effective drop height of the coal to the stockpile and by reducing the potential for fine coal particles to be entrained in the wind during stacking. The design of the WICET stackers will also ensure that bulldozing is not required for stacking – eliminating a potentially significant source of dust emissions
- Environmental bunds, with vegetated buffers have been designed, primarily for visual amenity, however are expected to result in a reduction in dust emissions leaving the Project site

12.4.2 Construction

Mitigation measures for construction air quality are detailed in the Wiggins Island Coal Export Terminal Air Quality Management Plan (Appendix 23.3). It covers all air quality related issues that are reasonably expected to arise throughout construction, including dust, odours, gas emissions and pollutants, and relates to all air quality affecting aspects at the Project construction site, including related activities of all Contractors and subcontractors. Construction air quality mitigations measures include:

- Implementation of the Air Quality Management Plan prior to construction commencing
- Applying water on all exposed areas by water cart as required to minimise dust emissions, particularly from wheel-generated dust
- Minimising significant dust generating activities during high wind speeds where practicable and unwatered
- Restricting vehicle speeds on unsealed haul roads to reduce dust generation
- Avoiding spillages and prompt cleanup of any that occur
- Covering haul vehicles moving outside the construction site
- Stockpiled material should be treated appropriately to prevent wind erosion from the prevailing easterly wind direction
- Regular cleaning of machinery and vehicle tyres will prevent track-out of dust to public roads
- Minimising licensed onsite burning or incineration
- Ensuring that roads are appropriately surfaced as soon as possible after the commencement of site activities
- Routing roads away from sensitive areas wherever possible
- Revegetating disturbed areas as soon as possible
- Vehicles and equipment are to be appropriately maintained to minimise air emissions
- Visual monitoring of dust. Dust deposition gauges will be installed at nearby residences in receipt of a dust complaint

12.4.3 Operation

Mitigations measures that will be included as part of the operation of WEXP1 and WEXP2 include, but are not limited to:

- In high winds water cannons become ineffective at dust suppression. A secondary suppression system will be used in these conditions that utilises a mist curtain. The mist curtain enhances deposition of dust by impaction of the dust particles
- Mechanical dust extraction and bag filter installed on rail dump hoppers
- Ensure high moisture content of coal arriving from mines and the ability to add between 1.5% and 2% additional moisture at each dump station through water sprays
- Wet down of stockpile surfaces. The final stockyard design will have 116 water cannons each with a radius of throw of 76 m. The water cannons will wet down the surface of the stockpiles to form a surface crust that inhibits the wind erosion of dust
- Dust emissions during shiploading will be reduced through the enclosure of shiploader boom on two sides, sealing of shiploader drive floor to capture spillage, and the insertion of the loading chute into ships hold during loading
- The environmental bunds, with vegetated buffers, primarily for visual amenity, are expected to result in a reduction in dust emissions leaving the Project site

12.5 Conclusion

12.5.1 Construction

Air quality impacts generated during construction of WEXP1 and WEXP2 are expected to be similar to that of WICET Stage 1, and as such are not expected to increase impacts on sensitive receptors.

Air quality during construction will be managed though the Air Quality Management Plan (Appendix 23.3).

12.5.2 Operation

The air quality assessment for the EIS and SEIS included the assessment of the maximum capacity of the facility, ie 84 Mtpa. The air quality assessment results for WICET Stage 1, WEXP1 and WEXP2 are similar to those of the assessment undertaken in the EIS and SEIS, any impacts on sensitive receptors are not expected to increase.

Air quality monitoring undertaken as part of the EIS Change Request process predicted that cumulative 24-hour average ground-level PM_{10} concentrations are predicted to exceed the EPP (Air) objective of 50 µg/m³ at the Gladstone Marina, located 2.5 km east of WICET, on seven occasions. However, this is due to existing industries and background concentrations. The contribution of the WICET Project to the exceedences is predicted to be between 0.02% and 4.1% This presents a minor increase (1.1%) in the Project contribution from the modelling undertaken in the WICET SEIS, which predicted a contribution of <3% to maximum 24-hour average PM_{10} concentrations in Gladstone.

Air quality during operation will be managed through an Operational Air Quality Management Plan, to be developed prior to operation commencing.

Conclusion 1: Air quality monitoring predicted that cumulative 24-hour average ground-level PM_{10} concentrations are predicted to exceed the EPP (Air) objective of 50 µg/m³ at the Gladstone Marina on seven occasions. However, this is due to existing industries and background concentrations. The contribution of the WICET Project to the exceedences is predicted to be between 0.02% and 4.1% This presents a minor increase (1.1%) in the Project contribution from the modelling undertaken in the WICET SEIS, which predicted a contribution of <3% to maximum 24-hour average PM_{10} concentrations in Gladstone.

Conclusion 2: No further cumulative exceedances of particulate matter are expected as a result of construction or operation of the changed Project (including Stage 1, WEXP1 and WEXP2).

Conclusion 3: Any impacts associated with the changes to the Project will be managed in accordance with the AQMP approved by DEHP.

13. Waste

13.1 Summary

A modest increase in waste (of that originally predicted in the EIS and SEIS) will be generated during construction. This is largely due to the expansion phases requiring a slight increase in construction intensity compared with that estimated in the EIS and SEIS.

All waste materials generated during construction and operation will be managed in accordance with the WMP and the WICET OEMP respectively (refer Appendix 13 and 23). As such, there are no additional waste related impacts to the surrounding environment expected as part of the WEXP1 and WEXP2 changes.

There are no changes to the waste management processes approved under the WICT EIS, as a result of WEXP1 and WEXP2.

13.2 Introduction

This chapter provides a description of the potential impacts of waste generated by the changed Project. Potential impacts of waste within the WICET Project area were originally outlined in the EIS and SEIS. This Change Request provides an updated assessment to address potential changes to the Project.

This Request for Project Change provides an updated assessment to address changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and EPBC Act controlled action approval (April 2008). Proposed changes to the Project as part of WEXP1 and WEXP2 (previously Stage 2 and Stage 3) are wholly contained within the Project footprint approved under the EIS and areas subsequently approved for WICET Stage 1). It should be noted that the majority of impacts from waste will be addressed as part of Stage 1 works.

13.3 Legislative Requirements

The Queensland legislation, regulations and guidelines for waste management include the following:

- *Environmental Protection Act 1994* (EP Act)
- *Environmental Protection Regulation 2008*
- *Environmental Protection (Waste Management) Policy 2000* (EPP(Waste))
- *Environmental Protection (Waste Management) Regulation 2000*
- Waste Management Strategy for Queensland 1996

The *Environmental Protection Regulation 1998* is subordinate to the EP Act. The EPP(Waste) and the *Environmental Protection (Waste Management) Regulation 2000* aim to achieve the objectives of the EP Act by providing additional strategies and guidelines. The policy sets the legislative framework outlined within the waste management strategy.

This framework includes:

- Adoption of the waste management hierarchy
- Assigning responsibility for waste management
- Outlining specific mechanisms for waste management planning
- Outlining state government responsibilities for waste management
- Implementing a review system for the policy

The objective of the EPP (Waste) is to protect Queensland's environment according to the principles of Environmentally Sustainable Development (ESD) as defined in the EP Act.

13.4 Proposed Waste Management during Construction and Operation of WICET

Wastes will be generated both during the construction and operational phases of the Project. This section describes the potential waste production and management during these phases and provides an indicative waste inventory through the identification of likely waste streams. There are no proposed changes to the waste management processes approved under the WICT EIS, as a result of WEXP1 and WEXP2.

The WICET Waste Management Plan (WMP) (refer Appendix 13.1) has been prepared to mitigate the impacts of wastes generated during the construction phase of the Project. The WMP was approved by DERM (now DEHP) in June 2011. Included in the WMP is an outline of proposed waste management strategies, having regard to the *Environment Protection (Waste Management) Policy 2000* principles of the waste management hierarchy of waste avoidance, reuse, recycling, treatment and disposal.

Where solid or liquid wastes are to be disposed of offsite, the following details are provided in the WMP:

- Typical facilities (locations) to which wastes would be sent for disposal
- Target rates of recycling
- Indication of how the transport of wastes from the site to the disposal facility will be undertaken
- Methods for the disposal of hazardous wastes and materials in the event of an accident/incident
- Onsite storage and treatment requirements for wastes, including waste receptors as per ANZECC guidelines
- The impact waste may have on the environment

The waste management strategies also consider segregation of waste, storage of waste, monitoring and reporting programmes, and cleaner production programmes.

13.4.1 Waste Streams

As outlined in the WICT SEIS (Appendix 1), the waste streams produced during the construction and operational phases of the Project will be distinctly different. During the construction phase, quantities of waste with varying compositions could be generated from activities including materials supply, maintenance of construction equipment and construction site/amenities and miscellaneous structures.

Minimal waste is expected to be generated from bulk earthworks (including cut and cover and directional drilling) as any excavated material is intended to be re-used onsite for construction and filling activities.

Ship Waste

Ship waste generated during construction and operation activities will be collected in accordance with the certified agreement between the Australian Quarantine and Inspection Service and GPC.

Demolition Wastes

Any wastes generated during the WICET expansion from demolition works, additional to those generated from WICET Stage 1, will be handled in line with the approved WMP and will be reused and recycled where possible.

Excavation Wastes

In areas that involve excavation activities, directional drilling and cut and cover will have spoil as one of the major waste streams. Management of the spoil, (eg storage, re-use and

disposal) will largely depend on spoil quality. Clean spoil will be managed through onsite reuse sites, reuse within other project areas or as engineered fill. Further waste management strategies will focus on the prevention of dust and wind erosion, sediment runoff, and the spread of weeds or other pathogens.

Regulated wastes generated during the demolition activities such as contaminated land and ASS will be reused or recycled where possible or disposed of in accordance with the WMP. The potential presence of ASS and contaminated soils has been discussed and assessed in further detail in Chapter 4.

Packaging Materials

Materials delivered to site often come with packaging materials. This consists largely of timber pallets, crates, cartons, plastics, and wrapping materials, all of which need to be disposed of once the product has been utilised. It should be noted that minimisation of packaging of raw products will be strongly encouraged.

Stormwater Runoff from the Construction Site

During periods of rainfall, runoff has the potential to become contaminated prior to its discharge from the site if not appropriately managed. Also, stormwater can result in siltation of the drainage system and offsite impacts if appropriate sediment and erosion controls are not implemented. This issue is discussed in Chapter 9.

As the rail maintenance and provisioning facility is no longer part of the WICET Project, a wastewater treatment plant will only be constructed as part of the coal Terminal requirement. The location and design of the facility will be finalised during detailed design along with the necessary license conditions.

Wastes from Operation of Construction Equipment

Various heavy vehicles and construction equipment will be utilised for the duration of the construction phase. Liquid hazardous wastes from cleaning, repairing, and maintenance of this equipment will be generated. Likewise leakage or spillage of hydrocarbons and chemicals during construction needs to be managed and disposed of appropriately. Regulated wastes such as tyres, batteries and hydrocarbons will be reused or recycled where possible or disposed of in accordance with the WMP.

Non-hazardous Liquid Wastes

Non-hazardous liquid wastes will be generated through the use of workers' facilities such as toilets and kitchen facilities. Where possible facilities will be connected to the Gladstone Regional Council sewerage system, however where this is not available an appropriate liquid waste disposal systems will be utilised.

Sewage within the operational Terminal will be processed through a packaged sewage treatment plant established during Stage 1 and the treated effluent will be irrigated to designated landscaped zones. Sewage at the rail receival will be pumped to a septic holding tank during Stage 1 which is to be periodically emptied via a vacuum truck. The Stage 1 sewage treatment plant is also capable of servicing requirements for WEXP1 and WEXP2. No direct piping to the sewage treatment plant will be provided for the permanent and temporary WEXP1 and WEXP2 crib and ablution facilities.

Sewerage will be stored at these facilities in a 5,000 L holding tank and then trucked to the sewage treatment plant when full, approximately every 3 days based on 60 L/person/day and 27 person allowance. The Stage 1 sewage treatment plant is located adjacent to the south stormwater pond. Treated wastewater will be discharged and stored within this pond.

General Wastes

General wastes include office wastes, scrap materials and biodegradable wastes. Due to the variety of waste streams likely to be generated, sorting and segregation will be undertaken. The “recyclability” of the waste, disposal method, storage requirements and volume will be taken into consideration.

The generation of a detailed waste inventory during both construction and operation will aid in monitoring the movement and correct disposal of wastes. At a minimum, the waste inventory will contain information on the volumes of waste, type of waste, location of the storage area, disposal method, frequency of disposal and any special requirements or warnings regarding the waste. Table 13.1 is a typical example of a waste inventory. Once design and construction details are finalised this inventory can be updated and completed in more detail, as well as being regularly updated during construction and operation.

General waste will be recycled where possible or disposed of in accordance with the WMP.

13.4.2 Construction

The types and quantities of construction wastes and their likely treatment/disposal methods and associated environmental impacts are listed in Table 13.1. These estimates have been adapted from the WICET EIS and SEIS and will be reassessed during detailed design of WEXP1 and WEXP2.

Where possible, the quantity of wastes generated and removed from site will be reduced, with wastes to be segregated and recycled. Onsite reuse of wastes including soil, green waste and concrete is to be undertaken, with wastes associated with materials packaging returned to suppliers wherever possible. Remaining wastes during the construction phase will be recycled or disposed at Council’s landfill where recycling is not feasible. Regulated waste will be removed by a regulated waste contractor.

Waste collection practices will be designed to prevent the site from becoming contaminated by oil or chemical spills during construction. New opportunities to reduce, reuse or recycle waste that may become available throughout the construction period will be incorporated into the waste management strategy.

Should they be required, appropriate disposal permits for the disposal of contaminated soil from site will be obtained in accordance with Section 424 of the EP Act. Disposal permits enable appropriate and legal disposal and tracking of contaminated soil or materials.

A small increase in construction waste, from that predicted in the WICT EIS (Appendix 1), is expected to be generated as a result of WEXP1 and WEXP2 Project.

13.4.3 Coal Terminal Operational Wastes

The types and quantities of coal Terminal operational wastes and their likely treatment/disposal methods and associated environmental impacts are not expected to change from those listed in the EIS and SEIS.

Wastes generated during the operation of the Terminal will be minimised where possible. Onsite reuse of wastes will be undertaken where feasible, and will include wastes such as green waste, pond sediment, concrete, bitumen and timber. Where suitable, wastes will be recycled or treated onsite with non-recyclable items sent to Council’s landfill.

Abrasive blasting has been identified as a potential ERA relevant to the Terminal, and will require approval for of a development permit granted under SPA and a Registration Certificate granted under the EP Act. Waste generated from abrasive blasting will be managed in accordance with the approval conditions.

Sewage from the proposed Terminal will be treated onsite and effluent used for landscape irrigation.

A WICET Operational EMP (OEMP) has been developed and will be implemented during the operational phase of the Project. The OEMP outlines measures to mitigate impacts of waste generated as part of project operations.

Table 13.1 WICET Waste Inventory - Construction (whole of project)

Waste type	Waste characteristic	Project Staging	Source	Estimated quantity (tonnes/annum)	Likely treatment/disposal	Potential environmental impact
Green waste	Inert	Construction	Site clearing	100 Once off	Chipped and used onsite for landscaping	Dust generation
Concrete	Inert	Construction and Operation	Left-overs from concrete pours	250 Over 5 years	Cast into moulds for future use	Transport impacts
General building materials	Inert	Construction	Construction	100 Over 5 years	Gladstone Regional Council landfill	Transport impacts and landfill space
Empty drums and containers – suitable for return to supplier	Regulated if they contain regulated waste products such as paint, oil etc Otherwise inert	Construction and Operation	Supply of chemicals, paint, oil, cleaning agents etc	20	Return to supplier	Transport impacts
Empty drums and containers – suitable for recycling	Regulated if they contain regulated waste products such as paint, oil etc Otherwise inert	Construction and Operation	Supply of chemicals, paint, oil, cleaning agents etc	20	Recycling	Transport impacts
Empty drums and containers – not suitable for recycling	Regulated if they contain regulated waste products such as paint, oil etc Otherwise inert	Construction and Operation	Supply of chemicals, paint, oil, cleaning agents etc	20	Triple rinse on site, crush and puncture prior to disposal in Gladstone Regional Council landfill	Containment and treatment of rinse water, transport impacts and landfill space
Electrical cables	Inert	Construction	Cable off cuts	50	Recycling	Recycling wastes and transport impacts
Timber crates and pallets	Inert	Construction and Operation	Supply of machinery and parts	50	Returned to supplier where possible Remainder chipped and used onsite for landscaping (where possible)	Transport impacts, dust generation
Scrap steel	Inert	Construction	Steel off cuts	200	Recycling	Transport impacts

Waste type	Waste characteristic	Project Staging	Source	Estimated quantity (tonnes/annum)	Likely treatment/disposal	Potential environmental impact
Plastics	Inert	Construction and Operation	Pipe and conduit of cuts	20	Recycle (where possible)	Transport impacts and landfill space
Oil and lubricants	Regulated waste	Construction and Operation	Machinery oil changes and lubrication	2	Recycling	Storage and transport impacts
Oil filters	Regulated waste	Construction and Operation	Vehicle servicing	0.5	Recycling	Transport impacts
Cleaning rags	Regulated waste	Construction and Operation	Vehicle servicing	0.1	Regulated waste contractor	Transport impacts and landfill space
Tyres	Regulated waste	Construction and Operation	Vehicle servicing	10	Regulated waste contractor	Storage and transport impacts, landfill space
Lead acid batteries	Regulated waste	Construction and Operation	Vehicle servicing	0.5	Recycling	Storage and transport impacts
Paints and solvents	Regulated waste	Construction	Painting	0.5	Recycling	Storage and transport impacts
Sewage	Regulated waste	Construction and Operation	Construction workforce	650 people peak	Onsite facilities or Gladstone Regional Council Wastewater Treatment Plant (Yarwun)	Transport and treatment/disposal impacts
Domestic: food, wrapping	General waste	Construction and Operation	Construction workforce	15	Gladstone Regional Council landfill	Transport impacts and landfill space
Domestic: recyclables eg cans, plastic bottles, glass	General waste	Construction and Operation	Construction workforce	15	Recycling	Transport impacts

13.5 Conclusion

The WICT EIS and SEIS (Appendix 1) outlined the various wastes that will be generated both during the construction and operational phases of the Project. These include:

- Ship waste
- Demolition wastes
- Waste water
- Excavation wastes
- Packaging materials
- Stormwater run-off from the construction site
- Wastes from operation of construction equipment
- Non-hazardous liquid wastes
- General wastes

Due to changes proposed under WEXP1 and WEXP2, it is expected that a modest increase (of that originally predicted in the EIS and SEIS) in waste will be generated during construction. This is largely due to the expansion phases requiring a slight increase in construction intensity compared with that estimated in the EIS and SEIS.

The WICET WMP will be implemented during construction to mitigate the impacts of waste generated as part of the Project. In line with the WMP, waste will be segregated and recycled where possible with the aim of reducing the amount of waste being removed offsite.

The WICET Operational EMP (OEMP) will be implemented during the operational phase of the Project. The OEMP outlines measures to mitigate impacts of waste generated as part of Project operations. In line with the OEMP, wastes generated during the operation of the coal Terminal will be minimised where possible. No change in operational waste is expected as a result of the WEXP1 and WEXP2 Project, from that outlined in the WICT EIS (refer Appendix 1).

Conclusion 1: A modest increase in waste (of that originally predicted in the EIS and SEIS) will be generated during construction. This is largely due to the expansion phases requiring a slight increase in construction intensity compared with that estimated in the EIS and SEIS.

Conclusion 2: All waste materials generated during construction and operation will be managed in accordance with the WMP and the WICET OEMP respectively (refer Appendix 13 and 23)

14. Noise and vibration

14.1 Summary

The changes proposed as part of WEXP1 and WEXP2 are expected to result in relevant noise criterion being exceeded at two sensitive receptors during neutral weather conditions, and at 19 receptors in 'worst case' temperature inversion conditions (for overland conveyors with low noise steel idlers and all other conveyors with low noise aluminium idlers)

During 'typical' operating scenarios, it is expected that noise levels at sensitive receptors will be 2-3 dBA lower than predicted in this modelling assessment as it is likely that not all infrastructure and equipment will be operating simultaneously.

Further targeted noise mitigation is likely to be required to avoid these exceedances, subject to the detailed design process and the status of the receivers as residential sites/dwellings. Mitigating measures for construction are contained within the Noise and Vibration Management Plan (NVMP) (refer Appendix 23.13).

14.2 Introduction

SLR Consulting were commissioned to undertake an assessment of the cumulative operational noise levels from WICET – Stage 1, WEXP1 and WEXP2 operation. Details of the noise assessment can be found in Appendix 14.1 (SLR WICET Expansion Project – Stage 1 WEXP1 and WEXP2 Due Diligence Noise Investigation, Rev1, 03 December 2011).

This Request for Project Change provides an updated assessment to address changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and EPBC Act controlled action approval (April 2008).

Construction noise is expected to be similar to that of construction for WICET Stage 1 and as such additional modelling was not undertaken for this Change Request.

14.3 Noise assessment

The residential noise intensity receiver locations assessed in the SEIS (Appendix 1) were assessed again in the Stage 1, WEXP1 and WEXP2 Due Diligence Noise Investigation. The residential noise receiver locations are summarised in Table 14.1 and presented in Figure 14.1.

Table 14.1 Residential noise receiver locations

Receiver	Address	Suburb	Land Zoning and Use
NM-1.	12 Lord Street	Gladstone	Residential B, Dwelling
1-a.	Central Queensland University	Gladstone	Not zoned, Harbour industries-Educational
1-b.	15 Flinders Parade	Gladstone	Special Purposes, Dwelling
1-c.	1 Rollo Street	Gladstone	Residential C, Dwelling
NM-2.	68 Flinders Street	Gladstone	Residential C, Dwelling
2-a.	35 Mylne Street	West Gladstone	Residential A, Dwelling
2-b.	51 Park Street	West Gladstone	Residential C, Dwelling
2-c.	1 Starmer Court	West Gladstone	Residential A, Dwelling
2-d.	7 Dawson Hwy	West Gladstone	Special Business, Motels
2-e.	1 Paterson Street	West Gladstone	Residential C, Dwelling
NM-3.	4 Linhow Crescent	Clinton	Residential A, Dwelling
3-a.	54 Aerodrome Road	Clinton	Residential A Dwelling
3-b.	21 Dunstall Street	Clinton	Residential A Dwelling

Receiver	Address	Suburb	Land Zoning and Use
3-c.	Lot 1 Plan RP614414	Callemondah	Rural A, Large Homesite - Dwelling
3-d.	5 Julius Crescent	Clinton	Residential A Dwelling
3-e.	24 Barrine Close	Clinton	Residential A Dwelling
3-f.	27 Barrine Close	Clinton	Residential A Dwelling
3-g.	4 St Bees Court	Clinton	Residential A Dwelling
NM-4.	65 Stewart Road	Beecher	Rural A, Large Homesite -Dwelling
4-a.	7 Don Young Drive	Clinton	Not Zoned, Large Homesite - Dwelling
4-b.	808 Dawson Highway	Byellee	Rural A, Large Homesite -Dwelling
4-c.	100 Lagoon Rd	Byellee	Rural A, Large Homesite -Dwelling
NM-5.	3 Lindherr Road	Yarwun	Rural A, Large Homesite -Dwelling
5-a.	18 Lindherr Road	Yarwun	Rural A, Large Homesite -Dwelling
5-b.	339 Gladstone-Mt Larcom Road	Yarwun	Rural A, Large Homesite –Dwelling
NM-6	Tide Island	Gladstone	Rural A. Dwelling
6-a.	Turtle Island	Gladstone	Rural A. Dwelling

14.3.1 Operational noise assessment

A summary of the noise assessment undertaken by SLR is provided in the following sections. The full report is attached in Appendix 14.

Neutral weather conditions

The noise assessment found that the revised operational noise levels (for overland conveyors with low noise steel idlers and all other conveyors with low noise aluminium idlers with neutral weather conditions) for all receivers is below the noise criteria (as defined in the SEIS for each receptor) excluding receivers NM-6, which had a result of 55 LAeq (1hour) dBA and 3-c, which had a result of 42 LAeq (1hour) dBA.

This represents an increase of 2 dBA for receptor NM-6 and an increase of 5 dBA for receptor 3-c from the modelling undertaken during the SEIS.

Worst case weather conditions

“Worst case” weather conditions are generally defined as when a steady light breeze blows directly across the WICET site to the receivers and when temperature inversions and atmospheric stability effects are such that noise propagation is optimal.

For overland conveyors with low noise steel idlers and low noise aluminium idlers for all other conveyors, and under “worst case” weather conditions the revised operational noise levels is above the respective noise criterion for 19 of the 27 receivers.

Receivers 1-b, NM-2, 2-a, 2-b, 2-c, 2-d, 2-e, 3-a, 3-c, 3-e, 3-f, 3-g, 4-b, 4-c, NM-6 and 6-a all exceed the relevant noise criteria by 4 dBA or more (refer Appendix 14.1). Targeted noise mitigation measures are likely to be required to avoid these exceedences, subject to the detailed design process and actual operating noise levels.

For overland conveyors with low noise steel idlers and super low noise aluminium idlers for all other conveyors, and under “worst case” weather conditions the revised operational noise levels 3-c, 4-b, 4-c and NM-6 exceed the respective noise criterion by 4 dBA or more. Targeted noise mitigation measures are likely to be required to avoid these exceedences, subject to the detailed design process and actual operating noise levels.

Legend

- Noise Monitorin
- Project Area

Source:
Monitoring Locations: Hegg

Tide Island was purchased by Santos/GLNG in late 2010 and depending on any planned development on the island by Santos/GLNG, or change from a residential dwelling, the relevance of Tide Island as a residential noise receiver will be reviewed during the detailed design stages of WEXP1 and WEXP2.

