

Rio Tinto Alcan Weipa

# Temporary Barge Plan

July 2015

**RioTintoAlcan**



**DOCUMENT CONTROL**

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Cover photo taken from approximate temporary barge location looking south towards Pera Head.

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## 1 PURPOSE

This Temporary Barge Plan (Plan) documents the principles and practices under which RTA Weipa Pty Ltd (RTAW) would undertake work associated with construction, operation and decommissioning of the Temporary Barge Facility located near Pera Head (refer Figure 1) for the South of Embley Project (SoE Project) to manage, avoid and mitigate potential negative impacts on listed turtle species, including their breeding and foraging habitat. The listed turtle species are:

- Green Turtle (*Chelonia mydas*) – listed as vulnerable and migratory under the EPBC Act;
- Hawksbill Turtle (*Eretmochelys imbricata*) – listed as vulnerable and migratory under the EPBC Act;
- Flatback Turtle (*Natator depressus*) – listed as vulnerable and migratory under the EPBC Act;
- Loggerhead Turtle (*Caretta caretta*) – listed as endangered and migratory under the EPBC Act;
- Olive Ridley Turtle (*Lepidochelys olivacea*) - listed as endangered and migratory under the EPBC Act; and,
- Leatherback Turtle (*Dermochelys coriacea*) - listed as endangered and migratory under the EPBC Act.

This Plan has been prepared to satisfy Conditions 1 to 4 of the South of Embley Project approval (EPBC 2010/5642) under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

This plan has been designed to achieve the following:

- document the measures to be implemented to manage, avoid and mitigate impacts on listed turtle species, including their breeding and foraging habitat, from the construction, operation and decommissioning of the Temporary Barge Facility near Pera Head;
- ensure the area to be impacted by the Temporary Barge Facility is surveyed prior to disturbance, to ascertain whether active or potentially active listed turtle species nests are present;
- document adaptive management and mitigation measures to be implemented;
- documents effective management strategies to mitigate each potential impact, desired outcomes, benchmarks, performance indicators and goals, timeframes for reporting and implementation, corrective actions and contingency measures, and specify the persons/ roles with responsibility for implementing actions; and,
- documents the process for identifying Traditional Owner employment opportunities.

## 2 BACKGROUND

Detailed environmental impact assessment for the SoE Project including community consultation has been conducted under the EPBC Act and is detailed in the *South of Embley Project Environmental Impact Statement* (RTA Weipa, March 2013).

### 2.1. Regulatory Requirements

The then Minister for Sustainability, Environment, Water, Population and Communities approved the SoE Project (EPBC 2010/5642) with conditions on 14 May 2013. The approval (varied on 3 June 2014) requires a Temporary Barge Plan to be prepared and approved by the Minister prior to commencement of construction of the Temporary Barge Facility. Commencement of construction does not include clearing of vegetation associated with the facility (which is included as Preliminary Works as defined under EPBC 2010/5642)

The conditions relating to the Temporary Barge Plan, and where they are addressed in this document, are outlined in Table 1.

**Table 1 Temporary Barge Plan EPBC Approval Conditions**

Condition	Addressed in this plan
1. Unless agreed to by the <b>Minister</b> in writing, the approval holder must submit a Temporary Barge Plan to the <b>Minister</b> to manage, avoid and mitigate negative <b>impacts to listed turtle species</b> , including their breeding and foraging habitat, from the <b>construction, operation</b> and decommissioning of the temporary barge facility near Pera Head.	Breeding and foraging habitat of turtles summarised in <b>Appendix 1</b> .  Impacts summarised in <b>Section 3</b> .  Management measures identified in <b>Section 4</b> .
2. The Temporary Barge Plan must include surveying to ascertain whether active, or potentially active, nests for the <b>listed turtle species</b> are present in the area to be <b>impacted</b> by the temporary barge facility.	<b>Section 4.1</b>
3. The Temporary Barge Plan must include adaptive management and mitigation measures to benefit <b>listed turtle species</b> , including as identified in the Final Environmental Impact Statement. The Temporary Barge Plan must include and address effective management strategies to mitigate each potential <b>impact to listed turtle species</b> , desired outcomes, benchmarks, performance indicators and goals, timeframes for reporting and implementation, corrective actions and contingency measures, and responsibility for implementing actions.	<b>Section 4 and Table 2</b>

Condition	Addressed in this plan
4. The Temporary Barge Plan must be submitted to the <b>Minister</b> for approval. Commencement of the temporary barge facility must not occur until the <b>Minister</b> has approved the Temporary Barge Plan. The approved Temporary Barge Plan must be implemented.	<p>The requirement does not relate to the content of this Plan.</p> <ul style="list-style-type: none"> <li>the plan has been submitted for approval;</li> <li>RTA will not commence constructing the Temporary Barge Facility until the plan is approved;</li> <li>the approved plan will be implemented.</li> </ul>

In addition, the Queensland Government's Environmental Authority (EPML00725113) also has stated conditions relating to the construction, operation and decommissioning of the Temporary Barge Facility. This Plan does not specifically address the Environmental Authority; however, many of the requirements are similar.

## 2.2. Description of Temporary Barge Facility

Prior to commissioning of the permanent ferry and barge terminals and the all-weather mine access road, temporary seaborne access to the mining lease may be established near the Boyd Port location to facilitate access for construction of the Project, particularly during the wet season.

It is anticipated that construction of the all-weather mine access road and permanent ferry and barge terminals will take between 12 and 24 months depending on wet season impacts. Therefore the Temporary Barge Facility will be operated if required for about this length of time but may be extended if delays to the construction schedule are encountered. Construction of the Temporary Barge Facility will take approximately 2 months, but may be extended if construction is delayed as a result of the sea state and weather.

The proposed location for the Temporary Barge Facility will be approximately 270m northeast of Pera Head (refer Figure 1 and Figure 2). The general location of the facility has been chosen to avoid impacts to culturally sensitive areas and maximise the distance from reef habitat at Pera Head, without requiring a significant cut through the bauxite cliff. The bauxite cliff at this location is only several metres high.

The Temporary Barge Facility will consist of a pontoon (dumb barge) approximately 30m by 12m held in position with anchors (fore) and piles (aft). Piles will be installed using a vibratory hydraulic hammer from a barge. Semi-flexible pre-cast concrete matting (approximately 7.5m wide and 85m long laid) will be laid on the beach starting from the landward end and extend from the cutting in the bauxite plateau to the pontoon (Figure 3). The matting will be anchored in position by 1m steel pins. Approximately 2,000m<sup>3</sup> of geochemically-inert rock (+400mm) may need to be placed as loose fill on the concrete matting between high tide and pontoon to keep equipment out of salt water. The rock fill will be brought in from the land and progressively pushed out. No excavation of

the sea bed will be required to construct the facility. It will be designed by a qualified marine engineer and have sufficient draft to minimise scouring. Eight 900mm diameter piles will be installed by low-impact vibratory piling for safe mooring and operation of the barge. Should driven piles be required, a soft start procedure will be followed and observation and exclusion zones established in accordance with Condition 12 of the EPBC 2010/5642 approval. A cutting through the plateau about 3-4m high, 7.5m wide at the base plus batters, and approximately 50m long is required to establish suitable grades.

A tug and work barge will be used to install the piles and to place the dumb barge. Excavators will be used to place the matting. An all-terrain dump truck will haul the rock onto the matting. A dozer will then push the rock out over the matting. Excavators and an all-terrain dump truck will be used to recover the rock and matting during decommissioning. Approximately 20 personnel will be required to construct and decommission the facility.

Temporary Barge Facility will receive up to four deliveries a day, with some night operation to suit the tides. The main cargo delivered to this facility will be camp modules, quarry materials and earthmoving equipment. Approximately five personnel will be required to operate the facility. Navigational safety lights will be installed on any structures associated with the temporary barge landing area in accordance with Maritime Safety Queensland (MSQ) requirements and additional lighting will only be utilised when barges are loading or unloading for safe access. Personnel may also be transferred here dependant on weather conditions.

The majority of barges that use the facility will be dumb barges with one tug in control of the barge. The typical crew for these types of barges will be two people, with a tug crew of three people. The dumb barges would typically be 50m by 15m in size. It is possible that a bigger barge (approximately 70m by 19m) will be used in some instances, subject to tides.

Any wastes generated during the construction, operation and decommissioning of the Temporary Barge Facility will be disposed of at the existing licensed waste disposal facility at Evans Landing. No sewerage from barges or tugs will be disposed of at the facility. If diesel fuel is brought in via the facility, it will be brought in by road tanker. No explosives or chemical reagents are required for bauxite mining or processing and hence none of these chemicals will be transferred to or unloaded at the Temporary Barge Facility.



