Advisian

WorleyParsons Group

Queensland Government

Abbot Point Growth Gateway Project

Environmental Impact Statement

Volume 1 - Executive Summary

17 August 2015

Disclaimer

This report has been prepared on behalf of and for the exclusive use of the Queensland Department of State Development, and is subject to and issued in accordance with the agreement between the Queensland Department of State Development and Advisian. Advisian accepts no liability or responsibility whatsoever for it in respect of any use of or reliance upon this report by any third party.

Copying this report without the permission of the Queensland Department of State Development, or Advisian is not permitted.

Table of Contents

List of Figures

List of Tables

1 Introduction

1.1 Preamble

The purpose of the Executive Summary is to convey the main findings of the Environmental Impact Statement prepared for the Abbot Point Growth Gateway Project (the Project) in a concise and readable form. It focuses on the key issues to enable the reader to obtain a clear understanding of the Project, its potential impacts and the management measures that will be implemented to mitigate risks. In order to remain succinct, the impact assessment section of this Executive Summary only relates to impacts on Matters of National Environmental Significance considered significant under the *Environment Protection and Biodiversity Conservation Act 1999*. This Environmental Impact Statement has been prepared to address the information requirements of the Environmental Impact Statement Guidelines issued by the Australian Government Department of the Environment. Volume 2 presents the impact assessment for the Project and Volume 3 provides reports of studies undertaken and preliminary management plans prepared in support of this impact assessment.

1.2 The Project

1.2.1 Rationale

In response to the recommendations of the UNESCO World Heritage Committee regarding the protection and management of the Great Barrier Reef, the Australian and Queensland Governments jointly developed the *Reef 2050 Long-Term Sustainability Plan,* which is the overarching framework for protecting and managing the Great Barrier Reef from 2015 to 2050. The plan announces the Australian and Queensland Governments' intention to permanently ban the disposal of capital dredged material in the Great Barrier Reef Marine Park. It also plans for the Queensland Government to legislate to restrict capital dredging for the development of new or expansion of existing port facilities to within the regulated port limits of Gladstone, Hay Point–Mackay, Abbot Point and Townsville.

The *Reef 2050 Long-Term Sustainability Plan* was informed by a two year strategic assessment of the condition and management of the Great Barrier Reef World Heritage Area (GBRWHA), carried out at the request of the World Heritage Committee in 2011, and the *Outlook Report 2014* published by the Great Barrier Reef Marine Park Authority. The Strategic Assessment (both the marine and coastal zone components) identified that the key risks to the long-term health of the Great Barrier Reef are increasing sea temperatures, nutrients and sediments from catchment runoff and Crown-of-thorns starfish. It also noted that industrial development, including shipping, port development and dredging operations, are recognised as having lesser, localised impacts. The *Outlook Report 2014* found climate change, land-based run-off, coastal land use change, and some residual impacts of fishing remain the major threats to the future vitality of the Great Barrier Reef.

The Port of Abbot Point straddles the boundary of the Great Barrier Reef World Heritage Area. The offshore port area is located within this property while the onshore coal terminals are immediately adjacent. The Great Barrier Reef Marine Park begins at the limits of the port boundary.

The Queensland Government's *Sustainable Port Development Bill 2015* aims to establish the legislative framework necessary to implement the intentions expressed in the *Reef 2050 Long-Term Sustainability Plan.* Through the Bill, the Queensland Government aims to balance the development of the state's major ports with the protection of the Great Barrier Reef, providing better economic and environmental outcomes for Queensland.

Figure 1-1 provides a locality map for the Project, which also shows the extent of the Great Barrier Reef Marine Park for reference.