14.4 Mitigation measures

14.4.1 Design

Potential mitigation measures to be investigated during detailed design of WEXP1 and WEXP2 include, but are not limited to:

- Use of super low noise aluminium idlers for all conveyors other than the overland conveyor
- Acoustic enclosure (full or partial) of overland, surge bin, yard, jetty and wharf conveyors
- Acoustic treatment (such as air conditioning and/or double glazing of windows) of all private dwellings subject to agreement with property owners and land use status of the sites as residential dwellings
- Consultation and negotiation with affected residents
- Discussions to be held with Santos/GLNG regarding the future status of Tide Island as a residential location

Operational noise modelling will be conducted during the detailed design stage of WEXP1 and WEXP2 and will form part of the operational ERA50 (Coal Terminal) development application process.

14.4.2 Construction

Noise

Mitigation measures for construction noise are detailed in the WICET Noise and Vibration Management Plan, a component of the Project CEMP (refer Appendix 23.13).

Vibration

Vibrations levels for construction of WEXP1 and WEXP2 are expected to be similar to those of WICET Stage 1. Based on the predicted vibration levels and safe working distances for WICET Stage 1, no additional mitigation measures are required to reduce vibration levels at residences in the communities surrounding the Project.

During the detailed design phase of the Project building condition surveys will occur for any buildings that fall within the safe working distances for the prevention of cosmetic damage. Further investigations will be undertaken for any structures within and around the safe working distances in order to determine if the “light weight” cosmetic damage criterion (as used for this assessment), is applicable or whether a higher value may be more appropriate.

Operation

The need for mitigation will depend on the severity of impact on sensitive receivers, and the circumstances of its occurrence.

It is expected that, for the majority of noise sensitive receivers, noise emissions from WICET Stage 1, WEXP1 and WEXP2 will be acceptable. This would need to be confirmed with measurement of noise levels post-commissioning.

14.5 Conclusion

14.5.1 Construction works

Noise and vibration generated during construction of WEXP1 and WEXP2 are expected to be similar to that of the Project approved as part of the WICET EIS and controlled action approval process, and as such are not expected to result in an increased noise and vibration impact on sensitive receptors. Construction noise and vibration will be managed though the implementation of the WICET Noise and Vibration Management Plan (refer Appendix 23.13).

14.5.2 Operational noise

The noise assessment found that the revised operational noise levels (for overland conveyors with low noise steel idlers and all other conveyors with low noise aluminium idlers with neutral weather conditions) for all receivers is below the noise criteria (as defined in the SEIS for each receptor) excluding receivers NM-6 and 3-c.

For overland conveyors with low noise steel idlers and low noise aluminium idlers for all other conveyors, and under “worst case” weather conditions the revised operational noise levels is above the respective noise criterion for 19 receivers. Receivers 1-b, NM-2, 2-a, 2-b, 2-c, 2-d, 2-e, 3-a, 3-c, 3-e, 3-f, 3-g, 4-b, 4-c, NM-6 and 6-a all exceed the relevant noise criteria by 4 dBA or more.

As stated in the SEIS, a more “typical” operating scenario is expected to produce equivalent noise levels around 2-3 dBA lower than that predicted in the model as it assumes that everything within the Terminal is operating simultaneously.

Noise mitigation is likely to be required, subject to the detailed design process, actual operating noise levels and the status of the receivers as residential sites/dwellings.

Conclusion 1: Relevant noise criterion are expected to be exceeded at two sensitive receptors during neutral weather conditions, and at 19 receptors in ‘worst case’ temperature inversion conditions (for overland conveyors with low noise steel idlers and all other conveyors with low noise aluminium idlers)

Conclusion 2: During ‘typical’ operating scenarios, it is expected that noise levels at sensitive receptors will be 2-3 dBA lower than predicted in this modelling assessment as it is likely that not all infrastructure and equipment will be operating simultaneously.

Conclusion 3: Noise mitigation is likely to be required where exceedances are expected, subject to the detailed design process and the status of the receivers as residential sites/dwellings. Mitigating measures for construction are contained within the Noise and Vibration Management Plan (NVMP) (refer Appendix 23.13).

15. Terrestrial ecology

15.1 Summary

The proposed changes to the Project (resulting from WEXP1 and WEXP2) will be contained wholly within the Project footprint approved under the EIS, which already has approved clearing permits under State and Commonwealth legislation. No additional clearing (ie outside of the project footprint) is proposed as part of the WEXP1 and WEXP2 changes. Potential impacts on the terrestrial ecology as a result of the changes will be limited to indirect impacts only, and are not expected to be significant.

The changed Project alters the location of potential construction and operational noise, vibration and air quality impacts (addressed in Chapters 12 and 14) which could potentially indirectly impact a different array of adjacent or nearby terrestrial communities than the original design. However, this change is not considered to have a significant impact on terrestrial fauna as the entire development footprint has been addressed in the original WICET EIS/SEIS (Appendix 1) and the changes will not occur outside of this footprint.

Grass trees and Orchids were identified within the WEXP1 Project area. These species are listed as Type A restricted plants under the NC Act and a permit has been obtained from DEHP for their removal as part of the WICET Stage 1 works.

As the footprint of the changed Project is entirely within the existing approved footprint, no additional clearing of potential water mouse habitat will be required for these changes.

15.2 Introduction

This chapter addresses the terrestrial flora and fauna issues for the changed Project, as a result of WEXP1 and WEXP2. Potential impacts to terrestrial flora and fauna within the WICET Project area were originally outlined in the EIS and SEIS (refer Appendix 1). Whilst the Project area has not changed, this Change Request provides an updated assessment to address current legislative requirements and changes to the Terminal design which was approved under the EIS and controlled action approvals.

Reclamation approval has previously been obtained for the areas known as Reclamation Areas A, B and C. GPC has released the approval for Reclamation Area A, as well as relinquished the approval for marine plant removal (17 ha mangroves, and 22 ha seagrass) back to the State as part of the proposed offset strategy for the Project.

It should be noted that the information regarding legislation is current at the time of writing this chapter but may be subject to change. Legislative requirements covered in this request have been cited from:

- *Nature Conservation Act 1992* (NC Act)
- *Nature Conservation (Wildlife) Regulation 2006* (NC Regulation)
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Vegetation Management Act 1999* (VMA)
- *Land Protection (Pest and Stock Route Management) Act 2002*
- *Land Protection (Pest and Stock Route Management) Regulation 2003*
- *Sustainable Planning Act 2009* (SPA)
- *Sustainable Planning Regulation 2009* (SPR)

The currency of such information will be checked during the detailed design stage of the Project and prior to commencement of construction activities associated with the Project area.

15.3 Site Description

The Project area is divided into three areas (refer Figure 15.1) to assist in describing the existing environment and identifying potential impacts and mitigation measures. They are:

- Stockyard Area A; including Golding Point, the proposed onshore terminal infrastructure, proposed offshore jetty, wharf infrastructure and dredge area
- Stockyard Area B; including the intertidal areas of Reclamation Areas B and C, proposed overland conveyor system, as well as Gladstone-Mount Larcom Road
- Dump stations and overland conveyor; including the proposed rail receival dump stations, and overland conveyors extending north-east to the stockyards of Reclamation Area B

15.4 Potential Impacts

15.4.1 Terrestrial Flora

The terrestrial areas of the Project's footprint are located on Reclamation Areas B and C which both have reclamation approval and marine plant removal approval (refer Appendix C2 of the EIS).

The WICET Project is contained entirely within the Project footprint approved under the EIS and as a result, will not require any additional approvals for disturbance to terrestrial flora. Some clearing will be required for the expansion of the existing settlement pond; however this clearing will occur within the existing footprint and already has development approval under the VMA and NC Act.

Regional Ecosystems

The changes to the Terminal design (as a result of WEXP1 and WEXP2) will not create any further impact to the RE disturbance area for WICET, as the infrastructure changes are occurring within the approved development footprint.

15.4.2 Terrestrial Fauna

The proposed changes resulting from WEXP1 and WEXP2 are not expected to have any additional impact on terrestrial fauna which have not already been addressed in the WICT EIS and SEIS (refer Appendix 1). The development footprint and throughput capacity have not increased as a result of the proposed changes, and no additional clearing (ie loss of habitat) outside of the already approved area is required.

The WICET Project will change the location of potential construction and operational noise, vibration and air quality impacts (which are addressed further in Chapters 12 and 14) which may potentially indirectly impact upon a different array of adjacent or nearby terrestrial communities than the original design. However, this change is not considered to have a significant impact on terrestrial fauna as the entire development footprint has been addressed in the original WICT EIS/SEIS and the changes will not occur outside of this footprint.

Potential coal terminal impacts to the adjacent estuarine and marine environments are discussed in Chapter 16.

Significant Areas

The land based terminal component does not encroach upon any protected areas as defined in the *Nature Conservation (Protected Areas) Regulation 1994* (Calliope Conservation Park) or a State Forest listed under the *Forestry Regulation 1998* (Mount Stowe State Forest).

New essential habitat mapped (post SEIS) within the Project area is for the Koala (Southeast Bioregion). It is important to note that the Gladstone LGA is outside of the areas protected under the *South East Queensland Koala Conservation State Planning Regulatory Provision*

Legend

Project Area

(SPRP) and the *State Planning Policy 2/10: Koala Conservation in South East Queensland* (SPP). It is unlikely that the loss of habitat will have a significant impact on this species as no Koala populations were recorded within the Project footprint.

The changed Project will not require any additional clearing of essential habitat areas, as it has remained within the development footprint approved under the WICT EIS.

Other significant areas (ie GBRWHA and GBRMP) within the vicinity of the Terminal are discussed in Chapter 16.

Significant Species under NC Act

The Water mouse (*Xeromys myodies*) was identified during pre-clearing surveys in 2011 undertaken as part of the WICET Stage 1 development. The Water mouse is listed as Vulnerable under the provisions of the NC Act.

Surveys have been conducted in accordance with Commonwealth's Significant Impact Guidelines to determine the presence or absence of Water mouse nesting sites within the WICET Project area. Mitigation measures and construction surveys have been implemented as part of WICET Stage 1, in order to mitigate the Project's potential impact on this species.

No other significant species under the NC Act have been identified within the Project footprint post SEIS.

Significant Species under EPBC Act

The Water mouse, which is discussed in the previous section, is also listed as Vulnerable under the provisions of the EPBC Act.

No other significant species under the EPBC Act have been identified within the Project footprint post SEIS.

Migratory Species

Potential impacts to migratory species include dust, noise and light generation associated with the construction activities, contamination, reduction in the buffering capacity of the area (removal of mangroves) and changes to the drainage patterns (freshwater/tidal influx). These factors can directly and/or indirectly impact on species behaviour. Potential impacts on migratory species associated with dredging activities, lighting, pile-driving and shipping are discussed in Chapter 16.

However, it is unlikely that the Project will have a significant impact on migratory species. Under the EPBC Act, a migratory species is significantly impacted on if a proposal will or is likely to:

- "Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat of the migratory species
- Result in invasive species that are impactful to the migratory species becoming established in an area of important habitat of the migratory species
- Seriously disrupt the life cycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of the species

Information on impacts of historical operations on species behaviour within Port Curtis is also limited (ie the intertidal banks are in close proximity to the RGTCT). This information would assist in determining species recovery (time lags and population size).

Vegetation Clearing

The additional changes being proposed in this request as part of WEXP1 and WEXP2, post WICET Stage 1 will be contained within the original development footprint, therefore no additional clearing beyond the approved Project footprint is required.

15.4.3 Mitigation Measures

The construction activities have the potential to impact on the fauna assemblage inhabiting the Project area. This includes a number of significant species under the NC Act and the EPBC Act. However, the implementation of environmental management and mitigation measures during the design and construction phases of the Project will limit these potential impacts to acceptable levels. The mitigation measures proposed are outlined in Section 15.7.

15.5 Potential Operational Impacts

Activities associated with the operation of WICET have the potential to increase the risk of environmental impacts, including:

- Hazardous substances entering the environment (fuels and chemicals)
- Air emissions (dust and gases)
- Noise and light sources
- Maintenance activities
- Exotic/pest species
- Mortality as a result of vehicles and machinery
- Waste generation
- Waste water/stormwater

The proposed WEXP1 and WEXP2 infrastructure design changes will not change the extent of disturbance; however there will be an alteration in location and source output of the operational noise, vibration and dust sources. These changes are not considered to have a significant increase or change to the impacts on terrestrial ecology.

Mitigation Measures

The operational activities of the WICET Project have the potential to impact on the fauna assemblage inhabiting areas adjoining the Project area. This includes a number of significant species under the NC Act and the EPBC Act. However, the implementation of environmental management and mitigation measures during the operational phase of the Project will limit the impacts to acceptable levels. The mitigation measures are detailed in Section 15.7.

15.6 Clearing Vegetation Approvals

Table 15.7 summarises the vegetation clearing approvals obtained for the Project, and cover the entire Project footprint.

Table 15.7 Summary of vegetation clearing approvals within the Project area

Purpose	Legislation	Subject Land	Details of Approval
Clearing of Native Vegetation	*Vegetation Management Act 1999*	Lots 107/SP241807, 108/SP238408, 110/SP238409, 4/SP200842, 5/SP200840	Approved by DEHP on 4 May 2011 – Permit 2009/011262
Clearing of Protected Flora	*Nature Conservation Act 1992*	Lots 1/SP225922, 100/CTN279, 104/SP228177, 105/SP228177, 107/SP241807, 108/SP238408, 110/SP238409, 2/SP218648, 2/SP225922, 28/CTN279, 4/SP200842, 4/SP218648, 5/SP200840, 98/CTN279, 99/CTN279, Road Reserve, Reid Road	Approved by DEHP on 12 October 2011 – Permit WICL09765211

The remaining remnant vegetation within Reclamation Areas B and C is exempt from requiring a permit for clearing, as it meets the definition of an 'urban purpose' in an 'urban area' under the provisions of the SPR. Therefore it is exempt from requiring a permit under the VM Act.

No additional vegetation clearing approvals will be required as a result of the proposed infrastructure design changes outlined in this request. The changes will occur within the area designated as Reclamation Area B, which is covered by existing vegetation clearing permits outlined in Table 15.7.

15.7 Mitigation Measures

The mitigation measures proposed are provided in Chapter 23 (Coal Terminal EMP), and detailed construction mitigation measures are contained in the WICET CEMP attached in Appendix 23.2.

15.7.1 Design Phase

The following mitigation measures will be implemented during the detailed design phase of WEXP1 and WEXP2 to minimise the impact on the fauna assemblage within the area:

- Coal terminal lighting design to minimise visual impact on adjoining habitats
- Completion of a Landscape and Rehabilitation Management Plan (LRMP) and approval by State and Local Government
- Maximise use of local native species in landscape design

15.7.2 Construction Phase

The mitigation measures contained in the WICET CEMP (refer Appendix 23.2) and below will be implemented during the construction phase to mitigate impacts on flora and fauna assemblages within and adjacent to the Project area.

- Intertidal batters to be stabilised as soon as possible and graded to allow recolonisation by marine plants
- Implement the approved Species Management Plan (SMP) (refer Appendix 23.11)
- Implement the LRMP
- Implement the WICET Pest Management Plan (PMP)
- Disturbed areas including riparian zones, wetlands, significant species, steep slopes and mapped REs to be revegetated and rehabilitated with suitable native species after construction activities have been completed (in accordance with LRMP)

- Suitable native flora species to be used in rehabilitation works
- Monitor the success of the rehabilitation strategies
- Maintenance works are to be carried out within designated area(s) and/or offsite
- Maintenance contractors are to remain on designated tracks and not disturb surrounding vegetation
- Exclude parking of vehicles, storage of plant and equipment and stockpiling from the drip zone of trees where possible
- Heavy machinery and equipment is stored in designated pre-cleared area(s) only
- Machinery and heavy equipment is inspected prior to entering site as per the PMP
- Ensure any imported soil is uncontaminated (abiotic and biotic)
- An Environmental Officer is onsite to address potential issues as required
- Ensure dust suppression mechanisms are in place
- Prepare and implement a Bushfire Management Plan (BMP)
- Implement the WICET ASS Management Plan
- Comply with the conditions of the reclamation approvals
- Mangrove communities adjoining the Terminal will be protected and managed (ie implement a monitoring programme)
- Appropriate signage in prominent positions and site rules modified to reduce speed within the Project area to promote awareness and provide safety for fauna crossing or inhabiting the area
- Site works, such as trenches and excavations, will be designed to ensure fauna are not trapped or likely to be impacted by construction activities
- Construction employees have been made aware of the species inhabiting the area and potential risk
- All native fauna is protected and shall be actively protected as part of construction activities

Operational Phase

The following measures will be implemented to mitigate impacts on flora and fauna assemblages within and adjacent to the Project area:

- Implement a LRMP
- Monitor the success of the rehabilitation strategies
- Maintenance works are to be carried out within designated areas and/or offsite. This should be an area that has been disturbed and/or cleared within the Project area
- Maintenance contractors are to remain on designated tracks and not disturb surrounding vegetation
- Exclude parking of vehicles, storage of plant and equipment and stockpiling from the drip zone of trees where possible
- Heavy machinery and equipment is stored in designated area(s) only
- Machinery and heavy equipment is inspected prior to entering site as per the PMP requirements
- Implement a BMP
- All native fauna is protected and shall be actively protected as part of operations

15.8 Conclusions

The proposed changes to the Project (resulting from WEXP1 and WEXP2) will be contained wholly within the Project footprint approved under the EIS, which has approved clearing permits under State and Commonwealth legislation. Potential impacts on the terrestrial ecology as a result of the changes will be limited to indirect impacts only, and are not expected to be significant.

The Project will change (post Stage 1) the location of potential construction and operational noise, vibration and air quality impacts (addressed in Chapters 12 and 14) which could potentially indirectly impact a different array of adjacent or nearby terrestrial communities than the original design. However, this change is not considered to have a significant impact on terrestrial fauna as the development footprint has been addressed in the original WICT EIS/SEIS (Appendix 1) and the changes will not occur outside of this footprint.

Grass trees (*Xanthorrhoea sp.)* and Orchids (*Cymbidium*, *Docknilia* and *Sarcochilus*) were identified within the WEXP1 Project area. These species are listed as Type A restricted plants under the NC Act and a permit has been obtained from DEHP for their removal. No threatened flora species under the NC Act or EPBC Act were identified within the Project area.

Pre-clearing surveys undertaken in 2011 as part of the WICET Stage 1 development, in the supralittoral and littoral habitat areas, have identified the presence of the Water mouse (*Xeromys myodies*). Surveys are currently being conducted in accordance with Commonwealth's Significant Impact Guidelines to determine the presence or absence of Water mouse nesting sites within the WICET Project area.

As the footprint of the changed Project is entirely within the existing approved footprint, no additional clearing of potential Water mouse habitat will be required for these stages. As such, post Stage 1 WICET construction; no further construction mitigation measures for the Water mouse are proposed.

The implementation of mitigation and management measures during the design, construction and operation of the Terminal should ensure that potential impacts to terrestrial flora and fauna within the area are minimised.

Conclusion 1: The changed Project is wholly contained within the existing Project footprint approved under the WICT EIS, which already has approved clearing permits under State and Commonwealth legislation. No additional clearing (ie outside of the project footprint) is proposed as part of the WEXP1 and WEXP2 changes.

Conclusion 2: Grass trees and Orchids were identified within the WEXP1 Project area. These species are listed as Type A restricted plants under the NC Act and a permit has been obtained from DEHP for their removal as part of the WICET Stage 1 works.

Conclusion 3: As the footprint of the changed Project is entirely within the existing approved footprint, no additional clearing of potential Water mouse habitat will be required for these stages.

16. Aquatic ecology

16.1 Summary

The changes proposed for the Project are not expected to cause a significant change to the disturbance of the aquatic ecology in the area, as the changes relate to infrastructure design and are located within the existing WICET development footprint approved under the EIS. The changes will not increase the intensity or area of disturbance of the Terminal above what has already been approved for the Project.

An additional operational stormwater outlet to the Anabranch from the proposed operational stormwater settlement pond at the western end of Reclamation Area B will result in a minor increase in the cumulative volume of periodic stormwater releases, due to the increase in stockyard catchment area. The additional outlet will assist with the dispersal of stormwater, rather than being restricted to one operational outfall as proposed in the original design. The discharge from this outfall will also be inert, as it will need to fully comply with relevant permits and approval conditions (ie ERA 50).

Any impacts on marine fauna will be managed through the WICET Construction EMP and Species Management Plan.

Reclamation activities, including the clearing of marine vegetation, has commenced as part of the WICET Stage 1 project.

16.2 Introduction

This chapter provides a description of the aquatic ecological communities within the Project area. The assessment focused on the distribution and health of the seagrass meadows, macroalgae, mangroves, benthic fauna, fisheries, and conservational and ecologically significant species and habitats.

This chapter also assesses the potential and likely impacts of the proposed Terminal infrastructure changes on these communities, and recommends mitigation measures to minimise potential impacts.

Potential impacts to aquatic ecology within the Project area were originally outlined in the EIS and SEIS (refer Appendix 1). Whilst the Project area has not changed, this Change Request provides an updated assessment to address current legislative requirements and changes to the Terminal design which was approved under the EIS and controlled action approvals.

16.3 Legislation

The conservation value of aquatic flora and fauna within the immediate vicinity of Wiggins Island area and Port Curtis are recognised by a variety of Commonwealth and State legislation, including the following:

- *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Nature Conservation Act 1992 and Nature Conservation (Wildlife) Regulation 2006*
- *Vegetation Management Act 1999* (VMA)
- *Great Barrier Reef Marine Park Act 1975, Great Barrier Reef Marine Park Regulation 1983 and Marine Parks Act 2004*
- *Sustainable Planning Act 2009* (SPA), *Coastal Protection and Management Act 1995* and Local Government Planning Schemes
- *Fisheries Act 1994 and Fisheries Regulation 2008*

Details of relevant legislation are described within Chapter 5.

16.4 Methodology

The Project area encompasses freshwater, marine and estuarine environments. A detailed assessment of the aquatic biodiversity from a regional perspective (Port Curtis) to a local context (Wiggins Island area) was undertaken during Autumn/Winter 2006 for the WICT EIS (Appendix 1), targeting aquatic species, communities and aquatic habitats that may be affected by the proposed development.

Species of conservation and ecological significance within and surrounding the Project area were also a focus of the aquatic assessment, including habitat/species sensitivity to disturbance. The general habitat types targeted within the assessment included:

- Seagrass communities
- Mangrove communities
- Intertidal and subtidal communities
- Saltmarsh and mudflat communities
- Estuarine communities
- Freshwater communities

Figure 16.1 illustrates aquatic monitoring locations targeted during the WICT EIS ecological surveys.

16.5 Watercourses

The WICET Project area is located in the lower reaches of the Calliope River catchment below the level of tidal influence. The Terminal infrastructure (ie conveyor system) intersects Pyealy Creek sub-catchment and also drainage lines of Beales Creek. The lower reaches of these systems are influenced by tidal influx from the Calliope River, while the mid and upper reaches are ephemeral, with sporadic environmental flows associated with overland runoff within the sub-catchments.

These watercourses are shown in Figure 9.1 of this request and are discussed further in the WICT EIS (refer Appendix 1).

Chapter 9 details the water quality objectives and performance criteria for discharges from the WICET Project.

16.6 Significant Wetlands

The majority of the coal terminal infrastructure is located within the Port Curtis wetland, which is considered to be a nationally significant wetland and is listed in the Directory of Important Wetlands in Australia (DIWA) (refer Figure 16.1). The inclusion of Port Curtis as an important wetland is in recognition of the areas geomorphology, cultural and socio-economic value and ecological diversity. The area supports a diverse range of wildlife, including significant flora and fauna, as well as being the preferred feeding grounds of several CAMBA (China-Australia Migratory Bird Agreement), JAMBA (Japan-Australia Migratory Bird Agreement) and Convention on Migratory Species (Bonn Agreement) listed migratory birds (refer Chapter 15).

In conjunction with the Calliope River there are a number of freshwater wetland ecosystems, natural and artificial, within the Project area (refer Chapter 9). Wetland ecosystems are of high ecological value and are also important buffering systems. This occurs by protecting against flooding and filtering out excess nutrients and sediment from runoff that would otherwise enter receiving environments. Overland flows and floods along watercourses are important processes for maintaining wetland health.

Additional impacts to the Port Curtis wetland are not expected as the footprint of the changed Project is wholly contained in the footprint approved under the WICT EIS.

Legend

- Project Area
- Directory of Imp
- Great Barrier Re
- Local Drainage
- Fish Monitoring
- Mangrove Monit
- Macro Benthos

Source:
World Heritage Area: DERM
Directory of Important Wetla

16.7 Intertidal Wetlands

The intertidal wetlands of Port Curtis are characterised by strong zonation and extensive saltflats. Danaher *et* al (2005) mapped a total of 30 intertidal habitats within The Narrows and Port Curtis (Ramsay Crossing to Colosseum Inlet and seaward side of the Curtis and Facing Islands). The dominant habitats were exposed mud and sandbanks (24%), closed Rhizophora (20%) and saltpans (18%).

General zonation patterns within Port Curtis show exposed mud and sandbanks with or without seagrass occurring on the seaward side of the mangroves. On the seaward side mangroves were generally closed Rhizophora communities with an Avicennia/Ceriops community on the landward side. There are also extensive saltpans with no apparent vegetation. Where conditions are favourable samphires and saline grassland communities may occur (Danaher *et* al 2005).

Along watercourses with freshwater input Closed Rhizophora/Avicennia communities occur. On accreting banks within winding watercourses Aegiceras communities occur with the upper reaches showing a mix of communities (Danaher *et* al 2005). Figure 16.2 illustrates the intertidal communities within and adjacent to the Project area.

16.7.1 Mangroves

Works associated with the WEXP1 and WEXP2 overland conveyors and associated infrastructure are contained wholly within the approved project footprint.