Figure 1 Coastal and Marine Components of the Project

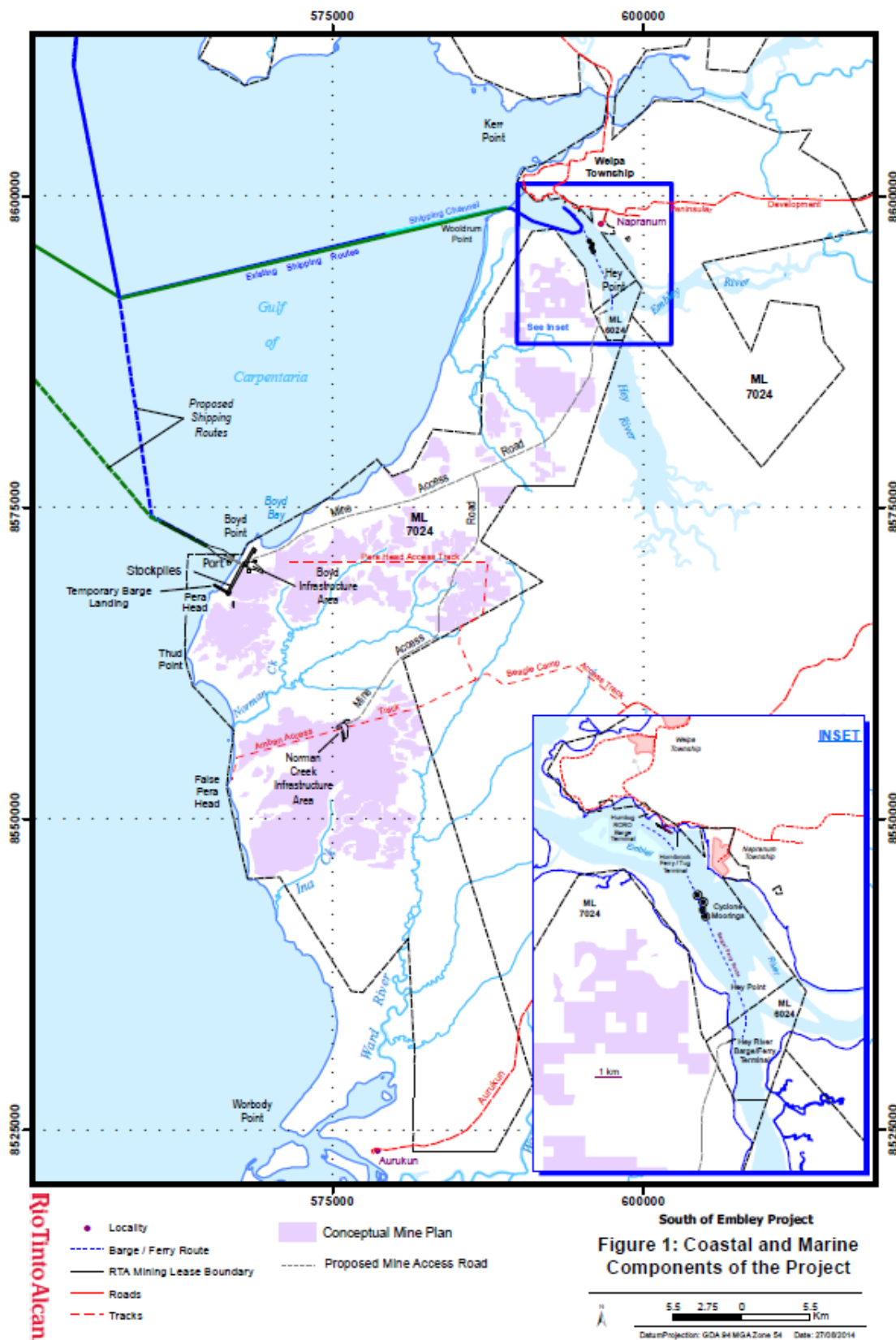




Figure 2 Temporary Barge Landing site – Aerial Photo

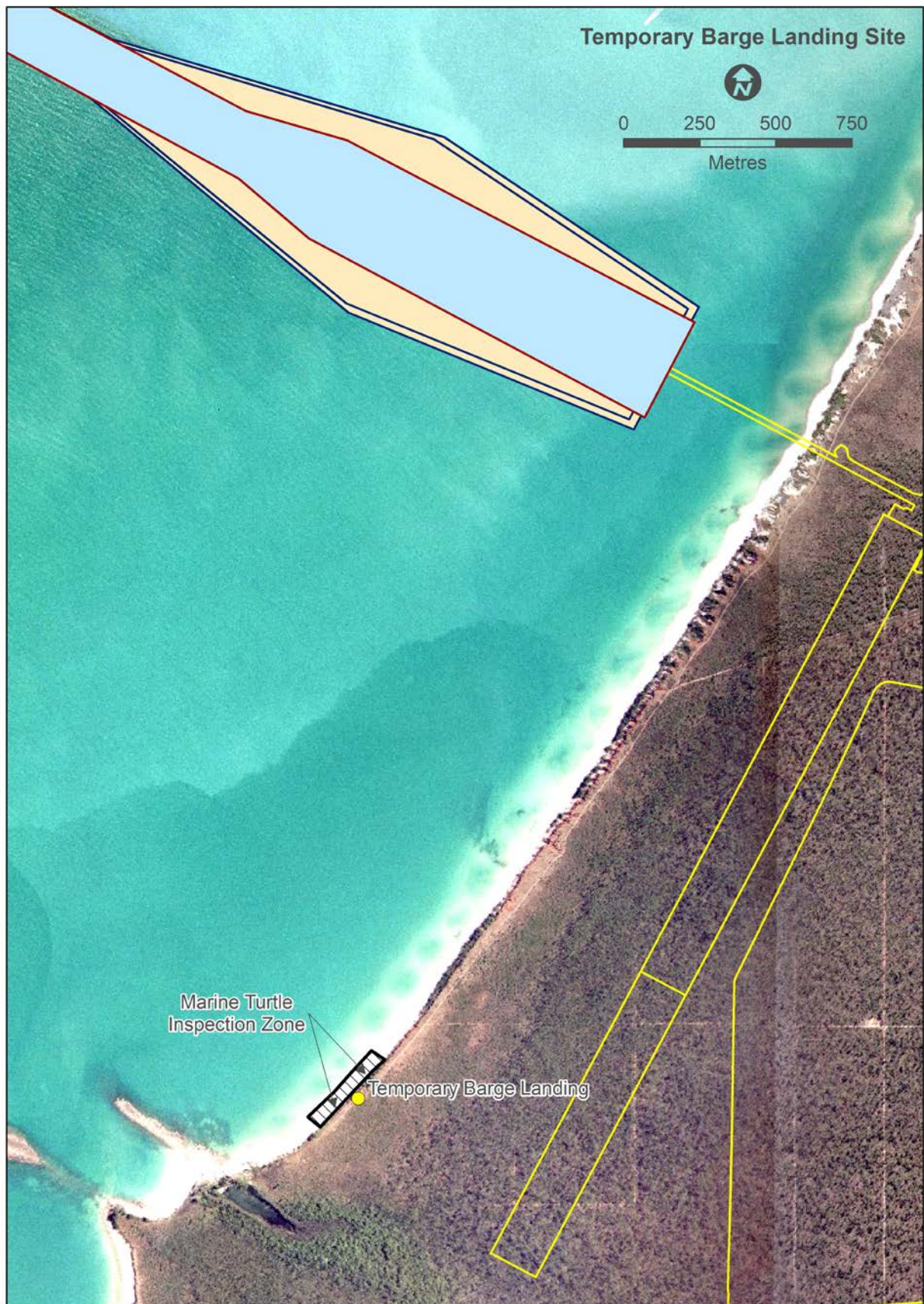
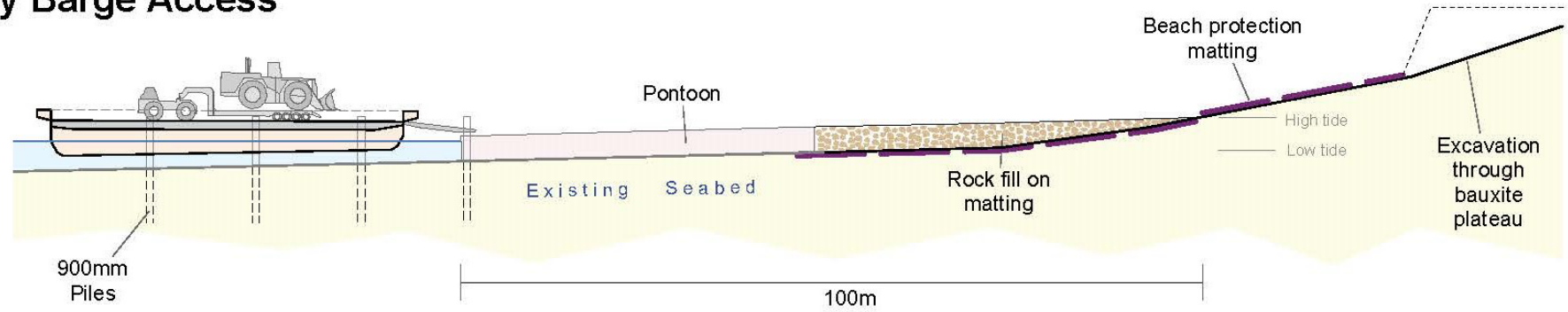


Figure 3 Temporary Barge Facility (Conceptual Plan)

## Temporary Barge Access



### 3 POTENTIAL IMPACTS

Benthic habitat and turtle nesting surveys have been undertaken in the vicinity of the Temporary Barge Facility and are presented in the Environmental Impact Statement (RTA Weipa, 2013) and a subsequent monitoring report. A summary is provided in **Appendix A**.

Construction and operation of the Temporary Barge Facility has the potential to impact on marine turtles by way of:

- Temporary disturbance of turtle nesting habitat from the installation of the matting on the beach;
- disorientation of hatchling turtles by lights during operation of the facility;
- disturbance of foraging habitat such as reef and seagrass from the installation of the facility or turbidity arising from vessel movement;
- underwater noise from barge movements during operation or from piling if pile driving is required during construction of the facility;
- vessel strike associated with barge movements; and
- solid and liquid waste discharges during construction and decommissioning of the facility and during loading and unloading operations.

Negligible impacts on nesting and foraging marine turtles are anticipated as a result of construction and operation of the Temporary Barge Facility. However, mitigation measures are identified in Section 4.

### 4 AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The key measures to be adopted for the various phases of the Temporary Barge Facility are described below. Action plans for construction, operation and decommissioning have been developed and are presented in Table 2, Table 3 and Table 4 respectively. The measures (including adaptive management measures) summarised in the following sections and in Table 2 to 4 are consistent with those proposed in the *South of Embley Project Environmental Impact Statement* (RTA Weipa, March 2013) as they relate to the Temporary Barge Facility and as a minimum reflect the proposed measures for marine turtles outlined in Appendix 7-E – EMP Outline of RTA Weipa, (March 2013).

#### 4.1. Construction

The Temporary Barge Facility will be required prior to commissioning of both the permanent barge/ferry terminals and the all-weather mine access road. Therefore flexibility of constructing the facility at any time during the year is required.

The location of the Temporary Barge Facility avoids direct disturbance of seagrass or reef habitat. No dredging is required for the construction of the facility.

Semi-flexible pre-cast concrete matting (approximately 7.5m wide and 85m long) will be laid on the beach to reduce risk of beach erosion or scouring from vehicle traffic. Ten days prior to the



installation of the semi-flexible matting, visual surveys of marine turtle crawls and nests will be conducted within 100m of the centreline of the facility (Figure 4). These inspections will continue daily until the semi-flexible matting is installed. If nests that have not been predated by feral pigs are present during these inspections, RTAW either (a) move the location of the matting to avoid the active nest or (b) consult with the Queensland Department of Environment and Heritage Protection (EHP) to evaluate options for the relocation of nests to a distance of at least 100m outside the potential zone of impact. Any active nests will be marked and exclusion markers installed.

It is proposed that the 8 piles required will be installed by low-impact vibratory piling. Should driven piles be required, a soft start procedure will be followed and observation and exclusion zones established in accordance with Condition 12 of the EPBC 2010/5642 approval as set out below:

- soft start procedures will not commence until the above species are observed to leave the exclusion zone/s or are not observed in the exclusion zone/s for at least 30 minutes;
- observations for the above species will be undertaken over the observation zone by a suitably qualified marine observer, for at least 30 minutes before the commencement of pile driving operations, and during pile driving operations;
- the exclusion zone will be no less than 100 metres from the pile driving operations and be implemented so as to ensure that the above species are not exposed to sound exposure levels of greater than or equal to 183 dB re 1 $\mu$  Pa<sub>2.s</sub>;
- pile driving operations will cease if the above species are observed within the exclusion zone, and action to cease all pile driving operations within the exclusion zone will be taken within two minutes of the observation, or as soon as possible, if it is unsafe to cease pile driving operations within two minutes. Every 30 days during periods when pile driving operations are occurring, the number of incidents where pile driving operations did not cease within two minutes will be reported to DoE;
- pile driving operations will not recommence until the above species observed within the exclusion zone are observed to leave the exclusion zone or are not observed to leave the exclusion zone for at least 30 minutes; and,
- only pile driving operations which have commenced prior to sunset or prior to a period of low visibility will continue between the hours of sunset and sunrise, unless pile driving operations are suspended for more than 15 minutes.

