Rio Tinto

# Amrun port and river facilities long-term maintenance dredge management plan

Amrun | Plan

# Amrun Port and River Facilities

# Long-term Maintenance Dredge Management Plan

## 2021 – 2031

## January 2021

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## ACRONYMS

| Term | Definition |
|---|---|
| AHO | Australian Hydrographic Office |
| BPDTAG | Boyd Port (Amrun Port) Dredging Technical Advisory Group |
| DAF | Department of Agriculture and Fisheries |
| DES | Queensland Department of Environment and Science |
| DAWE | Department of Agriculture, Water and Environment |
| Amrun | South of Embley |
| ANC | Acid Neutralising Capacity |
| CBD | Chart Datum Boyd |
| $CO_2$ | Carbon Dioxide |
| DMPA | Dredge Material Placement Area |
| DWT | Dry Weight Tons |
| DTMR | Department of Transport and Main Roads |
| EA | Environmental Authority |
| EHS | Environment and Health Sub-Committee |
| EMP | Environmental Management Plan |
| EP Act | Queensland Environmental Protection Act 1994 |

| Term | Definition |
|---|---|
| EPBC | Environmental Protection and Biodiversity Conservation Act |
| GBRWHA | Great Barrier Reef World Heritage Area |
| IMO | International Maritime Organization |
| IMP | Invasive Marine Pest |
| LAT | Lowest Astronomical Tide |
| LMDMP | Long Term Maintenance Dredge Management Plan |
| MEPC | Marine Environment Protection Committee |
| MFO | Marine Fauna Observer |
| MNES | Matters of National Environmental Significance |
| NAGD | National Assessment Guidelines for Dredging |
| NQBP | North Queensland Bulk Ports |
| PASS | Potential Acid Sulphate Soil |
| RPA | Regional Partnership Agreement |
| RTAW | RTA Weipa Pty Ltd |
| SAP | Sampling and Analysis Plan |
| SPRAT | Species Profile and Threats Database |
| SSC | Suspended Sediment Concentration |
| TACC | Technical Advisory Consultative Committee |
| TC | Tropical Cyclone |
| TSHD | Trailing Suction Hopper Dredge |
| UCL | Upper Confidence Limit |
| WCCCA | Western Cape Communities Co-existence Agreement |
| WRB | Waverider Buoy |

# 1. Introduction

This Long-term Maintenance Dredge Management Plan (LMDMP) describes the monitoring and management arrangements for ongoing maintenance dredging and material placement activities to be undertaken as part of the Amrun Port operation and associated River facilities. This LMDMP addresses maintenance dredging for the next 10 years (2021 to 2031). It will follow on and replace a previous plan that applied from 2018 to 2021 (RTA 2018a).

#### Amrun Port

The Amrun Port was constructed in 2017-18 and involves the operation of a wharf facility located between Boyd Point and Pera Head (refer Figure 1). The port infrastructure includes a jetty, wharf and ship loaders, with dredged berth pockets and an approach/departure channel. The current wharf and footprint of the dredge area is designed to accommodate dedicated Post Panamax and generic Panamax vessels.

Capital dredging was completed in April 2016 with removal and disposal of 202,416 $m^3$ of marine sediments to the new Amrun Port dredge material placement area (DMPA), location indicated in Figure 1. Wharf construction commenced May 2017 with Port facility commissioning and first ore shipment in late 2018. The Port facility is operated by RTA Weipa Pty Ltd (RTAW). The primary purpose of the port is the export of bauxite from the recently established Amrun mine.

#### River Facilities

Additional to Amrun Port, RTAW also operate two terminals in the Embley and Hey River estuary located to the north of Amrun and nearby to the township of Weipa (Figure 1). These two facilities are the Hey River and Humbug Barge and Ferry River Terminals allowing for the transfer of personnel and freight between the two facilities. These facilities are also included in this LMDMP.

## 1.1. Purpose and Objectives

The purpose of this Long-term Maintenance Dredge Management Plan (LMDMP) is to document the strategy for managing natural sediment accumulation at Amrun Port, in a way that ensures the safe and efficient operation of the Port and the ongoing protection of local environmental, social and cultural values.

Left unmanaged, natural sediment fills up navigational infrastructure, impacting the depth necessary for safe loading, manoeuvring and transit of ships. A reduced ability to effectively load ships can have a substantial economic impact on the region that the Port supports.

The objectives of the LMDMP are to:

- Provide a framework for maintenance dredging of the Port over the next 10 years.
- Establish a robust, transparent long-term planning approach to managing port sediment.
- Outline operational, planning, consultation and monitoring arrangements.
- Maintain local environmental, social and cultural values.
- Comply with State and Commonwealth regulatory requirements
- Apply continual improvement practices in the management of sediment and dredging actions.

Maintenance dredging activities will not commence until the LMDMP has been approved by State and Commonwealth government. The LDMP must be implemented during maintenance dredging activities.

## 1.2. Changes to the LMDMP

This plan is intended to demonstrate commitment to the long-term management of maintenance dredging and placement activities for Amrun Port, from 2021 to 2031. The plan is supported by a detailed technical analysis, titled: *The Amrun Port Sustainable Sediment Management Assessment* (Amrun SSM) that has been conducted in association with a similar study at the nearby Port of Weipa by the North Queensland Bulk Ports Corporation.

This LMDMP will be reviewed, updated and placed on RTA website when or if one of the following occurs:

1. When the LMDMP has been amended requiring approval in accordance with either EPBC 2010/5642, condition(s) 17 and 72 or EPML00725113, condition(s) J10 or J11.

2. When permit conditions have been changed or amended or new permits issued in accordance with EPBC 2010/5642, condition 19.
3. The LMDMP must be made available for the life of the permit (electronically) on the RTA website within 30 days of the LMDMP being approved by the Minister in accordance with SD2020-3999, condition 9 and EPBC 2010/5642, condition 59.
4. When monitoring results report substantially different impacts than were predicted.
5. If significant new navigational infrastructure is planned and developed at the Port.
6. If an incident occurs that poses a significant risk to effective future management.


**Figure 1: Amrun Port and location of DMPAs, Hey River Terminal and Humbug Terminal**

## 1.3. Policy Content

The plan will also ensure that dredging activities align with the principles, elements and objectives described in:

- Environmental Code of Practice for Dredging and Dredged Material Management (Ports Australia 2016)
- National Assessment Guidelines for Dredging (NAGD) (CoA 2009).

The plan also seeks to address independent peer review criteria approved by the Department of Environment and Energy. The approved independent peer reviewer has completed a review of the LMDMP in accordance with the approved criteria. This LMDMP has addressed the peer review comments to their satisfaction. The final independent peer review report is attached as Appendix D and published on the Rio Tinto reports and publications website for the Amrun Project https://www.riotinto.com/search/documents#main-search_e=0&main-search_sxatags=weipa.

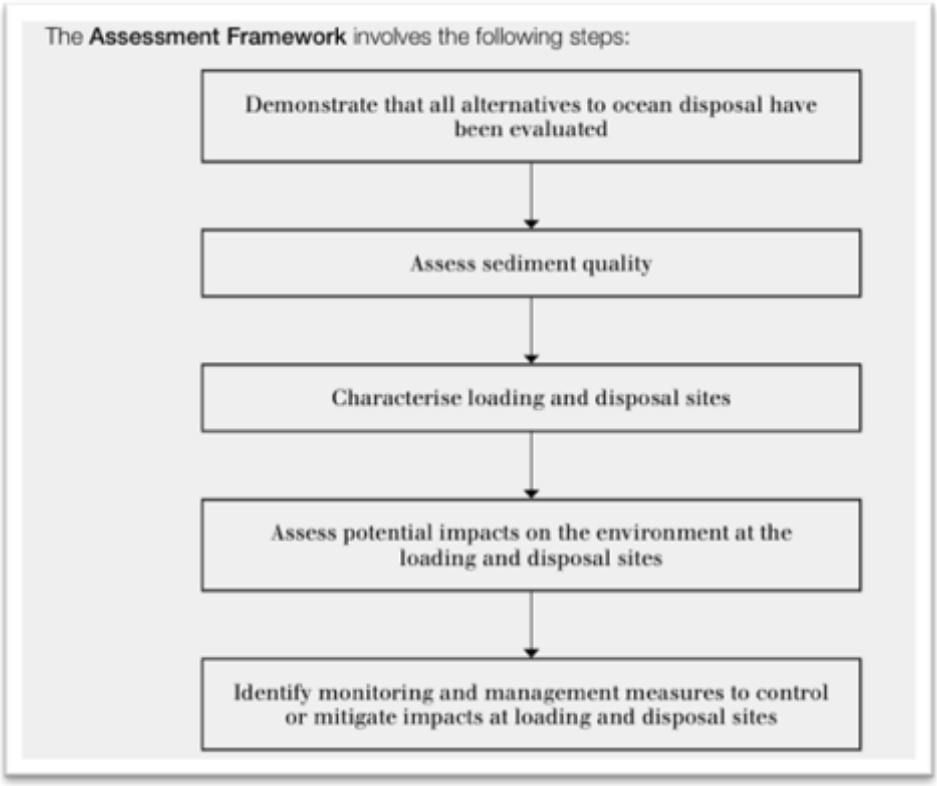
In addition, while Amrun is not located within the Great Barrier Reef World Heritage Area (GBRWHA), this Plan has followed the approach recommended in the GBRWHA Maintenance Dredging Strategy (DTMR 2016).

### Ports Australia Dredging Code of Practice

The Ports Australia *Dredging Code of Practice for Dredging and Dredged Material Management* sets out a number of environmental principles that Australian ports meet when undertaking dredging and placement of dredged material. The principles have been defined on the basis of ecologically sustainable development principles.

### National Assessment Guidelines for Dredging (NAGD)

The NAGD established a scientific assessment framework to determine if dredge material is suitable for ocean




placement in line with the *Environment Protection (Sea Dumping) Act 1981* and the *1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972* (the London Protocol). The Guidelines include an assessment framework (Figure 2) that is applied to ensure the impacts of dredged material loading and placement are adequately assessed.

**Figure 2: National assessment framework for dredge material placement (CoA 2009)**

### GBRWHA Maintenance Dredging Strategy

Queensland's *Maintenance Dredging Strategy for Great Barrier Reef World Heritage Area Ports* (DTMR 2016) provides a framework for sustainable, leading practice management of maintenance dredging at ports in the Great Barrier Reef World Heritage *(*GBRWHA). The framework builds on the current regulatory requirements to ensure the ongoing protection of the Reef's values and the continued operating efficiency of ports within the GBRWHA.

While not directly related to Amrun Port, the Strategy sets up a best practice framework for maintenance dredging management and recommends ports develop and implement long-term maintenance dredging management plans.


**Figure 3: Framework for Long-term maintenance dredging management (DTMR 2016)**

The development and implementation of this Plan is in line with applicable principles contained in the Maintenance Dredging Strategy (Figure 3), specifically:

- Developing the knowledge base, using the best science available
- Avoiding or minimising the need for maintenance dredging where possible
- Application of the principles of ecologically sustainable development
- Maintaining and enhancing environmental values
- Going further than avoiding and mitigating impacts, to look for opportunities to deliver environmental protection, restoration or enhancement outcomes (working with nature principles)
- Application of comparative analysis to determine the most suitable solutions
- Application of adaptive management and continuous improvement processes
- Reporting evaluated performance and providing access to data and information from monitoring
- Favouring transparency, consultation with key stakeholders and values-based assessment.

This LMDMP comprises the main planning and management tool for maintenance dredging at the Port. Supporting this Plan will be a works specific Maintenance Dredging Environmental Management Plan (EMP) and a Marine Environmental Monitoring Plan.

- The Maintenance Dredging EMP is developed in conjunction with the dredge operator, it is specific to an individual dredging campaign and contains the operational controls for dredging.
- The Marine Environmental Monitoring Plan outlines the ambient, impact (if required) and adaptive monitoring associated with dredging and material placement activities.

## 1.4. GOVERNANCE

### LEGISLATION AND APPROVALS

Maintenance and capital dredging programs are subject to a number of Commonwealth and Queensland government laws and policies. This section describes the key environmental, cultural and planning legislation and policies that apply to dredging and dredge material placement projects undertaken at Amrun Port. Specifics on which of these particular legislation and approvals processes apply to a proposed dredging project will need to be undertaken in the initial planning stage of any proposed dredging campaign, taking into account the specifics of each proposed dredging program.

#### COMMONWEALTH LEGISLATION AND POLICY

Two key pieces of Commonwealth environmental protection legislation apply to dredging projects undertaken within Australia:

- *Environment Protection (Sea Dumping) Act 1981*
- *Environment Protection and Biodiversity Conservation Act 1999*

#### Environment Protection (Sea Dumping) Act 1981

Dumping of waste and other material from any vessel, aircraft or platform in Australian waters is prohibited under the *Environment Protection (Sea Dumping) Act 1981*, unless a permit has been issued. Permits are most commonly issued for dredging operations and the creation of artificial reefs. The Act fulfils Australia's international obligations under the London Protocol (to prevent marine pollution by controlling dumping of wastes and other matter). The Act is administered by the Department of Agriculture, Water and Environment (DAWE).

#### Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's central environmental legislation. The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, wetlands and heritage places which are defined in the EPBC Act as matters of national environmental significance (MNES).

The EPBC Act is triggered when a development proposal has the potential to have a significant impact on MNES. Approval under this Act is not required if significant impact to MNES will not result.

#### STATE LEGISLATION AND POLICY

The Queensland Government also regulates maintenance dredging under a series of State laws. The legislation that applies is determined by the location of the dredging activity and the type and scale of dredging being undertaken.

**APPROVALS**

There are a number of State and Commonwealth approvals necessary for ongoing maintenance dredging at Amrun Port and where required, Weipa river facilities.

**Table 1: Dredging related permits**

| Permit | Activity |
|---|---|
| Environmental Authority (EA) | Where required, undertake maintenance dredging of navigational infrastructure |
| Operational Works (Tidal Works)<br>*Planning Act 2016* | Placement of dredged material below high-water mark |
| Sea Dumping Permit (Clth) | Loading and placement of dredged material at sea |
| EPBC Act Approval (Clth) | Capital and maintenance dredging |

The following approval conditions associated with the EA and EPBC approvals of relevance to this management plan are outlined in Table 2.

**Table 2: Commonwealth and Queensland Government approval conditions**

| **Conditions** | **Where Addressed in this Plan** |
|---|---|
| **Commonwealth EPBC Act Approval Conditions (EPBC 2010/5642)** | |
| **Port and River Dredge Management Plans**<br>**16.** The approval holder must submit to the Minister for approval a Maintenance Dredging Management Plan/s for all maintenance dredging activities associated with the South of Embley Project. The Maintenance Dredging Management Plan/s must be prepared in accordance with the Australian Government National Assessment Guidelines for Dredging (2009) and the department's Long Term Monitoring and Management Plan Requirements for 10 year Permits to Dump Maintenance Dredge Material at Sea (July 2012), or their most current versions, to avoid and mitigate impacts for the matters of national environmental significance listed at condition 14.<br>The matters of national environmental significance listed at condition 14 are:<br>**i.** Commonwealth Marine Area<br>**ii.** Listed turtle species<br>**iii.** Listed dolphin species; and<br>**iv.** Dugong (*Dugong dugon)* and Bryde's Whale (*Balaenoptera edeni*) | Section 1<br>Section 3<br>Section 5<br>Section 7<br>Section 9 |
| **17.** Maintenance dredging activities cannot commence until the Maintenance Dredging Management Plan at condition 17 has been approved | Section 1.1<br>Section 1.2 |
| **18.**The approved Plans at condition 14 and condition 16, and or their subsequent revisions must be implemented | Section 1.1 |
| **19.** The approval holder must comply with the requirements of any permit/s obtained under the Environment Protection (Sea Dumping) Act 1981, including any conditions attached to the permit/s. | Section 1.1 |
| **41**. The approval holder must consult with Indigenous people in accordance with the process under the Indigenous Land use Agreement (known as the Western Cape Communities Coexistence Agreement) during preparation of management plans and strategies specified in this approval. | Section 4.2 |
| **42.** The approval holder must identify employment opportunities (e.g. under an Indigenous Land and Sea Program or seed collection associated with rehabilitation | Section 4.3 |

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| activities) for Indigenous persons to facilitate the implementation of the conditions specified in this approval. | |
| **59.** Unless otherwise agreed in writing by the Minister the approval holder must publish, for the life of the project including decommissioning, all current approved program/s, plan/s, review/s (including Independent Peer Reviews) or strategies referred to in these conditions of approval on their website. Each of the approved program/s. plan/s or strategies (including revised versions) must be published on the approval holder's website within one (1) month of approval. | Section 1.4 |
| **60.** Unless otherwise agreed in writing by the Minister program/s, plan/s, or strategies specified in the conditions must be independently peer reviewed prior to submission to the Minister for approval. The approval holder must nominate an Independent Peer reviewer to the Minister. The person/organisation/technical committee conducting the independent peer review must be approved by the Minister, prior to the commencement of the review. The independent peer review criteria must be agreed to by the Minister and any reviews undertaken must address the criteria to the satisfaction of the Minister.<br><br>**61.** The reviews undertaken for Condition 60 must include an analysis of the effectiveness of the avoidance and mitigation measures in meeting the objectives, targets or management measures identified in the program/s, plan/s or strategies being reviewed.<br><br>**62.** Unless otherwise specified in these conditions or notified in writing by the Minister, the approval holder must provide to the Minister, a copy of all advice and recommendations made by the independent peer reviewer for program/s, plan/s or strategies, and an explanation of how the advice and recommendations will be implemented, or an explanation of why the approval holder does not propose to implement certain recommendations. | Section 1.3<br><br>Section 1.3<br>Section 5<br>Section 6<br><br>Section 1.3 |
| **68.** Within (3) months of every 12 month anniversary of commencement of the action the approval holder must publish a report on their website, for the duration of the project including decommissioning, addressing compliance with the conditions of this approval over the previous 12 months, including implementation of any management plan/s or strategies as specified in the conditions. Non-compliance with any of the conditions of this approval must be reported to the department at the same time as the compliance report is published. Within five (5) days after publication, the person taking the action must provide the Minister with a copy of the report/s. | Section 11 |
| **Queensland Government Environmental Authority Conditions (EPML00725113)** | |
| **(J1)** In carrying out dredging activities, the release of contaminants (including any release caused by extraction of material from the bed and banks of waters) must:<br>(a) only occur from the permitted areas identified in the plan(s) referred to in Condition (J22).<br>(b) only occur in accordance with conditions of this environmental authority.<br>(c) be carried out taking all practical measures necessary to minimise the concentration of suspended solids released during the loading of the vessel. | Section 1<br>Section 5.2<br>Section 7<br>Section 9<br>Section 10 |
| **(J5)** The administering authority must be advised in writing at least (5) business days prior to the date of commencement of a capital or maintenance dredging campaigns. | Section 1.4 |
| **(J6)** The administering authority must be advised in writing within ten (10) days following completion of the capital or maintenance dredging campaigns. | Section 1.4 |
| **(J7)** All persons engaged in the conduct of dredging activities including but not limited to employees and contract staff must be:<br>(a) trained in the procedures and practices necessary to:<br>i. comply with the conditions of this environmental authority; and<br>ii. prevent environmental harm during normal operation and emergencies, or<br>(b) under the close supervision of a trained person. | Section 9.2 |
| **(J8)** Any dredging activities must be conducted using equipment that is in survey and registered and, in relation to environmental performance, is equal to or superior to the following equipment:<br>(a) Trailing Suction Hopper Dredge that is equipped, at a minimum, with:<br>i. below keel discharge of tail waters via an anti-turbidity control valve; | Section 7.3<br>Section 9.2 |

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| ii. on-board systems for determining solids to water ratio or density of dredged material;<br>iii. electronic positioning and depth control system for defining the location and depth of dredging activities; and<br>iv. dredge heads capable of, and where appropriate, depth control and fitted with marine wildlife protection or fauna exclusion devices (e.g. turtle deflector, deflector plates, tickler chains or drag heads) prior to and during operation.<br>(b) Cutter Suction Dredge that is equipped, at a minimum, with:<br>i. electronic positioning and depth control system for defining the location and depth of dredging activities<br>ii. a system or process to ensure the delivery system integrity is maintained at all times; and systems for determining solids to water ratio or density of dredged material during operations<br>iii. dredge heads capable of, and where appropriate, depth control and fitted with marine wildlife protection or fauna exclusion devices (e.g. turtle deflector, deflector plates, tickler chains or drag heads prior to and during operation.<br>(c) Grab Dredge that is equipped, as a minimum, with:<br>i. electronic positioning system for defining the location and depth of dredge activities. | |
| **(J9)** Where trailer suction dredging is carried out, an effective turtle exclusion device must be fitted to the dredge head. Evidence that this device has been installed and used on the dredge for the entire period of the dredging activity must be provided to the administering authority on request. | Section 7.3<br>Section 9.2 |
| **(J11)** Dredging can only be carried out when the final dredge management plans are approved by the administering authority | Section 1 |
| **(J12)** All dredging must be undertaken in accordance with a dredge management plan/s (DMP/s) based on the draft DMP/s in the Supplementary Report to the EIS approved by DEHP prior to dredging commencing | Section 1 |
| **(J15)** The long term maintenance Dredge Management Plans for Amrun Port must be consistent with the conditions of this environmental authority and must:<br>(a) consider results of modelling, or alternative assessment methodology as agreed with the administering authority, to:<br>i. estimate sediment plumes that may be generated by maintenance dredging and spoil disposal operations for Amrun Port;<br>ii. provide risk estimates relevant to sensitive receptors that are based on the key water quality parameters, specifically increases in turbidity, sedimentation rates, and reduction in photosynthetically active radiation (PAR), for the key Concern Sites(i.e. where sensitive receptors are situated); and<br>iii. define the zones of Influence of the dredging and spoil disposal sediment plumes.<br>(b) implement a water quality monitoring program, as informed by previous dredging campaigns in consultation with the BPDTAG in accordance with condition (J31).<br>(c) in considering the maintenance dredging schedule consider any potential adverse effects on:<br>i. coral spawning; and<br>ii. marine turtle nesting.<br>(d) include reporting to and review by the BPDTAG in accordance with condition (J31). | Section 5<br>Section 6<br>Section 8<br>Section 9<br>Section 10<br>Section 8<br>Section 9<br>Section 4.1<br>Section 7<br>Section 11 |
| **(J18)** The administering authority and the Department of Agriculture, Fisheries and Forestry must be consulted during preparation of all final Dredge Management plan | Section 4.1<br>Section 7<br>Section 11 |

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|---|---|
| **(J20)** All dredging activities must be undertaken in accordance with the relevant approved final dredge management plan | Section 1.1 |
| **(J24)** Unless otherwise authorised, dredge spoil must not be disposed of on the mining lease | Section 1.1<br>Section 9.2 |
| **(J25)** Dredge spoil must not be disposed of on land unless otherwise authorised | Section 1<br>Section 9.2 |
| **(J26)** Dredging activities must not start until provision has been made to lawfully place or dispose of the dredge spoil material. Evidence of applicable approvals must be made available to the administrating authority on request | Section 1<br>Section 9.2 |
| **(J27)** The transport of dredge material must be carried out such that the dredge material is kept wet at all times | Section 1<br>Section 9.2 |
| (**J30)** The holder of this environmental authority must establish a Amrun Port Dredging Technical Advisory Group (BPDTAG) which must include a representative from the Administering authority and the Department of Agriculture Fisheries and Forestry (DAFF) for dredging at Amrun Port | Section 4.1<br>Section 7<br>Section 11 |
| **(J31)** The holder of this environmental authority must report to the BPDTAG on proposed dredging activities for Amrun Port and implementation of the DMP including monitoring results, management triggers and response actions. | Section 7<br>Section 11 |
| **(J32)** The administering authority, Department of Agriculture, Fisheries and Forestry and North Queensland Bulk Ports must be consulted during preparation of the final Dredge Management Plan for the Hey River. | Section 4.1<br>Section 7 |
| **(J33)** The holder of this environmental authority must report on the implementation of the final Dredge Management Plan for the Hey River to North Queensland Bulk Ports Technical Advisory and Consultative Committee for the Port of Weipa. | Section 7 |
| **(J34)** All reasonable and practicable measures must be taken to minimise the potential for turbidity plumes to cause environmental harm to seagrass meadows adjacent to the dredge site at the Hey River barge/ferry terminal. | Section 9 |
| **(J35)** The dredging campaign at the Hey River barge/ferry terminal must not occur for a period longer than fourteen (14) consecutive days. Dredging may extend over a longer time period, provided:<br>(a) there is a pause in dredging of at least three (3) days between periods of dredging at each dredging site in the river; or<br>(b) where turbidity monitoring is employed, turbidity levels have not increased significantly above background levels as defined in the final Dredge Management Plan. | Section 9.2 |
| **(J36)** Mobile dredging operations:<br>(c) Must not commence if dugong turtle or cetaceans are observed within 300 m of the dredge<br>(d) When underway, must alter the course if dugongs, turtles or cetaceans are observed within 50m of the dredge head | Section 9.2 |
| **(J37)** Stationary dredging operations:<br>(a) Must not commence if dugong turtle or cetaceans are observed within 300 m of the dredge<br>(b) When underway, must alter the course if dugongs, turtles or cetaceans are observed within 50m of the dredge head | Section 9.2 |
| **(J38)** Daily monitoring for impacted turtles must be undertaken at the dredge and at the shoreline down current from the dredging operations. If monitoring indicates more than | Section 9.2 |

| | |
|---|---|
| two (2) turtles are killed within a 24 hour period as a result of dredging. The dredge must relocate from the area until an incident investigation has been carried out and relevant preventative measures implemented | |
| **(J39)** Operating procedures must be developed prior to the commencement of dredging activities that minimise the risk of turtle capture by the dredge head and the risk from all activities of injury to marine species of conservation significance | Section 9.2 |
| (**J40)** The administrating authority must be immediately notified of any turtle captures by the dredge or injury to any marine species of conservation significance | Section 9.2<br>Section 11 |
| **(J41)** all reasonable and practicable measures must be undertaken to minimise the impact of dredging activities on marine fauna | Section 8<br>Section 9<br>Section 11 |

**NOTIFICATION AND OBLIGATIONS SCHEDULE**

A number of notifications are required for dredging activity prior to, during and after the campaign has been completed, specifically, there are. notification requirements and conditions pertaining to the following periods noted in Table 3. Other notifications will be required as part of the new sea dumping permit which will be managed in the same manner.