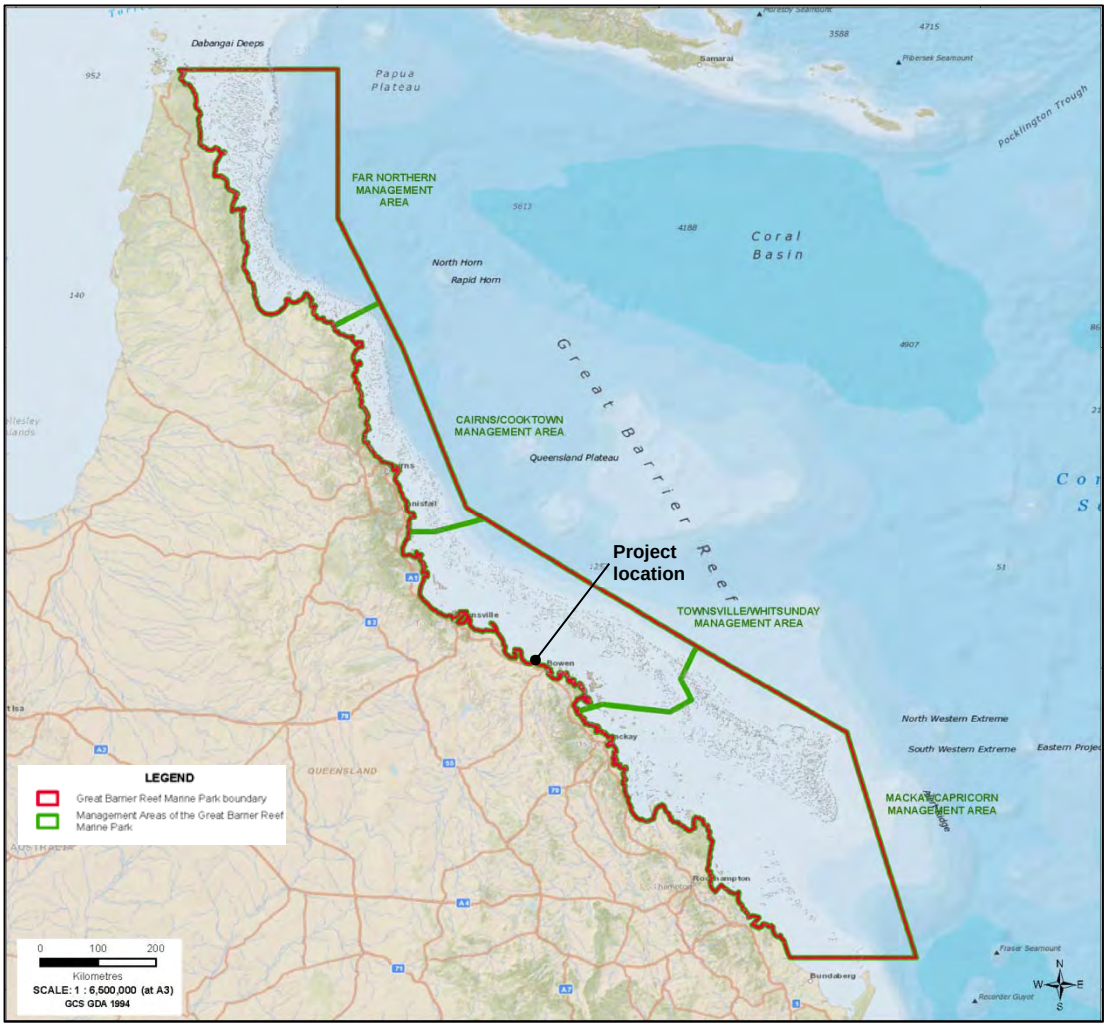

Figure 1-1 Locality map

In line with the strategy set out in the *Reef 2050 Long-Term Sustainability Plan*, the Queensland Government has developed the Abbot Point Growth Gateway Project with the aim to help safeguard the Great Barrier Reef while providing port infrastructure to support future resource exports from the Galilee Basin. This is intended to be achieved by avoiding the disposal of dredged material at sea by placing it on land and beneficially reusing it in future development, while safeguarding the nearby Caley Valley Wetlands.

1.2.2 Background

In December 2011, North Queensland Bulk Ports first proposed dredging of 3 million cubic metres to facilitate the development of the three new proposed Terminal 0, Terminal 2 and Terminal 3 and the relocation of the dredged material offshore in the Great Barrier Reef Marine Park. This action was approved under the *Environment Protection and Biodiversity Conservation Act 1999* by the Federal Environment Minister in December 2013, however the project did not proceed.

The former Queensland Government Department of State Development Infrastructure and Planning then developed the Abbot Point Port and Wetlands Strategy which sought to avoid the placement of dredged material at sea, proposing onshore placement and beneficial reuse of dredged material in future port development. The Strategy was referred under the *Environment Protection and Biodiversity Conservation Act 1999*. It involved the construction of dredged material management areas (ponds) within a beneficial reuse area covering part of the Caley Valley Wetlands and the placement of approximately 1.7 million cubic metres of dredged material into the ponds. This project also included the construction of three sections of a rail embankment that would support the future expansion of the North Galilee Basin Rail project. However, the two referrals submitted for this project were withdrawn in March 2015.

With the proposed Project, the current Queensland Government puts forward an alternative onshore placement location situated wholly in existing disturbed industrial land intended for development of Terminal 2.

1.2.3 Description of the Project

The Project is located adjacent to the existing port area within the declared Abbot Point State Development Area. The Project involves the construction of embankments to create dredged material containment ponds, the capital dredging of coal export Terminal T0 and the placement of the dredged material into the ponds.

The dredged material containment ponds will be designed to receive, settle and store dredged material. The construction of embankments for the ponds will be undertaken mainly using material taken from within the ponds' footprint, complemented by a small amount of selective material imported from nearby quarries.

The proposed location of the dredged material containment ponds is considered fit for purpose due to the proximity to the dredging area and existing port, which will facilitate the use of the dredged material in any future port or other development. The design of the dredged material containment ponds accounts for identified environmental risks associated with the placement and storage of large quantities of dredged material in proximity to the Caley Valley Wetlands. Risks that have been addressed include embankment failure, erosion and overtopping. The dredged material has been identified as containing potential acid sulfate soils which have the potential to generate acid if not neutralised . A preliminary acid sulfate soils management plan has been developed and outlines the adaptive management strategy to be implemented to ensure there are no off-site impacts of acidity from the dredged material.

The offshore component of the Project consists of dredging approximately 1.1 million m^3 of seabed for the purpose of ship berth pockets and apron to support the development of facilities for coal export terminal T0. Dredging will be undertaken using a Cutter Suction

Dredge. This type of dredge releases significantly lower quantities of sediment during dredging and so has a substantially smaller sediment plume than would occur from a Trailing Suction Hopper Dredge, which was originally proposed for capital dredging at Abbot Point.

In order to allow for the dredged material to be pumped to the dredged material containment ponds and seawater to be returned offshore, temporary pipeline infrastructure will be constructed. This infrastructure will include a dredged material delivery pipeline running from the dredging area to the dredged material containment ponds and return water pipelines (up to two) from the dredged material containment ponds to a sub-tidal discharge location. All pipelines will be removed on completion of dredging and dewatering of the ponds. The marine section of the dredged material delivery pipeline will be composed of a submerged section, a riser line section and a flexible floating section which trails behind the dredge, connecting it to the submerged/riser line. The two return water pipelines will take excess water from the dredged material containment ponds to a shallow sub-tidal location near the Abbot Point headland.

The dredged material containment ponds will be progressively filled over the dredging campaign, and as dredged material settles, return water will be pumped back offshore. Dredged material will continue to settle and dewater over time, and it is proposed that material may potentially be beneficially reused as general fill for future development in the area.

Figure 1-2 presents the components of the Project described above.