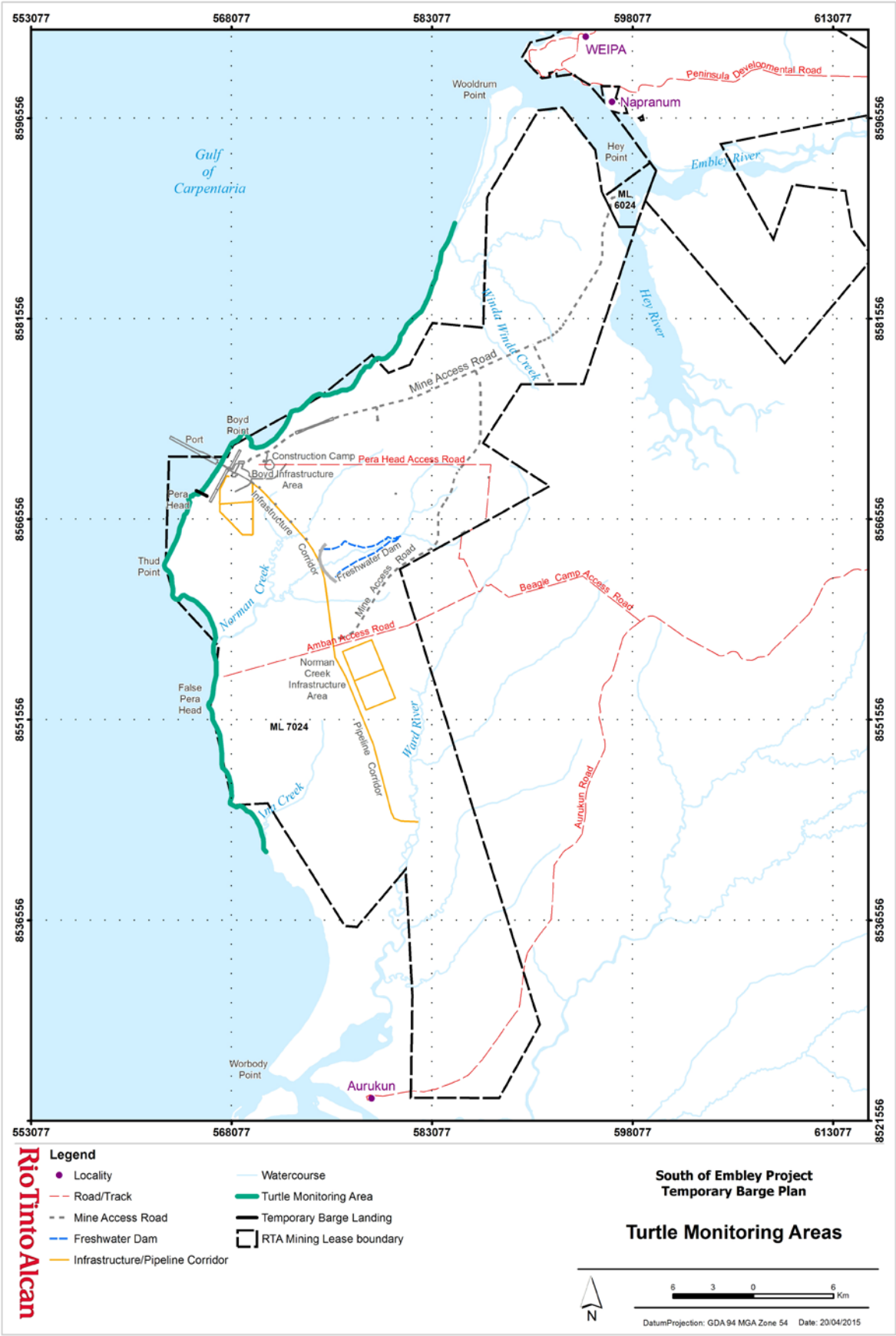
## 4.2. Operation

The Temporary Barge facility will be operated throughout both the wet and dry seasons.

Vehicles and equipment will be restricted to the concrete pathway over the beach to minimise disturbance of marine turtle nesting habitat. Bunting and/or signage will be used along pathways and the landing area to minimise disturbance to adjacent potential marine turtle nesting areas. This pathway will temporarily remove a very small proportion (0.1%) of the available 5.8km marine turtle nesting habitat available between Boyd Point and Pera Head.

The slow-moving barges present a low risk of boat-strike to marine turtles. The Environmental Impact Statement (section 7.3.5.3) found the potential impacts from construction-related shipping

Figure 4      Extent of Marine Turtle Nesting Surveys



would be negligible and short-term. The Environmental Impact Statement (section 7.3.5.3) found the potential impacts from underwater noise from construction-related shipping would be negligible and short-term and that noise causing harm to turtles is unlikely. All equipment and machinery will be maintained in accordance with manufacturer's recommendations and any unusual or excessive noise from tug engines detected by the vessel master will be investigated and remedied.

Navigational safety lights will be installed on any structures associated with the Temporary Barge Facility in accordance with Maritime Safety Queensland (MSQ) requirements. Night time barge deliveries will only be required to meet high tide. There will be no lights installed on the land side of the beach. Lighting will only be utilised for safe access when barges are loading or unloading and be turned off when not required. Lighting will be kept low, shielded and appropriately directed to minimise light spill. This is consistent with the principles from the *Environmental Assessment Guideline for Protecting Marine Turtles from Lighting Impacts* (WA EPA, 2010).

Access to the beach in the vicinity of the Temporary Barge Landing Facility by the workforce engaged in constructing and operating the Temporary Barge facility will not be permitted at night for recreational purposes. Inductions of personnel involved in constructing and operating the Temporary Barge facility will include appropriate behaviours for beach access to prevent impacts on nesting marine turtles or nests, and an awareness program to include signage, posters in the camp.

RTA will reinforce the required code of conduct for employees and contractors in the Project area and emphasise need for appropriate behaviour at all times. Interfering with nests or hatchlings will be forbidden under the code of conduct.

The Feral Pig Management Offset Strategy, which is documented separately, will also be implemented to further reduce the impact of the Project on nesting marine turtles and their hatchlings. The strategy aims to reduce feral pig numbers along nesting beaches and is expected to reduce the level of predation on marine turtle nests and hence increase hatchling survivorship in the Project area. The Feral Pig Management Offset Strategy requires marine turtle monitoring to be conducted during the peak nesting season between Winda Winda Creek and Ina Creek. If the peak nesting season occurs during the operation of the Temporary Barge Facility, then marine turtle monitoring will be conducted in accordance with this Strategy in the vicinity of the Temporary Barge Facility.

### 4.3. Decommissioning

All infrastructure from the Temporary Barge Facility will be removed when no longer required and the bauxite plateau reinstated from the original stockpiled excavated material as close as possible to original contours. The reinstated material will be compacted and stabilised as much as practicable. If piles cannot be removed they will be cut off below the surface. All material in tidal waters will be removed within 6 months of cessation of use of the facility.

Ten days prior to the removal of the semi-flexible matting, visual surveys of marine turtle crawls and nests will be conducted within 100m of the centreline of the facility (Figure 4). These inspections will continue daily until the semi-flexible matting is removed. If nests that have not been predated by feral pigs are present during these inspections, RTAW will consult with EHP to evaluate options for the relocation of nests at least 100m outside the potential zone of impact.

**Table 2 Action Plan - Construction**

Potential Impact	Avoidance, Mitigation and Management Measures	Benchmarks/ Baseline	Desired Outcomes/ Goals	Performance Indicators	Timeframes for implementation	Corrective actions and contingency	Responsibility
Disturbance of turtle nesting habitat by: <ul style="list-style-type: none"> <li>Installation of semi-flexible pre-cast concrete matting</li> </ul>	Nest and crawl inspections within 100m of the centreline of the facility conducted 10 days prior to the installation of the semi-flexible matting. Inspections to continue daily until the semi-flexible matting is installed.  Construction area will be fenced off and works limited to within the fenced off area.	Existing turtle nesting habitat within the Temporary Barge Facility footprint	No active turtle nests disturbed by construction of facility.	Number of turtle nests disturbed by construction of facility.	Nest Monitoring – 10 days prior to the installation of the semi-flexible matting. Inspections to continue daily until the semi-flexible matting is installed.  Fencing of construction area – during construction	If there are nests that have not been predated by feral pigs within the footprint of the facility, RTAW shall either move the location of the matting or consult with EHP to evaluate options for the relocation of nests at least 100m outside the potential zone of impact.	Project Manager – Early Works
	Bunting placed either side of concrete matting to indicate designated confined trafficable area.	Existing turtle nesting habitat in the vicinity of the Temporary Barge Facility footprint	Concrete matting limited to approximately 7.5m wide.	Area of turtle nesting habitat disturbed by the facility is limited to width of matting.	To be implemented during construction of facility.	Area to be surveyed to ensure compliance with designated footprint. Breaches to be investigated and appropriate corrective actions implemented.	Area Manager – Early Works
Disturbance of turtle nesting habitat by: <ul style="list-style-type: none"> <li>Access by general construction workforce to beach</li> </ul>	No Recreational Beach Access allowed during construction.  Induction program for all on-site workforce prior to commencement of work.	Existing turtle nesting habitat.	No access to Temporary Barge Facility site and surrounds by construction workforce for recreation.	Number of workers accessing Temporary Barge Facility site and surrounds outside of working hours.	During construction of the Temporary Barge Facility	Breaches to be investigated and appropriate disciplinary action undertaken.	General Manager Construction



Potential Impact	Avoidance, Mitigation and Management Measures	Benchmarks/ Baseline	Desired Outcomes/ Goals	Performance Indicators	Timeframes for implementation	Corrective actions and contingency	Responsibility
Disturbance of foraging habitat by: <ul style="list-style-type: none"> <li>Installation of pontoon</li> </ul>	Preferred location has been identified which avoids reef and seagrass habitat, to be implemented during construction.  Location to be agreed to by Traditional Owners.	Location of foraging habitat.	Zero direct disturbance of reef or seagrass habitat	Area of disturbance of reef or seagrass habitat.		If preferred location alters, identify alternate location that does not contain reef or seagrass habitat.	Area Manager – Marine
Underwater Acoustic Impacts from Pile Driving	If pile driving is required, pile driving conditions specified in the EPBC Approval will be implemented (Condition 12).  Monitoring of observation zones as per Condition 12 of the EPBC approval if pile driving conducted.  All piles associated with Temporary Barge Facility installed using vibratory piling.	Underwater acoustic environment.	Underwater acoustic impacts on marine fauna are minimised as a result of pile driving associated with the construction of the Temporary Barge facility	Pile driving is conducted in accordance with Condition 12 of the EPBC Approval	To be implemented during pile driving activities associated with construction of the Temporary Barge Facility.	If pile driving is required, pile driving conditions specified in the EPBC Approval will be implemented (Condition 12).  Monitoring of observation zones as per Condition 12 of the EPBC approval if pile driving conducted.	Project Manager – Early Works
Spills or discharges of oil or solid or liquid wastes	Any wastes generated during the construction of the facility will be disposed of at the existing licensed waste disposal facility at	Existing beach and marine environment.	No spills or discharges of oil or wastes	Number of spills or discharges of oil or wastes	During construction, of the Temporary Barge Facility.	Any spills or discharges of wastes to be reported and appropriate corrective actions implemented.	Project Manager – Early Works

Potential Impact	Avoidance, Mitigation and Management Measures	Benchmarks/ Baseline	Desired Outcomes/ Goals	Performance Indicators	Timeframes for implementation	Corrective actions and contingency	Responsibility
	Evans Landing.						