Any clearing of mangroves will be undertaken in accordance with the existing marine plants disturbance operational works permits, through amendment to existing applications or submission of new applications (if required)

The changed Project is wholly contained within the development footprint approved under the EIS, therefore any removal or disturbance from the changed Terminal design is not expected to have a significant impact on the mangrove communities within the area.

16.7.2 Saltmarsh/Saltpan

A saltpan covering an area of approximately 127 ha dominates the area of Reclamation Area B (refer Figure 16.2). Bordering this saltpan is Gladstone-Mount Larcom Road, the Golding Point access track, saline grasslands and the Calliope River Anabranch. Tidal flows from Sandfly Creek and the Calliope River Anabranch are the main inundation pathways.

The changed Project is wholly contained within the development footprint approved under the EIS, therefore any removal or disturbance is not expected to have a significant impact on the saltmarsh communities within the area.

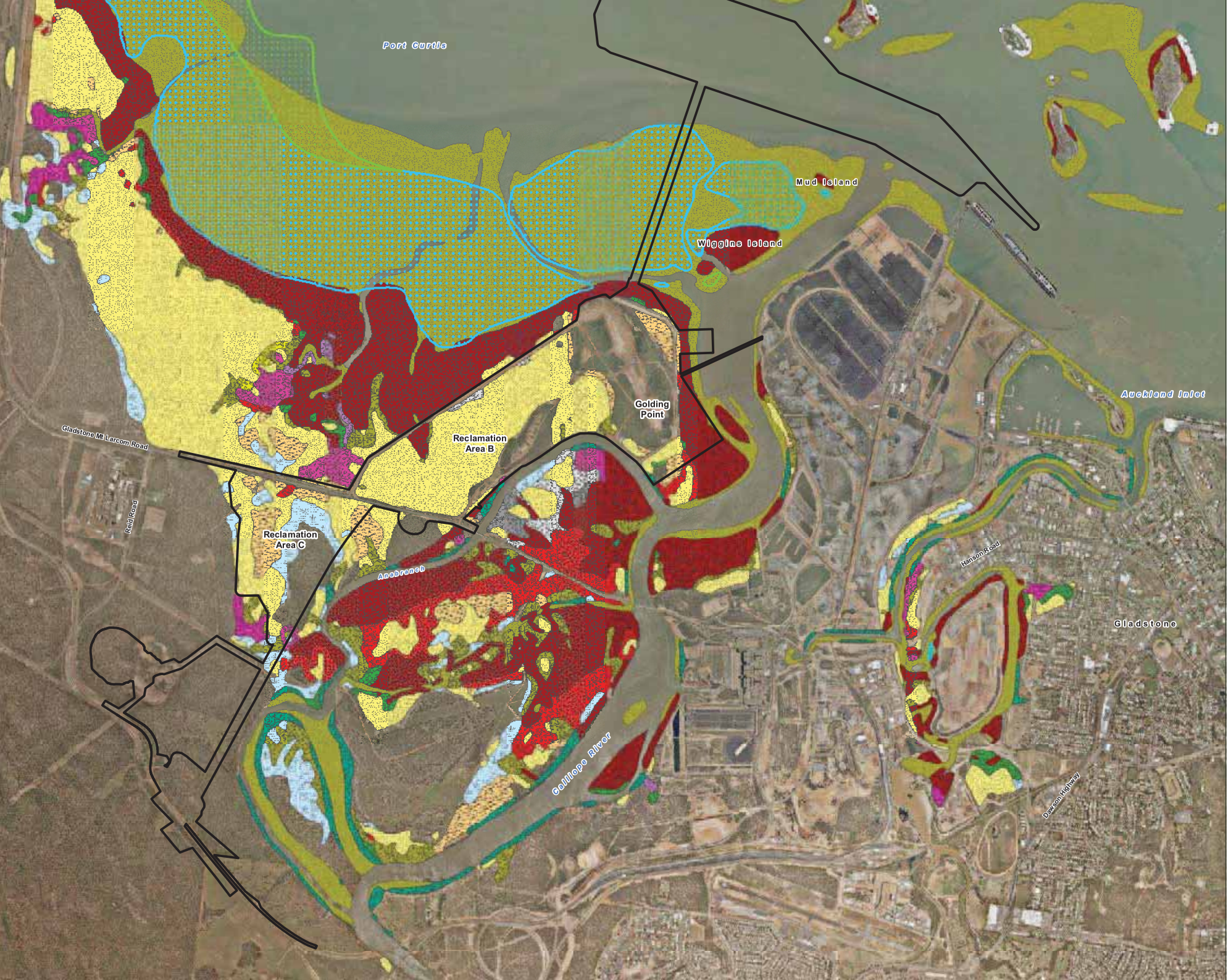
Any clearing of saltmarsh/saltpan (if required)\ will be undertaken in accordance with the existing marine plants disturbance operational works permits, through amendment to existing applications or submission of new applications (if required)

16.7.3 Intertidal Banks

During the 2004 mapping of the Port Curtis intertidal wetlands (Danaher *et* al 2005) approximately 5,144 ha of unvegetated exposed mud and sandbanks were recorded. Within the vicinity of the Project area, three major intertidal banks were identified:

- Fisherman's Landing
- Golding Point
- Wiggins Island

No additional intertidal banks are required to be disturbed as part of the Project.



Legend

- Project Area
- **Intertidal Wetlands**
- **Saltmarsh and Substrate**
  - Saline Grassland
  - Exposed Rocky Su
  - Saltpan
  - Samphire Dominat
  - Exposed Banks (M
- **Seagrass**
  - Zostera Aggregate
  - Zostera Isolated pa
  - Halophila Aggrega
- **Mangrove**
  - Closed Rhizophora
  - Closed Avicennia
  - Open Avicennia
  - Closed Ceriops
  - Closed Avicennia /
  - Open Avicennia / C
  - Closed Avicennia /
  - Closed Aegiceras
  - Open Avicennia / R
  - Closed Mixed
  - Dead Ceriops
  - Dead Ceriops with

Source:
Danaher, K.F., Rasheed, M.
Intertidal Wetlands of Port C
Series Q105031, 2005.

16.7.4 Seagrass Communities

The scope of dredging for the Project is unchanged. Further details regarding the existing environmental values within and adjoining the dredge area are discussed in Chapter 9 (Water Quality) and the WICET DMP (refer Appendix 23.18).

No seagrass communities are present within the dredging footprints for the Project (refer Figure 16.3)

16.7.5 Subtidal Waters (including reef and sand habitats)

The proposed marine structures and dredging activities will occur within the Great Barrier Reef World Heritage Area (WHA), while the majority of the terrestrial and intertidal habitats of the Project area occur outside the WHA (refer Figure 16.1).

An assessment of the potential impacts on the WHA is outlined in the Potential Impacts on Matters of National Environmental Significance Report (refer Appendix B2 of the EIS, attached in Appendix 1).

The offshore footprint for the Project is unchanged. Figure 16.4 shows where the footprint intersects areas of the shipping channel subtidal and subtidal sandy channel (refer Figure 16.4).

There are no proposed changes to the dredging activities, approved by DEHP on 13th April 2012, as included in the WICT EIS and SEIS. Potential impacts will be managed as part of the WICET DMP (refer Appendix 23.18) and the WICET Species Management Plan (SMP) (refer Appendix 23.11).

16.8 Fauna Communities

16.8.1 Macroinvertebrates

Benthic invertebrates live either on the surface of bedforms (eg rock, coral or sediment - epibenthos) or within sedimentary deposits (infauna), and comprise several types of trophic groups (eg deposit-feeders, filter-feeders, grazers and predators). The abundance, density, biomass and species composition of benthic invertebrates can be used as an indicator of changing environmental conditions.

16.8.2 Fish and Nektobenthos

The updated EPBC Act Protected Matters Report identified 34 syngnathids (Seahorse and their relatives) which may potentially inhabit the near shore environment (refer Appendix 15.1). The EPBC Act Protected Matters Report generated during the EIS process identified 37 syngnathids. No species were recorded from the area during the EIS fieldwork activities, however other studies within the area identified three species, including one species of seahorse *Hippocampus* sp. and one species of pipefish.

16.8.3 Marine Megafauna

No additional marine megafauna have been identified beyond those identified in the WICT EIS within the Project area or surrounds. Potential impacts to marine megafauna will be managed as part of the WICET SMP (refer Appendix 23.11) and the DMP (refer Appendix 23.18).

16.8.4 Reptiles

No additional marine reptiles have been identified beyond those identified in the WICT EIS within the Project area or surrounds. Potential impacts to marine reptiles will be managed as part of the WICET SMP (refer Appendix 23.11) and the DMP (refer Appendix 23.18).

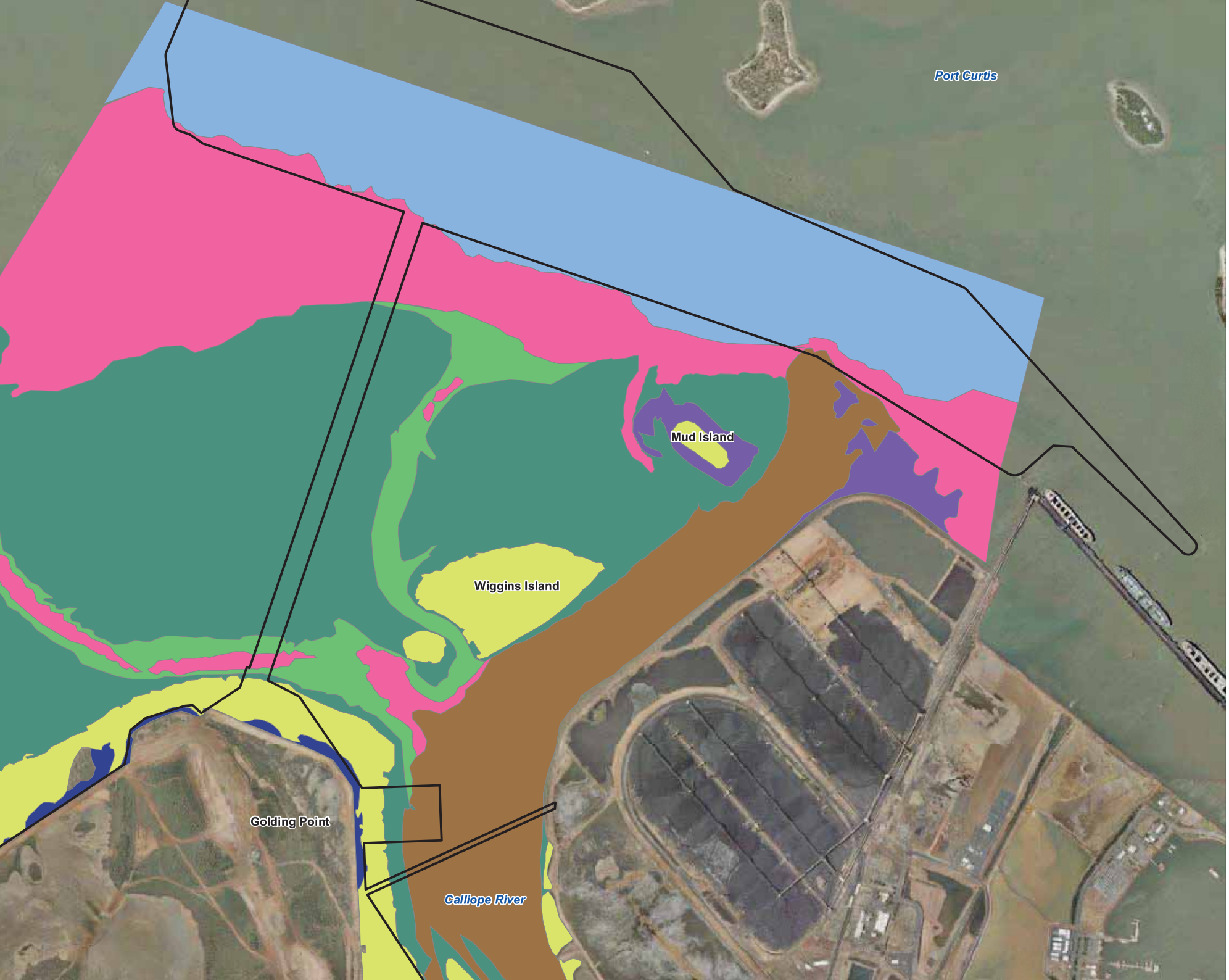
Legend

- Project Area

Seagrass Distribution

- Halodule uniner
- Halophila ovalis
- Light Halodule u
- Light Halodule u Halodule uniner
- Light Halodule u
- Light Halophila
- Light Halophila
- Light Zostera ca
- Light Zostera ca
- Light Zostera ca
- Light Zostera ca uninervis (narro
- Light Zostera ca
- Moderate Haloc
- Moderate Halop
- Moderate Halop
- Moderate Halop
- Moderate Zoste
- Zostera caprico

Source:
Seagrass Distribution, PCI



Legend

- Project Area

Marine Substrate

- Intertidal Mudfla
- Intertidal Rock/I
- Intertidal Sandy
- Mangroves
- Riverine Subtid
- Saltmarsh Clay
- Shipping Chann
- Subtidal Sandy

Source:
Marine Substrate: WBM, 20

16.8.5 Marine Pests

Marine pests will be managed as part of the CEMP Pest Management Plan (PMP) and SMP (refer Appendix 23.14 and 23.11).

16.9 Potential Construction Impacts

The potential construction impacts associated with the proposed coal terminal are detailed in the WICT EIS (refer Appendix 1). However, the amendments to the Project design post EIS have resulted in minor changes to the potential impacts to the existing environment as a result of the Project construction activities associated with the Terminal.

16.9.1 Earthwork Activities

Existing Approvals

GPC has reclamation approval for the site of the proposed stockyard and conveyor system. Approval for the reclamation of intertidal areas near Wiggins Island was granted under the *Harbours Act 1955* on the 3 October 1991 and published in the Queensland Government Gazette on the 5 October 1991 (refer Appendix C3 of the WICT EIS). The approval, which was in force for a period of 20 years from the 5 October 1991 (until the 5 October 2011), allows the reclamation of the Areas A, B and C (refer Figure 11.1 for location of dredging and reclamation areas) to a minimum level of 3.7 m Australia Height Datum (AHD) and 5.968 m Lowest Astronomical Tide (LAT), so as to render it fit for port land and industrial purposes.

An amendment to the existing Harbours Act reclamation approval has been granted under the SPA to remove Reclamation Area A from the development footprint and to extend the approval currency period until 5 October 2021.

The total area of approved reclamation under current approvals is outlined in Table 16.1.

Table 16.1 Existing reclamation approvals

Reclamation Area	Approximate Area (ha)
Reclamation Area B	193
Reclamation Area C	140
Total Reclamation Area	**333**

The approved WICET Project will result in the physical disturbance of approximately 135 ha of marine plants as defined under the *Fisheries Act 1994*. The disturbance of the marine plants is associated with the reclamation and marine structures required to construct a coal terminal. Approvals for marine plant removal have been obtained. The Project changes as a result of WEXP1 and WEXP2 are wholly contained within the proposed development footprint, however an amendment to the development approval for marine plant disturbance (or new development approval) will be required for a small area associated with the new operational stormwater outfall, along with the additional disturbance at Pyealy and Beales Creeks.

A list of obtained approvals for the WICET Project are summarised in Table 16.2.

Table 16.2 Summary of marine plant approvals obtained for WICET

Location	Marine plant type	Approximate area (ha)	Permit Reference No.
Reclamation Area B	Mangroves, Saltmarsh, Saltcouch	34	04S0DB0287
Reclamation Area B extension	Marine plants	10.2	IPDC01748109 & IPDC01748209 2010DB0025

Location	Marine plant type	Approximate area (ha)	Permit Reference No.
Gladstone- Mount Larcom Road Reserve & Lot 101 SP215262	Marine plants	4.2	IPDC01239908 2008DB0261
Reclamation Area C (access roads)	Saltcouch and Samphire species	3	2006DB0084
Gladstone- Mount Larcom Road, Offshore Approach Jetty & Dredge Spoil Pipeline	Marine plants	80.9	IPDC01322508 2009DB0029
Beales Creek	Marine plants	3	SPDC00470910 2010DB0192
Pyealy Creek	Marine plants	0.05	SPDC00428810 2010DB0269
Berth Wharf 1, Offshore Approach Jetty	Marine plants	0.01	SPDC00682310 2010DB0248
Barge Wharf	Marine plants	0.4	SPDC00419210 2010DB0203

Intertidal areas

No additional intertidal areas are proposed as a result of changes to the Project.

Watercourses

The majority of the works associated with the Terminal are below the limit of tidal influence and are subject to approvals under the *Fisheries Act 1994* and the Coastal Act. However, the Project footprint includes the construction of a conveyor system that crosses two creeks.

The changes proposed for the Project are not expected to have an increased impact on the watercourses in the area, as the changes to the infrastructure design are contained within the original development footprint. The proposed additional operational stormwater outfall to the anabranch of the Calliope River will be contained within the Project footprint approved under the WICT EIS.

Although this change is contained within the original development footprint, an increase in the cumulative volume of periodic releases will occur due to the increase in stockyard catchment area. However, the design of the settlement pond and outfall will ensure that the quality and rate of stormwater discharge will be compliant with modelling undertaken in the approved EIS. The stormwater discharge will also be compliant with water quality release limits required in the EPBC Act controlled action approval (refer Chapter 9). Therefore the minor changes proposed for the Project are not expected to have a significant impact during construction on the aquatic communities in the area.

Flora and fauna

The proposed WEXP1 and WEXP2 overland conveyors will retain the buffer zone between the development and the intertidal wetlands of the Calliope River Anabranch from 80 m to 100 m.

The Project changes (as a result of WEXP1 and WEXP2) will be contained within the development footprint approved under the WICT EIS (refer Appendix 1). The changes include an alteration to the infrastructure design layout, however this is not expected to have any additional impact on flora and fauna assemblages within Reclamation Area B, as the entire area has already been approved for clearing.

Mitigation measures will be implemented to reduce and offset the potential impacts through a variety of different methods and techniques (refer Chapter 23 and WICET CEMP).

16.9.2 Dredging Activities

Dredging will take place to create six berth pockets and channel deepening and widening to provide ready and safe passage associated with the bulk carrier vessels. This is unchanged from the WICT EIS (refer Appendix 1). The approved dredging operations will occur in the subtidal environment of the Project area (refer Figure 11.1).

16.9.3 Reclamation pond dewatering and discharges

The beneficial reuse of the marine dredge spoil within Reclamation Areas B and C will result in controlled and measured discharge of the settlement water into the Calliope River Anabranch. The changed Project proposes to use a new stormwater settlement pond on the southern end of the Stockyard Area B and a new stormwater outfall to the Anabranch. The Stage 1 stormwater pond at the northern end of Stockyard Area B will require extension in both WEXP1 and WEXP2.

A minor increase in the cumulative volume of periodic stormwater releases will occur, due to the increase in stockyard catchment area. The additional operational outfall will assist with the dispersal of stormwater discharges, rather than being restricted to one operational outfall as proposed in the original design.

The discharge from the two stormwater outlets has the potential to impact upon the system into which it is released, however, no significant impact upon the ecological values of the system is envisaged as resulting from the dewatering process as the discharge will be inert and fully comply with relevant permits and approval conditions. The rate of stormwater discharge will be in compliance with modelling undertaken and reported within the WICT EIS (refer Appendix 1) and WICET DMP (refer Appendix 23.18).

Chapter 9 details the water quality objectives and performance criteria the discharges will be required to satisfy.

Mitigation measures to reduce the impacts during the dredging activities are discussed further in Section 16.11 and the WICET DMP.

16.9.4 Marine Structures and Vessel Movements

Impact sources

No additional disturbance to seagrass communities is expected to occur from the changed Project as there has been no change to the marine Project footprint approved under the EIS.

The Project's construction activities with potential to impact on aquatic ecology will include:

- Construction of the marine jetty and berths
- Marine vessel movements for construction of jetty and wharfs
- Marine vessel movements to and from the construction barge wharf, delivering construction materials
- Abrasive blasting activities that will occur in proximity to and/or over marine waters

16.10 Potential Operational Impacts

16.10.1 Maintenance dredging

There are no proposed changes to the approved dredging and maintenance dredging, as included in the WICT EIS and SEIS.

16.10.2 Operational and Marine Vessel Traffic

No additional vessel movements are expected as a result of the Project changes

The port currently operates in accordance with a number of legislative acts governing waste, ballast waters, discharges and maritime safety. The current GPC Integrated Environmental Management System (IEMS) and safety procedures will be reviewed and updated prior to operation to reflect the new berths and associated operations.

16.10.3 Other Operational Activities

The following operational activities/infrastructure have potential to impact on aquatic ecology:

- Conveyor system operation
- Coal stockyard operation
- Coal loading into ships
- Maintenance of marine structures

Potential impacts include the generation of dust, risk of coal/chemical spills and/or contamination and waste, light and noise generation.

Noise and Vibration

Noise will be generated by a range of operational activities, including the use of heavy equipment and haulage vehicles, commercial vessels and any maintenance dredging. There is limited available information on the level of impact, underwater noise has on marine life. The regulation of underwater noise in Queensland is governed by the *Nature Conservation Act 1992* and Section 88 of supporting Regulations in which reference is made to conservation management plans and noise impact, and the *Environmental Protection Act 1994* defines noise as an 'environmental nuisance'.

Marine mammals and turtles will show avoidance of disturbance and noise, moving away and/or staying at a distance where they feel safe. As such, there is not expected to be a significant impact upon marine mammals and turtles once they have become accustomed to the additional levels of activity.

The use of a conveyor structure to transport coal from the dump station to the Terminal will ensure a buffer of 100 m remains between the proposed works and the intertidal wetlands of the Calliope River Anabranch.

The semi-enclosed conveyor system should also minimise visual disturbances within the Project footprint by reducing light pollution, noise, vibration and dust generation. The retention of terrestrial communities within the Project footprint should also assist in limiting the visual disturbances associated with the conveyor system (refer Chapter 15).

Lighting

Artificial lighting is known to affect marine turtle behaviour (Environment Australia 2003). However, there are no nesting sites within the Project area and the closest known nesting area is on the eastern side of Facing Island within Port Curtis.

Turtles are frequently found within the Project area and surrounding waters (The Narrows and Calliope River mouth have both been identified as major turtle foraging areas). As such there is a potential for the artificial lighting to affect marine turtle behaviour. However, this impact is likely to be minimal to the turtle populations due to the existing elevated lux levels at the current port facilities.

Lighting pollution may also be an issue for roosting waterbirds, shorebirds and flying fox colonies within the immediate area.

Water Quality

The operational impacts upon water quality are similar to those during construction and are also discussed within the water quality chapter (refer Chapter 9). Handling of substances

hazardous to health; oil and hydrocarbon facilities; spills and discharges will be addressed through the WICET Operational EMP.

Oil and Chemical Spills

Good site management will reduce the risk of chemical and oil spills. Procedures are in place at the port to minimise any spills into the terrestrial and/or marine environment therefore the potential for impact is minimal if the WICET Operational EMP is implemented appropriately.

Air Quality

The air quality issues associated with the changed Project are considered within Chapter 12 of this request. The loading of bulk cargoes, including coal ships can create air pollution in the form of dust. Impacts from dust during loading are primarily concentrated around loading terminals and port environs. The cleaning of bulk cargo residues from ships' holds may also create a dust nuisance or health hazard, as well as a source of water pollution (Australian Maritime Safety Authority 2003).

The WICET Dust Management Plan will be prepared prior to operation. As such, implementing the WICET Dust Management Plan should result in minimised air quality impacts on the aquatic values of the area.

16.11 Mitigation and Monitoring

It is an objective of the WICET to have minimal impact on the aquatic ecology of the area during construction and operational activities. To assist in achieving this objective, the mitigation strategies described below will be implemented.