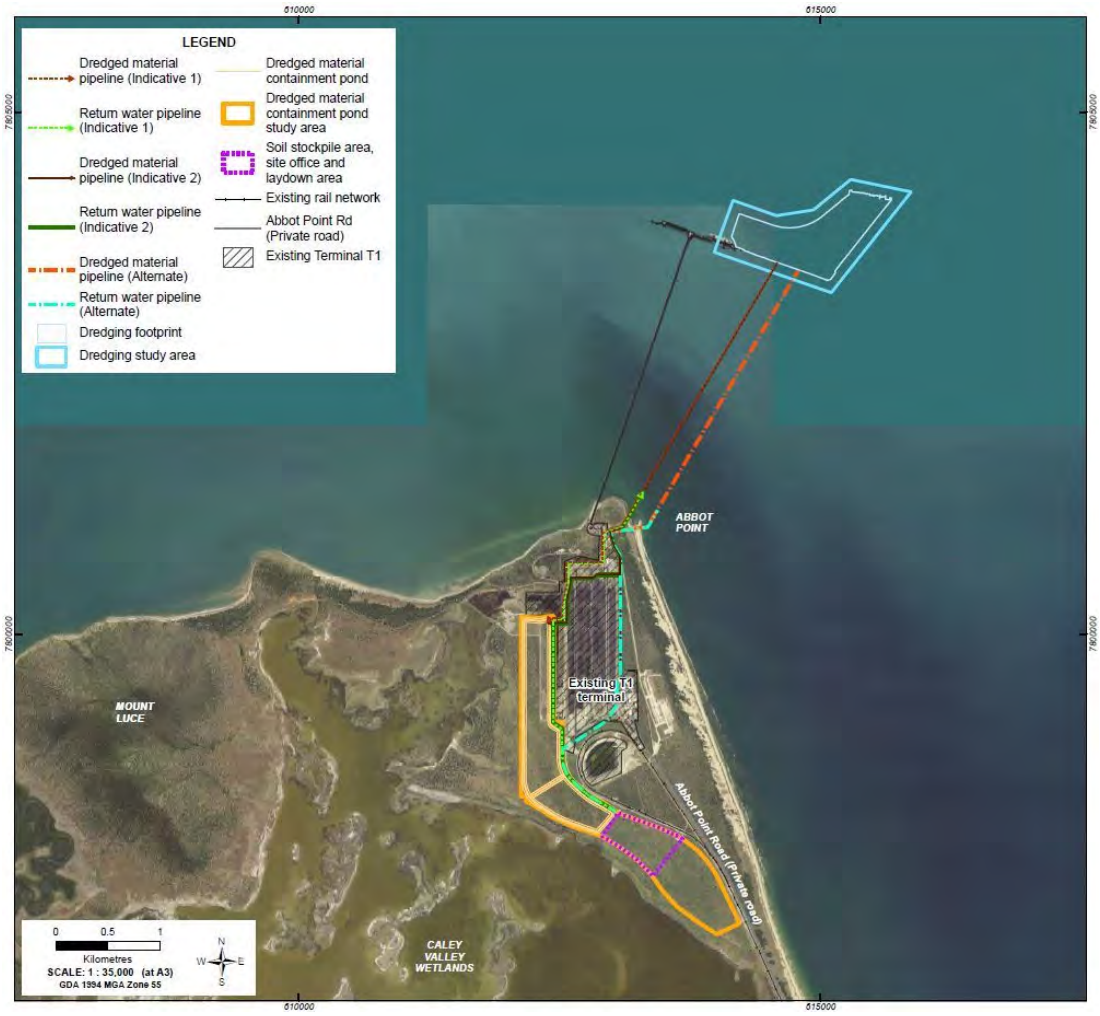

Figure 1-2 Abbot Point Growth Gateway Project – project detail

Project stages will include:

- Pre-construction activities
- Construction of dredged material containment ponds, including contractor mobilisation and demobilisation
- Dredging operations, including pipeline installation and dredging contractor mobilisation and demobilisation
- Decommissioning of the dredged material containment ponds.

Construction of the dredged material containment ponds is anticipated to occur over a three to six month timeframe. Mobilisation of the dredge, supply and installation of dredging pipelines will occur over a four to five month timeframe. Construction of the ponds, dredging pipe supply and transport to site, and dredge mobilisation may occur concurrently.

Capital dredging will commence as soon as practical post completion of the dredged material containment ponds. Dredging and dredged material placement will be completed in a single campaign over approximately 5 to 13 weeks, after which dewatering and consolidation of placed dredged material will occur over time.

Table 1-1 illustrates the indicative project schedule.

Table 1-1 Indicative project schedule

Activity	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Mobilisation of dredged material containment ponds construction contractor												
Construction of dredged material containment ponds												
Dredging contractor mobilisation (including pipeline installation)												
T0 dredging												
Demobilisation (including pipe removal)												

1.3 Project alternatives

This EIS provides a summary of the alternatives considered to date, which include:

- Taking 'no action' (for dredging project and T0 development)
- T0 project alternatives
- Alternatives to avoid or reduce dredging
- Alternatives to placement of dredged material.

The Abbot Point Growth Gateway Project aligns with the objectives of the proposed *Sustainable Ports Development Bill 2015* and the *Reef 2050 Long-Term Sustainability Plan*, and will have the least impact on matters of national environmental significance compared with alternatives considered to date.

The do nothing alternative would mean the anticipated economic benefits from the Adani Abbot Point Terminal 0 project would not be realised. In light of the economic benefit predictions stated in the environmental impact statement carried out for the T0 project, this would prevent an important boost to the local and state economies from being realised. The potential economic benefits at stake are creation of an important number of jobs and significant revenue increase in the Mackay, Isaac and Whitsunday region, Queensland and in the rest of Australia. The economic impact assessment undertaken in the T0 environmental impact statement identified an estimated workforce requirement of 500 workers during construction and a peak operational workforce in the order of 200-250 full time and contract full time equivalent positions. The economic impact assessment indicated that estimated total gross value generated during construction of the Project will peak at AU$59.4 million per annum in the Mackay, Isaac and Whitsunday region while the estimate for the operational period is between AU$23.0 million and AU$50.9 million per annum.

The environmental impact statement for the Adani Abbot Point Terminal 0 project identified no suitable alternative locations for establishment of the terminal, either elsewhere along the Queensland coast or within the Port of Abbot Point, noting that alternative siting at the port would require extension into the Caley Valley Wetlands.

With regards to dredged material placement options, relevant alternatives to the proposed Project include:

- The offshore placement options considered under North Queensland Bulk Ports Corporation Limited's proposed dredging to facilitate T0 along with proposed terminals 2 and 3 (2011)
- The onshore placement option previously proposed by the Queensland Government under the Abbot Point Port and Wetlands Strategy (2014).