1. Pre-maintenance dredging commencing.
2. During active maintenance dredging and placement.
3. Post-maintenance dredging reporting and closeout.

**Table 3: Notification requirements**

| Approval | Condition | Department notified | Time required |
|---|---|---|---|
| EA EPML00725113 | J5 | DES | Advised in writing at least (5) business days prior to the date of commencement |
| EA EPML00725113 | J6 | DES | Advised in writing within 10 days following dredging completion. |
| EPBC 2010/5642 | 59 | DAWE | Approved programs, plans or strategies must be published on RTAW's website within 1 month of approval. |

# 2. Port Locality, Setting and Shipping

The Amrun Port is located in the Gulf of Carpentaria, on the north west coast of Cape York Peninsula (Figure 1). The Amrun Port is located on the open coast at the southern end of Albatross Bay, while the Humbug Terminal and Hey River Terminal are located in the Embley and Hey Rivers respectively close to the Port of Weipa.

Capital dredging at the Amrun Port and at the river facilities was undertaken in March/April 2016:

- 202,416 $m^3$ (in-situ volume) was removed for the Port berth pocket and departure area (RTA, 2017a). The dredged material was placed at the Amrun Dredge Material Placement Area (DMPA) which is located approximately 14 km to the west of the Port
- 47,325 $m^3$ was removed by a cutter suction dredge at the river terminals and placed at the Albatross Bay DMPA (RTA, 2017a).

At the Port the capital dredging created the following (Figure 4):

- main shipping channel: an 11.2 hectare channel for vessels travelling to and from the berth with a dredge depth of -13.6 m Lowest Astronomical Tide (LAT) and a declared depth of -13.1 m LAT
- berth pocket: a 3.3 hectare (350 m long, 75-110 m wide) berth pocket with a dredge depth of -15.9 m LAT and a declared depth of -15.4 m CDB
- wharf: a 1.4 hectare area under the wharf and adjacent to the berth pocket with a dredge depth of -14.9 m LAT.

At the river facilities the capital dredging created the following (Figures 5 and 6):

- Hey River Terminal: a 0.9 hectare roll on roll off (RORO) channel with a dredge depth of -3 m Lowest Astronomical Tide (LAT) and a 1.1 hectare heavy mining equipment (HME) channel with a dredge depth of -2.5 m LAT
- Humbug Terminal: a 0.4 hectare RORO channel with a dredge depth of -3 m LAT and a 0.3 hectare HME channel with a dredge depth of -1.8 m LAT.

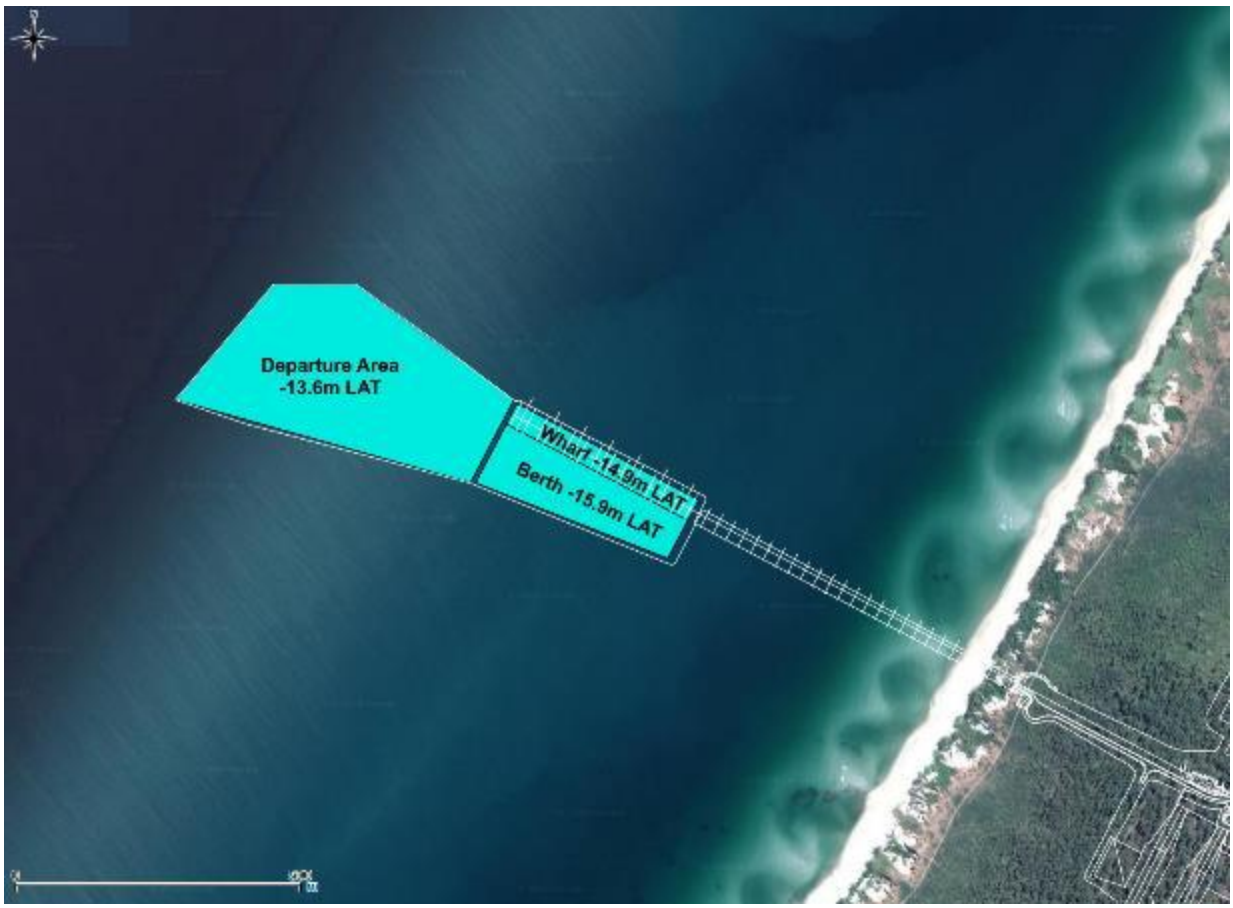



**Figure 4: Amrun Port navigational areas**


**Figure 5: Humbug Terminal navigational area**


**Figure 6: Hey River Terminal navigational area**

### 2.1. VESSELS

Vessels currently transporting bauxite from Amrun Port include a mix of vessels owned and operated by Rio Tinto Marine (the Rio Tinto fleet) and chartered vessels. The current Rio Tinto fleet consists of seven vessels (five existing vessels of approximately 90,000dwt and two new vessels of approximately 88,000dwt). The vessels are all Japanese built bulk carriers with minor modifications to the cargo spaces, rudder and hull form to suit the specific requirements of the bauxite trade.

Bulk carriers from Amrun Port currently travel to and from the Port of Gladstone via the Torres Strait and follow the inner Great Barrier Reef Designated Shipping Area.

In addition to the Rio Tinto fleet, Rio Tinto charters Panamax vessels (typically 75,000 to 88,000dwt) as required. In future, Rio Tinto may also charter Cape size vessels if required for the transport of bauxite internationally. To accommodate bulk carriers of this size, the navigational areas within the Amrun Port may have to be deepened to enable the safe departure of loaded vessels.

Figure 7 provides a cross-sectional representation of the various depths related to dredging and safe vessel movements.

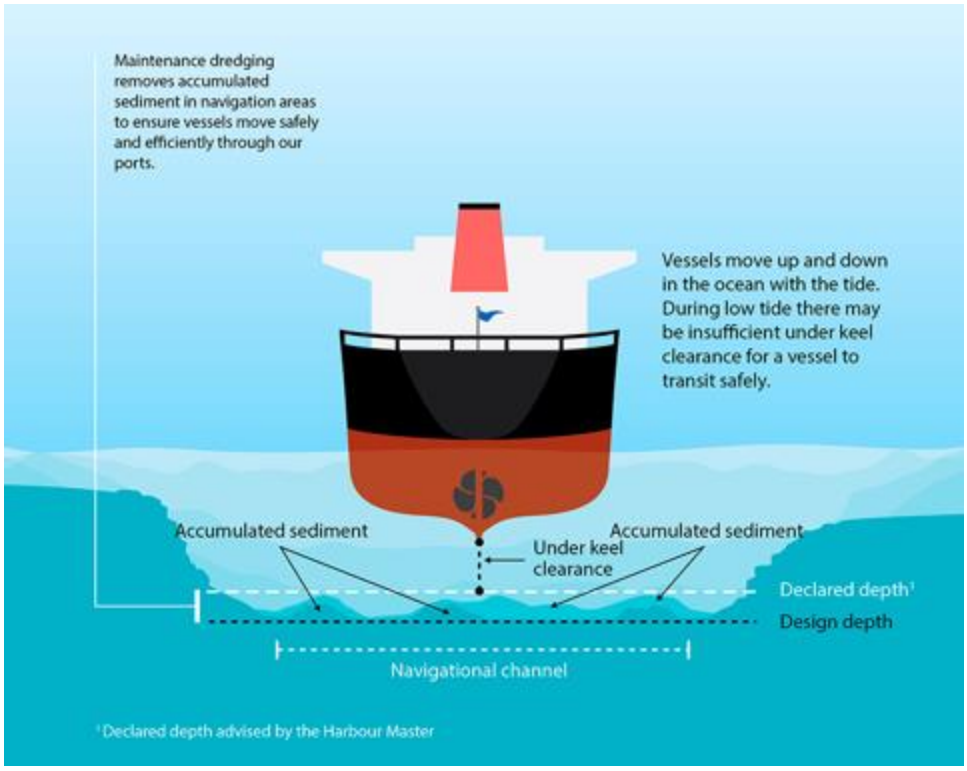



**Figure 7: Shipping channel terms and depths**

# 3. Port Environmental Values

In managing sediment and dredging activities at Amrun Port it is essential to understand the environmental, social and cultural values of the Port and the surrounding area.

The focus is on values that are considered important or notable at a national, regional or local level. The aim is to provide a useful level of detail and relevance to management planning. Values are described for the broader area incorporating the port limits and adjacent environs. More detailed information regarding these values can be found in the *Port of Weipa and Amrun Environmental Values Report* (GHD 2019).

This environmental values assessment has identified, assessed and evaluated those values considered to be important within the Amrun/Weipa region across the headline categories of social, aquatic ecosystems, landform and biota and air quality. This has been completed using robust methodologies that considered how values considered important at a national, regional and local level were expressed within the region to determine those values that are considered significant for the region. Assessment used desktop review of data collated and reported from field investigations in conjunction with data available through online portals, including government databases.

Assessment determined the significant values for the region to be:

- Traffic management
- Fisheries
- Waste management
- Indigenous cultural heritage
- Seagrass
- Mangroves
- Marine fauna (notably turtles and dolphins)
- Catchments and streams (estuarine)

WHAT IS AN 'IMPORTANT VALUE'?

- For the purposes of this Plan, *important environmental* values are those that are:
- Matters of national environmental significance protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Matters of state environmental significance protected under Queensland environmental protection and management laws.
- Habitats or ecosystems that are considered 'important' or 'critical to the survival' of listed species or communities.
- Values that contribute significantly to the regional and local landscape.

Important *social and cultural* values are those that are:

- Included in national or state registers.
- Identified by traditional owners or community members.
- Values that contribute to the appreciation culture and heritage in the region.
- Features that provide a connection to the landscape, history or previous or current use of the area.

These values have been assessed as significant as they represent something that is regionally or locally unique. Some values, like corals, shorebirds and dugongs were recognised to be important for the region, however were not found to be of high value in the Port area when compared with other surrounding areas/regions. In addition, brydes whale (*Balaenoptera edeni*) was assessed, however, there are no species of whale known to regularly occur in waters around Amrun and as such bryde's whale is a species that may sporadically inhabit the area.

Relevant for the river facilities are estuarine species such as Sawfish, Mangroves and species that would use these areas for key life cycle stages such as prawns and fish.

A summary of the significant values is provided at Figure 8 and Figure 9 with indigenous cultural heritage not shown.

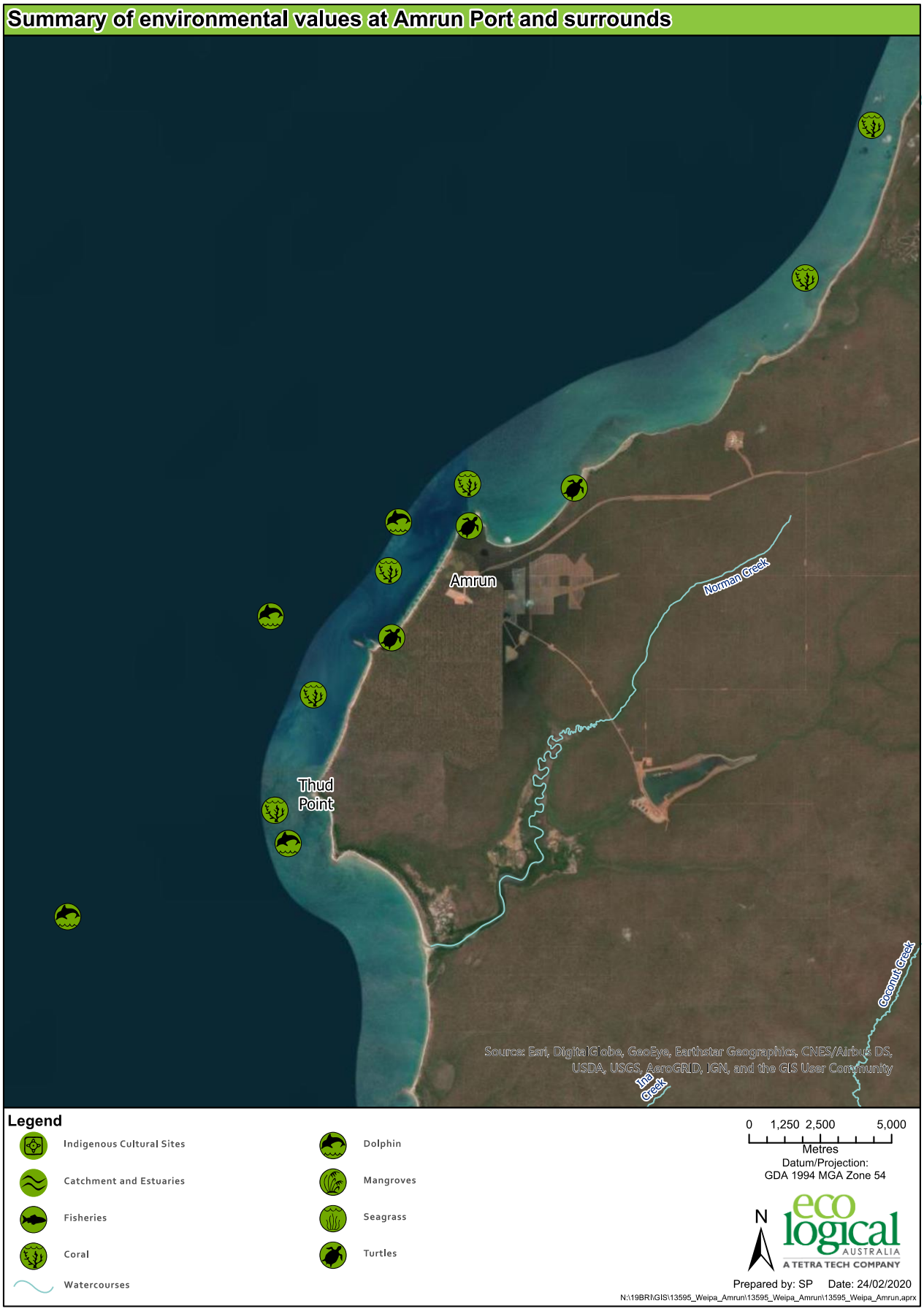



**Figure 8: Environmental values in the area surrounding Amrun Port**


**Figure 9**: **Environmental values in the area of the River Facilities (Weipa)**

## 3.1. Regional Environmental Features

Measures of importance were used as criteria to identify important environmental, cultural and social values on a national, regional and local level. Assessment was undertaken on important values to determine those that contribute significantly to the project area. These identified environmental, cultural and social values were then classified according to criteria defining 'significant values' and were supported by confidence of robustness to maintain integrity with this values assessment.

The findings can assist in identifying potential environmental constraints and opportunities when considering and ultimately deciding sediment management options for the port, as well as provide an important input into broader port planning and decision-making.

The environmental values were defined as important at a National, State/Regional or Local level by using set criteria, including:

- matters of National and State Environmental Significance
- critical habitats and ecosystems
- regional significance
- national/state heritage registers
- traditional owner considerations.

Those values that were found to be important for the region were further assessed to determine if they contributed significantly to the expression of social, cultural, environmental or economic values of the project area.

It is important to note that some values that were considered locally and regionally significant, such as terrestrial flora and fauna, were included as subsets of broader categories that were assessed overall as not being significant and therefore not included as significantly important values for the project area.

Those values determined to be significant for the Project area are summarised below:

***Traffic management***

Transport infrastructure in the area is highly valued and is regionally significant as it provides broader connections in the region and increases access to employment and essential social services. Transport was determined to be of high social significance in the area as there are limited traffic options given the remoteness of the area and the road and air network is vital to the economic survival of the region

***Fisheries***

Commercial and recreational fishing in the area is highly valued as it is an important component of the economic and social landscape that is otherwise largely reliant on mining. Commercial fishing is recognised in the Cape York Regional Plan as being an important economic value of the region as providing for a more diverse economy. Fishing is of high social significance and the range of species (e.g. barramundi, mackerel, grunter) that attract fishers needs to be considered in future port decision making.

***Waste management***

Waste management is considered to be of high regional significance due to a constrained capacity to manage waste within the region.

***Indigenous cultural heritage***

Indigenous cultural heritage has been determined to be a significant value. The area is home to story places, shell middens, stone axes and a number of the woomera scarred trees with high archaeological significance.

***Seagrass***

Seagrass communities are considered to be of high local and regional importance in Albatross Bay and river estuaries. Seagrass has been determined be a significant value as it provides critical ecosystem functioning, important nursery ground for fisheries, and ultimately supports the commercial and recreational fisheries in the Gulf.

***Inshore Dolphins***

Annual inshore dolphins surveys have since been conducted in 2014 and years 2016 – 2019 as part of the Amrun projects *Inshore Dolphin Offset Strategy.* Where of relevance, the outcome of these surveys is used to inform the management of operational shipping within the area.

Several species of dolphins are known to occur within the study area of relevance to this management plan:

- Indo-pacific humpback dolphin (*Sousa sahulensis*)
- Inshore and offshore forms of the bottlenose dolphin (Tursiops spp.)
- Australian snub fin dolphin (*Orcaella heinsohni*)
- Spinner dolphin (*Stenella longirostris*)

A baseline dolphin survey was undertaken in 2014 with subsequent surveys undertaken in 2016 - 2019 for the Amrun / Weipa region. The combined survey outcomes for the period (2014 – 2018) identified a total of 347 dolphin groups. Over the study period humpback, snubfin and bottlenose dolphins have been sighted in the same general areas including within proximity to the Amrun port and river facilities (BPM, 2019).

The most frequently seen species was the Australian humpback dolphin (240 groups), followed by the Indo-Pacific bottlenose dolphin with inshore bottle nose (84 groups), offshore bottle nose (3 groups), snubfin (19 groups) and spinner dolphins (5 groups) (BPM, 2019). Refer to figure 10 for an overview of dolphin sightings and groups sizes.