16.11.1 Design

The following mitigation measures will be implemented during the detailed design phase of the Project to minimise the impact on the aquatic environments within the area:

- The minimisation of the clearing of marine plants and reclamation through innovative design techniques which will ensure minimal negative impacts on master plan objectives and function
- Coal terminal lighting design will ensure that the visual impact on adjoining habitats is minimised (eg directional lighting, low pressure sodium bulbs, shrouding etc)
- Where feasible the conveyor system should be an enclosed system and an elevated structure
- The depth and width of dredge channels are designed so as to reduce future maintenance dredging
- Implementation of the approved DMP (refer Appendix 23.18)
- Submit marine plant applications for the removal and/or disturbance of marine plants within the Project area (where required)
- Where practical, high noise construction activities will be planned to commence outside the bird migration period (October to May)

16.11.2 Construction

The mitigation measures contained in the WICET DMP, WICET CEMP (and supporting management plans) and below will be implemented during the construction phase of the Project to minimise the impact on the aquatic environments within the area. The WICET CEMP will be reviewed during the detailed design phase of the WEXP1 and WEXP2 to address changes in design, construction methodologies and improvements identified during the Stage 1 construction works. The following mitigation measures will be implemented during construction to minimise the impact on the aquatic environments within the area:

- Areas around construction works will be maintained and/or restored to their natural state

- A buffer zone should be constructed around retained mangroves and riparian plants with protection and/or establishment of native shrubs, trees and other vegetation along disturbed areas to prevent destabilising banks, trap sediment and filter other pollutants
- Limit the operation of heavy equipment within intertidal wetlands and riparian to established tracks
- Where possible given the Project scope and design, vegetation should not be removed within 30 m of a wetland, waterway or estuary
- Where possible protect and rehabilitate intertidal wetlands including mangroves, saltmarsh and saline grasslands
- Maintain adjacent high tide banks with their cover of salt-tolerant vegetation
- Implement a weed control strategy during and after construction
- Implement procedures that will ensure the avoidance of material spills and ensure prompt clean up
- A dredge vessel will be utilised to ensure the dredge program is completed within the shortest possible timeframe, thereby minimising the available window for potential impacts to occur
- Validation sampling should be undertaken during the dredging programme to confirm the continued non-contamination of the sediments
- Avoid temporary spoil sites and use spoil as a resource where possible
- Bund walls will be designed and constructed in general accordance with best practice. This should limit the movement of contaminants and risk of erosion/breaching
- Sediment containment structures must be appropriately maintained and where containment screens are used, joints should be over-lapping and be appropriately secured
- Sediment containment screens should be made of puncture and tear resistant material. Selection should consider fire retardancy, burst strength and ultra-violet resistance. Shade cloth will not prevent the escape of fine dust and should not be used for temporary enclosures if work generates silica, lead or other toxic dusts
- Over-water abrasive blasting will be carried out in accordance with the DEHP *Guideline: Over-water abrasive blasting in marine and other aquatic environments.* Environmental factors such as wind conditions should be considered prior to blasting operations commencing. Where wind conditions affect the ability to contain over-spray, work will cease
- The WICET Waste Management Plan (refer Chapter 23 and Appendix 23.17) will be implemented. This Plan specifically addresses the clean-up and appropriate disposal method of abrasive blast waste products immediately after completion of blasting operations. Dust collectors, abrasive vacuum systems and recycling unit to be used in the management plan
- Spray painting must be carried out in an approved spray paint booth where practicable
- No filling, draining or alteration of the waterways, excluding that shown in the approved design
- Construction vehicles and machinery will remain within construction footprint and on designated tracks and roadways
- Install erosion and sediment control measures, prior to construction and modify as necessary
- Retain and treat overland runoff and stormwater from the site prior to discharge
- Comply rigorously with the conditions of all approvals
- Implement a revegetation/rehabilitation plan for the area. Rehabilitating riparian buffers is key to restoring natural stream functions and aquatic habitats
- Implement the WICET Pest Management Plan (refer Appendix 23.14)
- Implement the WICET Species Management Plan (refer Appendix 23.11)
- Implement mechanisms to minimise the risk of entanglement and mortality of migratory species (eg shorebirds, dugongs and turtles)

16.11.3 Operational

The following mitigation measures will be implemented during the operational phase of the Project to minimise the impact on the aquatic environments within the area:

- Monitor the success of the revegetation/rehabilitation plan
- Establish spoil disposal arrangements for maintenance dredging for new and ongoing dredging that minimise long-term impacts. Maintenance dredged material should be monitored to ensure that the sediments continue to be classified as non-contaminated
- Access tracks will be constructed clear of waterways, wherever possible
- A fire management plan will be implemented to address the risk and management of operational activities in relation to fire risks
- Extend construction cataloguing and encourage community participation in compiling information on significant species within Port Curtis
- Implement the Pest Management Plan (PMP) (refer Appendix 23.14)
- Regular monitoring of the health of the intertidal wetlands, including the seagrass and mangrove communities

16.12 Conclusions

The changes proposed for the Project are not expected to cause a significant change to the disturbance of the aquatic ecology in the area, as the changes relate to infrastructure design and are located within the existing WICET development footprint approved under the EIS. The changes will not increase the intensity or area of disturbance of the Terminal above what has already been approved for the Project.

An additional operational stormwater outlet to the Anabranch from the proposed operational stormwater settlement pond at the western end of Reclamation Area B will result in a minor increase in the cumulative volume of periodic stormwater releases, due to the increase in stockyard catchment area. The additional outlet will assist with the dispersal of stormwater, rather than being restricted to one operational outfall as proposed in the original design. The discharge from this outfall will also be inert, as it will need to fully comply with relevant permits and approval conditions (ie ERA 50).

The implementation of mitigation and management measures during the construction and operation of the Terminal will minimise potential impacts to the aquatic environment within Port Curtis.

Dredging activities are not proposed to be changed as part of the changed Project (WEXP1 and WEXP2).

In summary, any potential aquatic ecology impacts from the proposed Project changes are considered minor and represent minimal to no change to the potential impacts addressed in the WICT EIS.

Conclusion 1: The changes proposed for the Project are not expected to cause a significant change to the disturbance of the aquatic ecology, as the changes relate to infrastructure design and are located within the existing development footprint.

Conclusion 2: Any impacts on marine fauna will be managed through the WICET Construction EMP and Species Management Plan.

Conclusion 3: The overall loss of marine plants will be mitigated by implementing the GPC approved offset strategy.

17. Cultural heritage

17.1 Summary

The changed Project (as a result of WEXP1 and WEXP2) does not extend past the Project footprint assessed in the EIS and controlled action, therefore there are no additional requirements for further cultural heritage field investigations or for amendments to the CHMP.

To ensure Indigenous and Non-indigenous duty of care is implemented during the Project and to avoid or minimise the damage or destruction of items of cultural heritage, the CHMPs (refer Appendix 23.6 and 23.7) will be implemented prior and during the Project activities.

17.2 Introduction

This chapter summarises the cultural heritage associated with the WICET Project located to the west and directly opposite the Calliope River from the existing RG Tanna Coal Terminal. The Project footprint is constrained by the Calliope River estuary to the south and east and by extensive seagrass beds to the north and west of Golding Point.

This Request for Project Change provides an updated assessment to address changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and EPBC Act controlled action approval (April 2008).

17.3 Cultural Heritage Management Plan

The potential for cultural and archaeological sites/items to be uncovered during construction activities within the Project footprint is most likely to occur during the Stage 1 phase of the Project.

As a requirement of the ACH Act Section 87, a CHMP is mandatory for activities requiring an EIS. In the event of a potentially significant find, actions should be undertaken in accordance with the CHMP. The implementation of the Cultural Heritage Management Plan (CHMP) will manage Project activities to avoid or minimise the impact on cultural heritage. As WEXP1 and WEXP2 do not extend past the approved Project footprint, there are no additional requirements for further cultural heritage field investigations or for amendments to the CHMPs.

Appendices 23.6 and 23.7 contain the complete management and mitigation measures within the CHMPs.

17.4 Future Cultural Heritage Consultation

GPC is the lessor of the site and has been contracted as the operator of the Terminal on behalf of WICET. GPC are committed to Indigenous employment initiatives and innovative employment practices. GPC adopted a Reconciliation Action Plan in 2010, which consisted of four targets:

- Strengthening relationships
- Fostering respect
- Increasing opportunities
- Ensuring accountability

This plan was reinforced by the Indigenous Employment Policy which seeks to increase Indigenous employment to be representative of the region's Indigenous population by 2015 and to have an Indigenous employment rate of 5% by 2020 (Aurecon Hatch 2011). To achieve this, an Indigenous Liaison person and a monthly meeting committee have been established and a series of bursaries, scholarships, traineeships and apprenticeships will be offered to encourage Indigenous participation in the workforce.

The Future Direction Indigenous Liaison Group (FDILG) was established in 2008 by GPC to manage their involvement with the Indigenous community. Their role is to ensure that the Indigenous community benefits from the growth and prosperity of the Port of Gladstone.

WICET will continue to consult regularly with the Indigenous community to build a future generation of Indigenous leaders in Gladstone and promote cultural awareness among current and future employees.

17.5 Conclusion

A Cultural Heritage desktop study was undertaken as part of the WICT EIS (2006) process. This study included undertaking a review of the Queensland Heritage Register, the Australian Heritage Database and the Aboriginal and Torres Strait Islander Cultural Heritage Databases to determine the location of potentially impacted Cultural Heritage locations within the vicinity of the WICET. The Australian Heritage Database identified two locations of heritage significance within the region; these being the Great Barrier Reef World Heritage Area (GBRWHA) and the North Reef Light Station located on Curtis Island.

A five day field assessment was undertaken by ARCHAEO in collaboration with the Traditional Owners (TOs) of the region in order to locate any previously unidentified culturally significant locations and/or artefacts. In total, 25 heritage artefacts and places were located within the vicinity of the WICET project area including one site of Indigenous cultural significance and four sites of historic significance.

A CHMP was developed in 2008 for the WICET Project in consultation with the TOs of the region. The CHMP will be implemented onsite during construction and operation of the WICET to prevent damaging harm to both known locations and undiscovered locations of Indigenous and European heritage significance.

WEXP1 and WEXP2 do not extend past the Project footprint approved under the EIS and controlled action, therefore there are no additional requirements for further cultural heritage field investigations or for amendments to the CHMP.

To ensure Indigenous and Non-indigenous duty of care is implemented during the Project and to avoid or minimise the damage or destruction of items of cultural heritage, the CHMPs (refer Appendix 23.6 and 23.7) will be implemented prior and during the Project activities.

Conclusion 1: There are no additional requirements for further cultural heritage field investigations or for amendments to the CHMP as a result of WEXP1 and WEXP2.

18. Social

18.1 Summary

The changes proposed as part of WEXP1 and WEXP2 are expected to result in minor changes to impacts on the local community. WICET has established and implemented (as part of Stage 1) a stakeholder engagement programme, and a Communication, Community and Stakeholder Management Plan (as part of this Request for Project Change) that will engage early, and adopt a clear communication approach to help manage community expectations, and to identify and communicate how the implementation of the design addresses community concerns.

Proactive planning and investment in the Maritime Precinct and the Maroon Group Accommodation Facility demonstrate that WICET has identified and assessed social and environment impacts, both adverse and beneficial, in the Project's area of influence.

The estimated peak workforce for the changed Project is 1,100 employees inclusive of construction labour, engineering and management staff. This compares with 1,450 employees assessed during the EIS and SEIS (should Stage 1, 2 and 3, as defined in the EIS all occur concurrently). The peak is expected to occur during WEXP1 construction as Stage 1 is completed and commences operation. Given the WEXP1 construction workforce is planned to ramp up as Stage 1 construction ramps down, it is expected that the 1,100 peak workforce will be sustained for a longer period than originally anticipated in the EIS and SEIS.

Provision of rooms from WICET's allocation within the Maroon Group Accommodation Facility will cater for the majority of non-Gladstone based workers required for the Project.

WICET has developed the over-arching Communications Plan, which details the communications process to be utilised throughout of Terminal's lifespan and the Community Relations Plan to address communication specifically relating to site establishment and construction phases of the Terminal.

The impacts arising from increased workforce requirements and concurrent projects include a shortage of necessary skills, a decrease in accommodation availability and increased pressure on social infrastructure in the surrounding community.

18.2 Introduction

Historically, the Gladstone region has experienced periods of economic growth and decline, relating to the major industrial development in the region and the associated migration of short-term construction workers. Gladstone has been recognised by the Queensland Government as a major industrial centre for the future of Australia and there is now a focus on attracting workers to Gladstone and retaining this population on a more permanent basis.

As part of the WICT EIS, a social impact assessment (SIA) was undertaken. This was updated as part of the Project Change Request with new information and data that has become available since the WICT EIS was prepared, and is attached in Appendix 18.

This chapter provides a summary of the updated SIA.

18.3 Overview of previous Environmental Impact Statement Approval

The original WICT EIS was produced in 2006 and submissions from key stakeholders and the community were made. The Project was granted "Significant Project" status by the Queensland Coordinator-General on 29 September 2005, requiring an Environmental Impact Statement (EIS) to be developed. A SEIS was produced in 2007 which included social impacts, which captured comments received during the WICT EIS consultation process relevant to social issues (refer Appendix 1).

The full EIS assessment was completed in 2007 and the Coordinator-General's Report assessing the EIS and SEIS was approved on 7 January 2008. The Coordinator-General determined the Project could proceed subject to ten conditions as outlined in the Change Request. Seven of these conditions related to transport and road impacts, one to soils, one to air quality and one to environmental management plans.

Commitments from the conditions of approval included the requirement for a series of EMPs to be developed to address the Coordinator-General's assessment of the Project. The Coordinator-General's Report included the requirement for a community liaison programme to address the range of issues identified in the EIS.

Due to delays in the execution of the WICET Project, and the increase in industry in the region (eg LNG industry on Curtis Island), the commitment to community liaison is potentially of even greater significance now than it was in 2006.

18.4 Queensland Government context - Social Impact Management

The Queensland Government committed to undertaking the Gladstone Growth Management Initiative in 2001. This initiative was aimed at planning for the potential impact of and opportunities arising from population growth and cumulative impacts arising from the development of major industrial projects in the Gladstone/Calliope area.

During June/July 2011 within the Gladstone/Calliope area, eight projects were identified as currently under construction, seven projects had completed an EIS, and nine projects were classified as pending/proposed (GEIDB 2011).

Since 2006, the Queensland Government has released key policy documents that may impact on the Project, in particular the *Sustainable Resource Communities Policy* (2008) and the *2010 Surat Basin Future Directions Statement*, in response to the need to manage growth in the resource development areas of the Surat Basin, Bowen Basin and north-west Queensland minerals province.

Under the Sustainable Resource Communities Policy and the 2010 Surat Basin Future Directions Statement, proponents of new or expanded major resource development projects, need to develop a Social Impact Management Plan (SIMP) in consultation with government and key stakeholders.

The *Major Resource Projects Housing Policy* (MRPHP) in August 2011, which delivers a set of core principles to guide the identification and assessment of accommodation and housing impacts and development of mitigation and management strategies.

The MRPHP will apply to all projects for which an Environmental Impact Assessment is undertaken and works alongside the SIA process and the SIMP Guideline to ensure that SIAs and SIMPs are comprehensive and take account of Queensland Government policy settings.

18.5 Project response to updated policies

The WICT EIS (Appendix 1) was approved prior to these state government policies and legislation changes, which now require project proponents to conduct a social impact assessment and then develop social impact management plans, in collaboration with stakeholders.

While the WICET Project is not bound by legislation to develop a SIMP, a *Social Impacts Management Report* was prepared by Aurecon in May 2011. This Change Request updates the profile of the population and housing environments of Gladstone. It also provides current housing availability data and a picture of industry and the potential growth in workforce numbers in Gladstone in the coming years.

If required in future, this report may provide a basis for WICET to develop a formal social impact management plan (SIMP), in collaboration with stakeholders.

18.6 Housing and accommodation

Accommodation Management Strategy (AMS)

As stated in the Project's original EIS/SEIS (Appendix 1), the accommodation requirements of the Project are expected to be met by the existing available accommodation, the implementation of an Accommodation Management Strategy (AMS) and the coordination of peak construction periods between different projects.

Coordination between different projects will occur with regular consultation with DSDIP and the relevant industry organisations. This will enable information sharing, to formally keep abreast of timing issues and to achieve a coordinated outcome in the provision of accommodation in the study area. Ongoing working group meetings will also enable the actions from the AMS to be monitored and for any high-level issues to be discussed.

Key components and mitigation measures that will be incorporated within the AMS may include:

- Regular review of the current housing situation to determine any change
- Initiating strategies and potential joint partnerships for the construction of a mix of new dwellings
- Provision of the Maroon Group Accommodation Facility, funded by WICET, which will cater for the majority of non-Gladstone based workers needed for construction (discussed later)
- Securing additional rooms as the Accommodation Facility expands
- Providing rooms in the Accommodation Facility for fly-in fly-out construction workers with families who do not plan on living full-time within the region
- Encouraging contractors to achieve around 80% local workforce participation
- Forming alliances with regional builders and/or other projects/developers
- Discouraging the construction workforce from using rental properties and instead, utilising the Accommodation Facility
- Providing feasible transport options for those construction workers to and from their place of temporary residence, including a bus to and from the Project on a daily basis, with a route directed away from the Gladstone city centre
- Approaching State housing agencies to increase the public housing supply in the region to support low income households
- Monitoring housing availability and affordability in response to demand associated with the timing of major projects in the Gladstone area
- Developing a monitoring programme to measure the performance of the AMS against key social planning principles established by the working group

Potential Project Impacts on Housing Availability

Most of the projects have estimated peak workforce numbers and estimated timing of their projects. In order to accurately capture the cumulative workforce data from each approved EIS as approved needs to be added to the currently approved workforce data. Project delays and inaccurate workforce data may result in the EIS figures being less accurate as the projects reach construction.

The Australian Pacific LNG (APLNG) Project EIS, used as raw data APLNG figures, plus those of a number (13) of other projects for the region which have produced worker figures through EISs or other documents. This EIS concludes that if multiple projects were under construction at the same time, then the region could conceivably be trying to house upwards of 9,000 construction workers in the year of 2012-2013 (GRC 2010a).

The *Voluntary Industry Contributions Framework* (GEIDB 2010) identified housing and accommodation recommendations for investment for new companies proposing to develop large scale projects within the Gladstone region:

> *Provide new workers' accommodation using a range of housing types and models aimed at increasing the supply of affordable housing to alleviate stress on existing stock, in the Gladstone/Boyne Island and Tannum Sands areas (page 31).*

WICET Workforce Accommodation

A key factor in trying to assess whether residential land development and dwelling unit construction activity will meet the needs of the community, is to estimate the workforce numbers of major projects.

The WICT EIS estimated that the peak workforce for construction phases would be 1,450, assuming Stage, 1, 2 and 3 (as defined in the EIS) were undertaken concurrently. Table 18.1 provides a summary of the EIS estimate staffing (adapted from Table 18.18 of the EIS).

Table 18.1 WICET construction staffing requirements as detailed in the EIS

Stage	EIS Estimate Staffing
Stage 1	650
Stage 2	450
Stage 3	350
Total	**1,450**

However, the peak construction workforce for the Project is now expected to be 1,100 personnel (during Stage 1 and WEXP1 construction) (refer Table 18.2). Accommodation and transport strategies have been implemented by WICET including the allocation of over 650 rooms in the Maroon Group Accommodation Facility and bus transport between the facility and the Project site.

In the Project Overview Briefing to GRC in March 2011, the WICET Project Director estimated the staffing and accommodation needs, summarised in Table 18.2.

Table 18.2 WICET Staffing and accommodation requirements

Stage	Date	Rooms	Estimate Staffing
Stage 1	July 2011	240	300
Stage 2	Dec 2012	400	450
Stage 3	Aug 2012	260	350
Total		**900**	**1,100**

The Maroon Group Pty Ltd has developed a workers accommodation facility for 2,265 people at Calliope, approximately 20 minutes' drive west of Gladstone. WICET has secured 240 rooms for Stage 1 and a further 408 rooms as the facility develops. There is also the option to secure an additional allocation of the remaining rooms.

WICET has also previously committed to employing a local workforce where possible to further reduce the impact of the Project on housing availability and affordability as it is assumed that a local workforce will already have suitable accommodation and will not contribute to further demand for housing in the area. Contractors are encouraged to achieve around an 80% local workforce.

WICET will contribute to the implementation of the AMS as part of a collaborative effort to address the housing shortage and housing affordability.

18.7 Project Impacts

18.7.1 Land Use

The proposed changes to the Project do not exceed the footprint of the approved Project under the EIS and will not directly impact on any additional landholdings (refer Chapter 5). The proposed changes to the Project are consistent with the existing and future land uses of the surrounding area and will improve the throughput of the Terminal to ensure the Port of Gladstone can satisfy the transport demands of the rapidly increasing coal export market.

The Project is partially located within the Yarwun Precinct of the GSDA, a dedicated area for industrial development. The RG Tanna Coal Terminal is directly adjacent to the Project and may reduce the perceived negative impacts associated with the Project.

18.8 Cumulative Impacts

When a number of projects are being planned over a similar timeframe it becomes necessary to try to estimate the potential cumulative workforce numbers that will impact on the housing market. GRC's *Regional Growth Report* (2010) sought to appraise Council of potential regional growth issues as the region moves towards its next period of major industrial development generated growth.

This Report states:

> *"Until some finite decisions are made by Government and project proponents, it will not be possible to firm up workforce estimates. As decisions are made, some scenarios can be eliminated or "firmed up", thereby increasing the confidence with which such estimates are made." (page 11).*

There is a huge number of variables that may contribute to an influx in construction workers, ranging from anywhere between 2,000 to almost 8,000.

The study area has experienced significant industrial growth over the past decade with over $60 billion worth of projects currently under investigation in Gladstone LGA. Among these are a number of projects in the LNG industry, located within close proximity to the WICET Project, with proposals to construct LNG facilities around the Port of Gladstone for processing and exporting LNG.

The Gladstone Economic and Industry Development Board (GEIDB) was established by the Queensland Government to facilitate project and infrastructure establishment in Gladstone. According to a recent project review by GEIDB, eight projects are under construction, seven projects have a completed EIS and are awaiting construction and nine projects are pending/proposed (GEIDB 2011).

These projects are summarised in Table 18A in Appendix 18. It should be noted that the timing of the listed projects will need to be reconfirmed prior to commencement of the expansion phases, WEXP1 and WEXP2.

These projects may operate concurrently with WEXP1 and WEXP2 and may result in cumulative social impact within the study area.

Construction

As indicated by Table 18.3, construction for Stage 1 of the Project is expected to occur between 2011 and 2014 with a peak construction workforce of 800 employees. WEXP1 and WEXP2 are expected to have a peak construction workforce of 1,100 employees and an additional 67 employees for operation. It is intended that the construction workforce will transition from the WICET Stage 1 construction into the WEXP1 and WEXP2 construction, with a peak of 1,100 personnel for the Project.

Table 18.3 WICET Stage 1 construction timeline and workforce

Project/proponent	Construction timeline	Peak construction workforce
Stage 1 coal terminal (Wiggins Island Coal Export Terminal Pty Ltd)	Construction to occur between 2011 and 2014	Construction: 800 Operation: 120
WEXP1/WEXP2	Construction of WEXP1 to commence mid 2012	Construction: 1,100 Operation: 67

Impact of this Project

The cumulative impacts arising from concurrent projects include a shortage of necessary skills, a decrease in accommodation availability and increased pressure on social infrastructure in the study area. Projects in the Gladstone region that are likely to coincide with the proposed expansions WEXP1 and WEXP2 include the Moura Link – Aldoga Rail Project, the Balaclava Island Coal Export Terminal (still in EIS phase) and various LNG projects. As previously stated the timing of these projects is uncertain and should be monitored during detailed design and prior to construction.

Gladstone is experiencing a skills shortage as the demand from industrial development in Gladstone is exceeding the local supply of workers. Temporary workers from outside Gladstone are being hired to address this shortage. Additional pressure is being placed on accommodation with a lack of short term housing options, increasing housing prices and increased rental prices with low vacancy rates.

Housing and Accommodation

With the influx of projects and workers to the region, the pressure on housing availability is evident through the latest rental RP data. Between January to March 2011, less than 150 units or houses were available across the region.

18.8.1 Project Responses to Mitigate Impacts

Gladstone Coal Exporters Maritime Precinct

Current EIS approvals set conditions for the proponent to make a community amenity contribution in isolation or collaboration with other projects. This amenity contribution is a feature of the government's response to the LNG projects seeking EIS approvals. WICET was not bound by these EIS approval processes but has developed a proposed project for community amenity contribution to mitigate potential social impacts of the Project.

Therefore, it is proposed that WICET will directly fund works with GPC to provide a Gladstone Coal Exporters Maritime Precinct. The precinct will extend from O'Connell Wharf to the mouth of Auckland Inlet on the east shore of Auckland Creek and including the side of Auckland Hill Park.

The precinct would focus on the maritime history of Gladstone and be designed for families with parklands, cafes, a water park and fishing platforms. It is proposed WICET's costs for delivering this precinct would be approximately $35 million. This contribution from WICET will deliver a long term, high quality amenity to the Gladstone community. There are positive opportunities for WICET to promote the Marine Precinct and to seek community involvement in the development of this precinct.

Hanson Road Upgrade

WICET is currently undertaking the $70M upgrade of Hanson Road which will result in a four lane carriage way over a two kilometre stretch as part of DTMR's ultimate upgrade of Hanson Road.

As part of expansion works, and consistent with the current EIS conditions, WICET will construct a grade separated overpass. Design has commenced on this overpass, which is expected to cost between $20 and $25M and improve the safety of road users on Hanson Road and those accessing the terminal.

Community Impacts and Engagement

In addition to addressing worker accommodation impacts, WICET has put in place a series of plans/programs to support the community relations function of the WICET Project.

WICET commissioned the Social Impacts Management Report in 2011 to document the range of plans and programs that the WICET Project team have established to effectively manage the social impacts of the Project.

WICET has developed an over-arching *Communications Plan (April 2011)* detailing the communications process to be utilised throughout the lifespan of the coal terminal development. It is the master reference designed primarily for internal use, which explains the philosophy and messaging behind all WICET communications.

This communication plan is designed to support key Project management documentation, including the:

- Environmental Management Plans (Appendix 23) (and sub plans addressing such issues as bushfire management, soil and water quality, energy and water use, noise and vibration, dangerous goods, waste management, landscape and rehabilitation, and air quality)
- Traffic Management Plan (Appendix 23.16)
- Emergency and Disaster Management Plan

The Community Relations Plan 2011 (Appendix 23.8) addresses communication specifically relating to the site establishment and construction phases of the Terminal. This Plan details how the local community and stakeholders are to be kept informed about all aspects of the Project throughout its lifespan.

WICET has also developed a Communication, Community and Stakeholder Management Plan (April 2012) as part of this Request for Project Change (refer Appendix 18).

The Plan is designed to outline the additional communication, community relations and engagement activities which will be undertaken to effectively inform, educate and engage with all stakeholders who may be directly impacted by the proposed changes to the expansion phases of the WICET Project.

It complements the existing Communication, Community and Stakeholder Management Plan for Stage One Project Delivery, which details the approach and processes being utilised to ensure the Gladstone community and key stakeholders are properly informed and engaged throughout the delivery of Stage One.

Stakeholder Engagement

WICET has established an approach to engage the community to ensure relationships with stakeholders are appropriately managed to ensure the Project's goals are effectively met. Key community, government and internal stakeholders and groups have been identified in the Community Relations Plan, and are discussed in the sections below.

The Stakeholder Engagement Plan (within the Community Relations Plan)

This plan aims to assist in building awareness, acceptance and ultimately endorsement of the Project by external stakeholders. This plan focuses on stakeholder issues likely to be encountered in the lead up to financial close and commencement of construction.