**Table 3 Action Plan – Operation**

Potential Impact	Avoidance, Mitigation and Management Measures	Benchmarks/ Baseline	Desired Outcomes/Goals	Performance Indicators	Timeframes for implementation	Corrective actions and contingency	Responsibility
Disturbance of turtle nesting habitat by: <ul style="list-style-type: none"><li>• Access by general construction workforce to beach</li></ul>	No access to Temporary Barge Facility site and surrounds by general construction workforce for recreation.  Induction program for all on-site workforce prior to commencement of work.	Existing turtle nesting habitat.	No access to Temporary Barge Facility site and surrounds by general construction workforce for recreation.	Number of workers accessing Temporary Barge Facility site and surrounds outside of working hours.	During operation of the Temporary Barge Facility.	Breaches to be investigated and appropriate disciplinary action undertaken.	General Manager Construction
Disturbance of foraging habitat by: <ul style="list-style-type: none"><li>• Tug and barge movements</li></ul>	Monthly visual inspection to identify scouring that may cause indirect disturbance to reef habitat.	Existing foraging habitat.	No significant scouring occurring near pontoon that may cause indirect disturbance to reef habitat.	Area of scouring of the seabed.	Monthly visual inspection during the operation of the facility.	Extend the concrete matting under where the barge will enter and leave the facility or conduct localised repair work.	Project Manager – Early Works
	Visual monitoring of instances of turbidity plume reaching reef or seagrass habitat.	Existing turbidity levels	No sediment re-suspension and/or turbidity from vessel propeller wash reaching reef or seagrass habitat.	Incidences of visual turbidity from propeller wash reaching reef or seagrass habitat.	During operation of the Temporary Barge Facility.	Visual instances of turbidity to be investigated and appropriate corrective actions implemented.	Project Manager – Early Works

Potential Impact	Avoidance, Mitigation and Management Measures	Benchmarks/ Baseline	Desired Outcomes/Goals	Performance Indicators	Timeframes for implementation	Corrective actions and contingency	Responsibility
Altered Light Regime	<p>No permanent/fixed lights on land side of beach.</p> <p>Navigational safety lights will be installed on any structures associated with the Temporary Barge Facility in accordance with Maritime Safety Queensland (MSQ) requirements.</p> <p>Night time barge deliveries will only be required to meet high tide.</p> <p>Lighting will only be utilised when barges are loading or unloading for safe access and be turned off when not required.</p> <p>Lighting will be kept low, shielded and appropriately directed to minimise light spill.</p>	Existing lighting environment.	No records of marine turtles and/or their hatchlings aggregating around the Temporary Barge Facility or barges.	Incidence of marine turtles and/or their hatchlings aggregating around the Temporary Barge Facility or barges.	During operation of the Temporary Barge Facility.	If marine turtles and/or their hatchlings are found to be aggregating around the Temporary Barge Facility or barges, attempt to alter lighting regime if safe to do so.	Project Manager – Early Works
Vessel Strike	Barges to adhere to vessel speed requirements near the Temporary Barge Facility and in shallow	Vessel speed limits	Minimise the number of marine fauna vessel strikes associated	Number of marine fauna vessel strikes associated with barge	During operation of the Temporary Barge Facility	Training and awareness.	Project Manager – Early Works

Potential Impact	Avoidance, Mitigation and Management Measures	Benchmarks/ Baseline	Desired Outcomes/Goals	Performance Indicators	Timeframes for implementation	Corrective actions and contingency	Responsibility
	water.		with barge movements.	movements.  Number of non-compliances with vessel speed requirements			
Underwater Acoustic Impacts from Vessels	Vessel maintenance regime.	Baseline is minor anthropogenic noise	Underwater noise at levels that do not cause injury to turtles.	Relative level of tug engine noise as assessed by crew.	During operation of the Temporary Barge Facility.	Investigate any unusual or excessive tug engine noise and repair if necessary.	Project Manager – Early Works
Spills or discharges of oil or solid or liquid wastes	No sewerage from barges will be disposed of at the facility.  No explosives or chemical reagents will be transferred to or unloaded at the Temporary Barge Facility.  Any wastes generated during the will be disposed of at the existing licensed waste disposal facility at	Existing beach and marine environment.	No spills or discharges of oil or wastes	Number of spills or discharges of oil or wastes	During operation of the Temporary Barge Facility.	Any spills or discharges of wastes to be reported and appropriate corrective actions implemented.	Project Manager – Early Works

Potential Impact	Avoidance, Mitigation and Management Measures	Benchmarks/ Baseline	Desired Outcomes/Goals	Performance Indicators	Timeframes for implementation	Corrective actions and contingency	Responsibility
	Evans Landing.						

**Table 4 Action Plan - Decommissioning**

Potential Impact	Avoidance, Mitigation and Management Measures	Benchmarks/ Baseline	Desired Outcomes/Goals	Performance Indicators	Timeframes for implementation	Corrective actions and contingency	Responsibility
Disturbance of turtle nesting habitat by: <ul style="list-style-type: none"> <li>Access by workers to beach</li> </ul>	No access to Temporary Barge Facility site and surrounds by construction workforce for recreation.  Induction program for all on-site workforce prior to commencement of work.	Existing turtle nesting habitat.	No access to Temporary Barge Facility site and surrounds by construction workforce for recreation.	Number of workers accessing Temporary Barge Facility site and surrounds outside of working hours.	During decommissioning of the facility.	Breaches to be investigated and appropriate disciplinary action undertaken.	General Manager Construction
Disturbance of turtle nesting habitat by: <ul style="list-style-type: none"> <li>Removal rock and semi-flexible pre-cast concrete matting</li> </ul>	All infrastructure from temporary barge facility removed.  If piles cannot be removed they shall be cut off below the surface.  Disturbance footprint returned to original profile.  Nest and crawl inspections within 100m of the centreline of the facility conducted 10 days prior to the removal of the semi-flexible matting. Inspections to continue daily until the semi-flexible matting is removed.	Existing turtle nesting habitat.	Disturbance footprint returned to original profile.  No active turtle nests disturbed by the decommissioning of the facility.	Original profile re-established.  Number of turtle nests disturbed by the decommissioning of the facility.	Original profile - Within 6 months of facility no longer being used.  Turtle nest impacts – during decommissioning of the facility.	If there are nests that have not been predated by feral pigs within the footprint of the facility RTAW will consult with EHP to evaluate options for the relocation of nests at least 100m outside the potential zone of impact.	Project Manager – Early Works



Potential Impact	Avoidance, Mitigation and Management Measures	Benchmarks/ Baseline	Desired Outcomes/Goals	Performance Indicators	Timeframes for implementation	Corrective actions and contingency	Responsibility
Spills or discharges of oil or solid or liquid wastes	Any wastes generated during the will be disposed of at the existing licensed waste disposal facility at Evans Landing.	Existing beach and marine environment.	No spills or discharges of oil or wastes	Number of spills or discharges of oil or wastes	During decommissioning of the Temporary Barge Facility.	Any spills or discharges of wastes to be reported and appropriate corrective actions implemented.	Project Manager – Early Works

## 5 MONITORING AND REPORTING

All reports and related analysis of survey data will be published annually on the RTA website ( [http://www.riotintoalcan.com/ENG/ourproducts/1818\\_south\\_of\\_emberley\\_project\\_reports\\_and\\_publications.asp](http://www.riotintoalcan.com/ENG/ourproducts/1818_south_of_emberley_project_reports_and_publications.asp) ) in accordance with Condition 57 of the EPBC approval. The survey data will also be provided on request in accordance with Condition 56. In accordance with Condition 59, this Plan will be published on the RTA website within one month of it being approved by the Minister.

Under the HSE Management System, employees are required to report incidents of, for example, hydrocarbon spills, solid and liquids waste discharges and disturbance outside authorised areas. A breach of an aspect of the Temporary Barge Plan will be considered as an incident under the HSE Management System and will trigger an investigation and, if necessary, corrective action.

Ten days prior to the installation of the semi-flexible matting, visual surveys of marine turtle crawls and nests will be conducted within 100m of the centreline of the facility. These inspections will continue daily until the semi-flexible matting is installed. If nests that have not been predated by feral pigs are present during these inspections, RTAW either (a) move the location of the matting to avoid the active nest or (b) consult with the Queensland Department of Environment and Heritage Protection (EHP) to evaluate options for the relocation of nests to a distance of at least 100m outside the potential zone of impact.

## 6 TRADITIONAL OWNER EMPLOYMENT OPPORTUNITIES

RTA has committed to working collaboratively with Traditional Owners, through the relevant Western Cape Communities Co-existence Agreement (WCCCA) Sub-Committees and the WCCCA Coordinating Committee to further increase representation of local Aboriginal people, and in particular, the Wik & Wik Waya Traditional Owners across the workforce. For this reason, focussed work, in collaboration with Traditional Owners and the Members of the WCCCA Employment, Training, Environment and Heritage Sub-Committee will be undertaken, to understand the current challenges, the outcomes achieved to date and the development of strategies specific to the needs of this community.

In addition, RTA Weipa as a signatory to the Western Cape Regional Partnership Agreement (RPA) is actively working with the RPA working group on employment and training to identify opportunities where industry, Governments and local Aboriginal people can strategically partner to develop relevant skills and employment pathways prior to and during the construction phase of the SoE Project.

Traditional Owner employment opportunities associated with the Temporary Barge Facility will be available in the following Land and Sea Management Programmes, which are part of the Communities, Heritage and Environmental Management Plan (SoE Communities, Heritage and Environment Working Group, 2014):

- Feral Pig Management Offset Strategy;
- Foreshore Access Permit System; and,
- Marine Mammal Observations (if piling activities are required).

In addition, through the existing Indigenous Land Use Agreement, opportunities for employment of Traditional Owners are identified through an employment and training plan. This plan identifies work opportunities and roles within these work opportunities that may be filled by Traditional Owners. Traditional Owners that may be capable of filling these roles are then identified with RTAW supporting identified candidates to become appropriately skilled to fill the identified roles. RTAW supports the employment of Traditional Owners if they are appropriately skilled and qualified in all areas of the business.

As part of RTAW's reporting obligations under the Indigenous Land Use Agreement, quarterly review reports on Traditional Owner employment and training obligations are made to Traditional Owners.

## 7 TRADITIONAL OWNER CONSULTATION

Traditional Owners were consulted in accordance with the process under the Indigenous Land Use Agreement during the preparation of this Plan. This consultation involved the following:

- the Plan was lodged with the Western Cape Communities Coexistence Agreement (WCCCA) Coordinating Committee in November 2014;
- the Plan was subsequently presented to a meeting of the Communities, Heritage and Environment Management Plan (CHEMP) Working Group. No queries about the Plan were raised at the meeting. Members of the CHEMP Working Group were asked to provide any comments on the Plan within a few weeks. No comments were received;
- the presentation to the Working Group was then lodged with the WCCCA Coordinating Committee and which formally noted that the management plans had been presented to the Working Group.

## 8 GLOSSARY

**Construction** – any works that are required to be undertaken for the project including the beneficiation plant (including tailings storage facility); Boyd Port facility, and Hey and Embley River facilities; dam construction; clearing of vegetation; and infrastructure facilities (including power station, roads, and fuels storage). Excludes **preliminary works**.

**Exclusion zone** – a radius around pile driving operations of no less than 100 metres which must be visually observed at all times during pile driving operations.