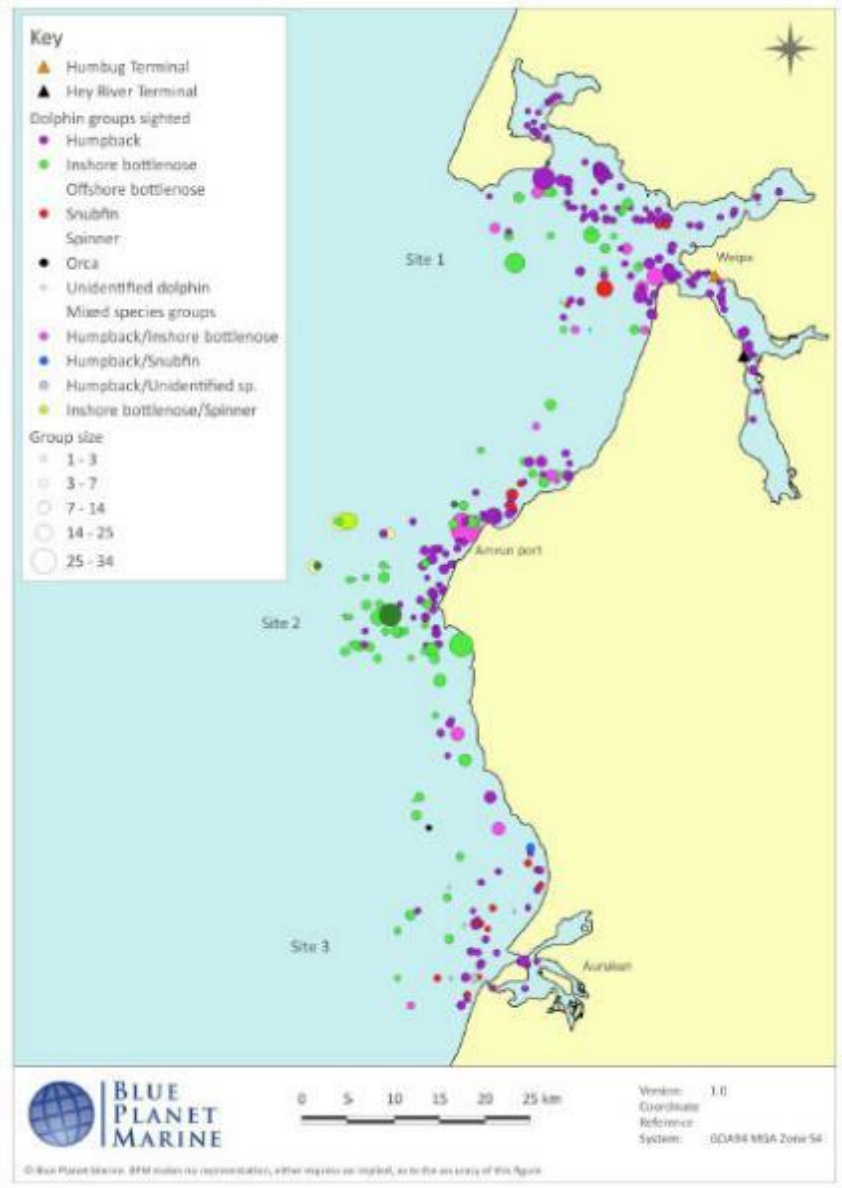



**Figure 10: Overview of dolphin sightings and group sizes for the 2014-2018 surveys combined (BPM, 2019)**

Dolphins forage in the shallow coastal and estuary habitats around Amrun, including the mangroves, reef systems and sea grass community. These habitats also provide important breeding grounds for the three common dolphin species and their calves are regularly observed during the surveys (BPM, 2019).

***Bryde's Whale***

There are two forms of Bryde's Whales; coastal and offshore. The coastal form of Bryde's whale appears to be limited to the 200m depth contour, moving along the coast in response to availability of suitable prey (Best *et al.* 1984). The SPRAT database states that it is likely that Australian inshore stocks of Bryde's Whale will be small, possibly of similar size to those off South Africa (estimated at 582 +/-184 animals: Best et al. 1984), and therefore it is unlikely that significant numbers would occur in the vicinity of the Project area.

There is no evidence of large-scale migrations of the inshore form of Bryde's Whales. The offshore form is found in deeper water (500 to 1,000m). The following listed threatened and migratory species were recorded on the EPBC Act protected matters search as possibly occurring within the Project area; however, they are unlikely to be present due to a lack of suitable habitat: Humpback Whale, Killer Whale and Blue Whale (RTA, 2011).

***Turtles***

Turtle populations in the region have been extensively studied. The South of Embley EIS (RTA 2011) and subsequent surveys under RTAs Marine Turtle Offset Plan and Feral Pig Management Offset Strategy have identified the olive ridley (*Lepidochelys olivacea*), flatback (*Natator* depressus), hawksbill turtle (*Eretmochelys imbricate*) and green turtle (*Chelonia mydas*). These turtle species were found to nest on beaches within the Amrun project area extending up to 27km North and 32km south of the Amrun Port. The greatest density of nesting in 2018 occurred on beaches south of Thud Point; however nesting does still occur on the beaches within the Amrun Port limits between Boyd Point and Pera Head (PE, 2019).

A targeted dolphin survey was conducted in 2018 as part of RTA's Inshore Dolphin Offset Strategy and recorded the same four turtle species as those previously mentioned as well as the logger head turtle (*Caretta caretta*), foraging within coastal habitats of the region (BPM, 2019). The leatherback turtle (*Dermochelys coriacea*) has not been directly observed in the region but suitable habitat is present and likely occurs as a transient species, foraging in the coastal habitats (BPM, 2019)

Relevant survey findings are used to inform the management of operational shipping within the area.

Results from the 2019 survey indicate that when compared to previous surveys, the annual rate of nest predation by feral pigs was significantly lower, falling below 30% for the first time since the programs inception.

***Dugong***

Amrun Port does not support an ecologically significant proportion of dugong or important habitat for the species as there are no major feeding grounds and no resident population. While no foraging areas for dugong occur in the area of the Amrun Port, it is likely dugong traverse as they travel between seagrass resources.

With respect to the river facilities, Humbug and Hey, the seagrass beds in the Embley and Hey Rivers potentially constitute feeding habitat for dugong; however it is noted that the long strap-like seagrass *Enhalus acoroides,* which dominates the seagrass beds of the Embley and Hey Rivers, is not a preferred species in the dugong diet (RTA, 2011).

Over construction and operation of the Amrun Project, there have been no incidents involving dugong.

***Catchments & streams (estuarine)***

With relevance to the River Facilities, catchment and streams are considered to be of high local and regional importance as they provide for permanent aquatic refuge in a highly seasonal environment and provide for critical habitat for conservation significant species. Catchment and streams that are located downstream (estuarine environment) are specifically rated as being a significant value as they play a vital part of the economic and environmental productivity in the Gulf.

## 3.2. INDIGENOUS CULTURAL HERITAGE

A large number of groups have historically occupied land in the vicinity of Amrun and Albatross Bay, many of which now live within a number of Indigenous communities along the western coast of Cape York. The cultural heritage value of the area is defined by both significant sites and places and by the presence of natural resources that are culturally significant. Traditional Owners carry out commercial fishing for prawns in Albatross Bay, which contributes to the economy of a number of local communities. They also hunt for turtle and dugong within Albatross

Bay. The area around Chwahn sandbank has been identified by Traditional Owners as an area of significance due to the location of two story sites:

- Thungganh story is located in the area around the Chwahn (Jackson) sandbank
- A'Ang story is located at the base of the existing Channel.

Previous capital and maintenance dredging has not impacted these cultural story sites.

Each option for a new offshore dredge management placement area within Albatross Bay has been considered in consultations with Traditional Owners. Consultation undertaken with Traditional Owners and other Aboriginal Parties concluded that no matters of cultural heritage significance were present in the proposed areas.

Traditional Owners are represented on the Boyd Port Dredging & Technical Advisory Committee by an appointed person under the Indigenous Land Use Agreement. It is recommended that ongoing efforts be made to consult with the Traditional Owner parties through the appropriate consultation process as directed in the Western Cape Communities Co-Existence Agreement (WCCCA) prior to commencement of works and thereon each year in which dredging is to occur.

# 4. Consultation

## 4.1. Technical Advisory and Consultative Committee

Under the NAGD (CoA 2009), development of a Technical Advisory and Consultative Committee (TACC) is necessary to assist in the consultation process required for a Sea Dumping Permit application and a condition of Environmental Authority EPML00725113 (EA).

The NAGD states that:

> "The TACC is intended to assist ports and other proponents and Determining Authority to access local knowledge and reconcile various stakeholder interests."

The EA, condition 31 states that:

"The holder of this environmental authority must report to the BPDTAG on proposed dredging activities for Boyd Port and implementation of the Dredge Management Plans(s) for the South of Embley port, including monitoring results, management triggers and response actions. The group will assist in the establishment, where appropriate, of longer term management for the maintenance dredging program".

As such, consultation on the development and implementation of this LMDMP will be conducted with the Boyd Port Dredging Technical Advisory Group (BPDTAG) prior to submission of any approval applications or commencement of dredging activity[1]. The views of the BPDTAG and how these have been considered will be provided to relevant regulators. Consultation on the implementation of this LMDMP will be conducted with the BPDTAG in accordance with the EA, EPBC Act and Sea Dumping Act approval requirements.

The BPDTAG is intended to:

- provide continuity of direction and effort in protecting the local environment
- support communication between stakeholders
- assist in the establishment of longer term management arrangements, including reviewing the development and implementation of management plans and monitoring programs
- review dredging and dumping activities in accordance forecast plans and programs
- make recommendations to the port authority and regulators as necessary or appropriate.

The BPDTAG includes representatives from Commonwealth, Queensland and local governments, port users and community interest groups as detailed below.

- Department of Agriculture, Fisheries and Forestry (Qld)
- Department of Agriculture, Water and the Environment (Clth)
- Department of Environment and Science (Qld)
- Department of Transport and Main Roads (Qld)
- Maritime Safety Queensland
- North Queensland Bulk Ports Corporation
- Port of Brisbane (dredge operator)
- Western Cape Communities Coexistence Agreement (WCCCA) Traditional Owner representative

Two workshops were held with the BPDTAG during 2019 to help inform the development of this Plan.

The first workshop was held with the BPDTAG in September 2019 to help define objectives and performance measures for the comparative analysis of reuse and placement options. A second workshop was conducted in December 2019 to provide an update and present the results of the analysis and seek stakeholder feedback. Additionally, separate discussions were held with Traditional Owner and government stakeholders to obtain their views.

[1] For dredging at the river facilities the Port of Weipa TACC should also be consulted, refer to Port of Weipa LMDMP for detail on the TACC.

### 4.2. INDIGENOUS CONSULTATION

Indigenous consultation was conducted in accordance with the process defined under the Indigenous Land Use Agreement referred to as the Western Cape Communities Coexistence Agreement (WCCCA) during the preparation of this Plan. This consultation involved the following:

- Consultation with Traditional Owners commenced with the WCCCA Environment and Heritage Sub-Committee (E&HSC) in August and November 2019. No major concerns were received regarding the dredge activities with representatives expressing a clear preference for dredge material to continue to be placed at sea and not brought ashore.
- Consultation on a draft of this LMDMP continued with the WCCCA E&HSC in February 2020.
- The draft LMDMP was lodged with the WCCCA E&HSC in January 2020 for comment prior to the scheduled WCCCA Coordinating Committee meeting in March 2020 along with minutes of the WCCCA E&HSC meeting.
- Traditional Owner representatives passed a resolution to accept the LMDMP at the WCCCA Coordinating Committee on 11 March, 2020.

### 4.3. TRADITIONAL OWNER EMPLOYMENT

RTAW has committed to working collaboratively with Traditional Owners, through the relevant WCCCA Sub-Committees and the WCCCA Coordinating Committee to increase representation of local Aboriginal people, and in particular, the Wik & Wik Way Traditional Owners across the workforce. In addition, RTAW 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.

Traditional Owner employment opportunities during dredging activities include use of Traditional Owners for downstream monitoring for dead or injured wildlife.

In addition, through the existing Indigenous Land Use Agreement, opportunities for employment of Traditional Owners are identified through and 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 Indigenous employment and training obligations are made to Traditional Owners

# 5. Sediment Assessment

## 5.1. PORT SEDIMENT CHARACTERISTICS

Port navigational areas, including shipping channels, aprons and berth pockets, are areas that have been deepened to allow the safe navigation, movement, loading and transit of ships trading at the Port. In these deeper areas of the Port, currents, wave energy and tidal regimes are responsible for mobilising and transporting sediments. This can be different to what is occurring in the adjacent natural seabed areas. The different depths and water movement can cause significant changes in the patterns of sediment scouring and accumulation.

Currents, wave energy and tidal regimes are responsible for mobilising and transporting sediments into these deeper areas of the Port. The different depths and water movement can cause significant changes in the patterns of sediment scouring (erosion) and accumulation (accretion).

Accretion of seabed sediments results in 'high spots' or 'high areas' within the navigational areas, above which safe navigational depths must be applied. The result is often reduced 'declared' depths, the effects of which may significantly affect the efficiency of the Port.

A number of studies were undertaken to help understand the sediment management needs of the Port and identify the most appropriate solutions for reuse or disposal of the maintenance dredge material. This work involved:

- Consideration of the sediment properties (Rio Tinto 2017).
- Identification and analysis of beneficial reuse options (Advisian 2018).
- Identification and analysis of suitable material disposal/placement locations (PCS 2019c).

These studies helped answer key questions around:

- The nature and sources of marine sediments that accumulate in the navigational areas at the Port
- What drives sediment dynamics at the local and regional scales
- Current and predicted rates of sediment accumulation
- Risks to operations from increased sedimentation at the Port.

#### NATURE OF THE SEDIMENT

Exploration for commercial deposits of bauxite in the Gulf of Carpentaria in the early 1970's involved a number of marine surveys that included seismic and borehole data from the inner shelf environments offshore of Weipa (Bates et al. 1971). Results from the drilling showed that the surface sediment typically comprised of Holocene marine muds with thicknesses of less than 1 m north of Duyfken Point to more than 6 m in parts of Albatross Bay. Based on information from available literature, the deposits which typically occur along the eastern shoreline of the Gulf of Carpentaria can be categorised by water depths as follows:

- Depths of less than 20 m: sands and sandy muds are present on top of older sediment (pre-Holocene). Typically, sands are present along the open coast down to 10 m water depth, while in sheltered embayments such as Albatross Bay silts and clays are present (Michaelsen, 1994)
- Depths of 20 to 60 m: relict alluvial (river) sands and gravels are common on the seafloor (Hudson, 1995).

The sediment composition information from the literature agrees well with the findings from recent sediment sampling undertaken in the region as part of the impact assessment for Amrun Port and the ongoing maintenance dredging requirements at the Port of Weipa. Based on the available information as well as findings from the bathymetric analysis and observations (PCS, 2018b) a sediment composition map has been developed for the region (Figure 11). Figure 11 shows the following:

- the majority of Albatross Bay is made up of sandy/clayey silt (brown shading)
- the mouths of the Pine, Mission and Embley Rivers are made up of predominantly sand (yellow shading), with some sandy gravel (orange shading) present in the Embley River where current speeds are highest
- the areas along the open coast and the southern side of Albatross Bay is predominantly sandy sediment (yellow shading)
- the offshore region (deeper than 15 to 20 m) is predominantly made up of silty sand.

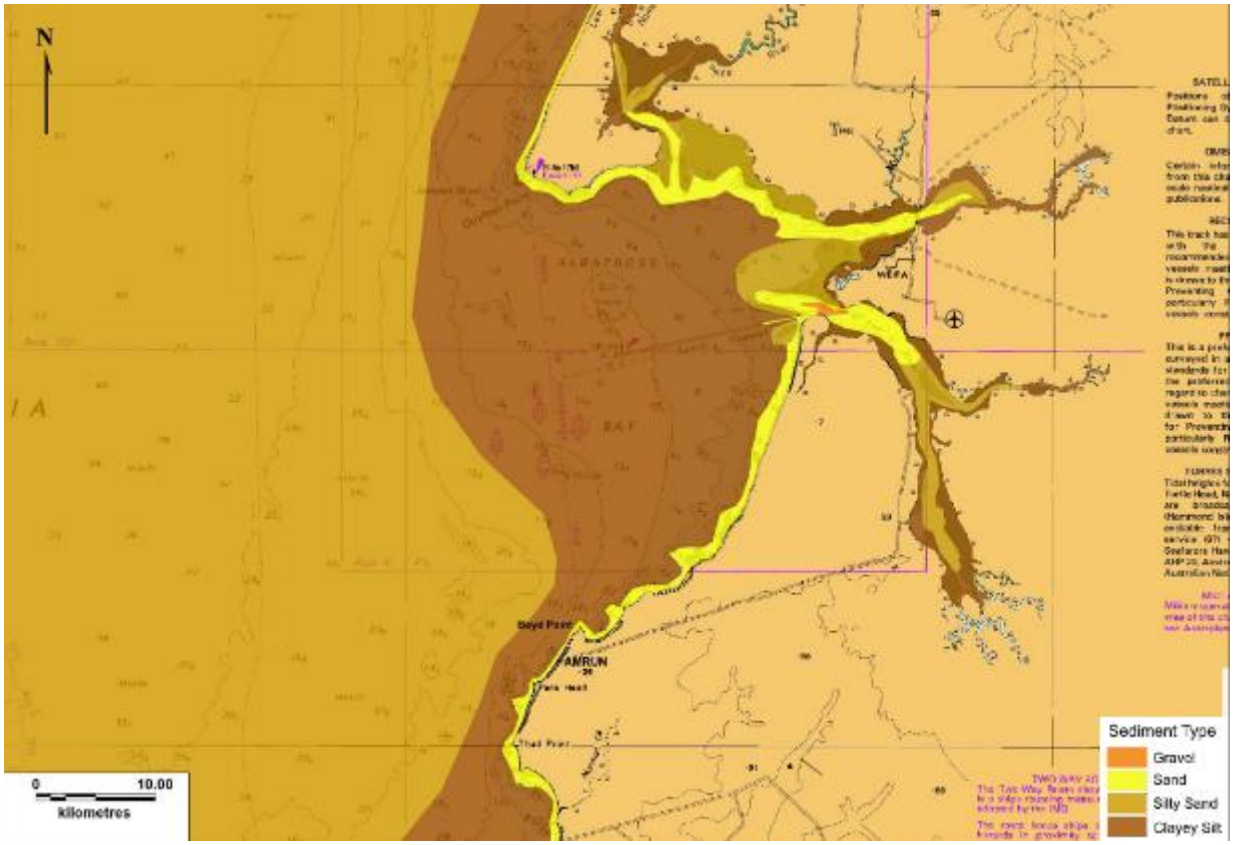



**Figure 11: Inferred sediment composition for the Weipa and Amrun regions (PCS 2019b)**

It is also important to understand the sources of sediment which contribute to sediment transport in the region. There are two types of sediment sources:

1. **Sources of new sediment**: for the Amrun region the main sources of new sediment to the marine system are from cliff erosion and nearby river discharge, although there will also be small inputs from the erosion and reworking of carbonate reefs.
2. **Sources of existing sediment**: for the Amrun region the main source of existing sediment which contributes to the sediment transport is from the surface sediment on the seabed, although the sediment in the Embley River estuary, particularly in shallow intertidal areas, will also contribute.

**SEDIMENT CONTAMINATION**

Sediment sampling and analyses was completed at the Amrun Port facility location in September 2017 (RTA 2017b). The assessment of dredged material was consistent with the assessment guidance described in the NAGD and was conducted in accordance with the submitted Sampling and Analysis Plan (SAP). The sediment characterisation report is to be supplied with any the Sea Dumping Permit application. The SAP and data analysis should be maintained as current on a 5 yearly cycle.

Based on previous results, there was no known contamination and sediments at the site were not expected to vary significantly over the dredge footprint. The dredge footprint was therefore treated as one area.

Sediments were sampled from 17 locations in the Amrun Port berth area and departure channel. Analytical results showed that sediments in the dredge footprint were dominated by silt (57%) and clay fractions (28%), with only 14% of sediments comprised of sand, and 1% gravel. Sediments from the spoil ground were dominated by sand (43%) with 24% silt, 27% clay and 6% gravel. Moisture content in sediments from within the dredge footprint was high (61%) compared to the spoil ground (34%).

Exceedances of the NAGD screening level were recorded for total recoverable Nickel (Ni) in multiple sediment samples (11 samples from the dredge footprint, 3 samples from the spoil ground). The 95% UCL for Nickel was 46 mg/kg, however, the 95% Upper Confidence Limit (UCL) for Ni in sediments by dilute acid extraction (DAE) was 2.9 mg/kg (well below the NAGD guideline value of 21 mg/kg). This shows that the bioavailability of Ni in sediments within the dredge footprint is very low.

Based on the assessment completed all metal(loid)s 95% UCL were less than the corresponding screening levels except for Ni, however Ni in sediments by DAE was substantially less than screening levels, accordingly dredged material is considered chemically suitable for unconfined disposal at sea.

This sediment characterisation (conducted September 2017) is anticipated to be representative of sediment for the next two years, beyond that a new SAP will be prepared and made available to regulators. If there is a release of contaminants to the marine environment during Port operations or a change in bauxite processing methods the sediment characterisation will be reviewed to determine if resampling of sediment is required.

Should subsequent testing indicate that sediments are unsuitable for ocean disposal the treatment and placement options will be reviewed in consultation with all stakeholders, including the BPDTAG and Government regulators.

## SEDIMENT BUDGET

### PORT OF AMRUN

In managing sedimentation within the Port it is important to understand the natural sediment transport processes which occur in the region. This includes understanding the source of the sediment, sediment transport pathways, processes controlling the sediment transport and the development of a quantitative sediment budget. Ports and Coastal Solutions (2019a, 2019b) has undertaken a series of studies to understand how best sedimentation should be managed at Amrun Port. The following summarises these studies.

**Local Conditions:** The dominant process which is resulting in sedimentation in the dredged areas at Amrun Port is wave action. The wave conditions control the mass of sediment resuspended along the open coastline and within Albatross Bay and the tidal currents subsequently transport the suspended sediment. The sediment will be transported until the bed shear stresses are sufficiently low for the sediment to be deposited (i.e. either the wave energy and tidal current speed have reduced or the sediment has been transported to a sheltered location).

**Wave Resuspension Relationships:** To better understand the relationship between wave activity and turbidity, numerical modelling simulations were undertaken for a range of wave conditions. The results show an approximate exponential relationship at all locations, with the Suspended Sediment Concentration (SSC) highest in open water and Albatross Bay and lowest in the estuary areas of the region. The increase in SSC is relatively gradual up to a significant wave height (Hs) of 2 m, and much more rapid when the Hs increases beyond this.

**Resuspension Calculations:** Two approaches were adopted to estimate the natural resuspension of fine-grained sediment from the region and assess the differences between the two approaches. The first approach estimated the annual resuspension through statistical analysis of measured turbidity data, while the second approach estimated annual resuspension using a calibrated sediment transport model. The two approaches provided similar (less than 10% difference) natural annual resuspension estimates for the region, with the first estimating 38 Mt/yr and the second 35 Mt/yr. The similarity between the two approaches provides confidence that the sediment transport model is able to provide a reliable estimate of the quantitative sediment budget for the region.