Social and Community Support Plan

A sub-plan of the Communications Plan, the Social and Community Support Plan details WICET's approach to support in the community and links to both the Communications and the Community Relations Plans to ensure the program delivers positive outcomes. A key component of this plan is to spell out exactly what the Project wishes to be known for in terms of its long term legacy to the community.

Community Engagement and Consultation –Construction

The Procurement, Construction and Management (PCM) Process for the WICET Stage 1 has been awarded to a PCM Project Manager – Worley Parsons. Worley Parsons will engage the services of specialised construction contractors to construct WICET Stage 1.

Worley Parsons will manage all matters requiring communication or coordination with the contractors to ensure that there is always 'one point of contact' during the course of the WICET Stage 1. However, the management of the engagement with key stakeholders in relation to the Project will be managed by WICET. It is expected that similar arrangements will be made with the WEXP1/WEXP2 PCM Project Management.

To ensure this engagement process is effectively managed from the beginning of the construction phase, an Early Works Plan has been developed. This plan highlights the specific actions required to inform the community and industry neighbours about potential community impacts.

Local Industry Participation Plan

In accordance with the Local Industry Policy 2008 document and State Government legislation, WICET is voluntarily complying with the Queensland Government's requirement to ensure the local industry is provided with full, fair and reasonable opportunity to tender for work on infrastructure and resource-based projects and major procurements in Queensland.

The Local Industry Participation Plan outlines how these policies will be met and how local industries will be informed of opportunities.

Obligations Database Plan

WICET's current database provides for environmental obligations and has the potential to cover other areas. A plan to cover its application and uses is to be developed by the Project PCM.

18.9 Conclusion

This social impact chapter has provided an updated profile of the Gladstone region – the people, the workforce and a profile of their community lifestyle and access to recreation, employment and accommodation.

In conjunction with the Queensland government, the GRC is proactively planning for the coming increases in population and workforce numbers to the region as a result of extensive industry approvals.

With over $60 billion worth of major industry projects currently under investigation in the Gladstone region, GRC has been proactive in planning for the social infrastructure needs of the community. Key Council planning documents have been referenced in this request and their relevance to the WICET Project discussed.

Media coverage indicates that government, industry and local communities generally welcome WICET and its expansion in Gladstone because of the broader benefits it presents.

However, these benefits could be overshadowed if the local impacts of construction and ongoing operations are not effectively managed.

The WICT EIS and Coordinator General's Report identified environmental impacts and benefits that will occur in the region due to the Project. Construction and operational impacts are likely for both internal port stakeholders as well as local Gladstone stakeholders. It is anticipated that the Project will bring local construction impacts from noise and vibration, dust, lighting and traffic. Abiding by the goals of the Environmental Management Plans will ensure that environmental impacts from WEXP1 and WEXP2 will be mitigated in appropriate ways.

WICET has established a stakeholder engagement programme that will engage early, and adopt clear communication approach to help manage community expectations, and to identify and communicate how the implementation of the design addresses community concerns.

Proactive planning and investment in the Maritime Precinct and the Maroon Group Accommodation Facility demonstrate that WICET has identified and assessed social and environment impacts, both adverse and beneficial, in the Project's area of influence.

Conclusion 1: The impacts arising from increased workforce requirements and concurrent projects include a shortage of necessary skills, a decrease in accommodation availability and increased pressure on social infrastructure in the surrounding community

Conclusion 2: The estimated peak construction workforce for the changed Project is estimated to peak at 1,100 personnel, inclusive of construction labour, engineering and management staff. This is during construction of Stage 1 and WEXP1.

Conclusion 3: Provision of rooms from WICET's allocation within the Maroon Group Accommodation Facility will cater for the majority of non-Gladstone based workers required for the Project.

Conclusion 4: WICET will provide $35 million towards a Gladstone Coal Exporters Maritime Precinct along the east shore of Auckland Creek to deliver a long term, high quality amenity to the Gladstone community.

Conclusion 5: WICET has developed the over-arching Communications Plan, which details the communications process to be utilised throughout of Terminal's lifespan and the Community Relations Plan to address communication specifically relating to site establishment and construction phases of the Terminal.

19. Health and safety

19.1 Summary

There are potential health and safety risks to the community and workforce from WEXP1 and WEXP2 construction and operation, including construction and operational health and safety risks, and environmental risks (eg dust, noise and disease vectors). The implementation of workplace health and safety procedures and the EMP (refer Chapter 23) will minimise the potential Project risks to acceptable levels.

With fewer bulldozers proposed as part of the operation of the changed Project, fewer personnel will be exposed to heavy mobile equipment risk.

Modelling of cumulative operational noise levels from WICET Stage 1, WEXP1 and WEXP2 resulted in an increase in the number of sensitive receptor locations being exposed to exceedances of relevant noise criterion during neutral and 'worst case' weather conditions. Noise mitigation is likely to be required for these sites and will be addressed during the detailed design process.

19.2 Introduction

This chapter summarises the requirements for the management of health and safety for the workforce (construction and operational) and the community. The Request for Project Change provides an updated assessment to address changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and EPBC Act controlled action approval (April 2008).

The main community concerns regarding health and safety that were raised during a public consultation period during the WICT EIS (2006) process included:

- Air quality from construction activities and coal dust emissions
- Hearing damage from excessive noise and chronic injuries from machinery operation
- Impacts on sensitive receptors particularly from dust and noise pollution

Air quality and noise and vibration have been reassessed as part of this Change Request and are further discussed in Chapter 12 (Air Quality) and Chapter 14 (Noise and Vibration).

19.3 Background Information

Queensland's *Workplace Health and Safety Act 1995* (WHS Act 1995) provides the legislative framework and obligations for health and safety in the workplace. The *Workplace Health and Safety Regulation 2008* (WHS Reg) sets out the requirements to meet the WHS Act 1995 such as prohibiting certain activities or prescribing methods to reduce risks.

Nationally uniform laws that were introduced in Australia on 1 January 2012 will replace the existing workplace health and safety legislation in all states, territories and the Commonwealth. Queensland is adopting the *Work Health and Safety Act 2011* (WHS Act 2011) to replace the current WHS Act 1995. This new legislation aims to provide a framework to protect the health, safety and welfare of all workers at work and of all other people who might be affected by the work.

A key difference in the legislation, particularly relevant to the construction and operation of the expansion phases WEXP1 and WEXP2, is that officers, as defined under the *Commonwealth Corporations Act 2001*, have a duty to exercise due diligence to ensure work health and safety obligations are met. Unlike in the WHS Act 1995, this duty applies regardless of whether there has been an incident and irrespective of whether there has been prosecution.

The WHS Act 2011 applies to those:

- Who have responsibility for the health and safety of people on the construction site
- Who may affect the health or safety of people as a result of construction activities
- Whose health or safety may be affected at a construction site or as a result of construction activities

The health and safety objective of the proponent (WICET Pty Ltd) is to have zero incidents that risk or harm the people involved in the Project. WICET has developed a Health, Safety, Environment and Community (HSEC) Policy to be implemented during design, construction and commissioning.

The Owner's Health and Safety Management Plan has been produced by WICET for the construction activities relating to the Project. It will describe the strategies and guidelines to be used to implement the WICET HSEC Policy and address WICET's obligations under the WHS Act 1995 and from 1 January 2012, the WHS Act 2011.

GPC is to be the operator of the Terminal and as such will implement their Workplace Health and Safety Policy during operation. Appendix 19 contains a copy of each policy.

19.4 Description of Environmental Values

The main community concerns regarding health and safety that arose during the Project's public consultation period include air quality from construction activities and coal dust emissions, hearing damage from excessive noise and chronic injuries from machinery operation (Connell Hatch 2007). There are also concerns over the impact on sensitive receptors particularly from dust and noise pollution.

Information regarding air quality modelling and noise modelling can be found in Chapters 12 and 14 respectively.

19.4.1 Sensitive Locations

The nearest sensitive receptor locations surrounding the Project are identified in Figure 19.1. Examples of sensitive receptors include the following:

- Residential areas
- Educational facilities
- Hospitals and medical centres
- Aged care facilities
- Recreational areas
- The marine environment

19.5 Potential Impacts

19.5.1 Impacts on Workforce

Construction Workforce

The WICET Health and Safety Management Plan will be implemented for the construction workforce employed on the Project. The potential safety hazards associated with construction activities for the Project detailed in the EIS (Appendix 1) and proposed changes to the Project will include:

- Working at heights – risk of falling, risk of falling debris/objects
- Working over water – risk of drowning
- Working in the vicinity of heavy equipment – risk of accident/injury
- Working in confined spaces – risk of suffocation, risk of entrapment
- Working with electricity – risk of electrocution
- Working with chemicals/hazardous substances – risk of spillage, fire and/or injury, risks from materials exposure

Legend

- Project Area
- Rail

Sensitive Recepto

- Education F
- Health Care
- Recreation
- Residence
- General Re

Source:
WICT Project Footprint: Au

- Working with tools – risk due to unsafe work practices
- Heavy lifting – risk of injury

A summary of the potential health and safety risks and appropriate mitigation measures for the construction phase of the Project (including expansion phases WEXP1 and WEXP2) are outlined in Table 19.1 below.

Table 19.1 Potential Workplace Health and Safety Risks and Mitigation Measures

Health and safety risks	Mitigation measure(s)
Construction workplace accidents	A construction Safety Management Plan will be developed for all Project phases which will be reviewed and approved by WICET before implementation
Occupational noise exposure	Contractor will identify areas where occupational noise will reach levels where hearing protection is required and will ensure that hearing protection is used within these areas. Refer to Chapter 14 regarding noise mitigation techniques
Hazardous chemicals and materials exposure	Contractor will develop a construction Safety Management Plan for all Project phases which will be reviewed and approved by WICET before implementation
Dust exposure	Contractor will employ dust mitigation methods such as regular watering of construction access roads during dry and windy period. Refer to Chapter 12 for more information regarding air quality and dust mitigation techniques (refer CEMP in Appendix 23.2)

Personal Protective Equipment (PPE) includes any items of clothing, equipment or devices that are designed to protect a person from risk of injury or illness. To increase general site safety and to assist in preventing minor injuries during Project construction activities, the following PPE must be worn as a minimum:

- Hard hat
- Safety glasses
- Gloves
- Steel capped boots
- Long sleeve shirt (Hi-Viz, reflective strips and SPF50)
- Long pants
- Ear protection when conditions warrant their use
- Dust masks when conditions warrant their use

Operational Workforce

The WICET Health and Safety Management Plan will be implemented for the operational workforce employed at the Terminal. Listed below is a summary of potential health and safety risks that may be present during operation of the Terminal.

- Working at heights – risk of falling, risk of falling debris/objects
- Working over water – risk of drowning
- Working in the vicinity of heavy mobile equipment – risk of accident/injury
- Working in confined spaces – risk of suffocation, risk of entrapment
- Working near live conveyors – risk of entanglement
- Interaction between operating and construction sites

With fewer dozers proposed as part of the operation of the changed Project (due to a stacker-reclaimer yard being proposed for the eastern side of Golding Point), fewer personnel will be exposed to heavy mobile equipment risk. Other risks are essentially unchanged from the WICT EIS.

Site Inductions

All visitors to the Project site will be required to undertake a Visitors Induction prior to entry and accompanied at all times. All contractor personnel will be required to complete a site specific induction for the Project site. This induction will be mandatory for all contractor personnel prior to their start in construction work. Other training may be required for employees and the level of training will depend on the inherent risk and complexities of the control measures. There will be measures in place to assess the employee's competency and determine the effectiveness of the training, as well as a process to effectively maintain training records will also be implemented.

19.5.2 Potential Impacts on the Community

Air Quality

One of the major community concerns regarding health and safety is air quality, particularly dust from the cut and fill operations during construction and coal dust emissions during the operation of the Project. Odour has been considered and is expected to be well below levels of concern.

The Project is separated from residential locations by a distance of over 1.2 km, therefore dust impacts to the community are unlikely to be substantial. Air quality monitoring predicted that cumulative 24-hour average ground-level PM_{10} concentrations are predicted to exceed the EPP (Air) objective of 50 µg/m³ at the Marina, located 2.5 km east of WICET, on seven occasions, however, this is due to existing industries and background concentrations (refer Appendix 12.1).

Chapter 12 summarises the likely impacts relating to air quality from the proposed changes to the Project.

Mitigation measures for dust produced during construction are shown in the Air Quality Management Plan (refer Appendix 23.3) while the mitigation measures for operation are outlined in Chapter 12.

Noise

An obligation under Queensland legislation is to ensure that the workforce is not to be exposed to excessive noise at work, as defined under the WHS Reg. The Queensland Codes of Practice provide methods that can be employed to manage the exposure to risks, including excessive noise.

Construction noise from the changed Project is not expected to be significantly different from that modelled as part of the SEIS (refer Appendix 1). Mitigation measures for construction noise will be based on AS2436-1981 "*Guide to Noise Control on Construction, Maintenance and Demolition Sites*" as detailed in Chapter 14.

Under neutral weather conditions, the investigation into operational noise emissions found that the revised operational noise levels for the complete Terminal, inclusive of Stage 1, WEXP1 and WEXP2, (for overland conveyors with low noise steel idlers and all other conveyors with low noise aluminium idlers) show that all receivers are predicted to be below the noise criteria excluding Tide Island and Lot 1 on Plan RP614414 at Callemondah.

Modelling under 'worst case' weather conditions for the complete Terminal indicated that the operational noise criteria will be exceeded at 19 receivers by 4 dBA or more. However, during 'typical' operating scenarios, it is expected that noise levels at sensitive receptors will be 2-3 dBA lower than that predicted as it is assumed that not all infrastructure and equipment will be operating simultaneously.

Noise mitigation is likely to be required for these sites and will be addressed during the detailed design process.

Disease Vectors

In Queensland, mosquitoes are carriers of several diseases including Barmah Forest virus, dengue fever, Japanese Encephalitis virus, Murray Valley Encephalitis and Ross River virus (Queensland Health 2010). There are no vaccines currently available for dengue fever and Ross River virus; mosquito control is an important step in preventing the spread of disease. Mosquitoes can breed in most water types, including polluted, and common breeding sites include natural or constructed ground sites as well as artificial containers, including water storage tanks and constructed drains.

It is imperative that the implementation of water recycling does not enhance mosquito breeding and the transmission and spread of disease. The Local Government Association of Queensland (LGAQ) produced a Mosquito Management Code of Practice (2002) to demonstrate reasonable and practicable measures to reduce the risk of outbreaks of arthroborne disease.

19.6 Mitigation Measures

With the proposed Project changes involved with WEXP1 and WEXP2, there is potential for additional mosquito breeding areas. The new stacker-reclaimer yard on Reclamation Area B will include a new settlement pond to treat and retain stormwater collected from the coal stockpiles prior to discharge.

The WICET Owner's Health and Safety Management Plan and the construction and operation health and safety risks associated with WEXP1 and WEXP2 will be reviewed during the detailed design phase.

The following strategies have been taken from the Queensland Water Recycling Guidelines (Environmental Protection Agency 2005) and will be adopted during the Project cycle to minimise the spread of arthroborne disease:

Design

- Consideration should be given to minimising potential mosquito breeding sites. Queensland Health (2002) has published guidelines to minimise mosquito and biting midge problems in new development areas. This document advises on methods to prevent or minimise the impact of mosquitoes in new development areas
- The design of constructed wetlands, water impoundments, grass swales and open earth drains can influence mosquito breeding. The Australian Mosquito Control Manual (Morris et al. 2002) provides useful advice on mosquito control

Construction

- Under Division 2 of the *Public Health Regulation 2005*, there is a requirement that the Project site does not become a breeding site for mosquitoes. The construction and installation of water storages shall be carried out in accordance with this regulation. Where a significant risk of arthroborne disease has been identified, such as holding tanks for recycled water, the design should prevent entry of mosquitoes
- The new settlement pond will be designed with steep clean sides to prevent vegetative habitat for mosquito breeding and the site will be graded to remove hollows that allow the ponding of water

Operation

- All structures associated with storage or treatment of recycled water, such as the settlement ponds, should be regularly maintained to minimise mosquito breeding. An example is clearing water plants away from the edge of open water storage to reduce the habitat for mosquito larvae. Research by Dale et al. (2001) suggests that dense mats of surface vegetation or fallen decaying material can encourage mosquito breeding

- If using recycled water for irrigation, surface ponding should be prevented by appropriate irrigation scheduling
- Open recycled water storages should be monitored regularly to assess the presence of mosquito larvae
- Biological control methods using native predators, such as aquatic invertebrates or native fish, may be considered if there is a potential health risk from mosquito breeding

19.7 Conclusion

There are potential health and safety risks to the community and workforce from WEXP1 and WEXP2 construction and operation, including construction and operational health and safety risks, and environmental risks (eg dust, noise and disease vectors). The implementation of workplace health and safety procedures and the EMP (refer Chapter 23) will minimise the potential Project risks to acceptable levels.

Conclusion 1: With fewer bulldozers proposed as part of the operation of the changed Project, fewer personnel will be exposed to heavy mobile equipment risk.

Conclusion 2: Under the 'worst case' weather scenario, the complete Terminal may exceed operational noise criteria at 19 receivers. Noise mitigation is likely to be required for these sites and will be addressed during the detailed design process.

20. Economics

20.1 Summary

The changes proposed as part of WEXP1 and WEXP2 are expected to result in positive changes to economics of the Gladstone region and State of Queensland. The changes are mainly attributable to timing changes with the project, with the approved Terminal output capacity (84 Mtpa) being achieved earlier than originally predicted, due to higher than expected demands for Queensland coals.

The proposed Project changes are in response to WICET's customer's requirements and results in an improved marketability of Queensland coals.

The Project is ideally located in the Port of Gladstone and provides a unique link in the coal supply chain from the Surat and southern Bowen Basins. RGTCT and BPCT have reached their ultimate capacity and are unable to expand further due to physical restraints.

The expansion phases of WICET are key to the opening of the Surat Basin coal reserves and provide the export link to the recently approved Surat Basin Rail Project. Given this, and the projected increase in demand, this Project is considered essential infrastructure, critical in ensuring continuity in the supply of coal to the export market.

The peak construction workforce, which was originally predicted at more than 1,450 (assuming Stage 1, 2 and 3, as defined in the EIS were undertaken concurrently), is expected to reach 1,100 workers along with the total capital expenditure for construction works, as a result of the cascading of WEXP1 and WEXP2 following on from commencement of WICET Stage 1.

20.2 Introduction

This chapter provides an update of the existing economic situation in Gladstone and provides background information regarding the coal industry in Queensland. The economic impacts associated with the changed Project are also discussed.

This Request for Project Change provides an updated assessment to address changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and EPBC Act controlled action approval (April 2008).

20.3 Background Information

The Port of Gladstone (the Port) is the world's fifth largest coal export ports with coal representing over 70% of all cargo and commodities exported. Gladstone Ports Corporation (GPC) currently owns and operates two coal export terminals in the Port, including RG Tanna Coal Terminal (RGTCT) and Barney Point Coal Terminal (BPCT). This Project, is funded and owned by a consortium of 16 coal companies and is targeted for Stage 1 operations (approximately 27 Mtpa) to commence in early 2014.

The Port has been identified by the Queensland Government as a major industrial centre for the future of Australia. It has a vital role in the regional, Queensland and Australian economies. Other major exports for the port include alumina, cement, petroleum, aluminium and grain. Gladstone provides a link between the imports/exports from the port and the coal mining, agricultural and pastoral areas of Queensland, including the Callide/Dawson Valleys, Central Highlands, Bowen Basin and in the future; the Surat Basin. However, the demand for coal exports is projected to exceed the capacity of the RGTCT, BCPT and Stage 1 of the WICET Project. WEXP1 and WEXP2, as outlined in Chapter 3, are critical to facilitating the coal export supply chain and the future development of the Gladstone region.

20.4 Existing Economic Environment

20.4.1 Economic Profile of Gladstone Region

The Gladstone region consists of the City of Gladstone, and multiple townships within the Gladstone Regional Council. It is an area of heavy industrialisation and strong economic development, based around resource extraction, agriculture, manufacturing, port facilities and processing and export. The Gladstone region has attracted these industries by the quality and versatility of infrastructure, services, availability of suitable land, a naturally deep and sheltered harbour, skilled local workforce, proximity to natural resources, including coal, gas and water and relatively short export times to the Asia Pacific region. The Queensland Government's support and promotion of the region, through the allocation of the Gladstone State Development Area, has also contributed to the industrial growth of the Gladstone region.

Population

Preliminary population estimates in the Gladstone region, as at 30 June 2010, was at 60,316 persons, representing 1.3% of Queensland's population. The annual average growth rate of the Gladstone region between 2006 and 2010 was 3.0% compared with Queensland's annual growth of 2.6%.

Population projections published by the Queensland Treasury's Office of Economic and Statistical Research in May 2011 estimate that the population for the Gladstone region will increase from 53,941 persons in 2006 to approximately 111,690 persons in 2031. This corresponds to total change for the same period of 107% compared with a total change of 61% for Queensland.

Further information regarding population growth and trends is detailed in Chapter 18 (Social) of this request.

Labour

The unemployment rate in the Gladstone region is 5.2% with 1,700 unemployed persons and is comparable to the Queensland and Australia unemployment rates of 5.5% and 5.1%, respectively (March Quarter 2011). Prior to June 2010, the unemployment rate in the Gladstone region exceeded that of Queensland and both experienced an increasing trend, peaking at 5.7% (Department of Education, Employment and Workplace Relations 2011). More recently, however, the unemployment rate in Queensland remained relatively constant, while the rate in the Gladstone region declined to current levels.

The occupation with the largest number of employed persons in 2006 in the Gladstone region was technicians and trades workers with 5,217 employed persons. Other occupations with high numbers of employed persons included labourers, accounting for 3,238 persons, machinery operators and drivers with 3,116 persons and professionals, accounting for 2,935 employed persons.

In the Gladstone region in 2006, the greatest degree of specialisation occurred in the occupations of machinery operators and drivers, technicians and trade workers and labourers. The proportion of persons employed as machinery operators and drivers in the Gladstone region was 13.1%, compared with 7.2% in Queensland. Technicians and trade workers represented 21.9% of all employed persons in the Gladstone region compared with 15.4% in Queensland. Labourers accounted for 13.6% of employed persons in the Gladstone region compared with 11.9% in Queensland. While this data is derived from the 2006 Census, there is a high likelihood that that this distribution of labour is representative of current occupations.

Businesses

The construction industry dominates the business count in the Gladstone region with 763 construction businesses in June 2009, representing 24.0% of all businesses in the region. The following next two largest industries in the region for this period were:

- The agriculture, forestry and fishing industry accounted for 367 businesses or 11.5%
- The renting and hiring and real estate industry accounted for 326 businesses or 10.2%

The number of businesses per industry in the Gladstone region in June 2009 compared with Queensland is displayed in Table 20.1.

Table 20.1 Number of businesses by industry in the Gladstone region 2009

Industry	Region (Number)	Percentage of Total	Queensland (Number)	Percentage of Total
Accommodation cafes and restaurants	130	4.1%	14,950	3.6%
Administrative and support services	102	3.2%	15,724	3.7%
Agriculture, forestry and fishing	367	11.5%	46,624	11.1%
Arts and recreation services	30	0.9%	5,313	1.3%
Construction	763	24.0%	78,768	18.8%
Education and training	33	1.0%	4,559	1.1%
Electricity, gas and water services	3	0.1%	1,039	0.2%
Financial and insurance services	162	5.1%	25,827	6.2%
Health care and social assistance	94	3.0%	17,630	4.2%
Information, media and telecommunications	6	0.2%	2,772	0.7%
Manufacturing	168	5.3%	18,193	4.3%
Mining	15	0.5%	1,913	0.5%
Not classified*	44	1.4%	9,533	2.3%
Other services	195	6.1%	18,591	4.4%
Professional, scientific and technical services	274	8.6%	41,509	9.9%
Public administration and safety	12	0.4%	1,460	0.3%
Renting, hiring and real estate	326	10.2%	46,636	11.1%
Retail trade	207	6.5%	27,747	6.6%
Transport, postal and warehousing	218	6.8%	27,180	6.5%
Wholesale trade	36	1.1%	13,442	3.2%
Total	3,185	100.0%	419,410	100.0%

Table Note * This Category consists of businesses that are yet to be coded to an industry
Source ABS 2011, Counts of Australian Businesses, including Entries and Exits, Jun 2007 to Jun 2009

The greatest degree of specialisation occurred within other services which represented 6.1% of businesses in the Gladstone region compared with 4.4% in Queensland. The construction industry and the manufacturing industry also experienced a high degree of specialisation in the Gladstone region. The construction industry represented 24.0% of businesses in the Gladstone region compared with 18.8% in Queensland, while the manufacturing industry represented 5.3% of businesses in Gladstone compared with 4.3% in Queensland.

On the employment front, according to the 2006 Census, the largest employer in the Gladstone region was manufacturing which accounted for 4,735 (19.9%) of the region's

employed labour force. Other industries with relatively large numbers of employed persons included the construction industry, with 3,007 employees (12.6%), retail trade with 2,484 employees (10.4%) and the transport, postal and warehousing industry with 1,690 employees (7.1%).

20.4.2 Coal Industry

Background

Global demand for coal has increased considerably in the past decade. It is the fastest growing source of electricity due to its low cost, abundance, safe extraction and use relative to alternative fossil fuels. This demand is expected to remain strong with industrial development and population growth, particularly in emerging countries. Currently Asia receives over 88% of Australia's coal exports with Japan, South Korea, Taiwan, China and India the main buyers. For the year ending 30 June 2010, the total coal exports from Australia were approximately 292 Mega tonnes (Mt) (ABARES 2011).