**Impacts/impacted** – as defined in section 527E of the EPBC Act.

**Listed turtle species** – listed threatened species and/or Listed migratory species under the EPBC Act, specifically Green Turtle (*Chelonia mydas*), Hawksbill Turtle (*Eretmochelys imbricate*); Flatback Turtle (*Natator depressus*); Loggerhead Turtle (*Caretta caretta*); Olive Ridley Turtle (*Lepidochelys olivacea*); and Leatherback Turtle (*Dermochelys coriacea*);

**Matter of national environmental significance** – those matters protected under the EPBC Act: World Heritage properties, National Heritage places, wetlands of international importance (Ramsar wetlands), listed threatened species and communities, listed migratory species, Commonwealth marine areas, Great Barrier Reef Marine Park, the environment where nuclear actions are involved (including uranium mines).

**Minister** – the **Minister** administering the *Environment Protection and Biodiversity Conservation Act 1999* and includes a delegate of the **Minister**.

**Observation Zone** – a radius around pile driving operations (unless otherwise agreed to by the **department** in writing, as detailed in Annexure B and must be no less than the **exclusion zone**) which must be visually observed at all times during pile driving operations.

**Period of low visibility** – where continuous visual observations to a distance of 300 metres or the observation distance relevant for the diameter of the pile as identified in Annexure B of EPBC 2010/5642, whichever is greater from the pile driving operations for the Boyd Port development, Humbug Terminal, Hornibrook ferry/tug terminal, Hey River terminal or for navigation aids, is not possible for a time period of greater than one hour.

**Preliminary works** – includes activities associated with the upgrade of Beagle Camp and Pera Head Access Roads; establishment of exploration drill and seismic lines; vegetation clearing and construction of the mine access road (between Hey River terminal and Boyd mine infrastructure area); terrestrial vegetation clearing associated with temporary barge landing area near Pera Head; construction and operation of barge landing area located on Hey River; preparation of laydown areas at Humbug and Hornibrook terminals (existing disturbed areas); construction (including vegetation clearing of up to 30 hectares) and operation of a temporary accommodation camp (up to 200 persons) in the project area; installation and operation of ancillary infrastructure (including diesel fuelled power generation, laydown areas, package sewage treatment plants, waste storage and disposal facilities, fuel storage, offices and cribs, and access roads); construction and operation of an artesian bore including associated storage and treatment facilities and pipelines; and, installation of communications infrastructure.

**Project Area** – the construction and operational area associated with the South of Embley Project works at Boyd Point on the western side of Cape York Peninsula

**RTAW** – Rio Tinto Alcan Weipa

**SoE Project** – South of Embley Project

**Soft start procedures** – initiated at commencement of all marine piling activities by piling at low energy levels and then build up to full impact force. The first five impacts from the piling operation must be at no more than 50% of full hammer weight (e.g. a hammer with an adjustable stroke height of 1.2 metres should drop from a height of 0.6 metres at least 5 times during a 'soft start' procedure), to encourage animals to move away from the area of piling activities.

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## Appendix A Previous studies and habitat mapping for listed Marine turtles

Benthic habitat and turtle nesting surveys have been undertaken in the vicinity of the Temporary Barge Facility and are presented in the Commonwealth EIS (RTA 2013). Subsequent to the EIS, turtle nesting surveys were undertaken in 2013.

Four species of marine turtles – the Flatback Turtle (*Natator depressus*), the Olive Ridley Turtle (*Lepidochelys olivacea*), the Green Turtle (*Chelonia mydas*) and the Hawksbill Turtle (*Eretmochelys imbricata*) – are known to nest on the beaches in the vicinity of the Project area and feed in the surrounding waters. All four species of marine turtles seem to nest all year round, with a peak in nesting occurring in August and September.

A further two marine turtle species – the Loggerhead Turtle (*Caretta caretta*) and the Leatherback Turtle (*Dermochelys coriacea*) have not been recorded nesting but may feed in the waters surrounding the Project area. The Leatherback Turtle is generally recognised as principally utilising offshore pelagic areas for foraging, and coastal waters such as the Temporary Barge Facility site is not key habitat for this species. All are listed as threatened species under the EPBC Act.

Summaries of these species profiles are provided in **Table A1** and the habitats of each species in the Project area are shown in **Figures A1 to A6**.

Table A1 – Profile Summaries – Marine Turtles

Species	Habitat Preferences			Preferred habitat in the Weipa / Cape York region	Likelihood of Occurrence in vicinity of Temporary Barge Facility
	Foraging	Nesting / Breeding	Migratory		
Green Turtle ( <i>Chelonia mydas</i> ) (Vulnerable)	Shallow coastal seagrass and seaweed, driftlines and <i>Sargassum</i> rafts.  Suitable seagrass habitat was identified within the Project area.	Nests on sandy beaches.  Remains close to the nesting site between nesting intervals.  Mates near-shore in vicinity of the nesting ground.  Some nesting identified in the Project area.	Pelagic.	Coastal waters, in particular seagrass beds. The Wellesley Island area in the south-western corner of the Gulf of Carpentaria is a significant nesting site.	<b>Known to Occur:</b> This species is known to forage in shallow coastal areas, which would include the temporary barge facility footprint. The 2013 surveys recorded this species as nesting at very low densities in the vicinity of the temporary barge facility.
Hawksbill Turtle ( <i>Eretmochelys imbricata</i> ) (Vulnerable)	Intertidal and subtidal rocky and coral reefs.  Suitable foraging habitats were identified within the Project area.	Nests on sandy beaches.  Mates near-shore or offshore from the nesting beach.  Hawksbill nesting identified in the Project area.	Pelagic.	Hawksbill Turtle nesting sites occur on islands adjacent to Arnhem Land and north-eastern Cape York.  The main feeding habitat for the species tends to be tidal and sub-tidal reefs. Hawksbill Turtles also commonly inhabit seagrass flats and mangrove habitats.	<b>Known to Occur:</b> Near shore fringing reef communities occur within the vicinity of the temporary barge facility at Boyd Point, Pera Head and between Pera Head and Thud Point. This species may therefore traverse across the proposed Port site to access preferred feeding habitat. The 2013 surveys recorded this species as nesting at very low densities in the vicinity of the temporary barge facility.
Flatback Turtle ( <i>Natator depressus</i> ) (Vulnerable)	Soft-bottom, coastal waters and rocky reefs. Wide depth range.  Suitable foraging habitat within the Project area.	Nests on sandy beaches in dunes or a steep seaward slope.  Mates offshore from the nesting ground.  Known to nest in the Torres Strait and NW Gulf of Carpentaria.  Some nesting identified in the Project area.	Coastal waters and surface waters of the continental shelf.	Soft-bottom, coastal waters including but not limited to shallow water habitats. Nesting is confined to Australia.	<b>Known to Occur:</b> Nesting has been regularly recorded in the vicinity of the temporary barge facility footprint. The area is not a major location for breeding aggregations of the species. This species forages in shallow coastal habitats. The very small footprint of the temporary barge facility would be considered foraging habitat for this species.



Species	Habitat Preferences			Preferred habitat in the Weipa / Cape York region	Likelihood of Occurrence in vicinity of Temporary Barge Facility
	Foraging	Nesting / Breeding	Migratory		
Loggerhead Turtle ( <i>Caretta caretta</i> ) (Endangered)	Intertidal and subtidal coral and rocky reefs, seagrass, unvegetated sand or mud. Suitable foraging habitat occurs within the Project area.	Nests on open, sandy beaches in southern Queensland and Western Australia. Nesting not identified within the Project area.	Pelagic, but migrates from rookeries in coastal waters suitable for foraging.	Coastal waters including subtidal and intertidal coral and rocky reefs and seagrass meadows as well as soft-bottomed habitats.	<b>Likely:</b> The species is likely to be transient in the vicinity of the temporary barge facility and use it for foraging or resting.
Olive Ridley Turtle ( <i>Lepidochelys olivacea</i> ) (Endangered)	Benthic unvegetated coastal waters but also some pelagic foraging over a wide depth range. Suitable foraging habitat within the Project area.	Nest on sandy beaches. Some nesting identified in the Project area. Inshore habitat near nest beach during inter-nesting periods.	Hatchlings pelagic then juveniles return to coastal waters. Adults utilise coastal water and out to the continental shelf.	Coastal waters including but not limited to reefs. The species forages in benthic habitats over a range of depths from a few metres to hundreds of metres. Low density nesting has been historically recorded from a number of locations including the Gulf of Carpentaria.	<b>Known to Occur:</b> Nesting has been recorded in the vicinity of the temporary barge facility footprint. This species forages in shallow unvegetated coastal habitats. The very small footprint of the temporary barge facility would therefore be considered foraging habitat for this species.
Leatherback Turtle ( <i>Dermochelys coriacea</i> ) (Endangered)	Pelagic feeder in tropical, subtropical and temperate waters. Suitable foraging habitat occurs within the Project area, and Albatross Bay.	Nest on sandy beaches although only a very small proportion of the global population nest in Australia. Nesting not identified within the Project area. Mates offshore.	Pelagic.	Pelagic environment. The Albatross Bay area is identified as a potential foraging area for the species.	<b>Likely:</b> The species is likely to occur sporadically in the vicinity of the proposed Port site, using it for foraging.

Figure A1 Potential Habitat of Green Turtle (Project Area)

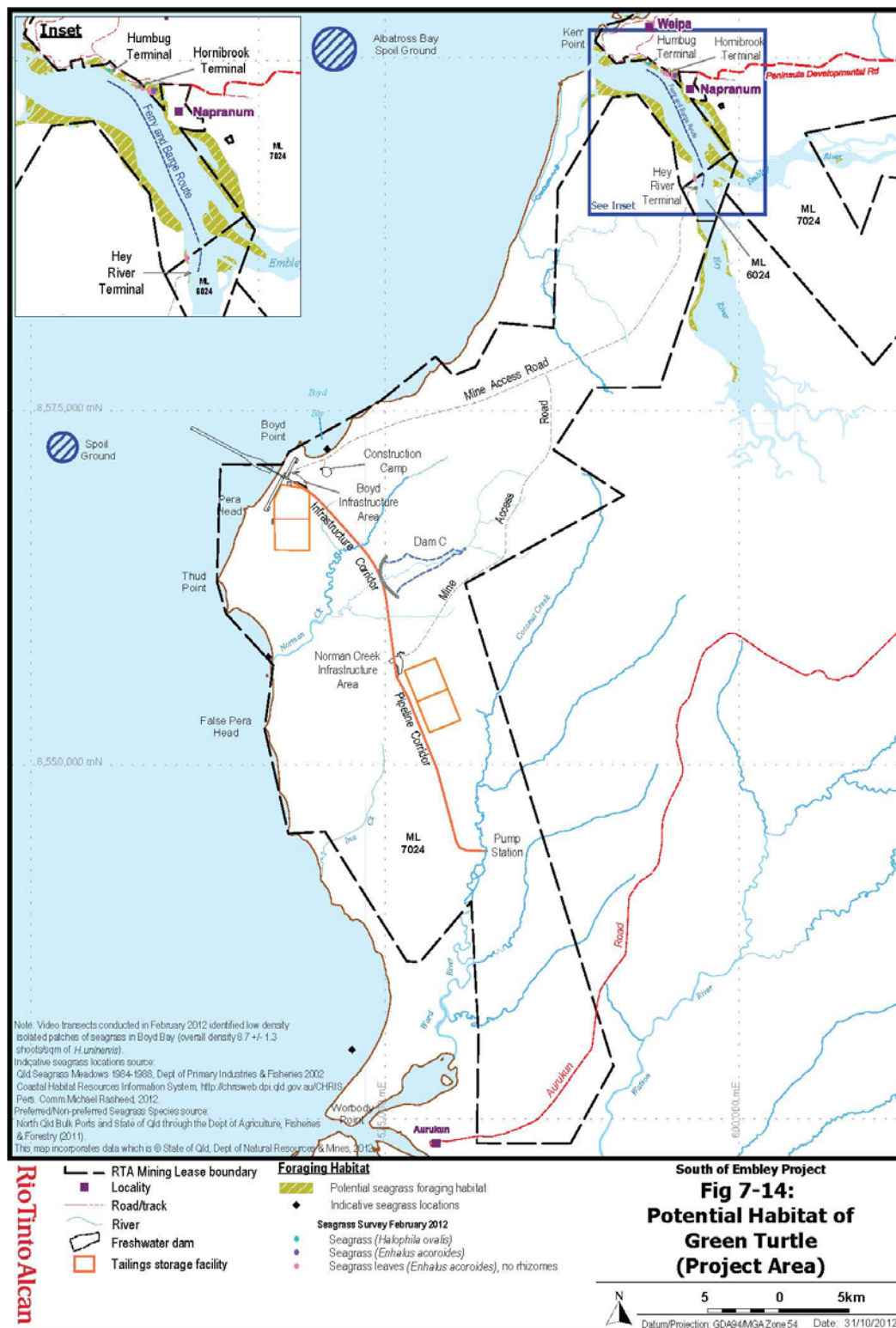


Figure A2 Potential Habitat of Hawksbill Turtle (Project Area)