**Sediment Budget:** The quantitative sediment budget has been run at both a regional and a local Amrun Port scale. The budget shows the following:

- approximately 45 Mt/yr of sediment is resuspended at the Weipa and Amrun regional scale (covering 10,000 $km^2$, approximately 130 km along the coast and 80 km offshore) during a typical year and 70 Mt/yr during a cyclonic year.
- the majority of sediment which is suspended at the regional scale is from the local resuspension of existing fine-grained sediment. Wave action drives the resuspension of existing fine-grained sediment within Albatross Bay and along the open coast to the north and south, while tidal currents and locally generated wind waves drive resuspension within the estuaries.
- there is limited input of new sediment to the sediment budget in the region (less than 1% of the total annual resuspension mass), with the main sources of new fine-grained sediment being from cliff erosion and river discharges/overland flow.
- there is limited net residual transport of sediment (less than 10% of the gross sediment transport in the local region) and as such the sediment budget is generally balanced. The suspended sediment is typically either transported north and south along the open coastline, or offshore (west) and onshore (east) in Albatross Bay and the adjoining estuaries.
- significant sedimentation occurs in the berth pocket at Amrun Port, which is mainly due to the resuspension of existing fine-grained sediment within Amrun region due to wave action. The suspended sediment is then repeatedly transported backwards and forwards past the channel with 2 – 3% of the total

(gross) suspended sediment becoming trapped. Sedimentation occurs predominantly during the wet season due to the increased SSC resulting from larger waves, with limited sedimentation during the dry season when wave conditions are calm and there is little resuspension of sediment from the seabed.

#### Dredge Material Placement Area

Numerical modelling was undertaken to better understand the potential for resuspension from the Amrun Dredge Material Placement Area (DMPA) and the fate of any sediment resuspended at the DMPA. The modelling showed that sediment placed at the Amrun DMPA only has the potential for significant resuspension during large wave events. The majority of the sediment which is resuspended from the DMPA is subsequently deposited adjacent to the DMPA directly to the north and south-west. This shows how the sediment lost from the Amrun DMPA becomes redistributed within the natural system and is subsequently re-assimilated back into the ambient seabed sediment.

**Implications**: The sediment budget shows that due to the regular reworking of existing fine- grained sediment within the Amrun region due to wave conditions in the wet season, there is expected to be regular annual sedimentation in the berth pocket at Port of Amrun. As long as the berth pocket remains deeper than the adjacent natural seabed (i.e. remains as a useable berth) it will act as a sediment sink with sedimentation likely to continue. As such, if no maintenance dredging is undertaken, then ongoing sedimentation in the berth pocket will pose a significant risk to Port operations and safety as the sedimentation will result in the berth becoming shallower than the declared depth.

From this work it was concluded that it is necessary to manage marine sediments in both the short and long term. This is due to the accumulation of marine sediments within the Port navigational areas, which will substantially impact port operations (ACIL Allen Consulting 2019) in the absence of measures to manage sediment. Current levels of marine sediment accumulation and predicted future rates necessitate a management approach that provides both short and long term solutions.

### RIVER FACILITIES

#### Hey River Terminal

The change in bathymetry two years following the capital dredging in 2016 at the Hey River Terminal is shown in Figure 12. Over the two years after the capital dredging, both erosion and accretion had occurred in the dredged areas. Accretion had occurred along the western, northern and southern edges of the dredged areas, with the most accretion along the western edge. Erosion had occurred adjacent to the northern and southern berths, where the stern of any berthed vessel would be located, due to the high current speeds created by the vessel propeller wash.

#### Humbug Terminal

The change in bathymetry two years following the capital dredging in 2016 at the Humbug Terminal is shown in Figure 13.

Over the two years after the capital dredging, there has been limited change in the bathymetry in the areas surveyed. However, the most landward part of the channels (approximately 10 to 15 m) was not surveyed in 2017 or 2018. This is likely to be due to the ramp and piles which have been installed, limiting access to the landward end of the channels. Based on the adjacent bathymetry it is possible that some sedimentation has occurred in these areas, but this cannot be quantified as the surveys do not cover the area.

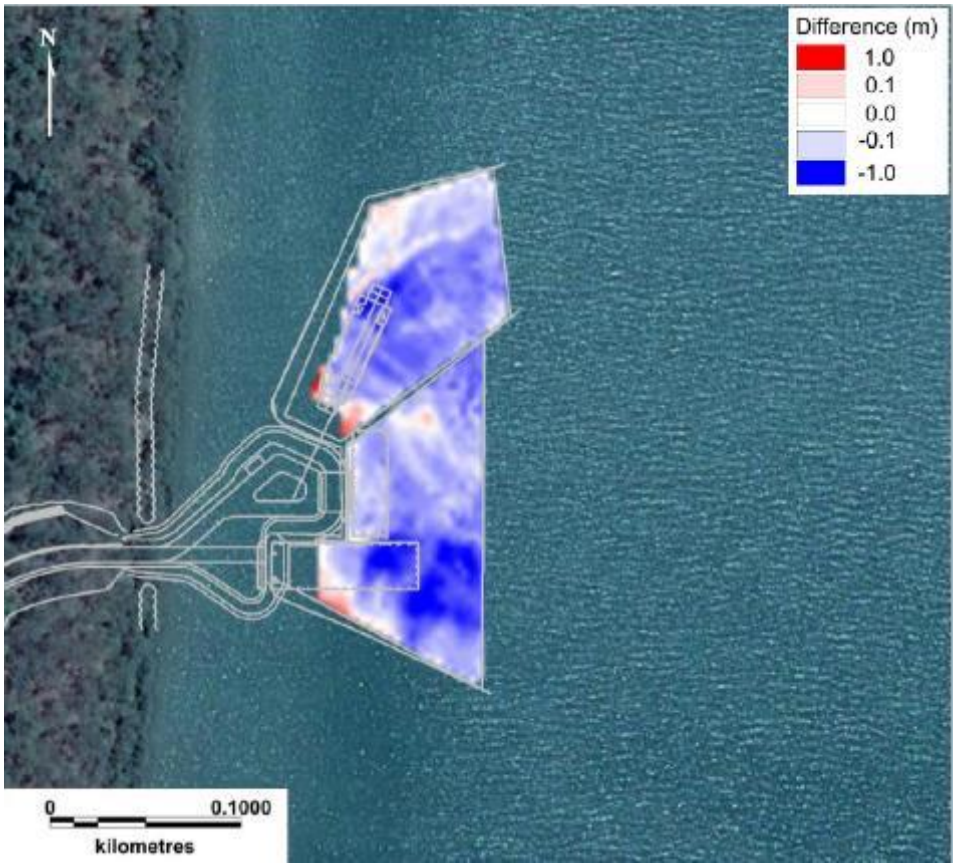



**Figure 12: Hey River Terminal comparison between the bathymetry in May 2018 and the design depths, red represents areas above design depth and blue areas below**

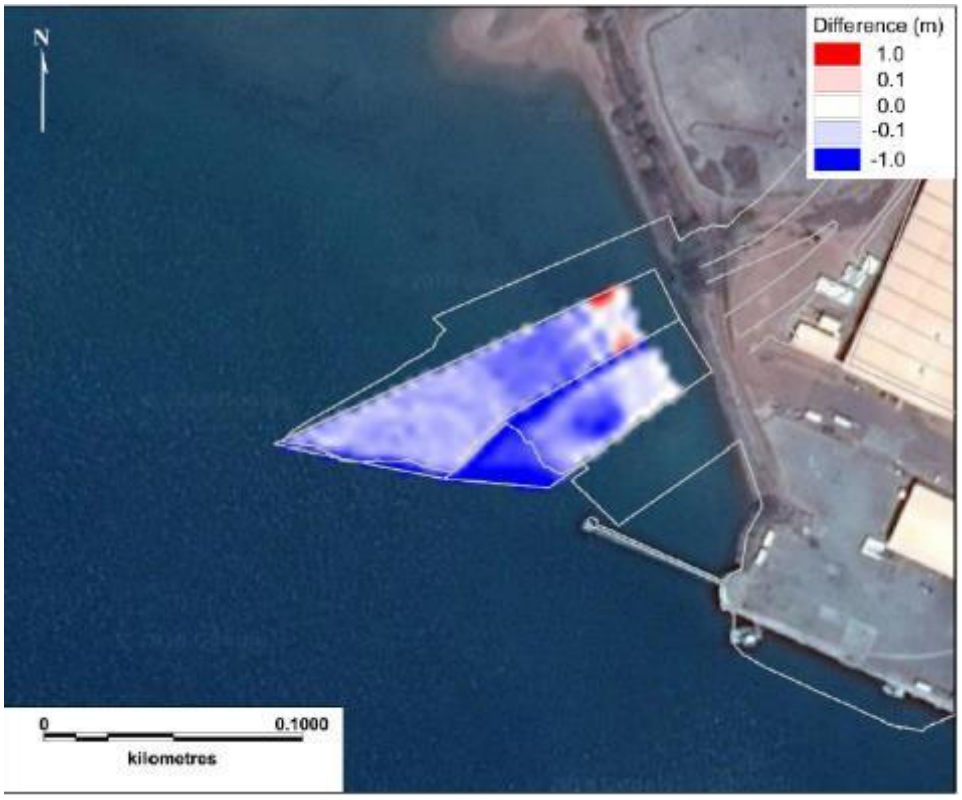



**Figure 13: Humbug Terminal comparison between the bathymetry in May 2018 and the design depths, red represents areas above design depth and blue areas below.**

## 5.2. MAINTENANCE DREDGING AND PLACEMENT REQUIREMENTS

### AMRUN PORT

To better understand exactly where sediment accumulates and in what quantities with the Port's navigational areas, an examination was undertaken of the bathymetric surveys from 2018 and 2019 (PCS 2019b).

During the 2018 to 2019 wet season a number of cyclonic and tropical low events influenced the Gulf of Carpentaria. This included TC Owen in early December 2018 and TC Penny at the end of December 2018 and early January 2019. Both of these cyclones made landfall twice along the Cape York peninsula. TC Penny made landfall close to Weipa when it crossed in an easterly direction, resulting in the largest waves of the 2018-19 wet season, although a tropical low in January/February 2019 resulted in the longest duration of increased wave heights.

The weather events in the 2018-19 wet season resulted in the significant wave heights (Hs) exceeding 2 m for more than double the duration of any other year since 2009 (when the Albatross Bay waverider buoy (WRB) was installed by the Queensland Government, Department of Environment and Science (DES)). This threshold was identified as a potential indicator of sedimentation volumes in the dredged areas. As a result of the potential for high sedimentation during the 2018-19 wet season, additional bathymetric analysis was undertaken.

Plots showing the bathymetry in May 2018 and February 2019 are shown in Figure 14 and Figure 15 and the change in bathymetry over this period is shown in Figure 16. In addition, the difference between the February 2019 bathymetry and the design depths is shown in Figure 17. The plots show that significant sedimentation has occurred in the berth pocket over this period, with more than 2 m of sedimentation in most areas of the berth resulting in the entire berth pocket being between 1 and 2 m above the design depths. The plots also show that although some sedimentation occurred in the shipping channel the area remained below the design depth.

Volumetric analysis of the bathymetric data has also been undertaken. It was calculated that 58,800 $m^3$ of sediment was deposited in the berth pocket between May 2018 and February 2019 and of this approximately 45,000 $m^3$ was above the design depth. This is approximately double the sedimentation which occurred over the 12 months when TC Nora influenced the region, with approximately 30,000 $m^3$ deposited in the berth over this period. This increase is expected as two tropical cyclones influenced the region and a long duration tropical low and this resulted in the Hs exceeding 2 m for four times longer than the year when TC Nora occurred (March 2018).

**Figure 14: Amrun Port bathymetry in May 2018 (post maintenance dredging) (PCS 2019b)**

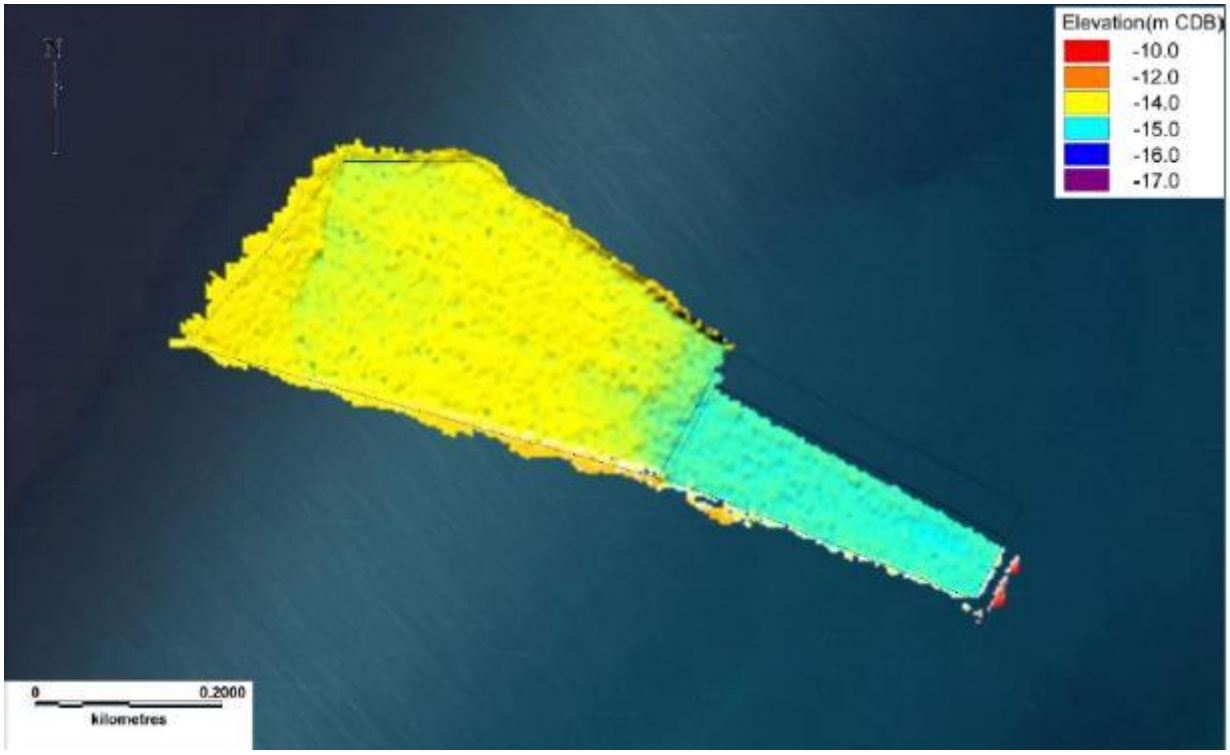



**Figure 15: Amrun Port bathymetry in February 2019 (post tropical cyclones and tropical low) (PCS 2019b)**

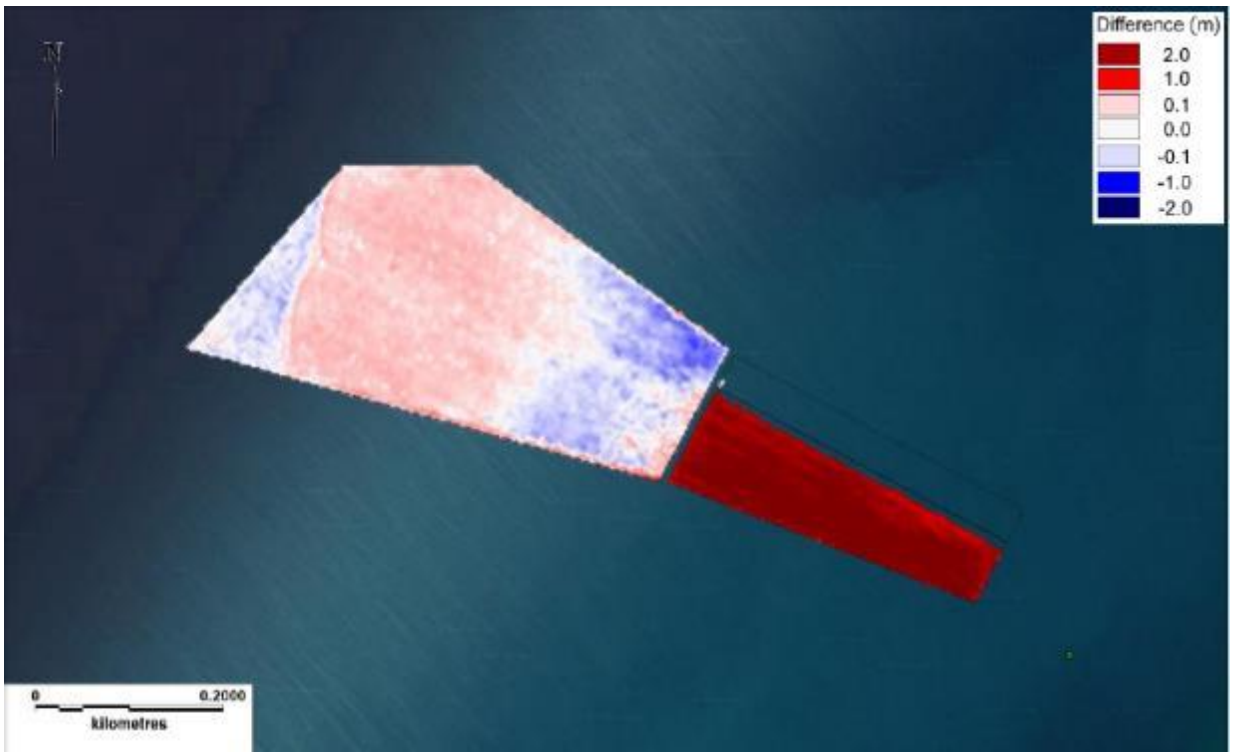



**Figure 16: Bathymetric change at Amrun Port from May 2018 to February 2019, showing erosion in blue and accretion in red (PCS 2019b)**

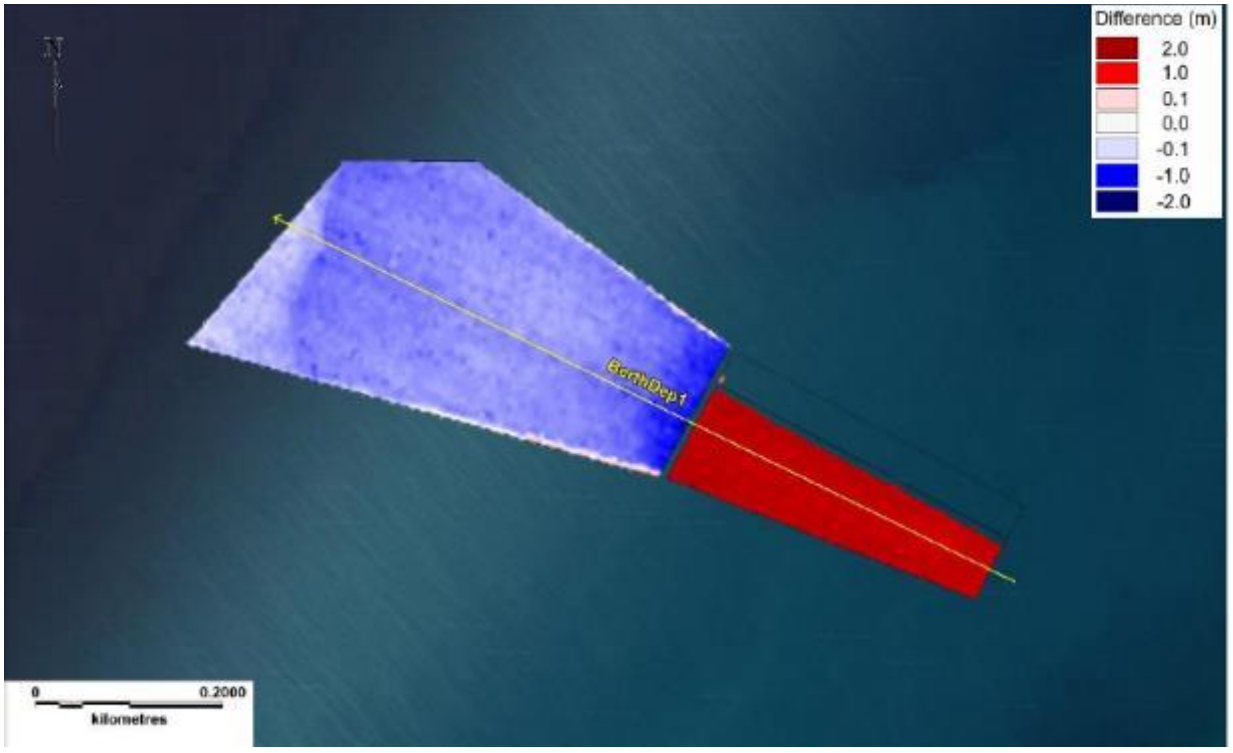



**Figure 17. Comparison between the Amrun Port February 2019 bathymetry and the design depths, red represents areas above design depth and blue areas below (PCS 2019b)**

Since the development of the Port there have been two maintenance dredging campaigns undertaken, the volumes dredged are shown in Table 4.

**Table 4: Historical dredging volumes**

| Year | Type of Dredging | Volume ($m^3$) |
|---|---|---|

| | | |
|---|---|---|
| **2018** | Maintenance | 42,038<br>(following two wet seasons) |
| **2019** | Maintenance | 40,826 |

**FINDINGS**

It is expected that at a minimum maintenance dredging in the order to 40,000 $m^3$ will be required annually; in addition to this historical data indicates that volumes in the order of 60,000 $m^3$ may need to be removed up to twice a decade to maintain safe port operations.

Accordingly, management options have been considered that accommodate the following volumes over a ten year period:

Standard volume – 40,000 $m^3$ removed annually.

Large volume – 60,000 $m^3$ removed 2 years out of every 10 years.

The full ten year volume may be in the order of 440,000 $m^3$.

### RIVER FACILITIES

The Bathymetric Model Report for Amrun (PCS 2019a) identifies that sedimentation rates for both river facilities is minimal. Based on available data the sedimentation rates are:

- For the Hey River Terminal 2,140$m^3$/yr for a typical year and 4,280$m^3$/yr for a cyclonic/worst case year.
- For the Humbug Terminal - 300$m^3$/yr for a typical year and 600$m^3$/yr for a cyclonic/worst case year

Based on this, over 10 years (assuming 5 typical years, 3 cyclonic years and 2 worst case years) the total volumes would be 4,500$m^3$ for Humbug Terminal and 32,100$m^3$ for the Hey River Terminal. With operational prop wash and selective bed levelling it is unlikely that dredging would be needed annually and in fact may only be necessary after a sequence of cyclonic/worst case years.

If material is dredged at the river facilities it would be best practice for this material to be placed at the Albatross Bay DMPA in line with other material dredged from the Hey River and Embley River estuaries as part of Port of Weipa maintenance dredging.

# 6. Sustainable Sediment Management

The following is a summary of **Amrun Port Sustainable Sediment Management Assessment for Navigational Maintenance.** For further details and data associated with the comparative analysis please refer to *Amrun Port Sustainable Sediment Management Comparative Analysis Report* (Adaptive Strategies 2019) and supporting technical reports.