It is estimated that Australia holds over 39.2 Giga tonnes (Gt) of black and brown coal reserves, the majority of which are concentrated in Queensland (56%) and New South Wales (40%), with Sydney Basin in New South Wales and Bowen Basin in Queensland containing the largest reserves (ABARES 2010). For the year ending 30 June 2010 Queensland produced a total of 205.7 Mt of saleable coal, representing 56.7% of Australia's saleable coal (ABARES 2011). Of this, Gladstone exported 60.4 Mt (27.6 %) to various international markets (this proportion is likely to increase). In 2010, there were a total of 54 mines in operation in Queensland, comprising 41 open-cut and 13 underground mines. The Queensland coal industry also directly employed a workforce of 17,388 employees for the same year.

Bowen Basin

The Bowen Basin is located in Central Queensland, from Collinsville extending south to Moura and Rolleston. It represents a significant economic driver for the state and national economies. The Bowen Basin is the most important source of coal in Queensland as it produces the majority of the viable prime coking coal. The basin produces a variety of coal types, which are sold into all sectors of international markets, including (Department of Mines and Energy 2007):

- High-grade metallurgical coking coal for iron and steel industry
- Blending coals for coke making for iron and steel industry
- PCI coals for iron and steel industry
- High and lower volatile thermal coals for power generation
- High to low volatile thermal coals for the industrial market (cement manufacturing, pulp and paper manufacturing and chemical industry)

The international markets for coal produced in the Bowen Basin include Japan, South Korea, India, Taiwan, China, Europe and Brazil.

Surat Basin

The Surat Basin contains over 4 billion tonnes of proven thermal coal resources, which are largely undeveloped at this point in time (Department of Mines and Energy 2007). Major deposits in this basin are located near Macallister and Chinchilla and also near Wandoan and Taroom. Coal from Surat Basin is used domestically in coal-fired power stations and is exported internationally for power generation and industrial use. The coal from this basin is a low sulphur coal not suitable for metallurgical coke making. The Surat Basin has potential for open-cut coal mines and has attracted domestic and international interest as a major source of high-volatile thermal coal, however may be impeded by a lack of infrastructure, particularly port access; to support coal mines.

Galilee Basin

The Galilee Basin is located to the west of the Bowen Basin in western Central Queensland. It contains large reserves of thermal coal but has not been subject to large-scale coal mining to date. This is due to the basin's remote location, lack of supporting infrastructure and the lower quality of coal. Recently, however, there has been renewed interest in coal exploration of the eastern margin of the Galilee Basin with the aim to develop thermal coal mines (Department of Mines and Energy 2007).

20.4.3 Coal Exports

The coal resources of Queensland are extensive and well exceed the domestic needs of Australia for the foreseeable future. As a result, Queensland will be able to maintain high levels of coal exports into the future, a major contributor to the State economy. Other benefits of the strong coal industry in Queensland are through exports, major financial returns, increasing employment opportunities and improving regional development.

In the year to 30 June 2010, the Queensland coal industry recorded a total of 275.2 Mt of raw coal mined, from which 205.7 Mt of saleable coal was produced, an increase of 7.8% from the previous year (Department of Employment, Education, Development and Innovation (DEEDI) 2010). Coal exports in the year to 30 June 2010 totalled 183 Mt (89 % of production), an increase of 14.9% from the previous year. These coal exports comprised 124.6 Mt (68.1%) of metallurgical coal and 58.4 Mt (31.9%) of thermal coal. The Port of Gladstone exported approximately 60.4 Mt of this coal.

Coal export sales in the year to 30 June 2010 generated approximately AUD$24.5 billion of Australia's AUD$40.9 billion of export. Average coal prices in the year to 30 June 2010 were AUD$151.98 per tonne for metallurgical coal and AUD$95.44 per tonne for thermal coal (DEEDI 2010). The price of coal per tonne was down 51.3% for metallurgical coal and 30.0% for thermal coal from the previous year. The Global Financial Crisis caused a reduction in the price of various commodities, including coal, due to the high level of uncertainty within the global economy that lead to a reduction in demand from countries including China. The steel production industry, a major importer of Queensland's metallurgical coal, took a significant hit during the economic downturn, which has contributed to reduced coal prices.

Following the price declines resulting from the GFC, the coal industry is recovering with data for the March Quarter 2011 indicating coal prices for high quality metallurgical and thermal coal were at AUD$217.25 per tonne (up 4% from mid-2010) and AUD$98.88 per tonne (up 4%) respectively (ABARES 2011).

Japan is the largest importer of Queensland coals, receiving 57.3 Mt or 31.3% of the State's 2009/10 coal exports. China was the second largest market for Queensland coals at 30.8 Mt (16.8%), followed by India with 28.1 Mt (15.4%), Korea with 22.6 Mt (12.3%) and Taiwan with 13.9 Mt (7.6%) (DEEDI 2010). Europe accounts for 11.4% of Queensland's coal exports. It is anticipated that in China and India an increase in electricity demand and steel production is expected to increase the consumption of coal, thereby increasing the demand on imported coal from Queensland (ABARES 2010).

The Project is ideally located in the Port of Gladstone and provides a unique link in the coal supply chain from the Surat and southern Bowen Basins. RGTCT and BPCT have reached their ultimate capacity and are unable to expand further due to physical restraints. Given this, and the projected increase in demand, this Project is critical in ensuring continuity in the supply of coal to the export market.

20.5 Assessment of Potential Impacts

20.5.1 Summary of the Approved Project

Economic modelling was undertaken during the EIS process to determine the economic impacts of the construction and operational phases of the Project. It is considered to be

representative of the Stage 1 construction phase and ultimate operational capacity of the broader WICET Project (including previously defined Stages 2 and 3). The timeline of the economic modelling was for the period from 2007, with the commencement of preconstruction activities till operations to 2040.

Significant results derived from the economic modelling include the following:

- Peak construction workforce of 800 for Stage 1, with an estimated 1,200 additional jobs elsewhere in Queensland
- Peak workforce for construction phases, assuming Stage, 1, 2 and 3 (as defined in the EIS) were undertaken concurrently, estimated to be 1,450
- When developed to the ultimate capacity, coal production and export will increase Gross State Product (GSP) by an estimated aggregated total of $183 billion to 2040
- When it reaches the ultimate capacity, economic activity directly attributable to the forecast coal production and export volumes will be in the range of $6.4 billion to $8.3 billion annually to 2040
- The Project will facilitate the generation of $140 billion in total coal export earnings to 2040 and around $5.5 billion annually from when ultimate capacity is reached

The EIS and SEIS further detail information regarding the results of economic modelling outlined above (refer Appendix 1).

20.5.2 Likely Economic Impacts of the changed Project

The nominal throughput used in the EIS economic modelling was 27 Mtpa for Stage 1 and cumulatively, 50 Mtpa for Stage 2 and 70 Mtpa for Stage 3. WEXP1 and WEXP2 will allow the Terminal output to achieve the ultimate EIS and controlled action approved capacity of 84 Mtpa. This increase in coal export throughput, combined with the rise in coal prices, will increase the GSP, which is currently predicted at $183 billion over the life of the Project. The total coal export earnings to 2040, currently estimated at $140 billion, will also increase due to the increase in the nominal capacity and the rise in coal prices. The approved ultimate capacity of 84 Mtpa will be achieved earlier than originally anticipated as a result of WEXP1 and WEXP2.

The peak construction workforce, which was originally predicted at more than 800 for post-Stage 1 construction, is expected to increase to 1,100 workers along with the total capital expenditure for construction works, as a result of the cascading of WEXP1 and WEXP2 following on from commencement of WICET Stage 1.

Indirect impacts of the Project may include the exploration and development of further coal mines in the Bowen, Surat and Galilee Basins, which will have flow-on benefits for the coal industry in Queensland and the surrounding regional communities.

The expansion phases of WICET are key to the opening of the Surat Basin coal reserves and provide the export link to the recently approved Surat Basin Rail Project.

Conclusion 1: Gross State Product from the complete WICET Project is expected to earn an aggregate $183 billion by the year 2040.

Conclusion 2: The peak construction workforce for the Project is 1,100 personnel. This will occur during construction of Stage 1 and WEXP1.

21. Hazard and risk

21.1 Summary

The changes proposed as part of WEXP1 and WEXP2 are expected to result in a reduction in hazards and risk to personnel onsite. This is primarily due to WEXP2; the development of a stacker-reclaimer yard on the eastern half of Golding Point in lieu of the approved bridge stacker/dozer reclaim yard in this area. This proposed change will result in less bulldozers being required for pushing of coal and removes the requirement for reclaim tunnels on the eastern half of Golding point (confined spaces), reducing risks to onsite personnel.

There are no expected changes to the potential hazards and risks associated with coal terminal operations, which were addressed the EIS (Appendix 1).

Potential hazards and risks associated with the Ultimate WICET Project will be managed in accordance with the CEMP and subordinate management plans and the approval conditions for the Project.

21.2 Introduction

The Request for Project Change provides an updated assessment to address changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and EPBC Act controlled action approval (April 2008).

This chapter of the Change Request discusses the potential hazards and risks that may be associated with the construction and operation of the WICET Project including how these have changed as a result of the proposed changes associated with WEXP1 and WEXP2.

Potential hazards and risks associated with the Project were identified and assessed through an EIS process as being manageable for the site. These potential hazards and risks, and the associated mitigation measures, were approved in the Coordinator-General's (CG) Report dated January 2008 and the EPBC Act controlled action approval in April 2008 (EPBC 2005/2374).

The potential cumulative hazards and risks associated with the operation of Stage 1 of the WICET Project and its expansion through WEXP1 and WEXP2 are also identified, and management processes identified to effectively mitigate these hazards and risks.

21.3 Potential Hazard and Risks

The potential hazards and risks associated with coal terminal operations were addressed the EIS (Appendix 1), including:

- Risks and hazards associated with oil spills, pilotage and vessel movement
- Introduction of exotic marine species from ballast waters
- Decrease in water quality from dredging operations, abrasive blasting over water and other Port operational discharges

The changed Project will not increase or change any of these potential risks and hazards.

The potential impacts of both natural and induced emergency situations, including land emergencies and shipping operations emergencies as a result of the Project were outlined in the EIS (refer Appendix 1). The changes introduced in WEXP1 and WEXP2 will not result in additional potential hazards or risks, and will have minimal cumulative impact on the potential for emergency situations, as the volumes of hazardous materials and extent of risks will be largely unchanged.

21.4 Potential Impacts and Mitigation Measure for Hazardous Substances

The EIS for the WICET Project outlined a number of hazardous substances that may be stored and used onsite, including:

- Petroleum distillates
- Motor spirits
- Aerosols
- Adhesives
- Corrosive liquids
- Paint
- Hydrochloric acid
- Ethanol
- Flammable liquids

The majority of the hazardous substances listed will be stored in small quantities and are to be stored in locked cupboards/storage until issued for use. Unleaded Petrol and diesel will be stored in bunded above ground tanks in accordance with the Australian Standard *AS1940: The storage and handling of flammable and combustible goods*, including design specifications to hold 110% of the volume of the largest tank in each bund.

Relevant statutory approvals such as Environmentally Relevant Activity 8 – Chemical storage and Flammable and Combustible Liquids Licences will be obtained by WICET where required.

The management of these substances will be outlined in the Emergency Procedures that apply to the WICET Project (refer CEMP in Appendix 23.2).

The construction and operation of WEXP1 and WEXP2 will not involve a substantial increase in volumes of the substances approved under the EIS, or include additional types of hazardous substances.

21.5 Mitigation Measures

21.5.1 Emergency Management and Response Strategies and Plans

The WICET Project approved under the EIS outlined a number of emergency procedures developed by GPC who were the proponent of the Project at the time. These procedures remain applicable to the Project and WEXP1/WEXP2 (where approved), until such time as the WICET Project completes its site-specific hazard and risk management documentation for the expansion.

GPC's procedures, combined with National and State plans, provide a comprehensive coverage of potential emergencies. These include:

- GPC Emergency Procedures
- The National Plan
- Queensland Coastal Contingency Action Plan
- Oil Pollution First-Strike Response Deed
- Port of Gladstone First-Strike Oil Response Plan
- Maritime Safety Queensland's role in dealing with the discharge of ship- sourced pollutants in QLD
- Gladstone Regional Council Local Disaster Management Plan
- Scientific Unit of the Queensland Fire and Rescue Service's role in the management of chemical incidents

An integrated risk management plan is being developed by GPC for their entire port operation, including the WICET Terminal, providing an overall strategy for the extension of existing plans and procedures.

Safety Plans relating to the construction and operation of port facilities will be provided to the Department of Emergency Services and other agencies prior to the commencement of each construction phase and priority to operate commencement respectively.

The development of the Terminal will be effectively managed under these plans and procedures, and is not expected to impact on current emergency management and response strategies.

21.6 Risk Assessment

21.6.1 Risk Assessment Process

Risk assessments are completed, monitored and continually updated during both the planning an implementation of each phase of the Terminal development stages. The assessments involve a process of identification of hazards, causes, and likelihood/consequence of risk and determination of mitigation measures to reduce the risk of occurrence.

Using the likelihood/consequence severity criteria (as shown in the tables below) a matrix was developed to assess the qualitative risk to the environment from potential impacts. Risk levels included:

- Extreme – Intolerable environmental risk with significant and urgent actions required to reduce the risk
- High and Moderate – Implement actions necessary to reduce risk to As Low As Reasonably Practicable (ALARP) within the EMP
- Low – Monitor and manage risk to extent necessary

Table 21.2 Likelihood table

Rating	Likelihood description and indicative frequency	Indicative probability
A **Almost certain**	Very high probability of occurrence, could occur several times per year. Has occurred several times on similar projects at this location	>0.8
B **Likely**	High probability, likely to occur approximately once per year. Similar event has occurred several times per year on similar projects for this organization	0.5 to 0.8
C **Possible**	Possible, reasonable probability that it may occur at least once in a 1 to 10 year period. A similar event has occurred at some time on other similar projects for this organization	0.1 to 0.5
D **Unlikely**	Plausible, unlikely to occur during the Project, could occur over the next 10 to 40 years. A similar event has occurred on other similar projects in this industry	0.02 to 0.1
E **Rare**	Very low likelihood but not impossible, unlikely to occur during the next 40 years. A similar event has occurred elsewhere in the world in this industry	<0.02

Table 21.3 Risk descriptions

Rating	Technical Performance	Project Cost	Project Schedule	Health & Safety	Reputation	Legal/Regulatory	Environment
E - 5 (Catastrophic)	60% of design capacity not achieved. Increase in operating costs	Greater than 30% cost overrun	Greater than 50% delay in completion of the Project	Multiple fatalities	Adverse global media coverage. Government inquiry. Major public concerns. Major loss of shareholder support	Very significant fines and prosecutions Multiple litigations	Long term environmental damage – 5 years or more requiring > $5M to remediate, study and/or penalties
D - 4 (Major)	Cannot achieve 80% of design capacity without significant capital expenditure. Increase in operating costs	10% to 30% cost overrun	17% to 50% delay in completion of the Project	Fatality Injury resulting in permanent disabilities	Adverse national media coverage. Government member involved. Senior management changed. Significant shareholder support	Significant fines and prosecution. Very serious litigation, including class actions	Medium term – 1 to 5 years, environmental damage requiring $1M to $5M to remediate, study and/or penalties
C - 3 (Significant)	Cannot achieve 100% design capacity without significant capital expenditure. 10% to 30% increase in operating costs	2% to 10% cost overrun	8% to 17% delay in completion of the Project	Serious injuries. Extended lost time	Adverse media coverage. Board involved. Significant decrease in shareholder support	Major breach of regulation. Major litigation	Short-term < 1 year, environmental damage requiring up to $1M to remediate, study and/or penalties
B - 2 (Moderate)	Cannot achieve 100% design capacity without some capital expenditure. <10% increase in operating costs	0.5% to 2% overrun	3% to 8% delay in the completion of the Project	Significant injury. Limited lost time	Adverse local media coverage. Report to Board. Shareholder concerns raised	Serious breach of regulation with investigation or report to authority with prosecution and/or moderate fine possible	Environmental damage requiring up to $250K to remediate, study and/or penalties
A - 1 (Minor)	Minor Difficulties	Less than 0.5%	Less than 3% delay	Minor injuries or near miss	No media attention Issue raised by workers	Low level legal or approval issue	Negligible environmental impact, managed within budgets

Table 21.3 Risk evaluation matrix

Likelihood	Consequence				
	A - 1	B - 2	C - 3	D - 4	E - 5
	Minor	Moderate	Significant	Major	Catastrophic
A - 1	Moderate	High	High	Extreme	Extreme
Almost Certain	11	16	20	23	25
B - 2	Moderate	Moderate	High	High	Extreme
Likely	7	12	17	21	24
C - 3	Low	Moderate	Moderate	High	High
Possible	4	8	13	18	22
D – 4	Low	Low	Moderate	Moderate	High
Unlikely	2	5	9	14	19
E – 5	Low	Low	Moderate	Moderate	High
Rare	1	3	6	10	15

21.6.2 Risk Assessment

The risk assessment completed during the planning phase and the TFS for the WICET Project identified risks with a rating of moderate or higher included:

- Accommodation services and social infrastructure etc
- Flora/ Fauna – onshore
- Traffic management
- Construction Noise – onshore and offshore
- Hydrocarbon and chemical spillage – onshore and offshore
- Sediment erosion
- Negative publicity
- Restricting public access
- Restricting fishing access
- Ballast water – introduction of exotic marine species
- Water quality – during dredging
- Dredging and spoil disposal
- Maintenance of offshore structures
- Ships (quarantine) waste
- Spillage of hazardous chemicals and materials
- Fire
- Erosion and flood damage
- Coal Spillage
- Dust pollution
- Fuel/ oil/ chemical storage
- Fuel handling
- Discharge of contaminants to surface drainage
- Discharge of waste water
- Cattle on rail corridor

The development of the Project (including changes associated with WEXP1 and WEXP2) is not expected to include any additional risks or significantly increase the likelihood or impacts of the risks approved in the EIS for the Project.

Table 21.4 isolates the environmental risks that relate to the key Project changes listed below:

- Expansion of the stacker-reclaimer yard, on Reclamation Area B
- Construction of a new settlement pond and stormwater outfall from Reclamation Area B to the Anabranch
- A change in yard type on the eastern half of Golding Point from a bridge stacker to a stacker-reclaimer yard

Table 21.4 WEXP1 and WEXP2 Risk Assessment

Risk Identification and Analysis			Risk Rating							Risk Rating (after implementation)					
Risk Issue	Causes	Impacts or Consequences	Planned Controls	Control Effectiveness	Likelihood Rating	Consequence Rating	Risk Rating		Priority	Risk Treatments	Likelihood Rating	Consequence Rating	Risk Rating		Priority
Construction noise and vibration - onshore	Construction equipment/ vehicles Pile driving/ Increased traffic	Nuisance noise and vibration Drives away fauna	Noise suppression on equipment CEMP usage Timing of works TMP usage	75%	Possible	Moderate	**Moderate**	8	Medium Term	Management Plan in place Monitor and control restricted hours of construction on critical activities Consultation Source controls	Possible	Minor	**Low**	4	No Action
Sediment erosion	Poor construction practices/ planning Non-compliance with operating procedures Flood water ingress to site	Water quality Erosion Reduced treatment efficiency of onsite storm water Product contamination Non-compliance with licence conditions Negative publicity Impacts to marine flora and fauna	CEMP usage SWQMP usage SMP usage Site drainage network	90%	Possible	Moderate	**Moderate**	8	Medium Term	Management Plan in place Monitor and control Audit long term maintenance plan OEMP	Rare	Minor	**Low**	1	No Action
Negative Publicity	Inadequate consultation and communication about Project changes	Complaints Community relations Loss of reputation	Community consultation program	80%	Possible	Moderate	**Moderate**	8	Medium Term	Continue consultation	Possible	Moderate	**Moderate**	8	Medium Term

Risk Identification and Analysis			Risk Rating							Risk Rating (after implementation)					
Risk Issue	Causes	Impacts or Consequences	Planned Controls	Control Effectiveness	Likelihood Rating	Consequence Rating	Risk Rating		Priority	Risk Treatments	Likelihood Rating	Consequence Rating	Risk Rating		Priority
Acid Sulfate Soils	Earthworks Pile driving	Water quality Erosion Reduced treatment efficiency of onsite storm water Product contamination Impacts to marine flora and fauna	Acid Sulfate Soil Management Plan approved by DERM SWQMP usage SMP usage	80%	Possible	Moderate	**Moderate**	**8**	Medium Term	Management Plan in place Monitor and control restricted hours of construction on critical activities Consultation Source controls	Possible	Minor	**Low**	**4**	No Action
Offshore lighting	Impact on community due to additional lighting Disturbance to marine/migratory species	Visual amenity Nuisance - light pollution	Shielding Directional lighting Address in design phase SMP usage	50%	Possible	Minor	**Low**	**4**	No Action	No further action required					
Dust	Earthworks and operations works Increased traffic	Visual amenity Nuisance – dust emissions	Dust Management Plan	80%	Possible	Moderate	**Moderate**	**8**	Medium Term	Management Plan in place Monitor and control restricted hours of construction on critical activities Consultation Source controls	Possible	Minor	**Low**	**4**	No Action

Table Notes

CEMP	Construction Environmental Management Plan
OEMP	Operational Environmental Management Plan
TMP	Traffic Management Plan
SMP	Species Management Plan
SWQMP	Soil and Water Quality Management Plan
DPIF	Department of Primary Industries and Fisheries
DERM	Department of Environment and Resource Management

21.7 Conclusion

The Proposed Project changes are not expected to significantly increase the hazards and risks that were approved for the construction and operation of the WICET Project. The mitigation measures outlined in the SEIS, CEMP and subordinate management plan as well as the approval conditions for the Project will be applied to WEXP1 and WEXP2 (where approved) and are considered adequate to address the potential hazards or risks identified.

The GPC emergency procedures and the integrated risk management plan for their entire port operation, combined with the State and National plans will continue to provide a comprehensive coverage of potential emergencies for the site.

These procedures will remain reasonably applicable to the Project including WEXP1 and WEXP2 (where approved), until more specific and better informed hazard and risk management documentation consistent with the relevant legislative requirements and the hazards and risks associated with site operations.

Conclusion 1: The Proposed Project changes are not expected to significantly increase the hazards and risks that were approved for the construction and operation of the WICET Project.

Conclusion 2: Potential hazards and risks associated with the WICET Project will be managed in accordance with the CEMP and subordinate management plans, approved ASSMP and the approval conditions for the Project.

22. Visual amenity and landscape character

22.1 Summary

The changed Project will involve elements visible from a wide range of locations within Gladstone due to the nature and scale of the infrastructure and will result in a change to the visual impact on the existing environment.

WEXP1 will result in a change to the visual amenity and landscape character of Reclamation Area B (Stockyard Area B) from an approved reclamation area under the EIS to major infrastructure, including coal stockpiles, stacker-reclaimer conveyors (both elevated and at grade), transfer towers and dust suppression/spray towers.

Vegetated visual amenity screening bunds will be constructed around Stockyard Area B to assist in the amelioration of visual amenity through provision of visual screens. Vegetation used will be endemic to the area.

WEXP2 will alter the appearance of the major infrastructure approved under the EIS on the eastern half of Golding Point, from a bridge stacker / dozer reclaimer yard to a stacker-reclaimer yard, involving an increase in the maximum height of structures from RL50.0 m (approved surge bins) to RL55.0 m (proposed stacker-reclaimers).

The Project changes will cause little to no cumulative lighting impacts as the proposed stacker-reclaimer stockyards in WEXP1 and WEXP2 do not use bulldozers, and will require relatively little artificial lighting.

The Project's infrastructure is not new to the Gladstone landscape, and will be consistent with that of the Project approved under the EIS, existing infrastructure, and the continued industrial focus of the region and the Gladstone.

22.2 Introduction

This chapter of the Change Request describes the existing landscape features, panoramas and views within the proposed Project area that have, or could be expected to have, value to the community whether of local, regional, State-wide, national or international significance.

Impacts to these values by elements of the Project, including coal stockpiles and major infrastructure, have been assessed in the Coordinator-General's (CG) Report (January 2008) and the EPBC Act controlled action approval (EPBC 2005/2374) (April 2008).

The EIS (November 2006) discussed impacts to the visual amenity and landscape character with regards to separate precincts (refer Figure 22.1).

Discussion in this section will be limited to the visual amenity impacts of the changed Project. This will include Stockyard Areas A and B on Golding Point and Reclamation Area B respectively. No new or altered physical development is proposed within the other precincts (which contains the Project's rail loop now managed by QR National).

22.3 Description of Visual Aspect Changes

The changes proposed as part of WEXP1 and WEXP2 will:

- Change the visual amenity and landscape character of Reclamation Area B (Stockyard Area B) from an approved reclamation area under the EIS to major infrastructure, including coal stockpiles, stacker-reclaimer conveyors (both elevated and at grade), transfer towers and dust suppression/spray towers
- Alter the appearance of the major infrastructure approved under the EIS on the eastern half of Golding Point, from a bridge stacker / dozer reclaimer yard to a stacker-reclaimer yard, involving an increase in the maximum height of structures from RL50.0 m (approved surge bins) to RL55.0 m (proposed stacker-reclaimers)

Legend

Project Area

22.4 Description of Environmental Values

The descriptions of the environmental values for this area remain largely unchanged from the EIS / SEIS, and are outlined below.

22.4.1 Land Use Context

Gladstone is a city with a significant number of existing industries and established rail and road networks that serve them. Existing industrial facilities in and around Gladstone include:

- RG Tanna Coal Terminal (RGTCT)
- Queensland Alumina Limited Alumina Refinery
- Yarwun Alumina Refinery (YAR)
- Boyne Smelters Limited Aluminium Smelter
- Gladstone Power Station
- Orica Australia chemical plant
- Cement Australia cement plant
- Queensland Energy Resources Limited shale oil plant
- Fisherman's Landing wharf
- Clinton Coal Wharf
- Auckland Point Wharf
- Theiss-Peabody Mitsui Coal Wharf (Barney Point)
- South Trees Point Wharf
- Callemondah Rail Yard

There are also a number of additional industrial facilities proposed in this area, including the Gladstone Pacific Nickel (GPN) Plant and a number of liquid natural gas projects on the western coast of Curtis Island, including Shell Australia LNG, Gladstone LNG, Queensland Curtis LNG and Australia Pacific LNG.