The Abbot Point Port and Wetland Strategy proposed the construction of dredged material management areas (ponds) covering a part of the Caley Valley Wetlands, the dredging by Cutter Suction Dredge and placement of the dredged material in the ponds. The Preliminary Documentation indicated that the project was expected to result in significant residual impacts to migratory birds and the Australian Painted Snipe due to the direct loss of foraging habitat in the wetland and the disturbance to additional habitat from construction and operation activities. The dredging activities were found to have no significant residual impact, partly owing to the very limited plume generated by the cutter suction dredge.

The proposed Project has been assessed in this EIS to be likely to have equivalent or lesser impacts on matters of national environmental significance than the onshore placement option proposed under the Abbot Point Port and Wetlands Strategy. In comparison to the offshore placement option, the Project is considered likely to have lesser adverse impacts to marine matters of national environmental significance but greater impacts to listed threatened and migratory avian species.

1.4 Existing environment

The Port of Abbot Point is located approximately 25km north-west of Bowen. It is Australia's most northerly coal export port. It is centrally located between Mackay and Townsville. The area is part of the Mackay, Isaac and Whitsunday region and within the Whitsunday Local Government Area on the North Queensland coast.

The Whitsunday Local Government Area recorded a total population of 34,211 persons in June 2014, which is expected to grow by an average 1.7% per annum over the next 25 years. Tourism, agriculture and mining are the key industries in the region.

Bowen is the commercial, business, service and administrative hub for the northern section of the Whitsunday Local Government Area and is the largest town in the Whitsunday region. Bowen's local economy is based on a nationally significant horticulture industry, commercial fishing, aquaculture, construction and a major salt processing facility. Bowen residents report having a relaxed and healthy rural-coastal lifestyle, with a strong sense of community and community pride. The Bowen community has stated their desire for the area to grow and develop, but not at the cost of community diversity and stability or environmental degradation.

The Abbot Point area has a long-standing Indigenous heritage and was occupied by Indigenous people for many generations, up until early last century, and Indigenous use of

the Abbot Point area continues today. The Juru People maintain strong cultural ties with the Abbot Point area.

Overall, the Mackay, Isaac and Whitsunday region can be characterised as having local and regional economies that are heavily dependent on primary production (agriculture and mining), and as such have generally experienced significant stimulus from major resource sector investment, although much of this stimulus has been concentrated within the Mackay, Isaac and Whitsunday region outside of the Whitsunday Local Government Area.

Bowen has experienced slightly lower growth when compared to the Whitsunday Local Government Area and the State of Queensland in recent years, likely due to the downturn in the mining industry and the delays to the Port of Abbot Point expansion. This has resulted in high unemployment rates. Population projections indicate that growth in Bowen will largely be attributed to development in mining and infrastructure activities such as upgrades to the Port of Abbot Point. Bowen's high proportion of persons aged 45 and over indicates that it is a popular retirement destination for the Whitsunday Local Government Area, however there remains a high proportion of working aged persons living in the town. The community includes a relatively high proportion of Indigenous persons.

With regards to housing and accommodation, Bowen experiences high vacancy levels in rental properties and tourism accommodation.

Community infrastructure is mainly tailored towards an aging community, however Bowen experiences a shortage of infrastructure and services like health services, aged care and emergency services. There is also a high level of demand for women's and child health services, as well as allied health.

The Port of Abbot Point lies within the Great Barrier Reef World Heritage Area and is adjacent to the Great Barrier Reef Marine Park. The Great Barrier Reef Marine Park is known to support extremely diverse biodiversity, a vast number of ecosystems (including mangroves, seagrass, coral reefs and open ocean), and fauna and flora species.

The Port of Abbot Point supports industrial activities at the coal export Terminal 1, including rail infrastructure, coal stockpiling and shiploading facilities. Two additional terminals, Terminal 0 and Terminal 3, have been approved east and west of existing Terminal 1.

The nearshore marine environment of the Abbot Point area is characterised by a predominantly heterogeneous habitat of soft-sediment, seagrass and algae, with variable water depths partitioned by shoals and channels. The nearshore marine environment to the south-east and north-west of the port is shallow and contains creek mouths, beaches, mud flats and mangrove habitats. The offshore area is characterised by soft-sediment seafloor providing habitat for seagrass species of varying coverage and density.

It is believed the marine ecosystem in the Abbot Point area is predominantly used as transient habitat and feeding ground by a number of species including dolphins, whales, dugongs and turtles. Green and Fatback turtles are known to nest on Abbot Point beach to the east of the existing terminal.

The onshore portion of the project area consists of existing industrial port land and highly disturbed areas composed primarily of non-remnant vegetation, including exotic grasses, with some patches of regrowth vegetation and very small patches of remnant woodland. The terrestrial environment in the Abbot Point area includes a diversity of ecosystems of varying

health condition depending on historical and current human activities. The foreshore habitats consist of sandy beaches and rocky headlands. Belts of microphyll vine forest and semi-evergreen vine thicket are located leeward of the frontal dunes on the northern and eastern beaches of the Abbot Point area. Woodland occurs on the fringes of the Caley Valley Wetlands. Pasture grassland can be found in several large areas in the Abbot Point area and along the southern boundary of the wetlands.

The Caley Valley Wetlands is ephemeral, experiencing various levels of seasonal inundation, including long dry spells. It has complex geology and soil conditions with features of alluvial, lacustrine and estuarine plains. The wetlands support a mix of vegetation communities. Mangroves are well developed within the western estuarine zone and along Saltwater Creek to the south east. Saltmarsh dominates the western estuary and the wetland basin. Whilst the wetlands are on a low gradient plain, the micro-topography is highly variable with low rises, small channels and depressions which are subject to various levels of seasonal inundation and groundwater influence.

During wet periods, the wetlands provide foraging habitat for shorebirds and waterbirds, such as terns, gulls, egrets, and storks, many of which are listed migratory species.

1.5 The proponent

The proponent of the Abbot Point Growth Gateway Project is the Queensland Department of State Development.

The proponent has a sound record of responsible environmental management and there are no proceedings against the State of Queensland, represented by the Queensland Department of State Development, relating to the protection of the environment or the conservation and sustainable use of natural resources under a Commonwealth, State or Territory law.