All reports are available at https://nqbp.com.au/sustainability/research-and-reports/sustainable-sediment-management-research.

**CONCEPT**

During 2018 and 2019, RTAW undertook an extensive research project to investigate the most sustainable way to manage accumulated sediment in and around Amrun Port.

The project: *Amrun Port Sustainable Sediment Management Assessment for Navigational Maintenance* (SSM), was to understand how the day to day operations at Amrun Port are affected by marine sedimentation and to determine, if necessary, the best way to manage operations and sediments.

First applied at the Port of Hay Point in 2018, this innovative sediment management approach has been widely acknowledged and a similar framework is now applied in the Department of Transport and Main Road's Maintenance Dredging Strategy for Great Barrier Reef World Heritage Area Ports.

The SSM project investigated where specifically the sediment at Amrun Port comes from, what impact it has on Port operations, whether accumulation can be eliminated or reduced, and what alternatives are available to reuse or dispose of any sediment that might need to be dredged.

The project has determined what is the best short and long-term approach to managing sediments within the Port. This includes investigation and consideration of:

- the source and nature of the particular sediment at the Port
- the requirements for management of the sediment in the short and longer term
- whether sediment can be managed without dredging while maintaining port operations and meeting legal requirements
- the feasible alternatives for use or placement of material if dredging is required
- the best package of measures to provide for long-term (10-year) sustainable management of marine sediments at the Port.
- The project involved consultation with stakeholders including Commonwealth, State and Local Government; port operators; conservation groups; the local community including indigenous people, fishing groups and community bodies; researchers; and tourism operators.

The work has provided valuable context for long-term management at the port, including understanding the economic effects of sedimentation and development a long-term sediment management strategy.

**SSM METHOD**

A central component of the SSM Project is a structured decision-making process that has focused on what is important to all stakeholders, not just the port authority and port customers. Contained within this structured process is a detailed comparative analysis of the various alternatives that are available to manage sediment to determine the best long-term strategy.

The decision-making process for the SSM project is a complex task dealing with social, economic and environmental factors. The principles of Structured Decision Making (Gregory *et al* 2012) were used to provide a robust method for the Project. The process involved the following five steps:

**AVOIDANCE AND REDUCTION**

The SSM project considered a range of possible alternatives to avoid or reduce the volumes or rates of sedimentation occurring within the navigational areas of the Port, as this would be the first and potentially ideal way to manage sediments in the Port area.

The SSM investigation:

- Described the sediment and hydrodynamic environment at Amrun Port in the context of possible solutions to 'keep sediment out' or 'keep sediment moving' from the offshore infrastructure areas.
- Identified both engineered and technological solutions to avoid or minimise future maintenance dredging and consider their feasibility based on the local environment, port layout and infrastructure design.
- Undertook a constraints analysis of the solutions for any feasible alternatives.
- Estimated the potential impact of any feasible solutions to existing and future maintenance dredging at Amrun Port.

A set of technical work was undertaken to fully explore the options available to manage marine sediment at Amrun Port. Three broad strategies used to reduce siltation at ports and harbours were considered (PCS 2019c). These were:

- Keep Sediment Out – keeping sediment out of the area of interest that might otherwise enter and deposit.
- Keep Sediment Moving – raising flow velocities in quiescent areas to prevent sediment from settling as it passes through the area of interest.
- Keep Sediment Navigable – applicable to sites characterised by high turbidity near-bottom sediment regimes where navigability of fluid mud zones is permitted, thereby reducing the required dredged depth.

The range of possible approaches is provided in Table 5.

**Table 5: Outline of approaches to avoiding or reducing sedimentation**

| Strategy | Approach | Example |
|---|---|---|
| Keep Sediment Out | Control sediment sources | Reduce sediment inputs through better catchment management |
| | Divert sediment-laden flows | Divert river inputs away from port |
| | Trap sediments before entering port | Sediment traps and insurance trenches |
| | Blocking sediment entry | Pneumatic barriers, silt screens, barrier curtains |
| | Habitat creation | Seagrass, saltmarsh, mangroves to stabilise and promote accretion away from port areas |
| Keep Sediment Moving | Structural solutions to train natural flows | Training walls to divert flow and prevent local deposition of sediment. |
| | Devices to increase bed shear stresses | Hydraulic jets, mechanical agitators |
| | Methods to reduce sediment flocculation | Adopting designs that reduce turbulence and therefore flocculation (e.g. solid wharf walls instead of piling supported wharfs). |
| Keep sediment navigable | Adopt a 'nautical depth' navigation approach which includes fluid mud | Nautical depth is the distance from the water surface to a given wet density, typically in the range of 1,100 to 1,300 kg/m$^3$. |

The potential applicability of approaches to reduce sedimentation must be considered on a case-by-case basis as the suitability is dependent on the port configuration, sediment type, natural environment and processes. The SSM investigation showed that many of the alternatives were simply not achievable at Amrun Port.

Within these strategies a set of options were examined to determine potential feasibility. Options that were considered included:

- Stabilise sediment sources
- Diverting sediment-laden flows:
- Trapping/Bypassing sediment
- Blocking sediment entry
- Habitat creation:
- Structural solutions to train natural flows
- Devices to increase bed shear stresses
- Alter nautical depth
- Traditional maintenance dredging

For each of these options a feasibility analysis was developed to get a high level understanding of environment impacts, operational impacts, ongoing maintenance requirements, the degree of confidence in achieving the desired outcomes and consideration of the regulatory pathways or approvals.

Due to the processes which control the sedimentation and the configuration of the dredged areas at Amrun Port, the assessment was not able to identify any feasible engineered or technical solutions which could significantly reduce the natural sedimentation at Amrun Port.

The installation of a jet array in the berth could possibly be considered as a feasible alternative to maintenance dredging. This solution has the potential to be a long-term alternative to maintenance dredging, although it is important to note that the solution does require a high initial capital expenditure. Additionally, there remains a risk with the solution that ongoing drag barring or maintenance dredging could be required to manage the sedimentation on the southern side of the berth where the jet array would not be as effective. Emergency maintenance dredging could also be required following a tropical cyclone due to the very high sedimentation rates which the jet array might not be able to manage.

Accordingly, none of the alternative solutions were seen as clearly preferable over ongoing maintenance dredging.

#### EXAMINATION OF REUSE, RECYCLE AND PLACEMENT OPTIONS

As the avoidance analysis showed that eliminating the need to conduct maintenance dredging at Amrun Port is not a feasible option if port operations and safety are to be maintained at efficient levels, the SSM project then moved to determine the most suitable use or placement location for any dredged material.

The SSM project undertook a comprehensive reuse assessment investigation of the most appropriate solutions for reuse of any maintenance dredging material. Factors considered were: sediment suitability, greenhouse gas emissions, opportunity or demand, conceptual cost, confidence in beneficial reuse process, duration from construction to use, environmental implications, socio-economic implications, environmental approvals, constraints, knowledge gaps and longevity of the beneficial reuse option.

One of the primary considerations for reuse is the physical and chemical properties of the sediment to be dredged. The analysis of the geotechnical properties of the material to be dredged indicated that:

- Naturally accumulating material encountered in Amrun Port navigational areas is typically of high fines (clay and silt) content.
- The fine-grained sediments may be suitable for low to medium load applications following adequate drying out and compaction, noting that this material may take many months to many years to consolidate.
- The relatively high water and fines contents would limit the use of sediments in high end concrete products.
- Potential Acid Sulphate Soil (PASS) was detected in all samples; however, analysis of the Acid Neutralising Capacity (ANC) of these samples indicated that if bought ashore, the marine sediments are unlikely to require treatment.
- All samples are considered highly saline and therefore if sediments are placed on land without treatment, salinity will degrade the quality of terrestrial soils and may impact the quality of receiving waters.
- The organic content of the material could result in a release of $CO_2$ if brought ashore.

The assessment then examined potential beneficial reuse options and analysed the opportunity, potential feasibility and achievability of the options in the context of Amrun Port.

As almost all of the dredge material is fine grained (silt/clay). The geotechnical properties of the fine- grained sediments (e.g. strength, plasticity, density, consolidation) are generally unsuitable for engineering applications and this material would require significant onshore processing and treatment to improve its suitability. Additionally, the remoteness of the Amrun location is also a significant constraint, while the demand associated with reuse opportunities is very limited.

The analysis indicates that there is no clear preferred long-term beneficial reuse option for maintenance dredge material from Amrun Port.

In addition to reuse analysis, a number of material placement alternatives and locations were identified following studies undertaken to identify potential locations for the placement of dredge material.

Placement (disposal) options were selected on the basis that:

- One is the existing placement area that has been used at the Port with success, monitoring has shown very low levels of environmental impact
- An inshore offshore option closer to the Port to reduce travel times and emissions
- A third offshore option north of the Port that could be also be used by the Port of Weipa, well away from sensitive environments
- One onshore option within reasonable pumping distances from a dredging vessel but away from mineral resource areas.

In all, one onshore and three offshore placement options were selected as possible options for consideration in the comparative analysis. These are:

- Onshore pond south of Amrun
- Existing Amrun offshore dredge material placement area
- New Amrun inshore dredge material placement area
- New south Albatross Bay offshore dredge material placement area.

The location of all options is shown in Figure 18.

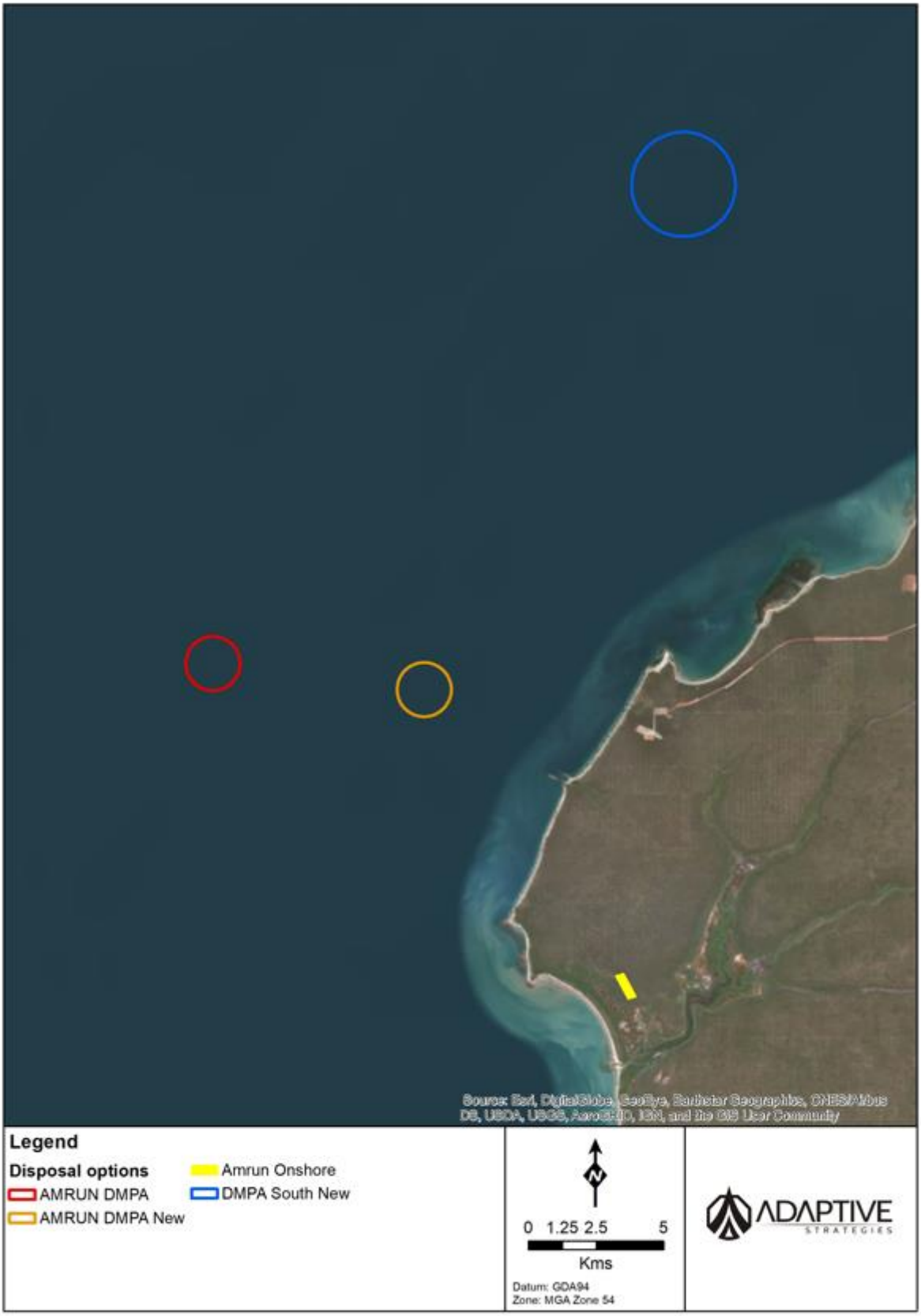



**Figure 18: Location of the options for dredge material placement**

### 6.1. COMPARATIVE ANALYSIS

To compare the various options a set of objectives and performance measures were developed in close consultation with the BPDTAG. A workshop was held with the stakeholder advisory group in September 2019 to help define objectives and performance measures. Additionally, separate discussions were held with traditional owner and government stakeholders to obtain their views.

This step generated two key components of the comparative analysis process:

1. **Objectives** to consider in the decision making process. In other words, the things that really matter to RTAW and stakeholders when trying to make comparisons between sediment management options.
2. **Performance measures** for each of the objectives that provide a clear and transparent way of measuring how each of the sediment management options perform.

Through this process a range of values were identified as relevant to the Port. These values fall within the following six broad themes:

- Environment
- Port Operations
- Costs
- Cultural heritage
- Social
- Health and safety.

The objectives identified were aimed to be:

- Complete – objectives were designed to capture all of the things that matter at the Port in the context of the decisions being made.
- Concise – unnecessary or similar objectives were removed to avoid double counting.
- Sensitive – objectives were developed that distinguish between the options, thereby helping to differentiate them to aid decision making.
- Independent – objectives were developed in a way that ensures that performance against an objective could be considered independently of any other objective.

The performance measures provided a mechanism for predicting how well each of the options performed against the objectives (Gregory *et al* 2012). Similar to the objectives, the performance measures were developed with a set of principles in mind to ensure they were useful and appropriate. The key issues considered when defining a performance measure were:

- Coverage - the measures addressed the range of relevant consequences of each option.
- Practicality – the measures needed to be predictable, which means the data required to assess them could be obtained or generated.
- Direct and specific – the measures reported directly on the relevant consequences and effectively highlight differences in the options to allow informed value comparisons.

The objectives and measures were refined and finalised following the workshop based on a review of the technical information that was available to conduct the analysis.

In total nine objectives and eleven performance measures were defined. These are shown in Table 6.

Further discussion of each of the performance measures, including a rationale for their use and how they have been calculated and analysed is available in Adaptive Strategies 2019.

**Table 6: Objectives and performance measures for the SSM Project**

| Theme | Objective | Measure |
|---|---|---|
| **ENVIRONMENT** | 1. Avoid and minimise impacts to coastal ecosystems | A) Predicted performance in relation to avoidance and minimisation of impacts to coastal ecosystems |
| | | B) Predicted risk on dredge material placement plumes and/or tailwater discharge exceeding ambient variation (percentile above median ambient TSS) |
| | 2. Minimise carbon emissions | C) Forecast Greenhouse gas emissions |
| **CULTURAL HERITAGE** | 3. Minimise impact on cultural heritage | D) Nature and scale of any impact on cultural heritage |
| **PORT OPERATIONS** | 4. Maintain effective and efficient port operations | F) Predicted lead time to dredge material placement |
| | | F) Capacity to provide a long term solution for the port |
| | 5. Avoid a loss of future port expansion opportunities | G) Predicted performance in terms of facilitating or constraining future port expansion |
| **COSTS** | 6. Ensure solution is cost effective | H) Assessment of costs |
| **HEALTH & SAFETY** | 7. Avoid or mitigate health and safety risks | I) Relative risk |
| **SOCIAL**[2] | 8. Minimise interference to social activities | J) Scale and duration of any impacts on social activities |
| | 9. Provide increased economic and social opportunities | K) Predicted number of FTE jobs created |

The final step in the comparative analysis was the application of a process to compare the options against the objectives and performance measures.

The process was extensive and involved:

- Calculating raw scores for all measures and options
- Converting raw scores into normalised results to enable fair comparison

[2] The social theme includes consideration of other industries such as fisheries, aquaculture and tourism. It also takes into account local recreational and commercial activities.

- Comparing options against the objectives and performance measures
- Ranking options using various methods (e.g. different weightings)
- Recommending a preferred solution based on the outcomes of the analysis.

**RAW SCORES CONSEQUENCE TABLE**

The raw scores from each performance measure were used to generate a consequence table. A consequence table is a matrix that illustrates and compares the performance of each option with respect to the objectives. Key elements of the table (refer Table 6) include:

- All of the objectives and performance measures identified in Step 2
- The table indicates which direction is better for each performance measure in the “Direction” column.
- The best scores for a performance measure are highlighted in green
- The worst scores for a performance measure are highlighted in red.

**NORMALISED SCORES CONSEQUENCE TABLE**

In order to compare options using different performance measures it is necessary to apply standard statistical methods to ensure the comparisons are valid and balanced. In particular this involves the process of normalisation whereby different measures and units of score are standardised to a score in a range from 0 to 1.

The formula that was used to normalise raw scores was:

$$\textit{Normalised score} = \frac{\textit{raw score} - \textit{worst score}}{\textit{best score} - \textit{worst score}}$$

Table 8 shows the results for all measures and options converted into normalised scores. A score of 1 or the highest number closest to 1 indicates the best result.

**Table 7: Raw scores for each placement option**

| | | | | | Amrun Port Placement Options | | | |
|---|---|---|---|---|---|---|---|---|
| Objective | Unit | Score min | Score max | Direction is better | Amrun DMPA | Amrun Inshore | Albatross South | Amrun Onshore |
| Avoid and minimise impacts to coastal ecosystems | Coastal ecosystems | 4 | 16 | lower | 10 | 10 | 10 | 10 |
| | Water quality | 0 | 42 | lower | 2 | 3 | 2 | 0 |
| Minimise carbon emissions | GHG emissions | - | - | lower | 1,900 | 1,400 | 2,200 | 15,500 |
| Long term solution | Percentage | 0 | 100 | higher | 100 | 100 | 100 | 100 |
| Ensure solution is cost effective | Cost ($M) | - | - | lower | $4.50 | $3.70 | $4.90 | $105 |
| Lead time | Years | - | - | lower | 0.5 | 0.5 | 0.5 | 3 |
| Avoid a loss of future port expansion opportunities | Performance | 2 | 8 | higher | 4 | 6 | 6 | 4 |
| Avoid or mitigate health and safety risks | Relative risk | 8 | 24 | lower | 10 | 10 | 10 | 18 |
| Minimise interference to social activities | Performance | 0 | 9 | lower | 3 | 3 | 7 | 3 |
| Provide increased economic and social opportunities | Employment (FTE) | - | - | higher | 0.05 | 0.03 | 0.06 | 5.92 |
| Minimise impact on cultural heritage | Performance | 4 | 12 | higher | 12 | 11 | 12 | 5 |

**Table 8: Normalised scores for each placement option**

| Objective | Unit | Amrun DMPA | Amrun Inshore | Albatross South | Amrun Onshore |
|---|---|---|---|---|---|
| Avoid and minimise impacts to coastal ecosystems | **Coastal ecosystems** | 0.50 | 0.50 | 0.50 | 0.50 |
| | **Water quality** | 0.95 | 0.93 | 0.95 | 1.00 |
| Minimise carbon emissions | **GHG emissions** | 0.96 | 1.00 | 0.94 | 0.00 |
| Long term solution | **Percentage** | 1.00 | 1.00 | 1.00 | 1.00 |
| Ensure solution is cost effective | **Cost ($M)** | 0.99 | 1.00 | 0.99 | 0.00 |
| Lead time | **Years** | 1.00 | 1.00 | 1.00 | 0.00 |
| Avoid a loss of future port expansion opportunities | **Performance** | 0.33 | 0.67 | 0.67 | 0.33 |
| Avoid or mitigate health and safety risks | **Relative risk** | 0.88 | 0.88 | 0.88 | 0.38 |
| Minimise interference to social activities | **Performance** | 0.67 | 0.67 | 0.22 | 0.67 |
| Provide increased economic and social opportunities | **Employment (FTE)** | 0.01 | 0.00 | 0.01 | 1.00 |
| Minimise impact on cultural heritage | **Performance** | 1.00 | 0.88 | 1.00 | 0.13 |

The next step involved weighting the normalised scores for each performance measure and calculating an overall performance score for each option out of 100. A score of 100 would mean that an option performs perfectly against every performance measure.

Weighting is an important step in the decision making process. It is a process that people often undertake subconsciously by placing more value on some objectives over others when trying to make a decision between options. The structured decision making process provides a transparent way of applying and testing weightings.

It is recognised that stakeholders value objectives differently and will therefore apply different weightings. Given this, no attempt was made to reach a consensus on how to apply weightings. Rather a number of different weighting scenarios were generated to see how each option would perform. The weighting scenarios were:

- Equal weights - all performance measures were weighted equally.
- Environment - performance measures relating to the environment theme were attributed with 75% of the weightings.
- Port operations - performance measures related to the efficient ongoing and future operation of the Port were attributed with 75% of the weightings..
- Costs - performance measure relating to the cost of each option was attributed with 75% of the weightings.
- Health and Safety - performance measure was attributed with 75% of the weightings.
- Social - performance measures relating to the social theme were attributed with 75% of the weightings.
- Cultural - the performance measure relating to the cultural heritage theme was attributed with 75% of the weightings.

A summary of the overall performance of each option under the seven weighting scenarios is provided in Table 9. The best performing option under each scenario is highlighted in green and the worst performing is highlighted in red.

**Table 9: Summary of weighted scores (max 100) for each option across the six weighting scenarios**

| | Equal | Environment | Port Operations | Costs | Health & Safety | Social | Cultural |
|---|---|---|---|---|---|---|---|
| **Amrun DMPA** | 75.49 | 79.17 | 76.99 | 92.69 | 84.20 | 46.33 | 93.26 |
| **Amrun Inshore** | 77.60 | 80.32 | 85.01 | 93.84 | 84.78 | 46.86 | 84.78 |
| **Albatross South** | 74.26 | 78.28 | 83.86 | 92.06 | 83.86 | 30.58 | 92.92 |
| **Amrun Onshore** | 45.45 | 48.44 | 44.79 | 12.50 | 39.69 | 71.76 | 21.56 |

**FINDINGS**

Review of the scores led to the following observations:

- The three offshore options all perform relatively well across a range of measures and weighting scenarios. The new inshore option generally out-performs the other offshore options, but only marginally.
- The performance of the new inshore option is driven by lower costs, lower greenhouse gas emissions and better safety scores.
- The onshore option performs worst on almost all measures and weighting scenarios, in short it is a poor option.
- The existing Amrun DMPA performs well across the board and scores best under a Cultural Heritage weighting due to its distance offshore. While not the best performed option, continued use of this site would not be inconsistent with the findings given that it is only marginally behind the inshore option on most scores.
- The Albatross South option performed well across most measures but was consistently third behind the other two offshore options. The poor social score is due to its proximity to an emergency mooring buoy.
- The onshore pond ranked best on social weighting due to the employment opportunities created.