The Central Queensland Regional Growth Management Framework (CQRGMF) recognises the region for its major contribution to the Australian and Queensland economies, and identifies the regional drivers as future economic growth and the opportunity to capitalise on its competitive advantages.

Gladstone is recognised in the CQRGMF as a major urban centre with its future prosperity being generated by its port, infrastructure and the level of major industrial development, both existing and planned.

The changed Project remains consistent with this regional outlook.

22.4.2 Views and View Shed Analysis

The EIS (November 2006) described a number of major viewpoints in the area and the relevant view types (refer Appendix 1). The potential of the Project to impact on view sheds depends on the scale and form of what is proposed, as well as the intervening distance, topography, vegetation and existing built elements which create blinds spots in the view.

Major viewpoints in the area are shown in Figure 22.2. Table 22.1 summarises any changes to the views from these viewpoints as a result of the modified Terminal expansion phases of WEXP1 and WEXP2.

Legend

- View Point
- REGIONAL VIEW
- SUB-REGIONAL V
- Project Area

Table 22.1 Views towards the Project area

Viewpoint	Change to view		View type
	Approved Project	Changed Project	
Waters of Port Curtis	Coal terminal and marine structures	New / Changed stockyards (partially screened by the approved coal terminal)	Local to regional
Hamilton Point, Curtis Island	Coal terminal and marine structures	New / Changed stockyards (partially screened by the approved coal terminal)	Local to sub-regional
Tide Island	Coal terminal and marine structures	Changed stockyard (partially screened by the approved coal terminal)	Local to sub-regional
Compigne Island, Witt Island, Turtle Island, Picnic Island, Diamantina Island	Coal terminal and marine structures	Changed stockyard (partially screened by the approved coal terminal and RGTCT)	Sub-regional to regional
Quoin Island, Facing Island	Coal terminal and marine structures	Changed stockyard (partially screened by the approved coal terminal and RGTCT)	Regional
Auckland Point Lookout	Coal terminal and marine structures	New / Changed stockyards (partially screened by the approved coal terminal and RGTCT)	Sub-regional
Spinnaker Park	Marine structures	No change (screened by the approved coal terminal and RGTCT)	Sub-regional

Photo 22.2 View from Spinnaker Park toward Project area

Gladstone Marina	Coal terminal	New / Changed stockyards (partially screened by the approved coal terminal, RGTCT and other existing built elements)	Sub-regional

Viewpoint	Change to view		View type
	Approved Project	Changed Project	

Photo 22.3 View from Gladstone Marina toward Project area

Albion Park	Coal terminal	New / Changed stockyards (partially screened by vegetation and topography)	Sub-regional

Photo 22.4 View from Albion Park toward Project area

Round Hill Lookout	Coal terminal and marine structures	New stockyard (partially screened by existing built elements)	Regional

Photo 22.5 View from Round Hill Lookout toward Project area

Jeff Ringland Drive Lookout	Coal terminal and marine structures	New stockyard (partially screened by vegetation and topography)	Sub-regional

Viewpoint	Change to view		View type
	Approved Project	Changed Project	

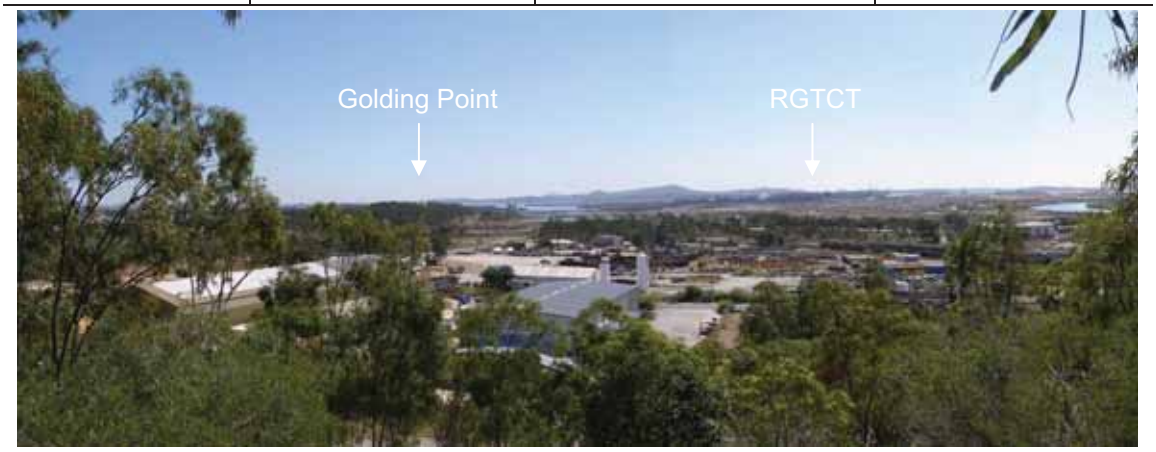


Photo 22.6 View from Jeff Ringland Drive Lookout toward Project area

Leslie Street, Clinton	Coal terminal	New stockyard (partially screened by vegetation)	Sub-regional

Photo 22.7 View from Leslie Street, Clinton toward Project area

Julius Crescent, Clinton	Rail infrastructure	No change	Local
Rural residential area along Boundary Road, Kirkwood	Rail infrastructure	No change	Local
Dawson Highway south of Boundary Road	Rail infrastructure	No change	Local
Rail Loop Precinct	Rail infrastructure	No change	Local
Gladstone-Mount Larcom Road (formerly Hanson Road)	Coal terminal and Rail infrastructure	New stockyard (partially screened by bund wall and vegetation)	Local to sub-regional
Mount Larcom	Coal terminal, marine structures and Rail infrastructure	New stockyard (partially screened by vegetation)	Regional
Aircraft flying into and out of Gladstone Airport	Entire Project Area and infrastructure	New stockyard	Regional

Views of the Terminal, including WEXP1 and WEXP2, from further offshore in the Curtis Channel and the Great Barrier Reef islands of the Capricorn and Bunker Group are shielded by the presence of Curtis and Facing Islands that form the eastern edge of the view shed. View Hill blocks views of the Project area from the settlement at south end on Curtis Island. The O'Connell Ridges form the western boundary of the view shed.

22.4.3 Focal Points and Landmarks

Focal points and landmarks in proximity to the Project area include:

- The City of Gladstone
- Existing wharves at Auckland Point, RGTCT and Barney Point
- Queensland Alumina Limited Alumina Refinery
- Gladstone Marina
- The Gladstone Power Station
- The ranges to the west of Gladstone (O'Connell Ridges and Mount Larcom)
- Curtis Island (including construction activities associated with LNG industries)
- Existing Fisherman's Landing and construction activities associated with Western Basin Reclamation Area
- Tide Island, Compigne Island, Witt Island, Turtle Island, Picnic Island, Diamantina Island, Quoin Island and Facing Island (mostly uninhabited)

The major waterway adjoining the Project area is the Calliope River. Gladstone-Mount Larcom Road (formerly Hanson Road) is the arterial road that connects Gladstone to the Bruce Highway and passes through the Project area. This is an over-dimension load route to and from the Port of Gladstone.

22.4.4 Landscape Character

The landscape character of the Project area and adjoining areas have not altered since the development of the EIS (November 2006), and is shown on Figure 22.3 to include a mosaic of:

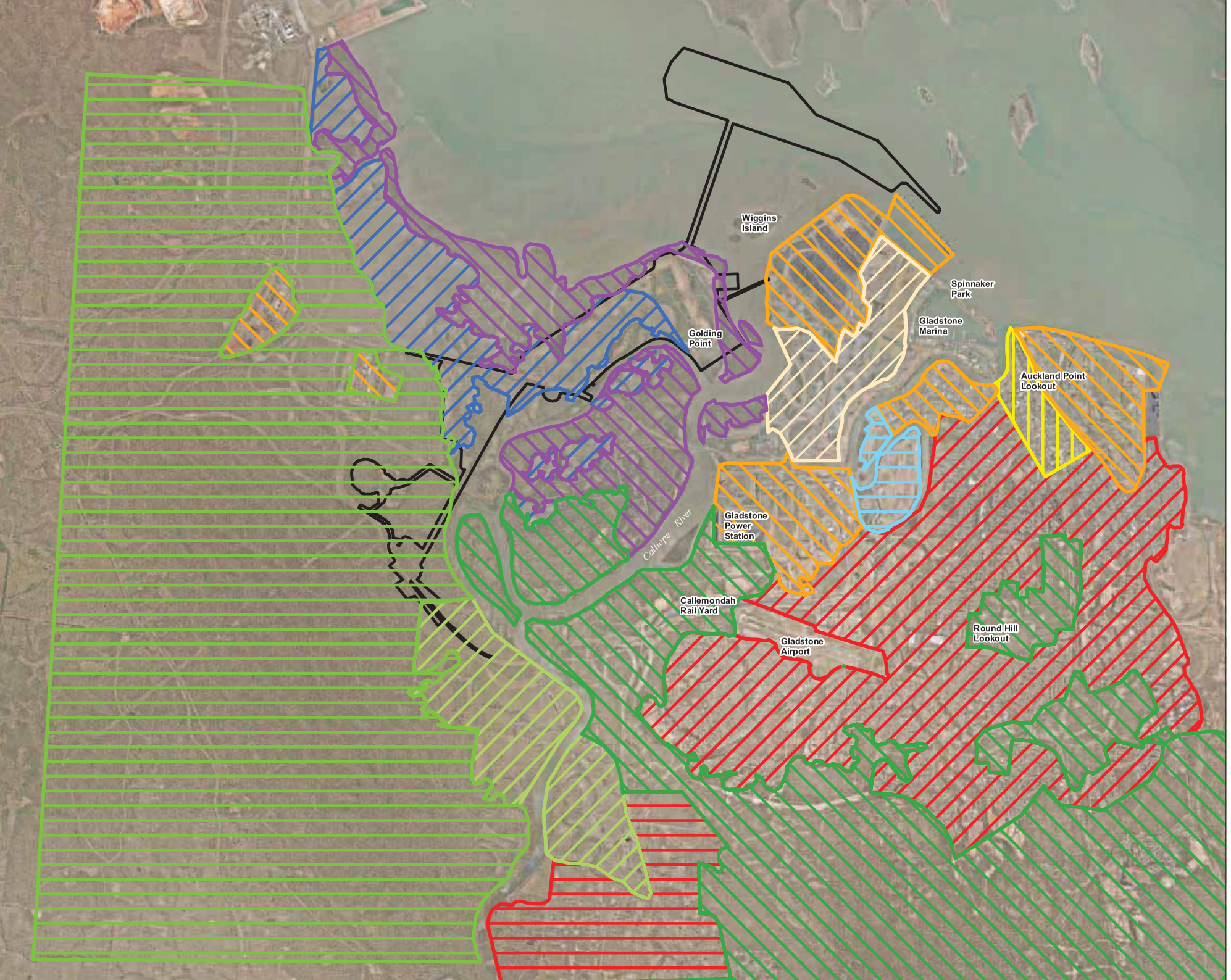
- Mangrove scrubland
- Open eucalypt / corymbia open forest
- Tidal mudflats
- Reclaimed land
- Rural (grazing and horticulture)
- Open bay
- Gladstone CBD
- Various residential developments
- Rural residential development
- Industrial development and associated infrastructure
- Port facilities

22.4.5 Visual Absorption Capability

Visual absorption capability (VAC) is an indication of the landscape's capacity to absorb visual modification such as roads, residential and other anthropogenic activities. It is a function of existing land use, vegetation cover and type, topography, location and visibility. It is a measure of the degree of the existing visual landscape to absorb contrasting elements.

The methodology adopted for this visual assessment was developed from the following:

- Resource Inventory Committee, British Columbia, 1997
- North Shore City study, undated
- Waitakere City Study, undated
- Department of Natural Resources, State of Alaska, 1978



Legend

- Project Area
- CBD
- Industrial
- Mangroves Sh
- Open Forest o
- Open Forest o
- Open Grasslar
- Open Space
- Reclamation
- Residential
- Rural Resident
- Tidal Mudflats

The methods of calculating the VAC of an area was described in the WICT Project EIS (refer Appendix 1). Essentially, an area with a high VAC score (10-12) has a high capacity to absorb or hide contrasts in the landscape, such as industrial development. An area with a low VAC score (3-6) has little capacity to absorb contrasting visual elements placed within it.

Overall VAC for the project area

The overall VAC scores for the changed Project were calculated from the analysis of the land use, vegetation cover and type, topography, location and visibility within the project area, and are shown in Table 22.2.

Stockyard Area A and B

The Stockyard Areas A and B are undeveloped open land. However, the completion of the WICET Project will introduce major industrial infrastructure to this precinct. The vegetation is mangrove forest to approximately 3 – 4 m tall fringing the area to be developed. The topography is largely flat (<25%). The precinct is visible from the residential area of Gladstone less than 5 km away and from passing boat traffic.

Overland Conveyors

The majority of the Overland Conveyor area is undeveloped open land. The vegetation is predominantly tidal mudflats with mangrove forest to 3 m tall around the fringes. The topography is flat and the precinct is visible from the residential areas of Gladstone less than 5 km away. A high voltage, power transmission line runs parallel and adjacent to Gladstone-Mount Larcom Road (Hanson) on the northern side.

Table 22.2 below shows the scores given to the various attributes for each of the precincts within the Project area to arrive at an overall VAC score.

Table 22.2 WEXP1 and WEXP2 Total VAC

Attribute / Precinct	Stockyard Areas A and B	Overland Conveyors (south of Gladstone-Mount Larcom Rd)
Existing Land Use	3	1
Vegetation Cover and Type	1	0
Topography	1	1
Location and Visibility	2	3
Total VAC	**7 (Moderate)**	**5 (Low)**

Stockyard Areas A and B provide a moderate capacity to absorb the changes in stockyard type under the changed Project, while the Overland Conveyors precinct has a low ability to absorb alteration and maintain its visual integrity.

The development of a new stockyard on Reclamation Area B (Stockyard Area B) and changes to the materials handling methods and infrastructure on the eastern half of Golding Point (within Stockyard Area A) will impact on the visual amenity and landscape character of the area.

22.4.6 Visual Screening Value of Existing Vegetation

The ability of the existing vegetation to screen industrial infrastructure has been generally dealt with above in the VAC scoring methodology. It is dependent on the scale of the development to be screened, and the density, depth, extent and height of the screening vegetation.

The screening value rating for vegetation in the Project area is shown in Figure 22.4, and was assessed in the EIS (refer Appendix 1). While there are areas that provide some screening value for the Project area (patches of open forest in the Stockyard Area A and B

Legend

- Low Screening
- Moderate Scree
- No Screening V
- Project Area
- Proposed Infras

Source:
Project Footprint: Aurecon Hatch, July 20

and Overland Conveyors areas), surrounding vegetation provides little screening value for either the Project approved under the EIS, or the changed Project as proposed.

22.5 Impacts and Mitigation Measures

The Coordinator-General's Report (January 2008) for the WICET Project accepted major changes to the visual amenity and landscape character of the project area, from a greenfield site to a major coal terminal facility, and approved a number of mitigation measures for the WICET Project.

22.5.1 Impacts of Project changes on Visual Amenity and Landscape Character

The Project changes will impact on the visual amenity and landscape character of the area through:

- Changing the visual amenity and landscape character of Reclamation Area B from an approved reclamation area under the EIS to major infrastructure, including coal stockpiles, stacker-reclaimer conveyors (both elevated and at grade), transfer towers and dust suppression/spray towers
- Altering the appearance of the major infrastructure approved on the eastern half of Golding Point from a bridge stacker / dozer reclaimer yard to a stacker-reclaimer yard, involving an increase in the maximum height of structures from RL50.0 m (approved surge bins) to RL55.0 m (proposed stacker-reclaimers)

Views of the site will be partially screened from a number of key viewpoints by the intervening topography, vegetation and existing development, as outlined in Table 22.1.

22.5.2 Impacts of External Lighting

The Project changes will cause little to no cumulative lighting impacts on residents and motorists in the area, as the proposed stacker-reclaimer stockyards do not use dozers, and will require very little artificial lighting relative to the approved bridge-stacker stockyards. The stacker-reclaimer stockyards will be lit using only direct lighting by way of small 70 W High Pressure Sodium (HPS) lights mounted on the stockpile conveyors, to light the internal roads along the bunds, minimising spillage from the Project area and impacts to the surroundings.

22.5.3 Mitigation Measures

In addition to the mitigation measures outlined in the SEIS (August 2007), the following measures are proposed to manage impacts on visual amenity and landscape character from the changed Project:

- Minimise any additional vegetation clearing required for the construction of the proposed outfall to the Anabranch
- Provide vegetated screening bunds around Stockyard Area B to assist in amelioration of visual amenity through provision of visual screens. Vegetation used will be endemic to the area. Indicative extents of the screening bunds and vegetation are shown in Drawing 2B561-C-SK-0002 (Appendix 22), along with line of sight cross-sections from Hanson Road
- Utilise lighting only as required for the safe and efficient operation of the Terminal, in particular minimise lighting where automated equipment is used
- Minimise light spillage to areas outside the areas that need to be lit for operations using suitable fittings and shields consistent with the Project approved under the EIS

22.6 Conclusion

The Project will involve elements visible from a wide range of locations within Gladstone due to the nature and scale of the infrastructure and will have a visual impact on the existing environment.

However, existing remnant vegetation, new landscape plantings and local topographic features and existing development in the area will mitigate to some extent the visual impact of the proposed Project.

Further, the appearance of the Project's style of infrastructure is not new to the Gladstone landscape, and will be consistent with that of the Project approved under the EIS (Appendix 1), existing infrastructure and port function of the area, as well as the continued industrial focus of the region and the city of Gladstone.

Conclusion 1: The Project changes will cause little to no cumulative lighting impacts as the proposed stacker-reclaimer stockyards in WEXP1 and WEXP2 do not use bulldozers, and will require relatively little artificial lighting.

Conclusion 2: The Project's infrastructure is not new to the Gladstone landscape, and will be consistent with that of the Project approved under the EIS, existing infrastructure, and the continued industrial focus of the region and the Gladstone.

23. Coal terminal EMP

23.1 Summary

The EMPs and Management Plans developed for the WICET Project (Stage 1) provide management controls and mitigation measures to minimise potential environmental risks and impacts during design, construction and operation phases of the Project.

These documents will be amended as required to incorporate any additional controls or measures required for WEXP1 and WEXP2. As the proposed WEXP1 and WEXP2 will be wholly contained within the Project footprint approved under the EIS, the construction and operational activities will be similar to that of the Project approved under the EIS and therefore it is unlikely that significant changes to these documents would be required.

23.2 Introduction

This chapter of the Request for Project Change provides an overview of environmental management planning during the design, construction and operation of the Project.

The Coal Terminal Environmental Management Plan (EMP) for the Project will be developed from the following:

- WICT SEIS EMP
- Coordinator-General's evaluation report conditions
- EPBC Act controlled action approval conditions
- WICET CEMP and associated management plans
- WEXP1 and WEXP2 Technical Feasibility Studies (due for release)
- Relevant State Government/Local Government approval conditions (eg Tidal Works, marine plants removal, waterway barrier)

The construction and operation of the Project including expansion phases WEXP1 and WEXP2 will be managed through a series of linked documents as broad, over-arching EMPs to guide appointed contractors and operators in the development of their works-specific EMPs to be implemented during construction and operational phases. These documents will be submitted for approval to the relevant Government agencies where required.

Environmental management for the design, construction and operation of the Project will manage the:

- Stage 1: Development of a bridge stacker/dozer reclaim stockyard on Golding Point with one inloading and one outloading system, consistent with the Project approved under the EIS
- WEXP1: Development of a new stacker-reclaimer yard on Reclamation Area B to utilise available port land, including a new settlement pond at the western end of Reclamation Area B, and a new operational stormwater outfall to the Anabranch
- WEXP2: Development of a stacker-reclaimer yard on the eastern half of Golding Point in lieu of the approved bridge stacker/dozer reclaim yard in this area
- A total ultimate nominal capacity of 84 Mtpa, consistent with the Project approved under the EIS and this Change Request

It is not anticipated that the EMP will require significant amendments to be applicable to the proposed detailed design, construction and operation of WEXP1 and WEXP2, as the construction methods and operational requirements are similar to that of the Project approved under the EIS. Similarly, where any approvals issued regarding WEXP1 and WEXP2 include conditions specific to environmental management of WEXP1 and WEXP2, these requirements will be incorporated into the relevant documents.

23.3 Environmental Management

The following sections outline the documents that will guide the environmental management aspects of the Project and will be amended as required and applied to WEXP1 and WEXP2.

23.3.1 Design

Design Phase EMP – this document will be prepared as part of the detailed design phase of the Project. The Design Phase EMP ensures design mitigation measures contained in this EMP and other supporting documents are incorporated during the detailed design of the Project.

23.3.2 Construction

WICET EMP – the purpose of this document is to define the key responsibilities of WICET and the Construction Management contractor during the construction phase, to document the hazard and risk identification and management process for the construction techniques to be adopted on the Project, and to document the systematic process of implementing controls to minimise the potential impacts of construction methods on the environment (refer Appendix 23.1).

The WICET EMP will be reviewed and amended as required during the WEXP1 and WEXP2 detailed design phases. This review will address any additional impacts identified during the WICET Stage 1 construction as well as peculiarities of WEXP1 and WEXP2.

WICET CEMP – the purpose of this document is to detail the actions to be carried out during the construction phase of the Project in order to mitigate adverse and enhance beneficial environmental and social impacts. Construction contractors shall use the information contained in the CEMP and associated Management Plans to complete a Contractor's EMP specific to their package of works. Contractors will be required to adhere to their Contractor's EMP, as well as the WICET CEMP (refer Appendix 23.2) and associated Management Plans.

Management Plans – a series of issue-specific Management Plans (refer Appendices 23) have been developed to accompany the WICET CEMP. These Management Plans document the minimum level of mitigation measures, monitoring and other requirements for each key environmental element, which Contractors will use to inform their own EMPs, adding task and spatial specific procedures, responsibilities and other issues as relevant. Management Plans for the Project include:

- Acid Sulfate Soil Management Plan (ASSMP)
- Air Quality Management Plan (AQMP)
- Bushfire Management Plan (BMP)
- Community Relations Plan (incorporating Stakeholder Engagement Plan) (CRP)
- Cultural Heritage Management Plan (CHMP) Agreement (offshore)
- Cultural Heritage Management Plan (CHMP) Agreement (onshore)
- Dangerous Goods Management Plan (DGMP)
- Dredge Management Plan (DMP)
- Energy and Water Use Management Plan (EWUMP)
- Species Management Plan (SMP)
- Landscape and Rehabilitation Management Plan (LRMP)
- Noise and Vibration Management Plan (NVMP)
- Pest Management Plan (PMP)
- Soil and Water Quality Management Plan (SWQMP)
- Traffic Management Plan (TMP)
- Waste Management Plan (WMP)

These Management Plans will be reviewed and amended as required during the WEXP1 and WEXP2 detailed design phase. This review will address any additional impacts identified

during the WICET Stage 1 construction. These plans will also be submitted to the relevant government agencies as required prior to implementation.

Contractor CEMP – appointed construction contractors will be required to develop a CEMP specific to the package of works to be undertaken. This Contractor CEMP will be consistent with the requirements and commitments outlined in the WICET CEMP and associated Management Plans, as relevant to the package of works.

23.3.3 Operation

Operational EMP – Operational environmental management will be outlined in an Operational EMP (OEMP) to be developed prior to the commencement of operations. This will incorporate the requirements for Site Based Management Plans associated with the Environmentally Relevant Activity approvals for the WICET Project.

23.4 Environmental Management Strategies

This section identifies the mitigation measures to be implemented during the design, construction and operation of the Project.

23.4.1 Topography, Geology and Soils

Design Phase

The detailed design phase will address the following:

- Consideration of detailed geotechnical investigations relating to stability assessments, foundation design parameter requirements and potential settlement of fill embankments and foundations
- Consideration of further assessment of the contaminant status of sites where soil is required to be relocated onto or off of land parcels within the Project area

Construction Phase

Implement the SWQMP and the Acid Sulfate Soils Management Plan (ASSMP) developed for the WICET Project which outlines environmental management requirements addressing the following:

- Bulk earthworks
- Excavation works
- Stockpiling
- Contaminated spoil management
- Vegetation clearing
- ASS management

Operation Phase

An OEMP will be developed for the WICET Project incorporating geology and soil management requirements and procedures that apply to the operation of the Terminal.

23.4.2 Land Use

Design Phase

The detailed design phase will address the following:

- Ensure that detailed design of the WICET Project considers the potential for a cumulative increase in impacts associated with the following environmental elements:
  - Noise and vibration impacts
  - Dust / air quality impacts

- Light spillage impacts
- Traffic impacts (temporary road closures, permanent road closures, construction traffic)
- Visual amenity impacts

Refer to the relevant sections of this EMP for Design Phase measures proposed to prevent a cumulative increase in impacts associated with the WICET Project.

Operation Phase

Implement the OEMP to minimise cumulative increases in potential impacts associated with each environmental element outlined above.