The proponent operates within and in accordance with a planning and environmental framework, which promotes environmental responsibility, protects environmental values from harm and ensures development is ecologically sustainable.

It is proposed that responsibility for delivery of the Project would be transferred to North Queensland Bulk Ports Corporation Limited prior to the commencement of construction. North Queensland Bulk Ports Corporation Limited has a sound record of environmental management, with no proceedings against it in relation to any non-compliance with any Commonwealth, State or Territory approvals or permits.

2 Environmental Impact Statement Process

2.1 Legislative process

The Project was referred by the Queensland Department of State Development to the Australian Government Department of the Environment on 16 April 2015 and was declared a controlled action to be assessed by environmental impact statement under the *Environment Protection and Biodiversity Conservation Act 1999*. The relevant controlling provisions for the Project are the following matters of national environmental significance:

- World Heritage properties
- National Heritage places
- Listed threatened species and communities
- Listed migratory species
- Great Barrier Reef Marine Park
- Commonwealth marine areas.

Along with the above determination, Environmental Impact Statement Guidelines (EPBC 2015/7467) were issued by the Department of the Environment in May 2015 for the Project. This EIS (volumes 1, 2 and 3) addresses these guidelines.

The environmental impact statement process is a specific level of impact assessment prescribed under the *Environment Protection and Biodiversity Conservation Act 1999*. It follows an assessment process described under Part 8, Division 6 of the Act. Under this process the information contained in this EIS is subject to adequacy review by the Department of the Environment before it is published for public comment. Submissions by the public will be reviewed by the proponent and addressed in a supplement to this Environmental Impact Statement. The final documents will be published and submitted for review by the Department of the Environment and decision by the Minister for the Environment.

2.2 Stakeholder engagement

The stakeholder consultation process aims to ensure clear, transparent, multilateral communication regarding the Project and particularly encourages interested stakeholders to engage in the Project development process. The process provides an opportunity for the proponent to inform stakeholders about the Project, to obtain feedback from community and stakeholder groups, and to respond to concerns.

Stakeholder engagement about the Project was planned under a Communications and Engagement Strategy informed by two rounds of customer research carried out in October 2014 and June 2015 to assess awareness, attitudes and community information needs regarding the Port of Abbot Point.

Communication and engagement with stakeholders and the community comprised an array of activities including making the project team's contact details available to the public, release of media statements, a dedicated project email address, presentation of the Project on the Department of State Development's website, a dedicated twitter account and advertising through public notices published in newspapers to launch the public consultation.

This engagement has been complemented with the public consultation carried out for the referral of the Project to the Department of the Environment.

Upcoming engagement activities will include community information sessions and information sessions with conservation, industry, academic and indigenous groups, as well as stakeholders at the Port of Abbot Point. Engagement during the life of the Project is also intended.

To date, the stakeholder engagement process has allowed identification of key matters of importance to the public, which this Environmental Impact Statement seeks to address.

3 Native Title and Cultural Heritage

The Juru People hold non-exclusive native title rights and interests in land and waters within the Port of Abbot Point and the Abbot Point State Development Area. The Juru people are represented by the Kyburra Munda Yalga Aboriginal Corporation.

In accordance with the *Aboriginal Cultural Heritage Act 2003*, as registered native title holder, the Juru People have special legal status as the primary party in charge of Aboriginal cultural heritage within the boundaries of the registered native title determination. Therefore, the proponent intends to develop a cultural heritage management agreement with Kyburra Munda Yalga Aboriginal Corporation to identify and manage any project impact on Aboriginal cultural heritage values in both onshore and offshore areas. The engagement process has already been initiated and is ongoing.

4 Impact Assessment

The impact assessment of the Project relied on the important amount of publically available data from past studies carried out for the Abbot Point area but also on new technical studies undertaken specifically for the Project. These studies were:

- Terrestrial ecology assessment
- Wetland hydrology, water quality and aquatic ecology assessment
- Groundwater assessment
- Phase 1 preliminary site investigation for contaminated land
- Acid sulfate soil investigative assessment
- Marine seagrass light requirements assessment
- Marine ecology assessment
- Fisheries impact assessment
- Soils assessment
- Air quality assessment
- Terrestrial and underwater noise impact assessment
- Greenhouse gas assessment
- Social impact assessment
- Economic impact assessment.

The impact assessment found that the Project will not have significant impacts on the matters of national environmental significance controlling provisions of World Heritage properties, National Heritage places, the Great Barrier Reef Marine Park, Commonwealth marine areas, and Threatened ecological communities, threatened species and migratory birds.

Volume 2 describes the impact assessment carried out and the basis for these conclusions. Volume 3 provides study reports of the assessments undertaken and proposed (draft) management plans.

4.1 Economic and social impacts

The social impact assessment undertaken for the Project studied the potential positive and negative impacts that may originate from the Project locally and regionally. In addition to direct project impacts, it accounted for potential cumulative impacts to local business and employment, community values and lifestyle, housing/accommodation, community infrastructure and services. Following the implementation of the proposed mitigation or enhancement strategies, the clear opportunities resulting from the Project are associated with employment, training and development, along with increased business opportunities and a boost to the local, regional and State economies. Over the short-term this relates to direct benefits associated with the Project, while over the longer term opportunities relate more to the flow-on effects from the Project providing access to coal mining in the Galilee Basin.

Potential adverse impacts on community infrastructure and services, and any potential housing and accommodation issues are considered to have a low likelihood of materialising due to the small workforce and temporary nature of the construction phase. In addition,

these are likely to be successfully reduced in their severity through the application of the proposed mitigation measures.

4.2 Listed threatened species and communities and listed migratory species

4.2.1 Impact assessment

Terrestrial species and communities

The onshore project area is highly disturbed, with the Squatter Pigeon being the only threatened species likely to utilise it. The nearby Caley Valley Wetlands is an important habitat for listed bird species. Fifteen migratory shorebird species and the Australian Painted Snipe have been recorded at the site. For three species (Little Tern, Great Egret and Caspian Tern), an ecologically significant proportion of the population utilises the wetlands' habitats. Small patches of the Semi-evergreen Vine Thicket Threatened Ecological Community can be found in proximity to the dredged material transport and return water pipeline alignment.