## 6.2. Selected Dredging and Placement Strategy

Based on the detailed comparative analysis, offshore placement at the existing DMPA consistently performed well and was only marginally out performed by the inshore option.

On balance, given that the existing DMPA is well understood and is effective operationally there are benefits in staying with this option. Monitoring programs based on this location are already established and results show that no environmental harm or significant impacts have resulted from its use. Accordingly offshore placement at the existing DMPA is considered to be the preferred solution.

Based on the extensive work of the SSM project, a clear preferred 10-year maintenance dredging strategy is now established that involves:

1. Use of operational measures (drag bar) to manage sediments within berths and apron areas.
2. Use of traditional dredging to maintain navigational areas at safe design depths – annually in a volume of between 40,000 and 60,000 cubic metres.
3. Placement of dredged material at sea – preferably at the existing dredge material placement area.

Any material dredged at the river facilities (small volumes only) would best placed at the Albatross Bay DMPA in line with other material dredged from the Hey River and Embley River estuaries as part of any corresponding Port of Weipa maintenance dredging.

# 7. Environmental Management Framework

The following framework is designed to provide a repeatable structure for planning and executing maintenance dredging activities at Amrun Port.

The framework provides RTAW and its stakeholders with a clear and structured process for identifying, planning and implementing maintenance dredging. This process provides certainty for RTAW staff, BPDTAG members and regulators around how RTAW will plan and manage dredging activities. The framework will also be key to supporting long-term permit applications.

The Framework is underpinned by a three key documents:

- A Long-term Maintenance Dredging Management Plan (this LMDMP) – an overarching planning document to manage dredging over the ten year period.
- Amrun Port Marine Environmental Monitoring Plan – setting out the type, methods and frequency of any dredging related monitoring.
- Maintenance Dredging Environmental Management Plan (EMP) – works specific plan developed prior to any dredging with specific mitigation measures and operational requirements.

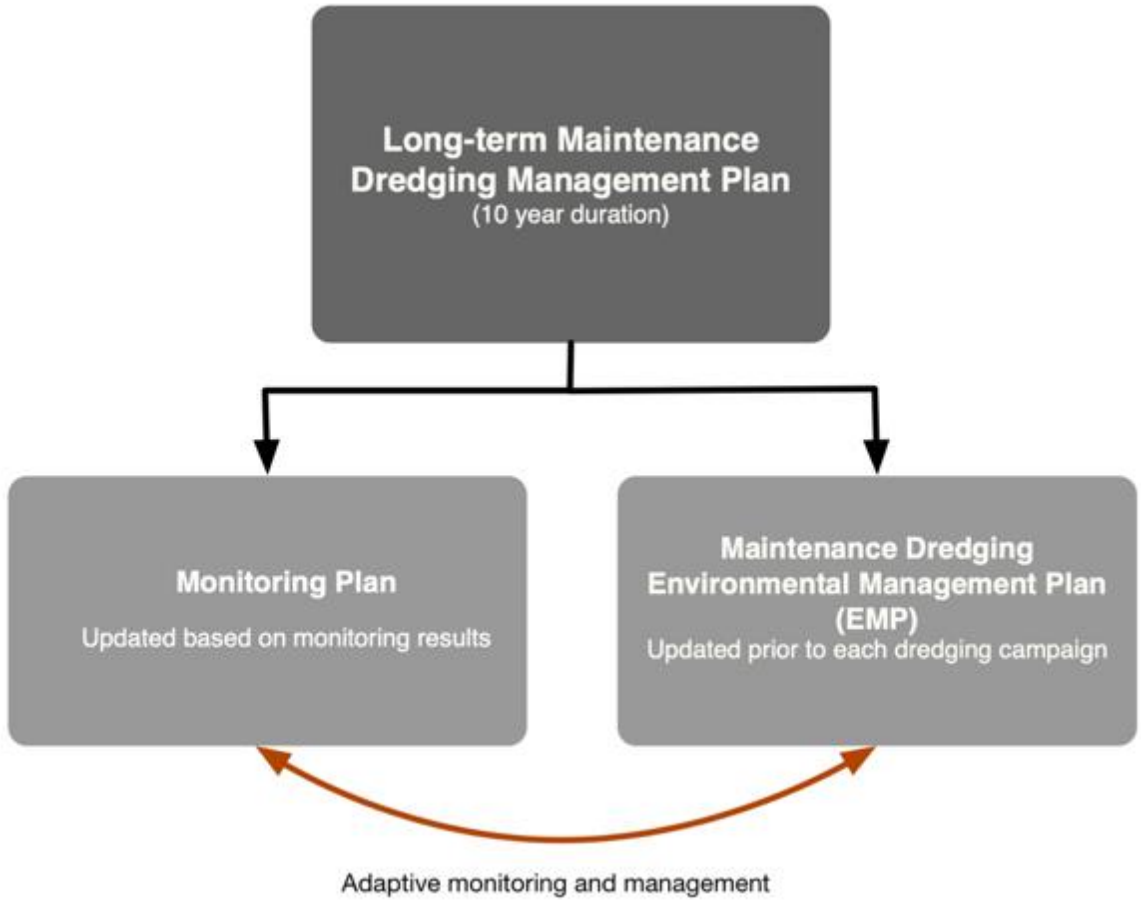



**Figure 19: Management Framework structure**

The overall structure of the Framework is shown in Figure 19 and the operational elements are illustrated in Figure 20.

The Framework is comprised of a staged planning and design process. Three key elements feed into the framework including consultation, monitoring and supporting studies. The framework provides RTAW with:

1. A technically informed process for the identification of Port maintenance dredging and dredge material management needs.
2. A process for identification, risk assessment and management of potential impacts to environmental values from proposed activities.
3. Adaptive management and operational controls to avoid and minimise potential impacts during dredging activities.
4. Ongoing monitoring and management of Port needs and values.

Most importantly, the framework provides a process that will be undertaken in collaboration with key Port stakeholders. Stakeholder consultation will occur throughout the application of the framework including during any dredging program design, execution and ongoing monitoring and management.

The framework draws on and incorporates aspects of processes outlined in relevant key policy documents. These include the:

- The National Assessment Guidelines for Dredging (NAGD) assessment framework for ocean placement (CoA 2009).
- Queensland Maintenance Dredging Strategy for Great Barrier Reef World Heritage Area Ports (DTMR 2016)
- Long Term Monitoring and Management Plan Requirements for 10 year Permits to Dump Dredge Material at Sea (CoA 2012).

Details of each of the steps in the framework are described in the following sections including:

- Identification of Port navigation needs, risks and sediment management approaches
- Dredging program design
- Dredging execution and control
- Monitoring and management

#### BPDTAG CONSULTATION

Consultation with the BPDTAG should occur during development and implementation of dredging activities. The BPDTAG should be consulted on:

- Proposed program specifics such as the location of dredging and placement sites and the timing and duration of dredging and associated activities
- Results of the risk assessment of potential impacts to values and proposed mitigation and management controls
- Scope of program monitoring and reporting requirements.

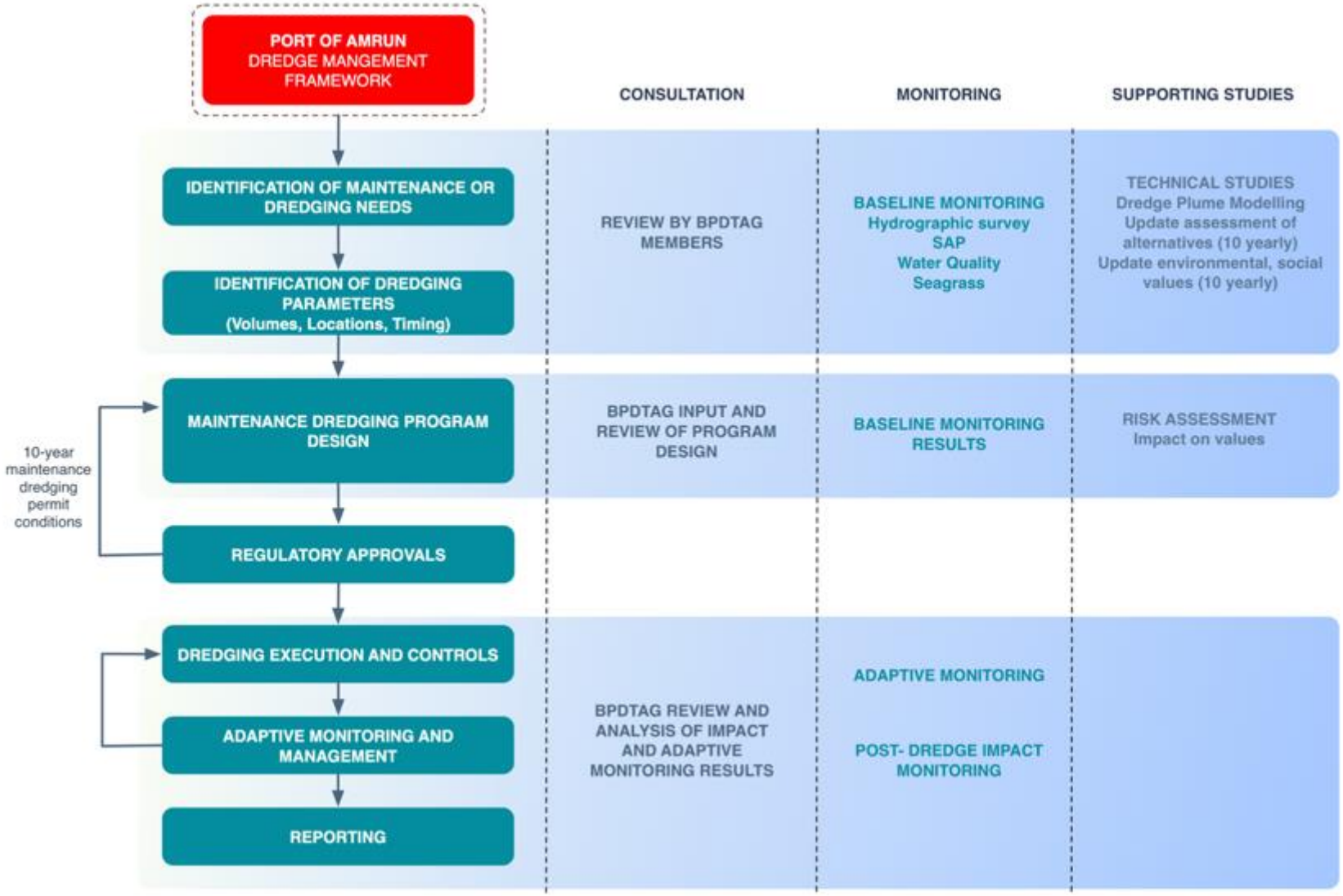



**Figure 20: Dredge Management Operational Elements**

## 7.1. Identification of Maintenance Dredging Needs

Identification of navigational risks in the offshore environment of a Port is one of the first steps of the framework process and is key to identifying whether maintenance dredging is likely to be required. Regular baseline monitoring (bathymetric surveys) of the offshore infrastructure of the Port including berths, swing basins and channels, is required. This monitoring will map sediment distribution within key offshore operational areas of each Port. Data from the monitoring will also be able to identify changes in sediment dynamics over time.

Where sediment accumulation may create a potential or future navigational hindrance, a risk assessment should then be undertaken. The aim of the assessment is to determine the level of risk posed to the ongoing safe operation of the Port. The level of risk can then be used to trigger the timing of the further phases of the dredge management framework.

Broad categories of risk are outlined in Table 10. An aim of the framework is to maintain all Port areas in the low or medium risk rating at all times.

**Table 10: Navigational risk categories**

| Risk | Description | Response |
|---|---|---|
| Extreme | Port vessel access and safety is compromised. Declared depths are above Port operational requirements. The full loading of vessels is constrained by berth depths. Loaded vessels cannot depart Port or can only depart on high tide. | Sediment management measures are required immediately.<br>Expedite framework planning and actions. |
| High | Safety and/or access to the Port could be compromised at any time in the near future or access is already significantly tidally constrained. Loaded vessels can only depart on high tide. | Sediment management measures are required immediately.<br>Expedite framework planning and actions. |
| Medium | Port depths and sedimentation trends indicate that access and/or safety could be compromised within the next 12-18 months | Commence planning for appropriate sediment management action(s). |
| Low | Sedimentation rates are low, indications are that Port access will not be compromised or affected within the next 2 years (depending on cyclonic influences). | Continue to monitor. |

The management of sediment and dredging in line with this LMDMP and associated long term permits should eradicate the need for any “emergency dredging” scenarios that are not dealt with or contemplated within the provisions of this Plan. The only exception could be if repeated cyclonic related volumes are needed to be dredged above that anticipated in this Plan. Such a scenario could result in approved volumes being met earlier than anticipated, variations to permits may then be required.

## 7.2. Identification of Dredging Parameters

Should an immediate or future navigational risk at the Port be identified, it is necessary to determine the appropriate response in terms of the type of sediment management activity required.

Monitoring data will be required to inform this phase. Up to date information regarding sediment volumes, quality and contamination may be needed. The specific data required includes:

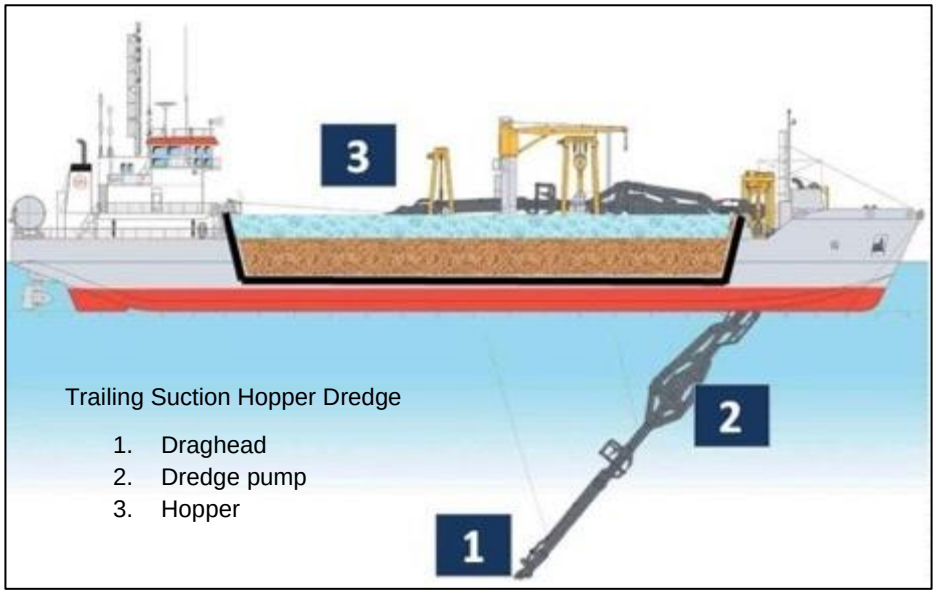
1. Sediment Sampling and Analysis Plan (SAP) results. The process for undertaking sampling and analysis of sediments is described in the NAGD (CoA 2009).
2. Bathymetric survey data.

**SEDIMENT MANAGEMENT OPTIONS**

Depending on the scale of sedimentation and level of navigational risk posed a range of management options could be applied. These need not necessarily be stand-alone actions and could be deployed sequentially to reduce and then remove the risk. Measures include:

A. **Bed levelling:** using a drag bar, high spots of sediment accumulation can be removed and reduced by shifting them into lower lying depressions in channels and berths. This can help to maintain a suitable declared depth. Rarely is this a long-term solution but it can be used to alleviate immediate risks or to prolong the period between major dredging activities.

B. **Hopper dredging:** often considered the more traditional dredging method, use of a trailing suction hopper dredge (vessel) where sediment is collected in the hopper of the vessel and placed at a designated location. This method is necessary for removing larger volumes and areas. Figure 21 provides a cross section of a typical hopper dredge.




Note that while not a management approach per sae, propeller wash agitation from operating vessels within the Port area is acknowledged to be of assistance in reducing the accumulation of sediment in certain areas. This may be partially effective in berth areas and in the shallower channel areas. Minor variation of the vessel path along the channel may assist in widening the area free of accumulated sediment.

**Figure 21: Cross section of a Trailing Suction Hopper Dredge (Source: Ports Australia 2016)**

## 7.3. DREDGING PROGRAM DESIGN

Should it be determined that hopper dredging is required then the next stages from the sediment management framework is the design of the dredging program and obtaining of relevant approvals.

Where the need for maintenance dredging and dredge material placement has been identified, planning for all aspects of the program needs to be undertaken. This includes:

- Timing, frequency and duration of the dredge program
- Location of dredging areas and volumes
- Equipment needs and standard procedures (*TSHD Brisbane* or other suitable dredge)
- Identification and assessment of potential impacts to values at dredging and placement sites
- Mitigation and management measures (including adaptive management) to address potential impacts to values
- Operational controls.

- Monitoring requirements.

All three input elements of the framework, including consultation, monitoring and supporting studies, will aid in the design of individual dredging programs. Additionally, standard dredging procedures, approval conditions and guidelines will need to be incorporated into the design.

**TYPE OF DREDGE**

Depending on the ongoing viability and availability the *TSHD Brisbane* will be used for annual dredging over at least the next 10-years.

Additional to this or if the *TSHD Brisbane* is not available an alternative suitable trailer suction hopper dredge would be commissioned and used. This may particular be the case if larger volumes need to be relocated following particularly bad cyclonic conditions.

For the purposes of this management plan, the specifications and operations of the *TSHD Brisbane* will form a baseline for dredge specification and operational environmental management. A brief description of the *TSHD Brisbane* operations is provided below.

Material to be dredged is removed through two suction heads, which are lowered into position on either side of the vessel. The capacity of the hopper is dependent on the sediment type – with volumes (including both sediment and water) approximating 2,800 $m^3$ for fine silts and 1,700 $m^3$ for sands (of a maximum hopper capacity of 2,900$m^3$). Each extraction run takes approximately 1 hour to complete.

The sediment/water ratio of material delivered to the central hopper of the *TSHD Brisbane* is typically quite low. Whilst it varies depending on the type of sediment being dredged, the sediment concentration is generally in the order of 10 – 30 % solids. To maximise dredge material capacity, these large volumes of water are managed using a central column weir, which is incorporated into the hopper. This arrangement allows excess water to decant from the sediment and overflow to discharge. Overflow occurs only toward the very end of the dredging run as the hopper nears capacity (typically the last ten minutes of a one hour dredging run).

Once the dredge has filled its hopper, the vessel will then relocate the material to the designated dredge material relocation ground. Dredged material is discharged below keel level to minimise turbidity generation. Each dredged material placement is manually logged using both satellite navigation and standard bridge equipment, and is electronically fixed using a differentially corrected global positioning system (GPS). The time taken to place material over the dredge material relocation ground is typically about 15 minutes.

Mitigation of potential turbidity and suspended solids impacts from dredging and dredge material relocation is partly achieved through the use of suitable and specifically designed modern vessels. The following are considered the minimum standard of specification for TSHDs that will be selected to undertake maintenance dredging works in Amrun Port:

- The dredger will operate under a Maintenance Dredging EMP. The EMP will be revised by RTAW in conjunction with the dredging contractor,and implemented for each maintenance dredging campaign. The permit conditions, dredge dumping procedures, any associated adaptive monitoring arrangements and corrective actions are incorporated into the EMP. Implementation of the EMP is audited by RTAW environmental staff.
- During the dredging works, electronic logs of each dredge material relocation event will be maintained.
- TSHDs undertaking dredging works at Amrun Port will include the following specifications:
    - Central weir discharge system
    - Below keel discharge point
    - Low wash hull design
    - Electronic positioning system (GPS)
    - Turtle exclusion devices on intake heads.

These dredge vessel specifications align with the requirements of the EA, specifically, on board systems for determining solids to water ration or density of dredged material, dredge heads capable of and where

appropriate, depth control and fitted with marine wildlife protection or fauna exclusion devices (e.g. turtle deflector, deflector plates, tickler chains or drag heads) prior to and during operation.

Any dredging at the river facilities is likely to be undertaken using either a combination of a drag bar and a cutter suction dredge (CSD) or by using a mechanical dredge (pontoon mounted backhoe or clam dredge) combined with a hopper barge for transport to the DMPA.

# 8. Risk Assessment Framework

Depending on the scale and frequency, dredging and dredge material placement activities have the potential to adversely impact on sensitive environmental receptors, social or cultural values associated with the Port.

Impacts can occur over a short or long term and can be direct or indirect. Dredging related impacts can result from:

- the direct removal of benthic habitat in the vicinity of the dredged area
- smothering of benthic organisms in offshore dredge placement locations
- changes to marine water quality from increased turbidity and sedimentation
- mobilisation of contaminants released from dredged sediments
- collisions and disturbance from vessel movements
- increased noise and lighting from dredge vessel operations.

Prior to each dredging campaign a risk assessment of potential impacts to environmental, social or cultural values should be undertaken. The assessment will help to determine the level of potential harm that environmental, social or cultural values are at from the proposed dredging program. The assessment will assist in refining where management measures to avoid, reduce or mitigate impacts are needed. Identified measures can then be incorporated into revisions of the works specific Maintenance Dredging EMP. This process is outlined in Figure 22.