23.4.3 Transport and Traffic

Design Phase

The detailed design phase will address the following:

- Identification of potential impacts on the Department of Transport and Main Roads road network, and assessment of the need to enter into an infrastructure agreement with the Department
- Implementation of a WICET Traffic Management Plan (TMP)

Construction Phase

- Implement the WICET TMP developed for the WICET Project works on the local transport network and traffic

23.4.4 Sustainability and Climate Change

Design Phase

The detailed design phase will address the following:

- Measures to reduce energy demand and minimise energy consumption
  - Determining site energy use across the life of the Project by undertaking an energy use assessment. An energy report will be prepared for each expansion phase of the Terminal's development
  - Investigation of energy efficiency measures in temporary site offices during construction and permanent office buildings during operation, including opportunities to utilise energy saving technologies such as energy saving lighting and air conditioning
  - Implementation of energy efficiency measures during construction phase activities
- Measures to ensure water reduction and efficiency is maximised throughout the Project, by minimising use of potable water during construction and operational phases, and protecting the quality of existing resources through:
  - Assessing the potential for treated stormwater to wet down stockpiles on site, particularly during extreme weather events or on windy days
  - Adoption of groundwater and surface water quality mitigation measures as detailed in this Change Request and the CEMP
  - Investigation of potential water efficiency measures and review all designs in order to incorporate these measures
- Measures that protect existing and proposed Project assets from the risk of sea level rise and storm tide inundation through:
  - Designing the Project to take account for the risk of sea level rise and storm tide inundation, including climate change allowance
  - All Project infrastructure to meet the 0.8 m 2100 sea level rise scenario
- Measures that promote the use of sustainably sourced materials and minimise the use of materials required for the design through:

  - The use of supply contracts to source materials as close as possible to the Project area
  - Pre-fabricate segments used for the Project, wherever possible
  - Re-use of dredged material onsite
- Actions that promote effective waste management beyond regulatory compliance by applying the principles of the waste management hierarchy by:
  - Identifying the waste streams applicable to the Project and developing a waste management plan which complies with the waste management hierarchy
- Actions that allow for infrastructure upgrades which are beneficial for wider community use by:
  - Undertaking an upgrade of Gladstone-Mt Larcom Road as part of the Project
- Measures which increase health and wellbeing of residents on site and sensitive receptors within proximity to the Project by:
  - Implementing coal terminal lighting that minimises visual impact on adjoining sensitive receptors (eg directional lighting, low pressure sodium bulbs, shrouding, low glare lighting etc)
  - Implementing the use of low noise alarms across the site
- Measures which minimise the Project's contributions towards climate change by reducing GHG emissions through:
  - Undertaking a preliminary GHG emissions assessment for construction and operation of the Project
  - Undertaking a preliminary climate change risk assessment to identify risks and management options
- Investigate feasible renewable energy alternatives to determine their suitability for implementation during construction and operation of the Project
- Local suppliers will be assessed and selected on the basis of cost-competiveness (must occur prior to procurement)
- Avoid/reduce consumption of materials during construction and operation, by finding alternatives appropriate for the same use
- Identify suitable locations for revegetation of native vegetation (ie where it will not interfere with Project facilities, operations etc)
- Biodiversity values incorporated into landscape designs (if required)
- Comply with the relevant components of the carbon price mechanism (once implemented)

Construction Phase

The construction phase will address the following:

- Use supply contracts to source sustainably accredited materials
- Prior to construction, review and update as required the existing WICET WMP for implementation during WEXP1 and WEXP2 construction and operation of the Project
- Implement all fauna protection measures presented in the WICET Management Plans and this Change Request
- Implement all vegetation mitigation measures presented in the WICET Management Plans and this Change Request
- Implement all nuisance avoidance measures presented in the WICET Management Plans and this Change Request
- Ensure that site supervision is provided during construction to minimise risk of damage to cultural heritage items within the Project area
- Undertake a revised GHG emissions assessment with updated diesel and electricity consumptions details for the construction phase of the Project, to ensure that the Construction Contractor complies with the relevant legislation
- Comply with the relevant components of the carbon price mechanism (when implemented)
- Use local workforce where possible
- Develop and implement a local procurement policy for goods and services

- Generate economic benefits for the local community, providing access to employment opportunities on the Project

Operation Phase

An OEMP will be developed for the WICET Project incorporating sustainability and climate change management requirements and procedures that apply to the operation of the Terminal, including:

- Undertaking a revised GHG emissions assessment with updated diesel and electricity consumption details for the operational phase of the Project, to ensure that the Operator complies with the relevant legislation
- Complying with the relevant components of the carbon price mechanism (once implemented)
- Preparing and implementing a Carbon Management Plan for the operational phase of the Project
- Seeking accreditation for the Carbon Management Plan (if deemed necessary)

23.4.5 Coastal Environment, Water Quality, Hydrology and Hydraulics

Design Phase

The detailed design phase will address the following:

- Areas of riparian vegetation and flow-dependent ecosystems as well as mangroves and seagrass communities are to be left undisturbed where possible
- The need and timing of conveyor infrastructure construction works and bank stabilisation works to protect all infrastructure from fluvial processes will need to be investigated during detailed design
- Detailed design will consider and avoid areas of protected vegetation not approved for disturbance
- Implementation of the WICET SWQMP
- Implementation of the WICET ASSMP
- Implementation of the WICET DMP

Construction Phase

Implement the SWQMP developed for the WICET Project which outlines environmental management requirements to address potential impacts of construction works on water quality within or surrounding the site, including:

- Dredge spoil / reclamation activities
- Drainage works and runoff
- Dewatering practices
- Monitoring raises in water levels upstream to ensure bank erosion and scouring does not occur

A draft DMP has been developed outlining environmental management requirements with regard to water quality during dredging operations. WICET DMP (RevE, 21 September 2011) which has been approved by DEHP.

Operation Phase

The OEMP will address the following:

- Maintenance dredging and associated spoil disposal will be undertaken in accordance with the relevant DMP, guidelines and approvals
- Where suitable, water will be recycled and reused onsite, for example in dust control, as washdown water, or for irrigation of vegetation

- Regular clearing of sediment build-up from the culverts / drainage lines as required and appropriate disposal of waste
- Monitoring and reporting on water quality during operation will be undertaken as required under the ERA approval conditions and will be incorporated into an OEMP as required
- Other relevant operational ERA approval conditions

23.4.6 Groundwater

Design Phase

The detailed design phase will address the following:

- Consideration of baseline groundwater level and quality data in the detailed design and development of construction methodology
- Implementation of the WICET SWQMP

Construction Phase

Implement the SWQMP developed for the WICET Project which outlines environmental management requirements to address potential impacts of construction works on groundwater within or surrounding the site, including:

- Excavation
- Dewatering practices
- Hazardous goods storage

23.4.7 Air Quality

Design Phase

The detailed design phase will address the following:

- Incorporation of dust mitigation measures, including water cannons and mist curtains to maintain optimal moisture content of the product
- Infrastructure design to minimise rehandling of product and exposure of product to wind, reducing dust generation, including partial or full enclosure of infrastructure, dust shrouds on stackers and strategic placement of product
- Implementation of the WICET AQMP

Construction Phase

Implement the AQMP developed for this Project which outlines environmental management requirements to address potential impacts of construction works on air quality surrounding the site, including:

- Excavation
- Bulk earthworks
- Abrasive blasting
- Stockpiling and reclamation spoil
- Transportation on unsealed tracks
- Concrete batching

Operation Phase

An OEMP will be developed for the WICET Project incorporating air quality management requirements and procedures that apply to the operation of the Terminal, including:

- Maintaining an appropriate level of moisture within the coal to minimise dust emission from the transported or stockpiled coal

- Monitoring the moisture content of coal at rail receival, linking to calibrated water sprays to raise moisture content as required
- Use of misting sprays on the gantry stackers and reclaimers during adverse meteorological conditions (such as high wind speeds)
- Use of conveyor belt scrapping and washing systems
- Use of a mobile spray tanker to apply water at regular intervals to areas outside the radius of water sprays, empty stockpile areas and ground areas subject to coal spillage
- Use of a mobile road sweeper / cleaner for roads and other sealed areas subject to coal spillage
- Other relevant operational ERA approval conditions

23.4.8 Waste

Construction Phase

Implement the WMP developed for the WICET Project which outlines environmental management requirements to address potential impacts of waste generation and management associated with construction works, including:

- Site clearing
- Site earthworks
- Batch plant operation
- Concreting
- Abrasive blasting
- Various construction activities
- Plant and equipment maintenance
- General office / staff activities
- Commissioning and decommissioning activities

Operation Phase

An OEMP will be developed for the WICET Project incorporating waste management requirements and procedures that apply to the operation of the Terminal, including:

- Wastes generated will be minimised
- Onsite reuse of wastes will be undertaken where feasible eg green waste, pond sediment, concrete, bitumen and timber
- Where suitable, wastes will be recycled or treated onsite, with non-recyclable items sent to Council's landfill
- Any regulated wastes generated will be managed in accordance with the relevant legislative requirements and /or approval conditions
- Sewage from the proposed coal terminal will be treated onsite and effluent used for landscape irrigation
- Other relevant operational ERA approval conditions

23.4.9 Noise and Vibration

Construction Phase

Implement the NVMP developed for the WICET Project which outlines environmental management requirements to address potential impacts of noise and vibration generated and management associated with construction works, including:

- Site clearing
- Bulk earthworks
- Increased traffic / vehicles
- Dredging
- Constructing structures and plant

Operations Phase

An OEMP will be developed for the WICET Project incorporating noise and vibration management requirements and procedures that apply to the operation of the Terminal, including:

- Design and implement a public complaint system to deal with operational noise and other impacts from operational traffic movements
- Investigation of noise levels post-commissioning will be carried out as confirmation of operational noise levels
- Monitoring and reporting on noise and vibration as required by the operational ERA requirements will be incorporated into the OEMP as required
- Other relevant operational ERA approval conditions

23.4.10 Terrestrial and Aquatic Flora and Fauna

Design Phase

The detailed design phase will address the following:

- Incorporation of terminal lighting that is located and designed to minimise visual impact on adjoining habitats
- Consideration of fauna movement in the design of conveyors, particularly in the Forest Precinct
- Minimising terrestrial vegetation and marine plant clearing required for the Terminal
- Maximising retention of existing habitats and wildlife corridors especially in the Forest Precinct
- Maximising use of local native species in landscape / buffer design
- Implementation of the WICET SMP
- Implementation of the WICET LRMP

Construction Phase

Implement the SMP developed for the WICET Project which will incorporate the management of activities that may impact on terrestrial flora and fauna and aquatic ecology, including:

- Vegetation clearing (including significant species)
- Bulk earthworks
- Night lighting
- Noise
- Chemical use
- Filling of intertidal areas
- Dredging
- Construction in the marine zone
- General disturbance

A draft Dredge Management Plan has been developed for approval by the Department of Environment and Heritage Protection (DEHP) and SEWPaC, outlining environmental management requirements with regard to terrestrial and marine flora and fauna during dredging and dredge material handling operations. Approval will be obtained prior to the commencement of dredging works.

Operation Phase

An OEMP will be developed for the WICET Project incorporating terrestrial and marine flora and fauna management requirements and procedures to mitigate potential impacts on terrestrial flora and fauna and aquatic ecology as a result of the operation of the Terminal and ongoing maintenance dredging of the approved berth pockets, approach channel and swing basin, including:

- Access, maintenance and operations associated with the coal terminal and conveyor facilities will be restricted to designated tracks to avoid disturbance of surrounding vegetation or habitats
- Heavy machinery, equipment and vehicles will be stored within designated areas only, away from surrounding vegetation
- Staff will be educated with regards to the protection of native flora and fauna and ongoing operations
- Material disposal arrangements will be established for maintenance dredging to minimise long-term impacts
- Future maintenance dredging will be undertaken in accordance with relevant approvals, guidelines and plans
- Monitoring and reporting on water quality during operation will comply with the relevant ERA approval conditions
- Other relevant operational ERA approval conditions

23.4.11 Cultural Heritage

A Cultural Heritage Management Plan (offshore) Agreement and Cultural Heritage Management Plan (onshore) Agreement have been developed for this Project, and agreed to between the proponent and the Aboriginal Group. These plans incorporate the relevant management and mitigation measures required during the construction and operation of the Project.

Further, the requirements of the *Aboriginal Cultural Heritage Act 2003* (Qld) and responsibilities under the Duty of Care will continue to be applicable to the works.

23.4.12 Social

Design Phase

The detailed design phase will address the following:

- Implementation of the WICET Communications Plan (2011) detailing the communications process to be utilised during the WICET development

Construction Phase

The construction phase of the WICET will address the following:

- Implementation of the WICET Communications Plan (2011) detailing the communications process to be utilised during the WICET development
- Implementation of the WICET Community Relations Plan (2011) which addresses communication issues relating to site establishment and construction of the WICET including the following sub plans:
  - The Stakeholder Engagement Plan
  - Social and Community Support Plan
  - Local Industry Participation Plan
  - Obligations Database Plan
- Implementation of the WICET TMP to manage traffic related issues within the Gladstone area

- Implementation of an Emergency and Disaster Management Plan (EDMP) to minimise social impacts in the event of an emergency situation

23.4.13 Health, Safety, Hazard and Risk

Design Phase

The detailed design phase will address the following:

- Implement the requirements of the '*Guidelines to minimise mosquito and biting midge problems in new development areas'* (Queensland Health 2002)
- Consider the design requirements outlined in '*The Australian Mosquito Control Manual'* (Morris et al. 2002) during detailed design

Construction Phase

Implement the Health and Safety Management Plan (HSMP) (to be produced by WICET) for all the construction and operational activities relating to the WICET Project including:

- Preventing mosquito breeding onsite by implementing the following:
  - Guidelines to minimise mosquito and biting midge problems in new development areas (Queensland Health 2002)
  - The Australian Mosquito Control Manual (Morris et al. 2002)
- Safe working procedures associated with the following:
  - Working in extreme weather conditions (eg heat, cold, storms)
  - Working at height
  - Working in confined spaces
  - Ergonomics
- Reporting and auditing all incidents (including near miss incidents)

Operation Phase

An OEMP will be developed for the WICET Project incorporating Workplace Health and Safety management requirements and procedures to mitigate potential harm to staff and the public onsite as a result of the operation of the Terminal and will include the following:

- All structures associated with storage or treatment of recycled water, such as the settlement ponds, should be regularly maintained to minimise mosquito breeding
- If using recycled water for irrigation, surface ponding should be prevented by appropriate irrigation scheduling
- Open recycled water storages should be monitored regularly to assess the presence of mosquito larvae
- Biological control methods using native predators, such as aquatic invertebrates or native fish, may be considered if there is a potential health risk from mosquito breeding

23.4.14 Visual Amenity and Landscape Character

The detailed design phase will address the following:

- Provision / maintenance of landscape buffers
- Minimising vegetation clearing
- Use of visually neutral colours for buildings and structures where possible
- Designing lighting to minimise light spillage from the site
- Prepare a more detailed LRMP during design
- Implementation of the WICET LRMP during construction and operational activities to maintain the landscape

23.4.15 Economics

As it is foreseen that there will be only positive impacts to the Queensland economy as a result of the Project, including the proposed changes documented herein, no mitigation measures have been proposed regarding Economic issues.

23.4.16 Decommissioning and Rehabilitation

A Decommissioning, Closure and Rehabilitation Plan (DCRP) has been developed for the WICET which describes a schedule, closure measures, and a closure action plan for the following aspects of closure:

- Decommissioning
- Closure research and improvement
- Rehabilitation
- Closure implementation and monitoring

A closure cost estimate was developed during the final stages of the DCRP, to ensure that sufficient funding is set aside for decommissioning, closure and rehabilitation activities described within the DCRP. This amount will be updated during the operational phase.

Significant closure improvement activities have also been identified and responsibility, priority and timing have been assigned to each of the closure improvement tasks. The scenario assumes that the Terminal will close in 2058.

23.5 Conclusion

The EMPs and Management Plans developed for the WICET Project provide management controls and mitigation measures to minimise potential environmental risks and impacts during design, construction and operation phases of the Project.

These documents will be amended as required to incorporate any additional controls or measures required for WEXP1 and WEXP2. As the proposed WEXP1 and WEXP2 will be wholly contained within the Project footprint approved under the EIS, the construction and operational activities will be similar to that of the Project approved under the EIS and therefore it is unlikely that significant changes to these documents would be required.

24. Abbreviations

AASS	Actual Acid Sulfate Soils
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ABS	Australian Bureau of Statistics
ACH Act	*Aboriginal Cultural Heritage Act 2003*
AHD	Australian Height Datum
ALARP	As Low As Reasonably Practicable
AMS	Accommodation Management Strategy
ANZECC	Australian and New Zealand Environment and Conservation Council
APLNG	Australia Pacific LNG
AQMP	Air Quality Management Plan
AR4	Fourth Assessment Report
ARI	Average Recurrence Interval
AS	Australian Standard
ASS	Acid Sulfate Soils
ASSMP	Acid Sulfate Soil Management Plan
AUD	Australian Dollars
AWG	Accommodation Working Group
BF	Belt Feeder
BICET	Balaclava Island Coal Export Terminal
BMA	BHP Billiton Mitsubishi Alliance
BMP	Bushfire Management Plan
BoM	Bureau of Meteorology
BPCT	Barney Point Coal Terminal
CAR	Comalco Alumina Refinery
CBD	Central Business District
CCIS	Climate Change Impact Statement
CEMP	Construction Environmental Management Plan
CG	Coordinator-General
CHMP	Cultural Heritage Management Plan
CIE	Commission Internationale de l'Eclairage
cm	Centimetre
CO_2-e	Carbon Dioxide Equivalent
Coastal Act	*Coastal Protection and Management Act 1995*
CPT	Cone Penetration Test
CQPA	Central Queensland Ports Authority
CQRGMF	Central Queensland Regional Growth Management Framework 2002

CQRP	Central Queensland Regional Plan
CQU	Central Queensland University
CRP	Community Relations Plan
CSC	Calliope Shire Council
CSD	Cutter Suction Dredge
CSIRO	Commonwealth Scientific and Industrial Research Organisation
dBA	A-weighted decibel
DAFF	Department of Agriculture, Forestry and Fisheries
DCCEE	Department of Climate Change and Energy Efficiency
DCRP	Decommissioning, Closure and Rehabilitation Plan
DEEDI	Department of Employment, Economic Development and Innovation
DEHP	Department of Environment and Heritage Protection
DERM	Department of Environment and Resource Management
DGMP	Dangerous Goods Management Plan
DIP	Department of Infrastructure and Planning
DLGP	Department of Local Government and Planning
DM Act	*Disaster Management Act 2003*
DMP	Dredge Management Plan
DMR	Department of Main Roads
DNPRSR	Department of National Parks, Recreation, Sport and Racing
DNRM	Department of Natural Resources and Mines
DNRMW	Department of Natural Resources, Mines and Water
DOTARS	Department of Transport and Regional Services
DPI	Department of Primary Industries
DPIF	Department of Primary Industries and Fisheries
DSDIP	Department of State Development, Infrastructure and Planning
DTMR	Department of Transport and Main Roads
DWT	Dead Weight Tonnage
EBSDS	East Banks Sea Disposal Site
EC	Electrical Conductivity
EDMP	Emergency Disaster Management Plan
EEO Act	*Energy Efficiency Opportunities Act 2006*
EIL	Environmental Investigation Level
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
ENSO	El Nino Southern Oscillation
EP Act	*Environment Protection Act 1994*
EPA	Environmental Protection Agency

EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPP (Waste)	*Environmental Protection (Waste Management) Policy 2000*
EPP(Air)	*Environmental Protection (Air) Policy 2008*
EPP(Water)	*Environmental Protection (Water) Policy 2009*
EPs	Equator Principles
ERA	Environmentally Relevant Activity
ERP	Estimated Resident Population
ESD	Ecologically Sustainable Development
EV	Environmental Value
EVNT	Endangered, Vulnerable or Near Threatened
EWUMP	Energy and Water Use Management Plan
FDILG	Future Direction Indigenous liaison Group
FFMP	Flora and Fauna Management Plan
g	Grams
GAPDL	Gladstone Area Promotion and Development Limited
GAWB	Gladstone Area Water Board
GBRMP	Great Barrier Reef Marine Park
GBRWHA	Great Barrier Reef World Heritage Area
GCC	Gladstone City Council
GEIDB	Gladstone Economic and Industry Development Board
GHG	Greenhouse Gas
GJ	Gigajoules
GLNG	Gladstone LNG
GPC	Gladstone Ports Corporation
GPN	Gladstone Pacific Nickel Limited
GQAL	Good Quality Agricultural Land
GRC	Gladstone Regional Council
GSDA	Gladstone State Development Area
GSP	Gross State Product
Gt	Giga tonnes
h	Hour
ha	Hectare
HACC	Home and Community Care
HAT	Highest Astronomical Tide
HERBRECS	Queensland Herbarium Records System
HIL	Health Investigation Level
HPS	High Pressure Sodium
HSEC	Health, Safety, Environment and Community

HSMP	Health and Safety Management Plan
Hz	Hertz
IAIA	International Association for Impact Assessment
ID	Identification
IDAS	Integrated Development Approval System
IEMS	Integrated Environmental Management System
IPCC	Intergovernmental Panel on Climate Change
JC	Jetty Conveyor
kg	Kilogram
kL	Kilolitre
km	Kilometre
km^2	Square Kilometre
kt	Kilotonnes
kV	Kilovolt
kW	Kilowatt
kWh	Kilowatt Hour
L	Litre
L_{Aeq}	Average A-weighted sound pressure level
LAT	Lowest Astronomical Tide
LDMP	Local Disaster Management Plan
LGA	Local Government Area
LGAQ	Local Government Association of Queensland
LNG	Liquefied Natural Gas
LOA	Length Over All
LOR	Level of Reporting
LRMP	Landscape and Rehabilitation Management Plan
LUP	Land Use Plan
m	Metre
m^2	Square metre
m^3	Cubic metre
MCU	Material Change of Use
mg	Milligram
ML	Megalitre
MLWS	Mean Low Water Springs
mm	Millimetre
Mm^3	Cubic mega metre
MRPHP	Major Resource Projects Housing Policy
MSIC	Maritime Security Identification Card

Mt	Mega tonnes
Mtpa	Million tonnes per annum
NC Act	*Nature Conservation Act 1992*
NC Regulation	*Nature Conservation (Wildlife) Regulation 1994*
NCL	North Coast Line
NEPC	National Environment Protection Council
NES	National Environmental Significance
NGA	National Greenhouse Accounts
NGER Act	*National Greenhouse and Energy Reporting Act 2007*
NGER Regulation	*National Greenhouse and Energy Reporting Regulation 2008*
NODGDM	National Ocean Disposal Guidelines for Dredged Material
NPI	National Pollutant Inventory
NSESD	National Strategy for Ecologically Sustainable Development
NTU	Nephelometric Turbidity Unit
NVMP	Noise and Vibration Management Plan
OC	Overland Unloading Conveyor
OD	Outside Diameter
OEH	Office of Environment and Heritage
OEMP	Operational Environmental Management Plan
OESR	Office of Economic and Statistical Research
PAH	Polynuclear Aromatic Hydrocarbons
PAR	Photosynthetically Active Radiation
PASS	Potential Acid Sulfate Soils
PCB	Polychlorinated Biphenyls
PCM	Procurement and Construction Management
PE	Polyethylene
PLC	Programmable logical controller
PM_{10}	Particulate matter less than 10 µm in aerodynamic diameter
$PM_{2.5}$	Particulate matter less than 2.5 µm in aerodynamic diameter
PMAV	Property Map of Assessable Vegetation
PMP	Pest Management Plan
PPE	Personal Protective Equipment
QCLNG	Queensland Curtis LNG
QCP	Queensland Coast Plan
QOCC	Queensland Office of Climate Change
QR	Queensland Rail
QWQG	Queensland Water Quality Guidelines
RC	Reclaim Conveyor

RE	Regional Ecosystem
RGTCT	RG Tanna Coal Terminal
RL	Relative Level
RR	Dumpstation (Rail Receival)
RTA	Residential Tenancies Authority
s	Second
SB	Surge Bin
SD	Statistical Division
SDPWO Act	*State Development and Public Works Organisation Act 1971*
SEIS	Supplementary Environmental Impact Statement
SES	State Emergency Services
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities
SHS	State High School
SIA	Social Impact Assessment
SIMP	Social Impact Management Plan
SKM	Sinclair Knights Merz
SMP	Species Management Plan
Sn	Tin
SPA	*Sustainable Planning Act 2009*
SPL	Strategic Port Land
SPP	State Planning Policy
SPP 1/03	State Planning Policy SPP1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide
SPP1/92	State Planning Policy SPP1/92 Development and Conservation of Agricultural Land
SPR	*Sustainable Planning Regulation 2009*
SPRP	State Planning Regulatory Provision
SR	Stacker Reclaimer
SS	State School
STP	Sewage Treatment Plant
SWQMP	Soil and Water Quality Management Plan
t	Tonne
TBA	To be advised
TBT	Tributyltin
TC	Transfer Conveyor
TFS	Technical Feasibility Study
TJ	Tera joules
TMP	Traffic Management Plan

TO	Traditional Owners
TOC	Total Organic Carbon
tph	Tonnes per hour
TSHD	Trailer Suction Hopper Dredge
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
TT	Transfer Tower
URS	URS Corporation
VAC	Visual Absorption Capability
VMA	*Vegetation Management Act 1999*
W	Watt
WBDDP	Western Basin Dredging and Disposal Project
WC	Wharf Conveyor
WEXP1	WICET Expansion Phase 1
WEXP2	WICET Expansion Phase 2
WHS Act 1995	*Workplace Health and Safety Act 1995*
WHS Act 2011	*Work Health and Safety Act 2011*
WHS Reg	*Workplace Health and Safety Regulation 2008*
WICET	Wiggins Island Coal Export Terminal
WICT	Wiggins Island Coal Terminal
WMP	Waste Management Plan
WQMP	Water Quality Management Plan
WQO	Water Quality Objectives
WTP	Water Treatment Plant
YAR	Yarwun Alumina Refinery
YC	Yard Conveyor
µg	Microgram
µm	Micrometre
µS	Micro Siemens

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