Figure A3 Potential Habitat of Flatback Turtle (Project Area)

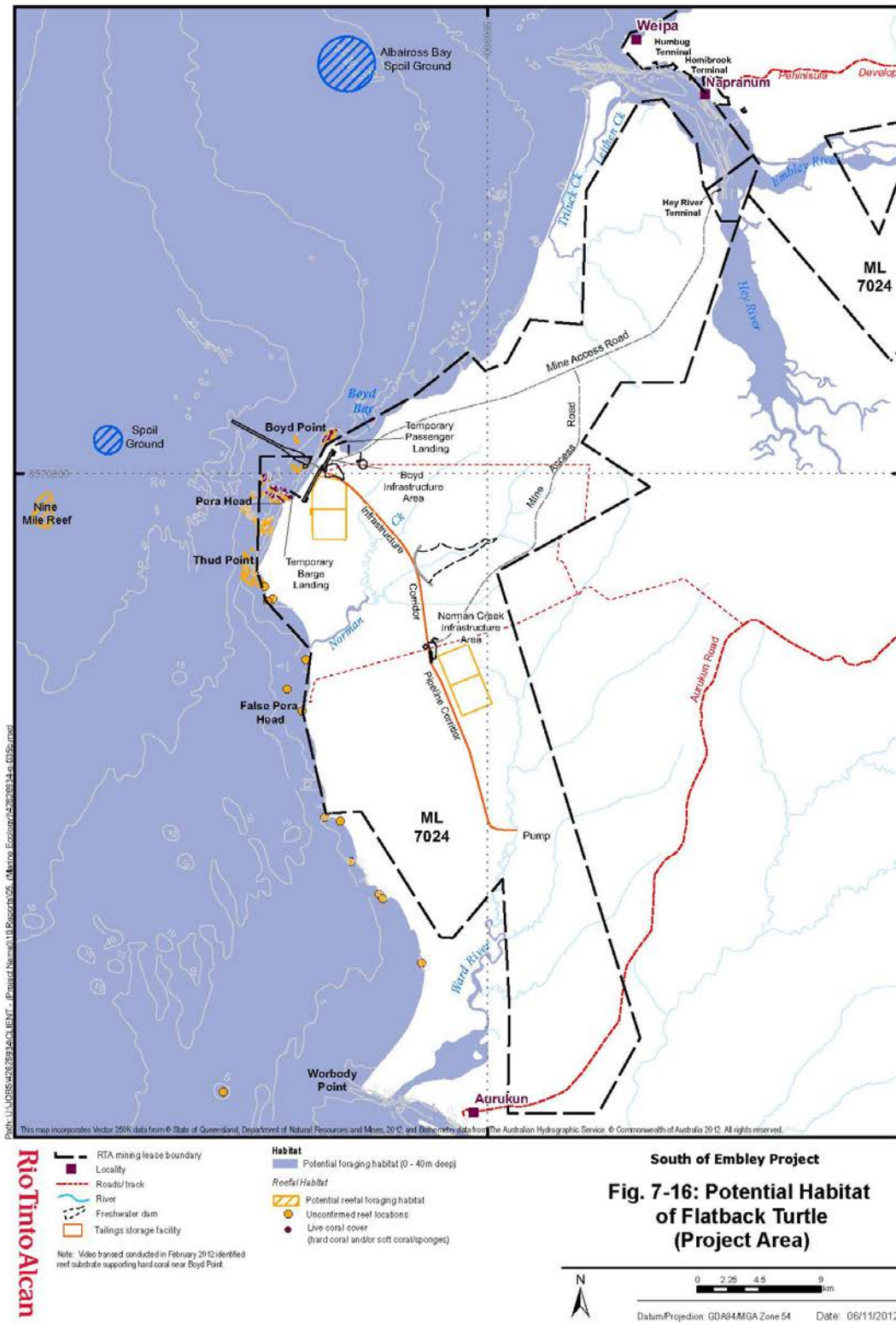




Figure A4 Potential Habitat of Loggerhead Turtle (Project Area)

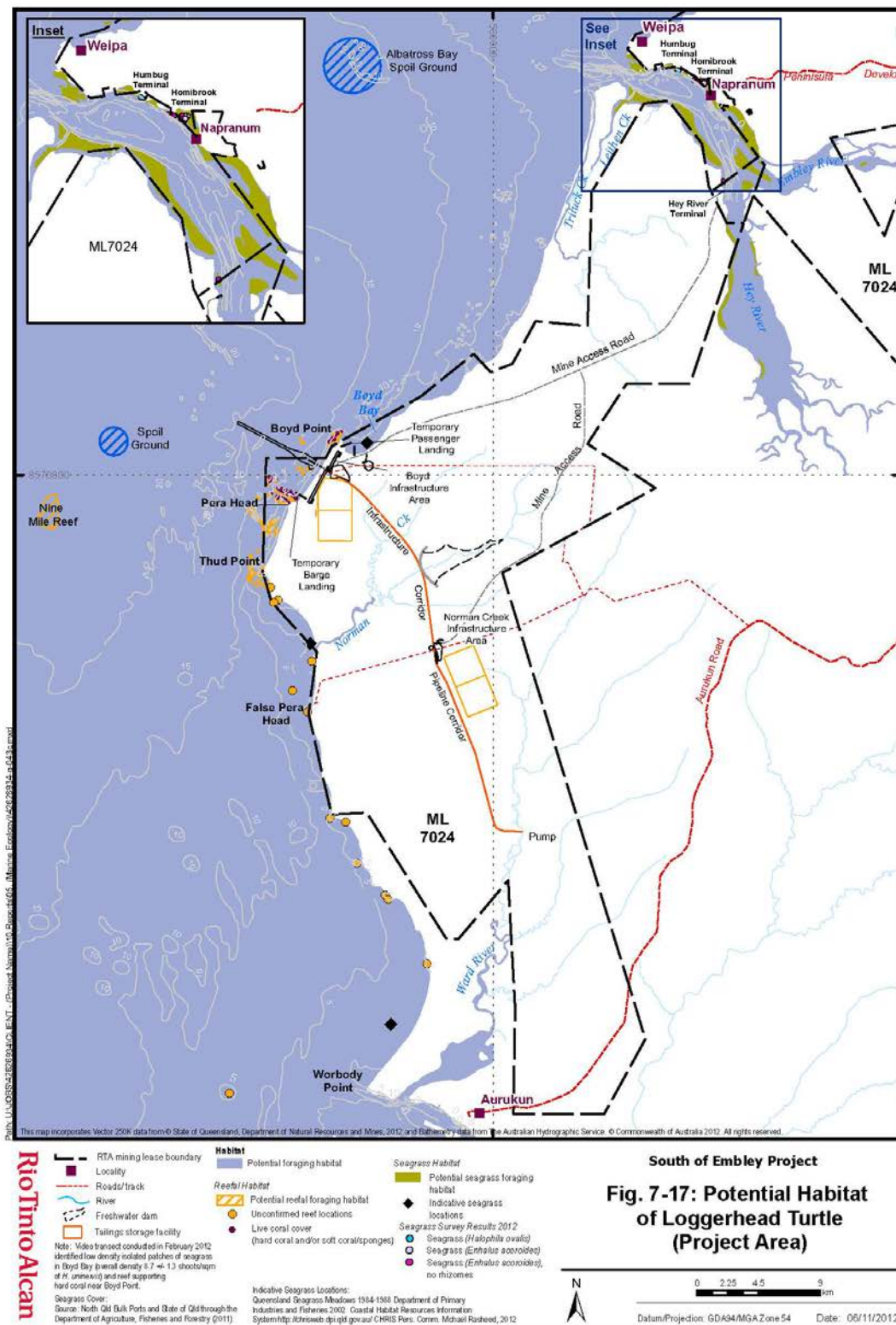


Figure A5 Potential Habitat of Olive Ridley Turtle (Project Area)