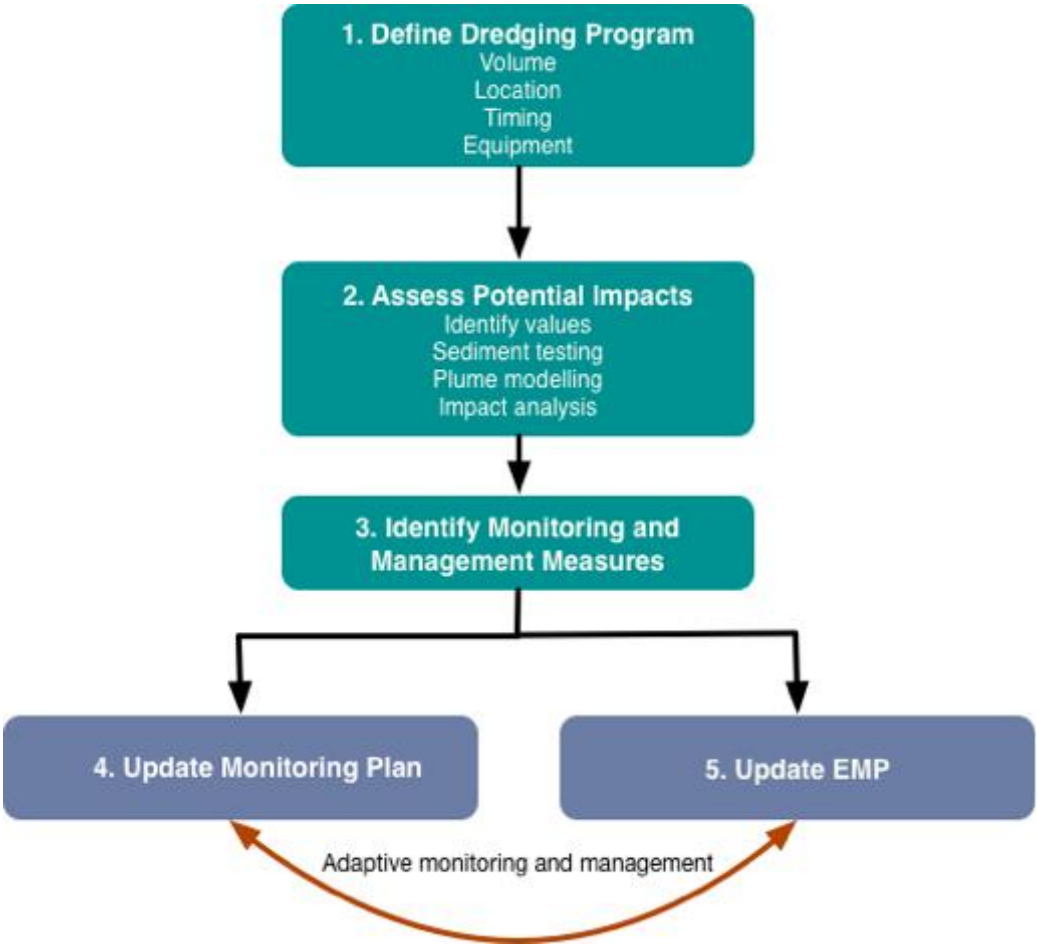



**Figure 22: Process for identification of potential impacts and management measures**

Information needed to inform the risk assessment should include:

- Up to date environmental values information, including data from baseline surveys of seagrass, fauna and water quality.
- Dredging program design including: dredge type, volumes, locations, duration, seasonal timing.
- Sediment characteristics: particle sizes, contamination results

**INITIAL ASSESSMENT**

To inform the development of this LMDMP an environmental risk assessment has been undertaken of potential dredging scenarios and volumes (ELA 2020b). Supporting this risk assessment were:

- a detailed plume modelling study (PCS 2019d) looking at potential water quality changes across various dredging volumes
- an environmental thresholds study (PCS 2019e)
- an environmental values report (GHD 2018).

As outlined in Section 4, there are a number of environmental values that occur in the vicinity of Amrun Port. Whilst there is potential for some of the values to be impacted by maintenance dredging, the plume modelling and risk assessment undertaken has indicated that any impacts are highly unlikely to be residual or significant.

Generally, the proposed maintenance campaigns will consist of yearly dredging of volumes in the order of 40,000 to 60,000 cubic metres. Campaigns will be short-lived in duration (3-5 days) and will include a range of impact avoidance and reduction measures that will further reduce impact risks.

All potential impacts were assessed against known environmental values and data to determine the risks posed by maintenance dredging at Amrun Port. The key findings of this risk assessment are:

- Resuspension of sediments from maintenance dredging is comparable to natural suspended sediment concentrations (SSC) during normal conditions.
- Water quality monitoring results and numerical modelling of sediment transport demonstrates that natural SSC levels during the wet season are much higher than those generated by maintenance dredging.
- Analysis against frequency intensity and duration thresholds indicated that dredging would not result in impacts to sensitive environmental values at volumes of 40,000 $m^3$ to 60,000 $m^3$ (PCS 2019d).
- Risks to sensitive habitats such as seagrass are likely to be negligible to low. There are no seagrass communities or in the vicinity of Amrun Port and the minimal dredging requirements at the River Facilities are unlikely to lead to conditions that would impact on seagrass.
- Risks to sensitive coral reef communities with respect to water quality impacts are expected to be negligible with turbidity not expected to exceed the natural variation present within the project area (PCS 2019d).
- Risks to marine turtles from maintenance dredging have considered removal/degradation of habitat, artificial lighting, underwater noise and direct vessel collision. This assessment has concluded that impacts to marine turtles from maintenance dredging at the Port are not likely to be significant.
- Protected species are also unlikely to be significantly impacted by maintenance dredging. Amrun Port does not provide critical habitat resources for any marine species and disturbance to habitats will be low. Indirect disturbances can be effectively managed via best practise dredging operations. The short timeframe of each campaign will also reduce risks.
- Risks associated with the introduction of marine pests have been considered and despite established practices to mitigate translocation, this risk remains high.

The activities associated with maintenance dredging are well tested and understood. It is considered that there would be limited ongoing management and monitoring requirements once the placement of dredged material has been completed.

A summary of risks is provided in Table 11. This risk assessment is based on the application of standard mitigation measures.

Any dredging campaign that is considered to introduce changes that may significantly differ to the parameters modelled and assessed should be subject to a new specific detailed assessment. Longer dredging durations may be one such consideration. This would also be considered as part of BPDTAG consultation prior to the commencement of dredging activity.

Table 11: Summary of environmental risk findings

| Risk activity (cause) | Potential environmental receptors | Potential Impact | Consequence | Likelihood | Risk rating |
|---|---|---|---|---|---|
| Smothering from dredge material placement | Benthic macroinvertebrate communities | Temporary loss of benthic habitat | Temporary, short-term negative impact | Unlikely | **Low** |
| Dredging and placement generated sediment plume | Coral and rocky reef habitats | Changes to water quality leading to mortality or changes in coral cover/diversity | Negligible<br>Within the natural variation and tolerance of the system | Rare | **Low** |
| Dredging and placement generated sediment plume | Coral and rocky reef habitats | Sediment deposition resulting in coral loss | Negligible<br>Within the natural variation and tolerance of the system | Rare | **Low** |
| Movement of dredge vessel from the Port to the dredge material placement area | Transitory threatened and migratory marine animals | Potential for marine fauna vessel strike | Negligible<br>No impact at the population or sub-population level | Unlikely | **Low** |
| Release of contaminants and nutrients | Marine biota | Potential for lethal and sub-lethal effects on marine biota | Negligible<br>Material is consistently suitable for at sea placement | Rare | **Low** |
| Dredging suction | Foraging marine turtles<br>Sawfish | Potential for marine fauna to be caught | Negligible<br>No impact at the population or sub-population level | Unlikely | **Low** |
| Noise | Inshore dolphins, dugong and marine turtles | Potential for alienation of habitat | Negligible<br>No impact at the population of sub-population level | Rare | **Low** |
| Lighting | Foraging inshore dolphins, dugong and marine turtles | Alienation of habitat, animal mortality | Negligible<br>No impact at the population of sub-population level | Rare | **Low** |
| Introduction of marine pests | Marine biota | Potential competition with native species and changes to the ecosystem | High<br>Significant impact on the environment in the Port and potentially in the greater region | Possible | **High** |

| | | | | | |
|---|---|---|---|---|---|
| Dredge program | Marine users | Disruption of activities | Negligible<br><br>Impact is confined to a small area or interest group that is not vulnerable | Possible | **Low** |

Overall, the conclusion is that environmental risks from maintenance dredging at Amrun Port and the River Facilities will be low. Maintenance dredging is short in duration and impacts to water quality are mostly within the range of natural variability of the region. This in turn limits the likelihood of flow on impacts to species and their habitats, as well as protected areas and other users.

The comprehensive works specific maintenance dredging Environmental Management Plan will ensure each maintenance dredging campaign is undertaken in line with best practice, and that impacts are avoided and reduced as far as possible.

# 9. Treatment of Key Risks

RTAW is committed to minimising and managing potential impacts from dredging and dredge material relocation as far as practicable.

## 9.1. Adaptive Management Measures

Adaptive management provides for continuous monitoring, evaluation and adjustment of management response measures based on real-time monitoring and environmental conditions (Figure 23).


**Figure 23: Adaptive Management Cycle (CEDA, 2015)**

Based on an understanding of acceptable environmental conditions and thresholds for impact a series of response levels (triggers) can be established and then monitored to ensure that conditions that may produce environmental harm are avoided or ceased before impacts occur.

The dredging monitoring framework is outlined in Section 7 with details provided in the supporting *Amrun Port and River Facility Maintenance Dredging – Marine Environmental Monitoring Plan* (ELA 2020a).

Adaptive monitoring will be implemented for each maintenance dredging campaign. This is a key step in impact avoidance and management.

As detailed in the Marine Environmental Monitoring Plan and based on a risk assessment conducted in 2020 (ELA 2020b), the adaptive monitoring and management program will focus on weather conditions and marine fauna (mammals (dolphin, bryde's whale, dugong and turtles). The nature of the response is scaled according to the level of environmental risk.

Based on the results of the initial risk assessment, targeted and ambient monitoring and established best practice; a set of key management strategies and actions to minimise the impact from dredging and dredge material relocation operations will be identified and incorporated into the Maintenance Dredging EMP.

These measures should, if necessary, be supplemented and enhanced with the ongoing real time inputs from the adaptive monitoring program.

## 9.2. Environmental Management Plan

A works specific Environmental Management Plan (EMP) provides the operational practices required for dredging activities to meet environmental standards. The EMP forms the operational control document to ensure all site specific environmental issues are adequately addressed.

The EMP will be developed or revised prior to the commencement of annual dredging activities. The EMP will be developed in partnership with the relevant dredging vessel operator. The development and implementation of the EMP will be the responsibility of both the dredge operator and RTAW.

The EMP covers all aspects of the dredging operations specific to Amrun Port and when necessary the river facilities. The EMP will contain:

1. Location and description of the activities
2. Timing of the dredging operations
3. Measures to meet permit conditions including but not limited to:
    - Spoil placement requirements
    - Training and competency requirements
    - Transport requirements for dredged material
4. Standard management measures relating to:
    - Waste management
    - Ballast water management
    - Biofouling management
    - Bunkering of fuel
    - Vessel washdown
    - Marine pests
5. Adaptive management measures relating to:
    - Water quality
    - Marine fauna
    - Climate conditions
6. Operation and incident reporting
7. Emergency procedures and contacts

Further specific matters that need to be considered in the development of the EMP are outlined below.

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#### Compliance with Permit Conditions

Any dredging at Amrun Port and the River Facilities must comply with all relevant approval and permit conditions. Relevant permit conditions are provided in the Appendices to this report as follows:

Appendix A: EPBC Act Approval (EPBC 2010/5642)

Appendix B: Environmental Authority (EPML00725113)

Appendix C: Sea Dumping Permit (SD2020-3999)

#### Minimise the Dredge Schedule

RTAW and its contractors will seek to keep dredging schedules as short as practicable. This means that the dredging campaign will be conducted so that it achieves the required engineering and navigational objectives to ensure ongoing safe shipping in Amrun, in the shortest time possible. Maintenance dredging will occur 24 hours per day, seven- days per week to complete the campaign as quickly as possible while managing the activity in accordance with the Maintenance Dredging EMP.

#### Bathymetric surveys – volume and location

A pre and post dredging bathymetric survey will be undertaken of the areas to be dredged prior to, and after, the dredging campaign, whereby an accurate volume and location of sediment removal requirements will be determined. This approach allows the dredge contractor to conduct a targeted and efficient campaign.

Similarly, a pre and post dredging bathymetric survey will be completed on the DMPA which would be submitted to the Australian Hydrographic Office (AHO) following each dredge campaign in accordance with the Sea Dumping Permit.

#### Dredge Vessel Specifications

Mitigation of potential turbidity and suspended solids impacts from dredging and material placement by the trailing suction hopper dredge operations is also achieved through requirements for modern vessel specifications, including:

- Low wash hull-design
- Below keel discharge
- Central weir discharge system
- Electronic positioning systems.

These elements are considered the minimum standard of specification for trailing suction hopper dredges that will be selected to undertake dredging works at Amrun Port.

In addition, a contract deliverable item for maintenance dredging is the development and implementation of a works specific Environmental Management Plan (EMP), which reflects the commitments made within this LMDMP. Where there are learnings from the post dredging implementation review, the EMP will be updated as an opportunity to continuously improve the implementation of the LMDMP.

An EMP for dredge operation will be developed prior to each annual maintenance dredging campaign.

#### Marine fauna and turtle management

Turtles are mobile and can generally avoid impacted areas for the duration of dredging activities. While there have been no turtle impacts at Amrun Port, dredge activity has been known to result in turtle impact due to contact with either the vessel or dredge head. Management and operational practices during maintenance dredging to reduce the risk of impacting turtles include the use of turtle excluding devices on the dredge head to reduce the possibility of capture and controlling of the dredge pumps to minimise operation while the dredge head is off the sea floor (pumps need to be operated for a short time to clear sediment from the pump with clean water).

The following management actions are to be applied:

- The Dredging Contractor is to ensure that the dredge is fitted with turtle exclusion devices on the drag heads for the duration of works. Dredging is not permitted unless these devices are installed and operational.
- The Dredging Contractor is to implement procedural controls to minimise off-bed suction time. These controls must ensure that drag head water jets are activated at times when the drag heads are not in contact with the seabed, and pumps are in operation, to minimise the risk of turtle capture.
- The length of the campaign will be minimised as far as practicable.
- The Dredging Contractor will be required to check for the presence of marine fauna (whales, dolphins, dugongs, marine turtles or sawfish) listed under the EPBC Act, particularly within the path of dredging. Prior to dredging and placement, the Dredging Contractor must check using binoculars from a high observation platform (dredgers bridge) for marine fauna within a 300 metres monitoring zone.
- Dredging and placement activities may only commence if no marine species (whales, dolphins, dugongs, marine turtles or sawfish) listed under the EPBC Act have been observed in the monitoring zone.
- If any whales, dolphins, dugongs, marine turtles or sawfish listed under the EPBC Actare sighted in the monitoring zone, dredging and dumping activities must not commence in the monitoring zone until 20 minutes after the last marine species is observed to leave the monitoring zone, or until 20 minutes after the last sighting.
- A record of the monitoring must be established and maintained by the Dredging Contractor.
- Daily monitoring for impacted turtles is to be undertaken at the dredge and at the shoreline down current from the dredging operations. If monitoring indicates more than two (2) turtles are fatally injured within a

24 hour period as a result of dredging, the dredge must relocate from the area until an incident investigation has been carried out and relevant preventative measures implemented.

- In the event of an incident involving marine fauna, the Dredging Contractor is to immediately contact RTAW's Environmental Manager.
- All sawfish sightings will be reported to DAWE.

#### Management of turbidity and water quality

Generation of turbid plumes and the potential for release of fuels, oils and other chemicals during dredging via spills/accidents has the potential to adversely impact water quality. In particular, increased turbidity may potentially influence the health of sensitive receptors such as seagrass, by reducing light availability and increasing deposition rates. However, the volumes proposed for dredging at both Amrun Port and the River Facilities are relatively small and sensitive receptors in the vicinity are well adapted to turbid conditions from natural background conditions Accordingly no turbidity monitoring or adaptive management measures are deemed necessary.

In some circumstances it is necessary to apply environmental windows that restrict dredging in periods when critical environmental processes may be sensitive to dredging, such as during coral spawning or seagrass seed set. Based on the environmental risk assessment undertaken (ELA 2020b), the small scale and duration of dredging activities combined with the distance to sensitive receptors such as coral, seagrass and turtle nesting beaches indicates that there is unlikely to be a need to apply environmental windows or seasonal restrictions on dredging activities, however, during the planning for any proposed maintenance dredging, consideration should be given to the potential for dredging to overlap locally critical ecological processes.

#### Introduced Marine Pests

Under the National System for the Prevention and Management of Marine Pest Incursions the *Australian Marine Pest Monitoring Manual* and accompanying *Australian Marine Pest Monitoring Guidelines* have been developed. These were released in early February 2010.

With regards to dredging the impact of introduced marine pests may stem from:

- an infested dredge vessel being used at Amrun Port and leading to the establishment of a viable marine pest population
- a vessel becoming infected at Amrun and servicing another Port
- in dredging the proposed foot print introduced marine species are translocated from the Port to the DMPA.

Amrun Port and Weipa Port maintain a program of monitoring for introduced marine pests.

#### Clearance of the dredge vessel

Australia has mandatory requirements for international vessels entering Australian waters that wish to discharge ballast water.

Currently, the Port of Brisbane has been identified as the primary contractor undertaking dredging at Amrun Port using the dredge vessel, 'Brisbane'. The Brisbane provides evidence under *National Biofouling Guidance for Non-trading Vessels* (Commonwealth of Australia, 2008) to demonstrate a low risk of infestation by introduced marine pests.

- The Dredging Contractor will ensure the dredge complies with AQIS ballast water management requirements.
- The Dredging Contractor is required to ensure that the hull of the dredge is not significantly fouled and does not contain any introduced marine pests.

In addition to these standard protocols,RTAW have established a risk based review of vessels intended to provide services to RTAW which include the Brisbane. Aspects taken into consideration is assessing the risk of translocation include the following:

- vessel type;
- cleaning and marine pest inspection history;
- type and treatment of internal seawater systems;

- previous areas of operation since the last documented cleaning and/or marine pest inspection, and the duration the vessel spent in those areas;
- activities in areas with known records of marine pests;
- residual sediment;
- the nature of previous vessel operations;
- time to be spent on site; and
- any periods spent out of water immediately prior to mobilisation

All vessels rated above a low risk may be required to implement specific risk mitigation measures such as:

- hull & niche space cleaning;
- internal seawater treatment;
- physical marine pest inspection by persons with qualifications and experience in marine pest management; and
- additional management methods must be detailed and the vessel must be cleared as free of biofouling or low risk prior to site mobilisation.

These are outlined further in the *South of Embley Project Operations Marine and Shipping Management Plan* (RTA, 2018), located at the following website https://www.riotinto.com/search/documents#main-search_e=0&main-search_sxatags=weipa

This same approach would be required to utilise the services of an internationally sourced dredge, or an interstate dredge for works at Amrun.

RTAW's approach is consistent with the biofouling risk assessment framework outlined within the *National Biofouling Guidance for Non-trading Vessels* (Commonwealth of Australia, 2008). This document also outlines steps for minimising the risk of marine pest risks aboard dredge vessels, and other non- trading vessels, such as:

- Selecting and applying the correct antifouling coating based on the vessels operating profile
- Ensuring anchors, lines, pipes and cables are checked and cleaned prior to stowage and transit
- Ensuring mud and sediments are cleaned from all equipment before transit
- Undertaking inspections when appropriate, including the hull, pipes, pumps, hoppers, doors hinges, cutters and drag heads, ladders, buckets and pontoons etc
- Applying suitable antifouling methods for internal seawater systems.

#### DMPA management

The continued use of the Amrun DMPA mitigates impacts from smothering by preventing the need to dispose of material in an area that has not been disturbed previously or may be closer to key receptors. Modelling completed in 2019 confirmed the retention of sediments is reliant upon the prevailing coastal processes; sediments remain relatively immobile during ambient states, and disperse during wind and wave events, such as the passage of tropical cyclones.

Impacts to the DMPA and adjacent areas will be minimised through placement of the dredge material in such a manner as to uniformly spread it over the DMPA. This is achieved through deposition patterns that vary with the prevailing current direction. When currents are minimal, deposition will occur relatively uniformly over the DMPA in arc patterns (refer Figure 24 left). When currents are present, deposition will occur in arcs in the up-current portion of the DMPA to take into account drift of sediment as it settles over the area (refer Figure 24 right). Uniform distribution of the material also maximises the potential capacity of the DMPA.

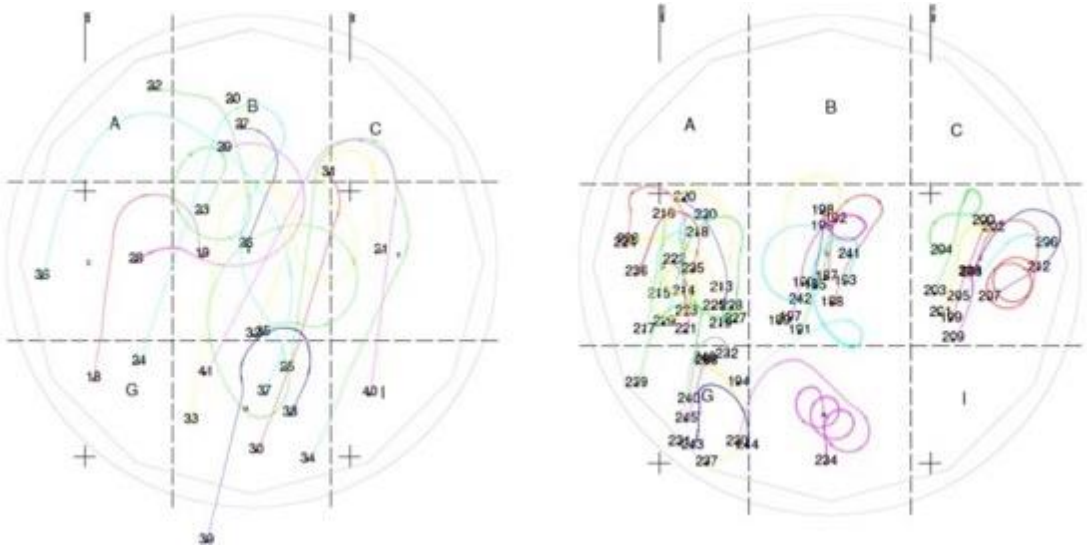


**Figure 24: Example of travel plot for placement during periods of low current (left) and high current (right)**

# 10. Monitoring Framework

Dredging related monitoring is detailed in the *Amrun Port and River Facility Maintenance Dredging – Marine Environmental Monitoring Plan (ELA 2020a)*.

The monitoring detailed in this plan is an important component of the overarching Dredge Management Strategy as described in the LMDMP. RTAW will oversee the implementation of the Marine Environmental Monitoring Plan, with each component being undertaken by appropriately qualified personnel.

Overall, the monitoring plan is made up of a combination of regular monitoring (long-term monitoring) and individual dredging event related monitoring (real time adaptive monitoring). The Marine Environmental Monitoring Plan aims to:

- Assess the long-term environmental health of the Port and nearby sensitive receptors and allow for corresponding management of operations.
- Respond to real time environmental conditions during maintenance dredging to prevent environmental harm during dredging campaigns.
- Collect data, as required, that will be used to drive continual improvement such as marine water quality, sediment quality, invasive marine pests and marine megafauna.

These aims will be met through the implementation of a two-tiered approach to monitoring**.** The two-tiers will include regular and adaptive monitoring. Results from each tier of the monitoring program will be used to inform the relevant stages of the dredging management framework

It should be noted that other maintenance dredging monitoring programs (including that for the Port of Weipa) often include an impact monitoring phase. This phase is designed to detect any impacts from maintenance dredging, both immediately after dredging and subsequently over time as impacts can be delayed. However, given the small volumes of dredging at Amrun Port, coupled with the very low risk of environmental impacts, a dedicated impact monitoring program was not considered necessary at Amrun. Should regular (ambient) monitoring reveal unexpected adverse results, this Plan will be updated to include an additional impact monitoring phase.

**REGULAR**

The aim of this monitoring is to provide a long-term environmental health assessment of the Port and nearby sensitive receptors.