Potential impacts associated with the construction of the dredged material containment ponds, their operation and decommissioning were assessed. In assessing potential impacts on listed threatened species and communities and listed migratory species, consideration was given to the impacts of vegetation clearing, habitat fragmentation, earthworks, vehicle movements, dust, noise and light emissions, waste disposal, increased human presence and the alterations to hydrology and water quality.

The assessment found that direct impacts (within the development footprint) of the Project associated with construction and operational phases are unlikely to occur or will not be significant. The assessment of off-site and indirect impacts has concluded that these are unlikely to be significant and will be managed through a range of mitigation and environmental management planning processes.

It is therefore considered that the Project is unlikely to result in residual significant impacts on terrestrial listed threatened species and communities and listed migratory species after all measures to first avoid and then mitigate impacts have been implemented. Accordingly, offsets are not required.

Marine species

The Abbot Point area is known to provide habitat for a number of marine listed threatened or migratory species. The species likely to occur or potentially occurring are:

- One threatened marine mammal species (Humpback Whale)
- Three migratory marine mammal species (Australian Snubfin Dolphin, Indo-Pacific Humpback Dolphin and Dugong)
- Five threatened marine turtle species (Green, Hawksbill, Olive Ridley, Loggerhead, and Flatback turtles).

In assessing potential impacts of the Project on marine listed threatened species and communities and listed migratory species, consideration was given to the dredging activities' impacts of Potential Acid Sulfate Soils disturbance, underwater noise, vessels collision with

fauna, artificial lighting, introduced marine species and the removal or disturbance of marine habitat.

The project area does not support important populations of any of these species and does not contain habitat critical to their survival. The Project is expected to have temporary and permanent impacts to the marine environment of the Abbot Point area. Where potential impacts have been identified, mitigation measures are provided to minimise effects to the Abbot Point area. As such, the Project is not likely to result in a significant impact on a listed threatened or marine migratory species.

4.2.2 Proposed mitigation measures

Terrestrial species and communities

Mitigation measures proposed to minimise impacts on the Semi-Evergreen Vine Thicket Threatened Ecological Community will target potential direct impacts by the compulsory surveying and marking of areas to be cleared to prevent inadvertent disturbance. Indirect impacts will be mitigated by ensuring material imported to site is certified weed-free, fire prevention measures are implemented on site such as appropriate flammable materials storage, use of spark arresters on equipment, appropriate firefighting equipment and smoking restrictions on site.

Clearing restrictions to the minimum required and careful surveying of areas to be cleared will assist in preventing inadvertent loss of Squatter Pigeon habitat. Additional measures targeted at the species will consist of preventing vehicle strikes by implementing speed limits, raising personnel awareness and conducting pre-clearance surveys prior to clearing, as well as translocation of eggs/young if necessary and appropriate.

Migratory shorebirds and the Australian Painted Snipe

A range of mitigation measures will assist mitigation of any minor impacts on migratory shorebirds and the Australian Painted Snipe. Measures applied to vegetation clearing will involve minimising the clearing footprint, avoiding inadvertent clearing and using spotter catchers to relocate birds from the clearing area if required. Restoration in temporarily disturbed areas will assist in preventing habitat fragmentation and edge effects, as will the prevention of fires spreading through maintaining adequate firefighting equipment. Deep pits and trenches will be fenced and monitored in order to prevent fauna trapping. Risks related to vehicle movements will be addressed through vehicle wash/blow-down to remove weeds and their propagules, speed limits as well as traffic restrictions to approved roads/tracks to avoid strikes. Impacts related to dust emissions will be mitigated through minimisation of exposed areas, regular spraying of exposed areas and vehicle speed limits. Mitigation of light emissions impacts will include the use of directional lighting, shrouds to protect the Caley Valley Wetlands from direct light, minimum or no lighting of unused areas and the retention of a buffer area between construction activities and the wetlands. Mitigation of construction noise impacts will be provided by the minimum 50 metres set back of the construction area from the wetland, the use of plant with efficient muffler design, adjustment of vehicle reversing alarms to limit their acoustic range vehicles and the use of newer, quieter machinery where practicable.

Marine species

The key mitigation measures to avoid vessel collision with marine fauna will include restricting dredging operations to approved locations, visual monitoring for marine fauna in immediate vicinity of the dredge, maintain vessel speed limits within port limits, particularly for planning hull work vessels, to minimise risk of animal strike.

The key mitigation measures of artificial lighting impacts on nesting turtles will include ensuring minimal direct light spill onto the Abbot Point beach during the turtle nesting and hatching season, minimising the number of ships at anchor and associated light spill by optimising the efficiency of port operations, as well as minimising artificial light requirements.

Risk of the spread of introduced marine species will be alleviated via systematic implementation of a risk assessment procedure consistent with the *National System for the Prevention and Management of Marine Pest Incursions Guidelines*. The risk assessment will be applied to all vessels and immersible equipment used for the dredging campaign to select the most appropriate vessel and establish management measures to mitigate risks to an acceptable level.

4.3 Great Barrier Reef World Heritage Area and National Heritage Property

4.3.1 Impact assessment

The Great Barrier Reef World Heritage Area is recognised as having Outstanding Universal Value because it meets four of the natural criteria outlined in the Operational Guidelines for the Implementation of the World Heritage Convention 2011 (UNESCO Guidelines), it fulfils the condition of integrity due to its sound natural state, and is protected and managed through conservation programs.

Twenty-nine natural heritage attributes were identified that underpin the UNESCO Guidelines natural criteria. Of these 29 natural heritage attributes, the Abbot Point Cumulative Impact Assessment has identified three as being relevant to the Abbot Point area, namely aesthetics, birds and marine mammals. The aesthetics attributes of the Great Barrier Reef World Heritage Area are summarised in Criterion 7 of the UNESCO Guidelines as “superlative natural phenomena or areas of exceptional natural beauty and aesthetics importance”.

A visual impact assessment undertaken under the 2012 Abbot Point Cumulative Impact Assessment found that the Abbot Point area contains superlative natural phenomena due to breeding colonies of waterbirds in the Caley Valley Wetlands, turtle, dugong and dolphin populations frequenting the marine areas and migratory whales passing through offshore.