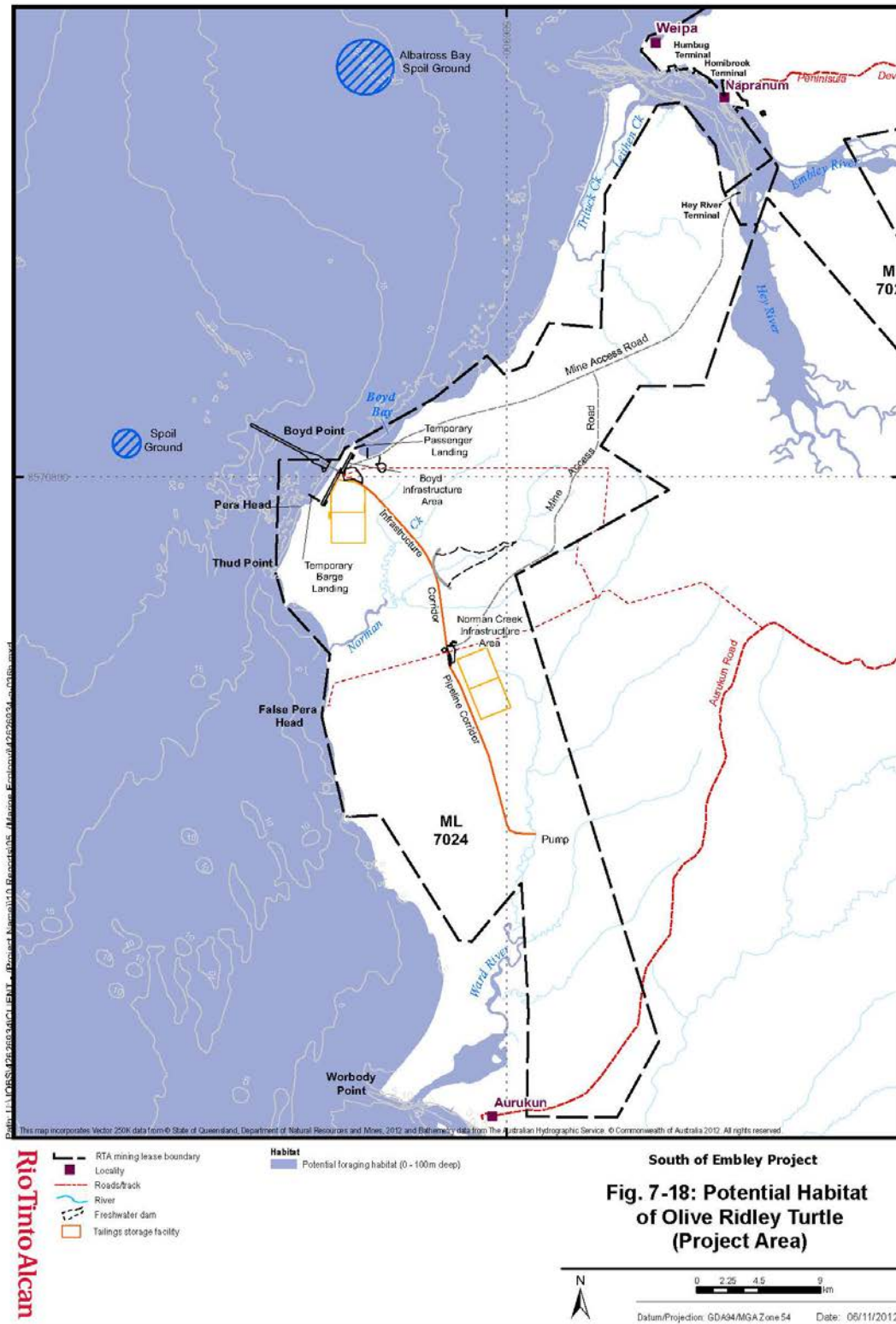
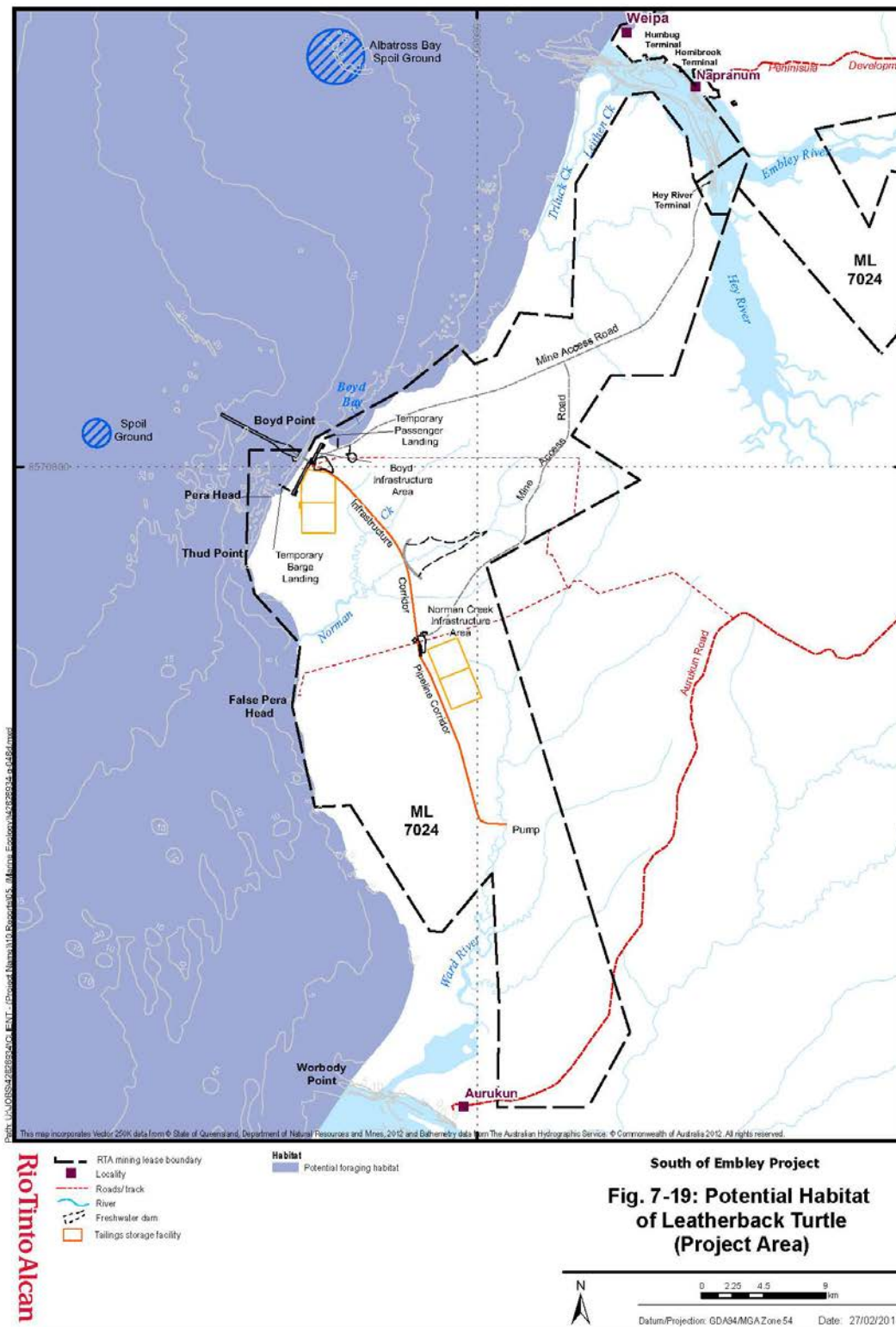


Figure A5 Potential Habitat of Leatherback Turtle (Project Area)





## Breeding

Marine turtles are characterised by a complex life history whereby all species undertake significant migrations between nesting, mating and foraging grounds, although the extent of these migrations varies between species. Marine turtles are long-lived and late maturing, with maturity reached at between 30 and 50 years of age (Miller, 1996). Female marine turtles emerge from the water, generally at night, and move up the shoreline to select a nesting location. Most females do not nest in consecutive years (Miller, 1996). However, a female marine turtle may lay several clutches of eggs per year (Limpus, et al., 1984). Nesting marine turtles generally demonstrate fidelity to a nesting beach and return to nest on their natal beach with a high degree of precision (Limpus, et al., 1984). The process by which turtles select nesting sites along a beach has not been clarified (Miller, 1996); however, the light regime is considered to have a significant impact on the emergence of female marine turtles from the ocean. Marine turtles may also emerge from the water and return without attempting to excavate a nest or lay eggs – a phenomenon known as a “false crawl”. Nesting generally occurs between the high water mark and the foredune; however, nests may also be laid below the high tide mark (Whiting, et al., 2007). If inundation of nests is significant, the nest becomes unviable.

Nesting activity recorded during the 2007 and 2008 surveys for the Project is summarised in Table A2 with the nesting locations illustrated in Figure A7. Of identifiable nests, 85% were Flatback Turtles, with Olive Ridley or Hawksbill Turtles also present. A survey was also conducted in 2003, however specific locations and details from this study have not been provided as that report only summarises the total nesting activity for each species.

Table A2 – Marine Turtle Tracks and Associated Nests in the Survey Area, 2007 and April 2008

Survey Date	Coordinates (WGS 84)	Species	Nest and Track Descriptions
May 2007	S12°54'787" E141°37'978"	Green Turtle	Large body pit, single egg shell, evidence of predation.
May 2007	S12°54'693" E141°38'107"	Flatback Turtle	Body pit with several egg shell fragments, evidence of predation.
May 2007	S12°54'675" E141°38'124"	Unidentified	Large body pit, no evidence of egg predation.
May 2007	S12°54'632" E141°38'124"	Unidentified	Body pit with several egg shell fragments, evidence of predation. No tracks.
May 2007	S12°54'721" E141°38'135"	Unidentified	False crawl, no associated body pit or nest. Old track.
May 2007	S12°54'613" E141°38'110"	Unidentified	False crawl, no associated body pit or nest. Old track.
June 2007	S12°54'060" E141°40'000"	Unidentified	Small body pit, shell fragments, evidence of feral pig predation. No tracks.
June 2007	S12°54'619" E141°38'128"	Unidentified	Small body pit, shell fragments evidence of feral pig predation. No tracks.
June 2007	S12°54'693" E141°38'107"	Unidentified	Large body pit, several egg shell fragments, evidence of predation of eggs. No tracks.
June 2007	S12°54'859" E141°37'910"	Unidentified	Small body pit, shell fragments evidence of feral pig predation. No tracks.
June 2007	S12°54'875" E141°37'852"	Flatback Turtle	Body pit/nest. No signs of feral pig predation.

Survey Date	Coordinates (WGS 84)	Species	Nest and Track Descriptions
July 2007	S12°54'598" E141°38'106"	Unidentified	Small body pit, shell fragments evidence of feral pig predation.
July 2007	S12°54'662" E141°38'090"	Unidentified	Small body pit, shell fragments evidence of feral pig predation.
July 2007	S12°54'836" E141°37'921"	Flatback Turtle	No evidence of egg predation.
July 2007	S12°54'875" E141°37'857"	Unidentified	Small body pit, shell fragments, evidence of feral pig predation. No tracks.
July 2007	S12°55'095" E141°37'672"	Olive Ridley or Hawksbill Turtle	Small body pit and narrow alternating tracks. No signs of predation. Multiple nest attempts.
July 2007	S12°55'209" E141°37'618"	Flatback Turtle	No signs of predation. Multiple nest attempts.
April 2008	S12°55'777" E141°37'299"	Flatback Turtle	Very fresh tracks and nest. No sign of disturbance or predation. Nest shallow.
April 2008	S12°56'513" E141°36'795"	Flatback Turtle	Paired gait of flippers. Nest adjacent to cliff edge. Evidence of predation by feral pigs.
April 2008	S12°55'897" E141°36'514"	Flatback Turtle	Old track. Nesting against fallen timber. Predation of nest. Quad bike tracks to and from nest.
April 2008	S12°56'913" E141°36'500"	Flatback Turtle	Old track. Nesting against cliff and under fallen timber. Predation of nest by feral pigs/dogs.
April 2008	S12°56'957" E141°36'461"	Flatback Turtle	Old track. Predation of nest by feral pigs.
April 2008	S12°56'990" E141°36'455"	Unidentified	Old track. Predation of nest.
April 2008	S12°59'230" E141°35'320"	Flatback Turtle	Nest adjacent to cliff edge.
April 2008	S12°59'608" E141°35'111"	Hawksbill Turtle	Fresh track probably from previous night. Several attempts made to nest on the side of a vegetated dune.
April 2008	S12°54'704" E141°38'047"	Flatback Turtle	False crawl with no associated nest.
April 2008	S12°54'635" E141°38'133"	Unidentified	Old nest with no tracks but fragments of egg shell present.

Surveys in August/September 2013 identified marine turtle nesting rates between Boyd Point and Pera Head of 0.3 nests/km/night. Previous surveys from False Pera Head to Boyd Bay recorded 0.3 tracks/km/day in 2004 and 0.6 tracks/km/day in 2007 (RTA, 2011). A 2008 survey recorded 0.1 track/km/day for the 27km of beach from Norman Creek to north of Boyd Point (RTA, 2011). As a comparison, nesting rates between Boyd Point and Pera Head of 0.3 nests/km/night are only 1% of the Crab Island rookery in the Gulf of Carpentaria where rates average of 30 tracks/km/day.