It was identified that impacts from the Project will be localised and either temporary in nature or will be adequately compensated for through the implementation of offsets. The Project will neither have significant impact on the visual amenity of the Abbot Point area, nor on marine mammals and birds frequenting the Caley Valley Wetlands. Therefore, it is considered highly unlikely for there to be a loss of Outstanding Universal Value or decline in integrity of the Great Barrier Reef World Heritage Area as a result of the Project.

The boundaries and heritage attributes of the Great Barrier Reef World Heritage Area are the same as those for the National Heritage Place, and as such the above discussion and conclusion apply to the Great Barrier Reef National Heritage Place.

The Abbot Point area meets world and national heritage criteria mostly due to the fauna species using it as habitat.

4.3.2 Proposed mitigation measures

The mitigation measures enunciated for listed threatened species and communities and listed migratory species will also contribute to mitigating minor impacts on the Great Barrier Reef World Heritage Area and National Heritage Property.

Dredging activities will be subject to strict operating rules. The Project's dredge vessels will adhere to the Australian mandatory ballast water reporting and management system enforced by the Australian Quarantine and Inspection Service. They will comply with regulations at the Port of Abbot Point, including the prohibition of high risk ballast water exchange. Additional requirements outlined in the Outline Dredging Management Plan will be implemented throughout dredging activities to ensure residual risk to introduce marine pests remains low. Mitigation measures proposed for the marine listed threatened species and communities and marine listed migratory species are also relevant for both matters.

4.4 Great Barrier Reef Marine Park and Commonwealth marine area

The Great Barrier Reef Marine Park shares its inner boundary with port land within which the Project is located. The Commonwealth marine area is any part of the sea, including the waters, seabed and airspace, within Australia's exclusive economic zone and/or over the continental shelf of Australia, that is not State waters. It is generally defined as the area extending from 3 to 200 nautical miles from the mainland coastline. Apart from the first 3 nautical miles, the Commonwealth marine area includes the majority of the Great Barrier Reef Marine Park.

With respect to the Project, the dredging area and marine pipeline infrastructure are located outside the Great Barrier Reef Marine Park and Commonwealth marine area. The same Significant Impact Criteria apply to both matters. Due to its location, the Project will not have any direct impacts on either area. Potential indirect impacts assessed include introduction of pest species, disturbance of an important area of habitat, adverse effect on a population of marine species, substantial change in water or air quality, persistent harmful chemicals accumulating in the marine environment and heritage values. Considering the location of the Project, the type of dredge proposed to be used, the onshore placement of dredged material, as well as the planned mitigation measures, residual risks of indirect impacts from project activities are considered low.

The mitigation measures outlined above and as included in the Outline Dredging Management Plan will protect the values of the Great Barrier Reef Marine Park and Commonwealth marine area.

4.5 Consequential and cumulative impacts

4.5.1 Impacts of consequential and related projects

An assessment of the impacts of consequential and related projects has been prepared. Consequential impacts are defined as those which result from further actions which are made possible or facilitated by the Project. The Project facilitates:

- The North Galilee Basin Rail development
- The Adani Abbot Point T0 development
- Increased shipping resulting from the T0 development.

The impacts of the related Carmichael Mine development proposed by Adani are also considered.

The North Galilee Basin Rail, Abbot Point T0 and Carmichael Coal Mine and Rail projects have all been subject to environmental assessment under Australian and Queensland environmental legislation and have been approved with conditions to manage and protect matters of national and State environmental significance. Where significant residual impacts are predicted for MNES, offset actions have been conditioned for affected matters. Approval of the projects, subject to conditions, indicates that the consequential impacts of the Project on MNES have been thoroughly assessed and determined to be acceptable.

4.5.2 Cumulative impacts

A cumulative assessment, relevant to the Project was undertaken to consider activities external to the Project, which have potential for additive impacts.

The impacts of the following activities have been considered cumulatively with those of the Project as they have the potential to have overlapping spatial and temporal impacts with the Project and may therefore require consideration in a cumulative context:

- Development and associated dredging and disposal increased shipping from:
  - Abbot Point T0 Project
  - Abbot Point T1 (existing)
  - Abbot Point T3 (proposed)
- The proposed NGBR project (limited to the port end of the rail line)
- The Alpha Coal and Rail Development (limited to the port end of the rail line).

For the purposes of cumulative impact assessment relevant to the Project, only the port end of the proposed rail developments, in the vicinity of the Project, are considered relevant.

Threats for which external activities were determined to potentially result in impacts that interact spatially and temporally with the predicted impacts of the Project are:

- Exotic species - the potential for introduction of marine pests from the Project, T0 and T3 projects to the local marine environment from construction and activities and from increased shipping to the Port of Abbot Point resulting from development of the T0 and T3 projects
- Land clearing and habitat loss - the potential for land clearing and habitat loss to result in significant residual impacts for conservation significant species.

The risk assessment for marine pests and habitat loss determined a low cumulative risk for both these threats taking into account mitigation measures.

More broadly, threats associated with increased shipping resulting from the development of the Terminal 0 and Terminal 3 projects, which do not interact directly with predicted project impacts were considered in order to address the Environmental Impact Statement Guidelines requirements. These threats, which have broader implications for biodiversity and the health of ecosystems and species within the Great Barrier Reef World Heritage Area are:

- Exotic species - the potential for increased shipping resulting from the development of the Terminal 0 and Terminal 3 projects to increase potential for introduction of marine pests
- Vessel strike - the potential for increased shipping resulting from the development of the Terminal 0 and Terminal 3 projects to increase potential for vessel strike on marine mammals and turtles
- Vessel waste discharge - the potential for water quality and subsequent impacts from vessel waste discharge due to increased shipping resulting from development of the Terminal 0 and Terminal 3 projects
- Noise pollution - the potential for disturbance to wildlife from increased underwater noise due to increased shipping resulting from development of the Terminal 0 and Terminal 3 projects
- Spills (small and large) - the potential for water quality and subsequent impacts from spills due to increased shipping resulting from development of the Terminal 0 and Terminal 3 projects
- Atmospheric pollution - the potential for air quality impacts from atmospheric pollution due to increased shipping resulting from development of the Terminal 0 and Terminal 3 projects
- Seafloor damage - the potential for anchor damage due to increased shipping resulting from development of the Terminal 0 and Terminal 3 projects.

The Great Barrier Reef Outlook Report 2014 included a comprehensive assessment of risks to the Great Barrier Reef region. Each of the threats listed above were rated as a low or medium level risk.

The *Reef 2050 Long-Term Sustainability Plan* indicates that, at Australia's request, the Great Barrier Reef is designated a Particularly Sensitive Area by the International Maritime Organisation, the first in the world, and that extensive and stringent navigation and pollution prevention controls are in place to manage the threats from shipping. The Plan states that despite increased ship movements through the World Heritage Area, the management measures have substantially reduced the frequency of shipping incidents.

The North-East Shipping Management Plan addresses increased shipping in the Great Barrier Reef region and in particular the impacts of current and increased shipping on the Outstanding Universal Values of the Great Barrier Reef World Heritage Area.

With a high level of confidence, it is considered that the cumulative impacts of shipping on the Outstanding Universal Values of the Great Barrier Reef World Heritage Area have been comprehensively addressed and are being acted upon by the Australian and Queensland governments and industry bodies.

Key findings of the cumulative impact assessment, of the Project with the other projects considered, include:

- No potential for the impacts of the Project to act cumulatively with the other projects considered on the *semi-evergreen vine thicket* threatened ecological community

- Low potential for increased cumulative impact from the Project on the Squatter Pigeon, and the overall cumulative impact to the Squatter Pigeon is considered to be low
- Low potential for increased cumulative impact from the Project on migratory shorebirds and the Australian Painted Snipe
- Low potential for cumulative impacts on non-shorebird migratory birds
- No impact from the Project on the Caley Valley Wetlands in a manner that will affect its connectivity, diversity or habitat values for the seasonal aggregation of waterbirds.

4.6 Offsets

Avoidance and mitigation measures are the primary strategies for managing the potential significant impacts of the Project.

Avoidance of potentially significant impacts to the Great Barrier Reef World Heritage Area associated with dredging and offshore placement of dredged material is an important feature of the Project. Using a cutter suction dredge, the dredged material will be pumped on land to the dredged material containment ponds. As the material settles, excess water is returned to the ocean and carries with it a quantity of suspended sediment. This is a short-term operation that will continue until dewatering of the dredged material has been achieved.

The dredging process itself will disturb currently stable seafloor sediments, making the fine components of the sediment available for re-suspension by wave energy within the marine environment.

While the use of cutter suction dredge technology and onshore placement of dredged material reduces as far as possible the impact of the Project on marine water quality, a total of approximately 9,938t of fine sediment available for re-suspension could be generated by dredging and dewatering activities. In comparison with the previously approved, and now discontinued, capital dredging project at the Port of Abbot Point where offshore disposal of dredged material was intended, the proposed Project is predicted to contribute significantly less fine sediment to the Great Barrier Reef World Heritage Area.

Dredging for the establishment of the T0 berth pockets will deepen these areas of the sea floor to depths that are likely to permanently preclude recolonisation by seagrasses from an area of approximately 10.5ha.

The sparse and ephemeral seagrass present in the dredging footprint is not considered to represent important habitat for migratory and threatened species that rely on seagrasses for foraging (e.g. Dugong and marine turtles), and no significant residual impacts to these species are predicted from removal of this habitat. Mitigation and management measures will be in place to reduce the risks of harming marine mammals and marine turtles during the dredging process, and no significant residual impacts to these species are expected during the 5 to 13 week dredging campaign.

Areas within the dredging apron that will be dredged to a depth of no greater than 1.5m, areas on the edge of the dredging footprint that will be disturbed during the dredging process, and the locations of the temporary pipelines will be available to be recolonised by seagrass and other benthic biota over time (<5 years) and no significant residual impacts for matters of national environmental significance are predicted for areas of mechanical disturbance outside of the berth pocket.

In consideration of the above impacts that cannot be mitigated, a net benefit/offset action that improves habitat for seagrass in the region and reduces sediment from entering the marine environment is warranted in order to provide a net benefit to the Great Barrier Reef World Heritage Area, in accordance with the targets and objectives of the *Reef 2050 Long Term Sustainability Plan*.

The proposed net benefit/offset action will focus on reducing the amount of sediment entering the Great Barrier Reef World Heritage Area in the Abbot Point area by a quantity greater than the fine sediment generated by the Project. The *Reef 2050 Long Term Sustainability Plan* indicates that work to decrease land-based runoff in the Great Barrier Reef World Heritage Area is well advanced under the Reef Water Quality Protection Plan. It is proposed to provide a net benefit for the Project by contributing offset funds to actions being delivered under the existing framework, with an emphasis on actions delivered in the catchments that influence marine water quality in the Abbot Point area. Funds are proposed to be pooled in Reef Trust, the Australian Government's financial mechanism used to fund strategies set out under *Reef 2050 Long Term Sustainability Plan.*

Offsets for the Project's impacts on seagrass are required under both Australian and Queensland legislations. Discussions are ongoing with the Australian and Queensland Governments regarding the legislative process that will be used to deliver the proposed Project's net benefit/offsets without duplication.

4.7 Conclusions

It is concluded that this short-duration and low environmental-risk project, with the proposed avoidance, mitigation and management measures in place, achieves the economic need for this infrastructure at the Port of Abbot Point while also supporting the goals and actions of the *Reef 2050 Long-Term Sustainability Plan*.

The Project has been developed to comply with the objectives of the *Environment Protection and Biodiversity Conservation Act 1999* Act and associated principles of ecologically sustainable development. There are no significant residual impacts predicted for matters of national environmental significance, and the opportunity will exist for the beneficial reuse of dredged material for future port development.

Through a commitment to contribute funds to actions being delivered under the framework that implements the strategies of the *Reef 2050 Long-Term Sustainability Plan*, via Reef Trust, and by ensuring that those actions are delivered in the catchments that influence marine water quality and nearshore ecosystems in the Great Barrier Reef region, the Project will provide a net benefit for the Great Barrier Reef World Heritage Area.