Once hatched, lighting cues are critical for hatchlings to move from the beach to the ocean – a behaviour known as sea-finding. In simple terms, where there are no anthropogenic light sources, hatchlings move away from the dark silhouetted shoreline towards the brighter ocean horizon. Brightness in this context is a term that encompasses wavelength and intensity (Witherington & Martin, 1996). The uniformity of the light regime can also act as a cue, whereby hatchlings may orientate away from a horizon that has patterns of light and shadow representing shoreline

vegetation or structures. In practical terms, marine turtles would see these patterns and orientate away from the shore and head towards the more uniform light environment of the ocean horizon ( (Godfrey & Barreta, 1995) and (Witherington & Martin, 1996)).

Altered above-water, night-time light regime can have an effect on hatchlings' attempts to find water. Lights at a nesting beach can result in marine turtle hatchlings heading inland rather than into the ocean, with subsequent mortality. Lights adjacent to nesting beaches can result in hatchlings entering the ocean safely, only to re-emerge closer to the light source. Offshore lighting may result in hatchlings aggregating under the light, effectively becoming a focus for predatory fish. Flashing lights (e.g. navigation beacons) are not recorded as inducing alteration to sea-finding behaviour.

Currently, there are two major anthropogenic threats to nesting marine turtles along the beaches of western Cape York – predation by feral pigs and entanglement in discarded fishing nets (ghost nets). Predation by feral pigs is currently considered the most significant of these threats. Feral pigs are a well-acknowledged environmental problem in Australia. Predation has been identified as a key threat to marine turtles under the EPBC Act in the 'Recovery Plan for Marine Turtles in Australia' (Environment Australia, 2003) and the *Threat Abatement Plan for predation, habitat degradation, competition and disease transmission by feral pigs* (DEH, 2005).

### Foraging

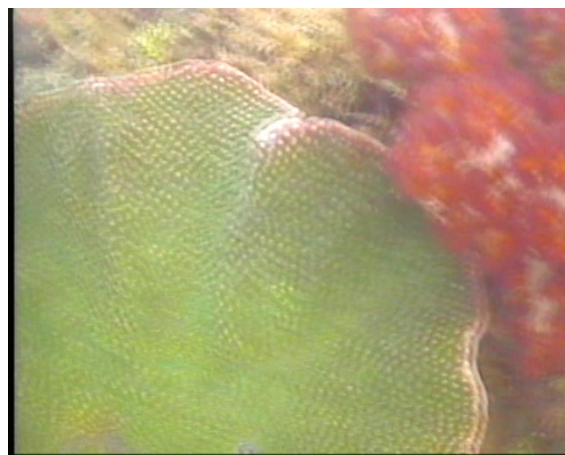
Preferred food items for marine turtles vary between species and can include seagrass, seaweed, soft-bodied animals (such as soft corals, sea cucumbers and jellyfish), bivalve and gastropod molluscs, and crabs ( (Bjorndal, 1996), (Brand-Gardner, et al., 1999), (Limpus, 2007), (Limpus, 2008a), (Limpus, 2008b), (Limpus, 2008c), (Limpus, 2009a) and (Limpus, n.d.)) (refer Table A1).

Drop camera surveys undertaken in 2012 confirmed there was no live coral or reef to support coral in the footprint of the proposed Temporary Barge Facility. However, near shore fringing reefal substrates occur at Pera Head (Plate A1), more than 200m to the south of the facility. These patchy reefs support hard corals and low profile reefs containing soft coral – sponge assemblages, with generally a low proportion of live cover. At Pera Head, 49 of the 269 locations recorded habitat suitable for live cover (i.e. rock) and 26 of the locations recorded live cover ranging from 5% to 100% cover at individual sampling locations. Figure A8 shows the locations where live cover and suitable habitat were recorded.

Plate A1 Images of Typical Benthic Assemblages



Pera Head – Turbinaria hard coral, seaweeds, rocks and entrusting algae



Pera Head – Turbinaria hard coral and soft coral



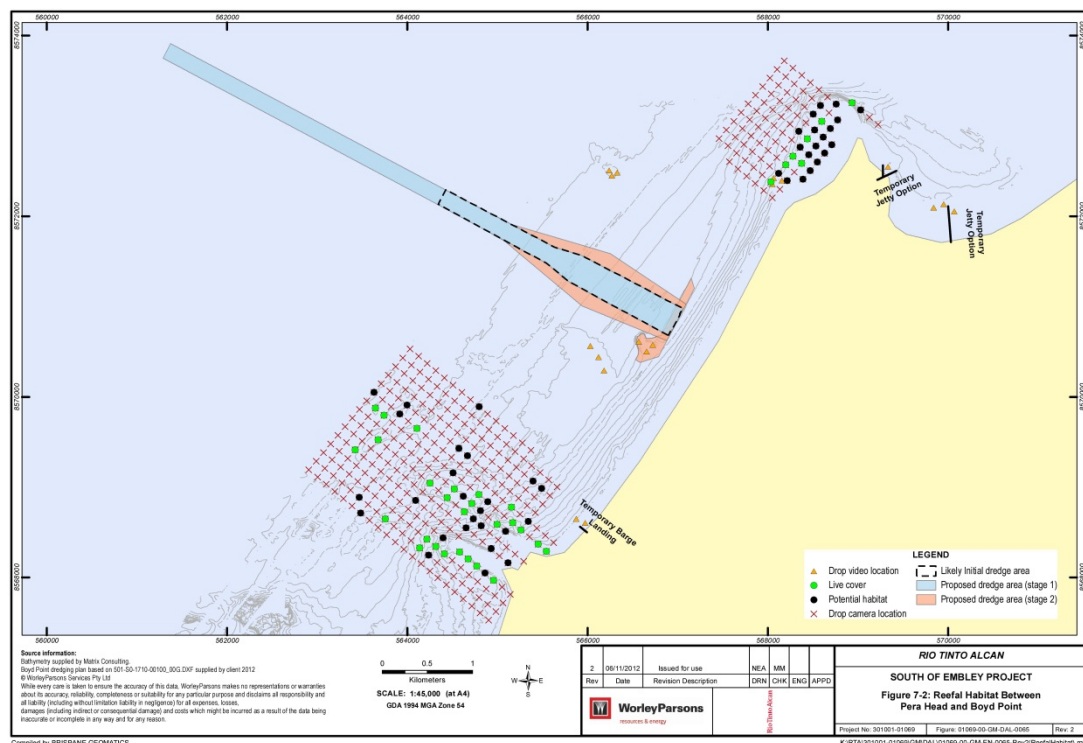
Pera Head – Branching soft corals, polyps out



Pera Head – Soft corals, rock and coarse sand substrate at base of reef slope

The reef system at Pera Head covers approximately 72ha, of which 4.5ha is hard coral, 4.5ha is soft coral and 2.7ha is sponges.

Figure A8 Reefal Habitat between Pera Head and Boyd Point



The importance of these reef systems (Boyd Point to Thud Point) in a regional context is considered to be high, as they support resources that are of conservation, cultural, commercial



and recreational importance. In particular, near shore sponge and soft coral habitats may provide a food resource for a range of marine turtle species in the area.

Extensive towed video and drop camera video surveys undertaken for the Project between Boyd Point and Thud Point found no seagrass. The nearest seagrass occurs in Boyd Bay.

The Commonwealth EIS contains water quality data for the Pera Head area. Baseline investigations determined that water quality at Pera Head exhibits significant natural fluctuations in suspended sediment and turbidity. The extent of this natural variation buffers minor water quality impacts associated with operation of the Temporary Barge Facility to some extent. Generally, these habitats may be described as being more resilient to short-term water quality changes.

Scouring can occur as a result of propeller wash or current movements and the facility would be designed such that there is sufficient draft to minimise this potential. Movement of vessels in and out of the inshore area is likely to cause very short term, localised increases in turbidity. The barge landing area would be more than 100m from the mapped reef habitat near Pera Head and it is very unlikely that these minor, short term fluctuations would have any impact on coral health near Pera Head.

In the Port facility area sediment moves along the shoreline driven principally by waves and to a lesser extent by currents. The Gulf of Carpentaria is a low wave environment (significant wave height ( $H_s$ ) is <1m 95% of the time and the majority of sediment transport occurs during storm events such as tropical cyclones which generate large waves ( $H_s$  up to 7m) and elevated water levels.

Annual along-shore transport was estimated through wave, current and sediment transport modelling for 15 historical storm events over an 18 year period. The results of the modelling show that alongshore transport rates vary considerably (100 to 80,000m<sup>3</sup> per event) dependent upon wave height, approach direction and storm duration. The material being transported in storm events can move north or south along the coast depending on the storm track and mean wave direction. However net transport of sediments occurs towards the north (towards Boyd Point). Results of modelling indicate that for even the largest of the modelled storms, along-shore sediment transport occurred within the 350m of the shoreline.

Vibratory piling would be used to install piles. Potential behaviour disturbance distances from these facilities were not modelled due to the lower impact of vibratory piling compared to piling driving and the short duration of piling at this facility (only eight piles).

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**Appendix B Department of the Environment Notice of Approval**





Our Reference: EPBC 2010/5642

Mr Paul Dewar  
General Manager-Health, Safety and Environment  
Rio Tinto Alcan Weipa  
123 Albert St  
BRISBANE QLD 4000

Dear Mr Dewar,

**EPBC 2010-5642 – South of Embley Bauxite mine and port development  
Approval of Temporary Barge Plan – conditions 1-4**

I refer to the updated Temporary Barge Plan, 20 April 2015 (Plan), submitted pursuant to the requirements of conditions 1-4 of the EPBC 2010/5642 approval granted to RTA Weipa Pty Ltd on 14 May 2013.

The Plan has been reviewed by officers of the Department and has been found to meet the requirements of the relevant conditions. On this basis, and as delegate of the Minister for the Environment, I have decided to approve the Plan.

In accordance with condition 4 of the approval, the approved plan must be implemented. Under condition 72, if RTA Weipa Pty Ltd wants to act other than in accordance with the approved plan, a revised plan must be submitted for approval. Until the Minister (or his delegate) has approved the revised plan, the original plan must be implemented.

The Department has an active monitoring program which includes monitoring inspections, desk top document reviews and audits. As part of this program we will be undertaking a review of our records to ascertain the present status of this project in relation to its conditions of approval. We will contact you again if we require further information.

Please ensure that you maintain accurate records of all activities associated with, or relevant to the conditions of approval, so that they can be made available to the Department on request. Such documents may be subject to audit and used to verify compliance. Summaries of results of audits may be published by the Department. Information about the monitoring and audit program can be found on the Department's website at [www.environment.gov.au/epbc/compliance/auditing.html](http://www.environment.gov.au/epbc/compliance/auditing.html).

We would appreciate if you could advise us of any changes to the project e.g. contact officer, company address, commencement date etc.

You should note that any transfer of this approval to another person must have the consent of the Minister under section 145B of the EPBC Act.

If you have any enquiries please contact Manel Samarakoon on 02 6274 1080.

Yours sincerely



Shane Gaddes  
Assistant Secretary  
Compliance and Enforcement Branch

28/7/2015