### Sediment Contamination Testing

Monitoring of sediment characteristics at the Port will be undertaken to ensure dredged material is suitable for ocean placement as per the requirements of the NAGD. This guideline recommends data currency of no more than 5 years. As part of the baseline monitoring program sediment sampling and analysis will be conducted at intervals of 5 years or less to ensure sediment testing results are current.

Additional unscheduled testing may be undertaken if there is a spillage incident or change in contamination risk.

### Invasive marine pests

As previously discussed, Invasive marine pests (IMP) have the capacity to enter into ports in ballast water, internal seawater systems and on the hulls of vessels (ships and yachts). Monitoring of IMPs will be conducted to prevent the establishment of IMPs in Amrun Port and to provide early detection of new incursions. In addition to the *Amrun Port and River Facility Maintenance Dredging – Marine Environmental Monitoring Plan (ELA 2020a),* these measures are outlined further in the *South of Embley Project Operations Marine and Shipping Management Plan* (RTA, 2018) https://www.riotinto.com/search/documents#main-search_e=0&main-search_sxatags=weipa

### Water quality

Note that based on water quality monitoring results during the capital dredge campaign, short duration of the maintenance dredge campaign and the known variability of natural turbidity levels in the region, water quality

impacts are unlikely. Accordingly, ambient monitoring for water quality is not deemed necessary although boat-based adaptive turbidity monitoring during dredging activities may be undertaken to confirm low levels of risk,

**ADAPTIVE**

Adaptive monitoring and management will be implemented for each maintenance dredging campaign. The program is focused on the collection and analysis of data to detect potential environmental harm and undertake corrective actions where necessary. This is a key step in impact avoidance and management.

Monitoring of weather conditions, specific marine fauna and as required, dredge plume and boat-based turbidity monitoring for larger volumes (~60,000$m^3$) will be undertaken as detailed in the Marine Environmental Monitoring Plan. The nature of the response will be scaled according to the environmental risk associated with the dredging campaign.

### Monitoring review and updates

Amrun Port Marine Environmental Monitoring Plan will be reviewed annually and the Plan updated accordingly.

The review will examine the;

- Effectiveness of monitoring methods
- Response times and outcomes of adaptive monitoring actions
- Monitoring results and data
- Environmental changes and any incidents with actual or potential for environmental harm

The review will be undertaken in consultation with the BPDTAG and the WCCCA Co-ordinating Committee and their feedback incorporated into any future Plan revisions.

# 11. Performance Review

The *Environmental Code of Practice for Dredging And Dredging Material Relocation* (Ports Australia 2016) identifies that 'transparent and open information sharing is important to improve knowledge and to understand community values, client needs and government expectations. Communication and reporting is an important component of this, to demonstrate performance and provide for community accountability'.

In fulfilment of this principle, reporting under this Plan will involve:

- regular updates to the BPDTAG and WCCCA Co-ordinating Committee on any planned or conducted dredging activities
- production of an annual report detailing:
  - dredging activity in the past 12 months
  - results of any environmental monitoring associated with dredging actions
  - indications of any possible upcoming dredging activities.

In accordance with Commonwealth approval EPBC 2010/5642, the LMDMP and compliance with the relevant conditions of this approval will be included in the annual EPBC compliance report.

For any operations covered by a Commonwealth Sea Dumping Permit, an annual report meeting the International Maritime Organisation's reporting requirements will be submitted to the Australian Government each year. The report will summarise the dredging and monitoring activates undertaken during the year, including:

- permit number
- permit start and expiry dates
- locations and type of material dredged
- volume dredged at each location
- placement locations used
- placement method used.

#### RECORD KEEPING

During dredging activities, RTAW (or their contractors) will keep records which detail:

- the times and dates of when each material placement run is commenced and finished
- the position (by GPS) of the vessel at the beginning and end of each dumping run with the inclusion of the path of each dredge material relocation run
- the volume of dredge material (in cubic metres) dumped for the specific operational period. These records will be retained for audit purposes
- detail of any spill of oil, fuel or other potential contaminant, details of remedial action and monitoring instigated as result.
- details of any marine mega fauna observations during dredging activities
- time and duration of any alterations to the program, including stop work actions, as a result of any environmental mitigation measure.

Post the dredging program, RTAW will

- within one (1) month of dumping activities, undertake a bathymetric survey of the dredged area and dredge material placement site
- within two (2) months of the completion of the bathymetric survey provide a digital copy of the final survey results to the Australian Hydrographic Office (AHO), and confirm this with relevant regulatory agencies
- continue monitoring as per Amrun Port Marine Environment Monitoring Program.

Note that all data must be provided to RTAW by the dredge contractor.

**INCIDENTS AND CONTINGENCY ARRANGEMENTS**

All RTAW port staff, and any contractors involved, have the responsibility to report any significant incidents and emergencies.

- In the first instance, reporting should be to the operational works supervisor, but generally, the Environment Manager will have the responsibility to initiate corrective action for environmental incidents.
- All incidents should be reported to the Manager responsible for the Project, as specified by RTAW.
- In the case of an environmental emergency, after first notifying the Environment Manager, the operational works supervisor may make contact with RTAW's nominated consultants, who would help co-ordinate and manage a response. Depending on the nature and magnitude of the incident, the Environment Manager may be required to notify government regulators. In such circumstances the BPDTAG and WCCCA Co-ordinating Committee should also be informed.
- Relevant regulatory authorities will be notified of any turtle captures by the dredge or injury to any marine species of conservation significance.

Significant environmental incidents should be logged in writing, with all relevant details recorded, after corrective action has been completed.

Should an environmental incident occur during the course of dredging or placement of material, RTAW will take measures to mitigate the risk or impact. RTAW would report the following information to DES/DAWE, within 24 hours:

- nature of incident and type of risk associated with the incident, including (where possible) volume, nature and chemical composition of substances released
- measures taken to mitigate the risk
- the success of the measures undertaken
- proposed future measures (if required) and monitoring.

**REVIEW AND IMPROVEMENTS**

RTAW will undertake an internal review after the completion of each dredging campaign, as per the ‘Notifications and Obligations Schedule’. Audit findings will be provided to the BPDTAG and will be used to inform improvements and revisions to the Maintenance Dredging EMP and Marine Environment Monitoring Program.

# 12. References


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ELA 2020a *Amrun Port and River Facility Maintenance Dredging – Marine Environmental Monitoring Plan*. Report prepared for RTA Weipa Pty Ltd.

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# APPENDICES

# Appendix A: EPBC Act Approval (2010/5642)

Australian Government

Department of Sustainability, Environment, Water, Population and Communities

## Proposed Approval

## SOUTH OF EMBLEY BAUXITE MINE AND PORT DEVELOPMENT (EPBC 2010/5642)

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

### Proposed action

| | |
|---|---|
| **person to whom the approval is granted** | RTA Weipa Pty Ltd |
| **proponent's ABN** | 54 137 266 285 |
| **proposed action** | South of Embley Bauxite Mine and Port Development, Cape York Queensland (See EPBC Act referral 2010/5642) |

### Approval decision

| Controlling Provision | Decision |
|---|---|
| World Heritage properties (sections 12 & 15A) | Approved |
| National Heritage places (sections 15B & 15C) | Approved |
| Listed threatened species and communities (sections 18 & 18A) | Approved |
| Listed migratory species (sections 20 & 20A) | Approved |
| Commonwealth marine areas (sections 23 & 24A) | Approved |
| Great Barrier Reef Marine Park (sections 24B & 24C) | Approved |

| | |
|---|---|
| **conditions of approval** | This approval is subject to the conditions specified below. |
| **expiry date of approval** | This approval has effect until 21 May 2063. |

### Decision-maker

| | |
|---|---|
| **name and position** | The Hon Tony Burke MP, Minister for Sustainability, Environment, Water, Population and Communities. |
| **signature** | Tony Burke |
| **date of decision** | 14 May 2013 |

## Conditions

### *Temporary Barge Plan*

1. Unless agreed to by the **Minister** in writing, the approval holder must submit a Temporary Barge Plan to the **Minister** to manage, avoid and mitigate negative **impacts** to **listed turtle species**, including their breeding and foraging habitat, from the **construction**, **operation** and decommissioning of the temporary barge facility near Pera Head.
2. The Temporary Barge Plan must include surveying to ascertain whether active, or potentially active, nests for the **listed turtle species** are present in the area to be **impacted** by the temporary barge facility.
3. The Temporary Barge Plan must include adaptive management and mitigation measures to benefit **listed turtle species**, including as identified in the Final Environmental Impact Statement. The Temporary Barge Plan must include and address effective management strategies to mitigate each potential **impact** to **listed turtle species**, desired outcomes, benchmarks, performance indicators and goals, timeframes for reporting and implementation, corrective actions and contingency measures, and responsibility for implementing actions.
4. The Temporary Barge Plan must be submitted to the **Minister** for approval. Commencement of the temporary barge facility must not occur until the **Minister** has approved the Temporary Barge Plan. The approved Temporary Barge Plan must be implemented.

### *Marine and Shipping Management Plan*

5. The person taking the action must submit a Marine and Shipping Management Plan, covering all facets of the **construction** and **operation** of all marine related precincts for the South of Embley project including, but not limited to, the Boyd Port development, shipping activities, barge and ferry terminals, recreational use of beaches on Mining Lease (ML) 7024 by project workforce and the marine environment, anchoring, and underwater noise (excluding dredge management plans at condition 14 and condition 16) for the **Minister's** approval and must effectively define, avoid, manage and mitigate against **impacts** to the following **matters of national environmental significance:**
    a. the outstanding universal value of the Great Barrier Reef World Heritage Property;
    b. Great Barrier Reef National Heritage Place;
    c. Great Barrier Reef Marine Park;
    d. **Listed turtle species;**
    e. **Listed dolphin species;** and,
    f. Dugong (*Dugong dugon)* and Bryde's Whale (*Balaenoptera edeni).*
6. The Marine and Shipping Management Plan must incorporate avoidance and mitigation mechanisms for **impacts** to the outstanding universal value of the Great Barrier Reef World Heritage Property; Great Barrier Reef National Heritage Place: Great Barrier Reef Marine Park; **Listed turtle species; Listed dolphin species;** Dugong *(Dugong dugon)* and Bryde's Whale *(Balaenoptera edeni)*, including but not limited to:

a. **impacts** to the marine environment that supports the above listed species traversing, foraging and/or breeding habitat including, seagrass, reefs and corals, **listed turtle species** nesting and/or foraging habitat;

b. **impacts** from changes to coastal processes, including beach and/or shore erosion from the Boyd Port development, barge facilities and/or ferry facilities and ensure the action does not alter the beach gradients to such an extent that **listed turtle species** are prevented from and/or impeded in accessing the beach foreshore to nest or **listed turtle species** hatchlings are prevented and/or impeded from entering the marine environment;

c. artificial light related **impacts** on **listed turtle species** (including hatchlings) nesting beaches and adjacent marine environment including, but not limited to, lighting from Boyd Port construction and operation, shipping, temporary passenger landing and barge facility between Pera Head and Boyd Bay, and anchored/moored vessels (but excludes operations within the Hey and Embley Rivers);

d. measures to ensure shipping activities are undertaken in accordance with the *Great Barrier Reef Marine Park Zoning Plan (2003)*, or its most current version;

e. mechanisms to implement best practice mitigation and management measures for ship loading and unloading, and all other aspects of shipping activities to minimise **impacts** on the marine environment (including bauxite and/or other contamination spills);

f. **impacts** from vessel strike to **listed turtle species, listed dolphin species** or Dugongs including, but not limited to, restricting vessel speed limits to 6 knots in water depths of 2.5 metres or less; and, implementation of a transit lane in the Hey River and Embley River that follows the greatest water depths;

g. **impacts** from underwater noise including, but not limited to, pile driving activities at Condition 12 and shipping;

h. measures that minimise the risk of introduced marine pest species over the life of the project, including ballast water management. The marine pest monitoring program must be consistent with the Department of Agriculture, Fisheries and Forestry's *Australian Marine Pest Monitoring Manual (version 2.0)*, or its most current version;

i. **impacts** associated with recreational use by project employees of **listed turtle species** nesting habitat (including, but not limited to, implementation of a permit access system for the employees);

j. if agreed by the **department** in writing, requirements of condition 1 to condition 4 may be incorporated into the Marine and Shipping Management Plan;

k. **impacts** identified in the Environmental Management Plan Outlines at Appendix 7-E (Threatened estuarine and Marine species); Appendix 9-A (Non-avian Migratory Species); Appendix 11-A (Great Barrier Reef Marine Park, World Heritage Area and National Heritage Place); and, Appendix 10- A (Commonwealth Marine Area) in the **Final Environmental Impact Statement;** and,

l. mechanisms to notify the **department** in writing within five (5) business days of any confirmed or suspected sighting/s and/or observation/s in the marine environment in and/or around the project area of the Dwarf Sawfish *(Pristis clavata)*; Green Sawfish *(Pristis zijsron);* Freshwater Sawfish *(Pristis microdon);* or the Speartooth Shark *(Glyphis sp. A)*.

7. The Marine and Shipping Management Plan must also include adaptive management strategies to benefit the outstanding universal value of the Great Barrier Reef World Heritage Property; Great Barrier Reef National Heritage Place; Great Barrier Reef Marine Park; **listed turtle species, listed dolphin species,** Dugong and Bryde's Whale. The Marine and Shipping Management Plan must include and address effective management strategies to mitigate each potential **impact**, desired outcomes, benchmarks, readily measureable performance indicators and goals, timeframes for reporting and implementation, corrective actions and contingency measures, and specify the persons/ roles with responsibility for implementing actions. The Marine and Shipping Management Plan must provide information detailing Traditional Owner opportunities for employment, and mechanisms for reporting the number of local indigenous person/s actually employed in the implementation of this Plan (consistent with condition 42).

8. The Marine and Shipping Management Plan may be submitted to the **Minister** in the following stages, but the respective stages must not commence until the **Minister** has approved each respective version of the plan:

    i. an initial plan related to **impacts** associated with **construction** activities, other than **Preliminary Works** and the pile driving operations carried out in accordance with condition 12 to condition 13;

    ii. a subsequent plan to also reflect **impacts** associated with **operations** on the outstanding universal value of the Great Barrier Reef World Heritage Property; Great Barrier Reef National Heritage Place and Great Barrier Reef Marine Park; and,

    iii. subsequent revisions in accordance with condition 10.

9. The subsequent Marine and Shipping Management Plan at condition 5 must be developed in consultation with relevant Commonwealth agencies, including the Australian Maritime Safety Authority and the Great Barrier Reef Marine Park Authority, and state agencies, including Maritime Safety Queensland.

10. Within two (2) years of **operations** commencing, the Marine and Shipping Management Plan must be reviewed, revised and submitted to the **Minister** for approval. The Marine and Shipping Management Plan must be reviewed, revised and submitted to the **Minister** for approval every three (3) years for the next nine (9) years and, unless otherwise agreed by the **Minister** in writing every five (5) years thereafter for the life of the project.

11. The approved Marine and Shipping Management Plan/s must be implemented.

***Pile Driving***

12. The approval holder must ensure that the following measures related to any pile driving operations are implemented to minimise the **impacts** of underwater noise and disturbance on the following listed threatened species and/or listed migratory species:

    iv. **Listed turtle species;**

    v. **Listed dolphin species**; and

    vi. Dugong *(Dugong dugon)* and Bryde's Whale *(Balaenoptera edeni).* Those measures must include:

a. pile driving operations must implement **soft start procedures.** The soft start procedures must not commence until the above listed species are observed to leave the **exclusion zone/s** or are not observed in the **exclusion zone/s** for at least 30 minutes;

b. observations for the above listed species must 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;

c. the **exclusion zone** must be no less than 100 metres from the pile driving operations and be implemented so as to ensure that the above listed species are not exposed to sound exposure levels of greater than or equal to 183 dB re 1μ Pa2.s;

d. pile driving operations must cease if the species listed above are observed within the **exclusion zone**, and action to cease all pile driving operations within the **exclusion zone** must 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 approval holder must report the number of incidents where pile driving operations did not cease within two minutes;

e. pile driving operations must not recommence until the species listed above 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,

f. only pile driving operations which have commenced prior to sunset or prior to a **period of low visibility** can continue between the hours of sunset and sunrise, unless pile driving operations are suspended for more than 15 minutes.

13. The criteria for a suitably qualified marine observer at condition 12b must be submitted to the **Minister** for approval and records must be kept of marine observers subsequently engaged. Pile driving operations cannot commence until the criteria has been approved.

***Port and River Dredge Management Plans***

14. The approval holder must submit to the **Minister** for approval a Capital Dredging Management Plan/s for capital dredging activities associated with the South of Embley project. The Capital Dredging Management Plan/s must be prepared in accordance with the *Australian Government National Assessment Guidelines for Dredging (2009)*, or their most current versions, to avoid and mitigate **impacts** on:

    i. Commonwealth Marine Area;

    ii. **Listed turtle species**;

    iii. **Listed dolphin species;** and,

    iv. Dugong (*Dugong dugon*) and Bryde's Whale (*Balaenoptera edeni)*.

15. Capital dredging activities cannot commence until the Capital Dredging Management Plan at condition 14 has been approved.

16. The approval holder must submit to the **Minister** for approval a Maintenance Dredging Management Plan/s for all maintenance dredging activities associated with the South of Embley Project. The Maintenance Dredging Management Plan/s must be prepared in accordance with the *Australian Government National Assessment Guidelines for Dredging (2009)* and the **department's** *Long Term Monitoring and Management Plan Requirements for 10 year Permits to Dump Maintenance Dredge Material at Sea (July 2012),* or their most current versions, to avoid and mitigate **impacts** for the **matters of national environmental significance** listed at condition 14.

17. Maintenance dredging activities cannot commence until the Maintenance Dredging Management Plan at condition 16 has been approved.

18. The approved Plans at condition 14 and condition 16, and/or their subsequent revisions, must be implemented.

19. The approval holder must comply with the requirements of any permit/s obtained under the *Environment Protection (Sea Dumping) Act 1981*, including any conditions attached to the permit/s.

***Vegetation Clearing***

20. The approval holder must not **clear vegetation** or remove more than 29,658 hectares of vegetation over the life of the project. The maximum **clearing of vegetation** for **mining areas** and **infrastructure** that can occur in any 12 month period is 4,000 hectares.

21. To mitigate **impacts** on Red Goshawk (*Erythrotriorchis radiates*) and Masked Owl (*Tyto novaehollandiae kimberli)*, **Listed flora species** and **Listed migratory species** the approval holder must provide vegetation buffer zones from **mining area/s** (in addition, to buffer zones required under state regulations) for the Environmental Features (as defined in the Queensland Department of Natural Resources and Mines *Regional Vegetation Management Code for Western Bioregions* (version 2.1, 30 November 2012)) described in following table. The vegetation buffer zones exclude areas of **infrastructure.**

| Environmental feature | Vegetation buffer zones |
|---|---|
| Stream order one or two | 100m to 200m** from edge of riparian vegetation |
| Stream order three or four | 100m to 200m** from edge of riparian vegetation |
| Stream order five and above | 200m from edge of riparian vegetation |
| Natural wetland | 200m from edge of wetland vegetation |
| Natural significant wetland | 200m from edge of wetland vegetation |
| Tidal areas and marine plants*** | 200m from boundary of feature |
| Vine forest, coastal vegetation on sand, estuaries | 200m from edge of relevant vegetation type |

** *Set based on site specific factors following field survey.*
*** *Category B Environmentally Sensitive area as defined by the Environmental Protection Regulation 2008 (Qld).*

***Pre-disturbance Program***

22. Prior to any **clearing of vegetation** (including for **Preliminary Works**), surveying must be undertaken to ascertain whether active, or potentially active, nests for the Red Goshawk (*Erythrotriorchis radiates*) and/or Masked Owl (*Tyto novaehollandiae kimberli)* are present in the area to be cleared. Surveying must be undertaken for the:

a. Red Goshawk – in areas located within one (1) kilometre of permanent water supporting riparian gallery forest or Paperback wetland; seasonally inundated coastal wetlands and seasonal water courses supporting riparian gallery forest, or an estuary; and,

b. Masked Owl – in areas within 200 metres of permanent water supporting riparian gallery forest of paperbark wetland, seasonally inundated Paperbark wetlands, seasonal watercourses supporting riparian gallery forest or an estuary.

23. The Pre-disturbance Program must include avoidance, mitigation or management measures (and may include measures in the **Final Environmental Impact Statement**) if active, or potentially active, nests for the Red Goshawk or Masked Owl are found during surveying, including a 200 metre buffer zone around nest trees. The nest tree and buffer zone cannot be cleared or disturbed until the end of the breeding season (being until fledglings no longer use the nest for habitat).

24. Information obtained during the Pre-disturbance Program must be used to inform the Terrestrial Management Plan at condition 25.

***Terrestrial Management Plan***

25. The approval holder must submit a Terrestrial Management Plan covering all of the land based activities associated with the **construction** and **operation** of the project for the **Minister's** approval to effectively define, avoid, adaptively manage and mitigate negative **impacts** to the following **matters of national environmental significance**:

i. Red Goshawk*(Erythrotriorchis radiates)*; Masked Owl (*Tyto novaehollandiae kimberli)*; and Bare-rumped Sheathtail Bat *(Saccolaimus saccolaimus nudicluniatus)*

ii. **Listed migratory bird species**; and,

iii. **Listed flora species.**

26. The Terrestrial Management Plan must incorporate avoidance and mitigation measures for each **impact** associated with the project including, but not limited to:

a. measures for water related **impacts** including, but not limited to, erosion, construction and operation of the dam; stormwater runoff, flood events, hydrocarbon spills, sewage, crude or process water, runoff from ore stockpiles, and downstream **impacts** on watercourses, streams and marine environment (including estuaries);

b. measures for pests and weed management, dust management, and fire management;

c. implementing the vegetation buffers zones at condition 21; and,

d. measures identified in the Environmental Management Plan Outlines at Appendix 5-A (Threatened Flora Species); Appendix 6-C (Threatened fauna species); Appendix 8-A (Avian Migratory Species); and, Appendix 16-B (Water Monitoring and Management Conditions) in the **Final Environment Impact Statement.**

27. The Terrestrial Management Plan must also include adaptive management strategies to benefit the species listed at condition 25. The Terrestrial Management Plan must include and address effective management strategies to mitigate each potential **impact**, desired outcomes, benchmarks, readily measureable performance indicators and goals, timeframes for reporting and implementation, corrective actions and contingency measures, and, specify the person/s roles with responsibility for implementing actions. The Terrestrial Management Plan must provide information detailing Traditional Owner employment opportunities, and mechanisms for reporting the number of local indigenous person/s actually employed in the implementation of this Plan (consistent with condition 42).

28. The Terrestrial Management Plan must be informed by the most current information available to avoid, manage or mitigate **impact** associated with the project (including, but not limited to *National Water Quality Management Strategy, Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC 2000) or most current version/s of these guidelines.

29. The Terrestrial Management Plan must be submitted to the **Minister** for approval within 18 months of the date of this approval. The approved Terrestrial Management Plan must be implemented.

30. Within 60 days of the first anniversary of **operations** commencing, a revised Terrestrial Management Plan must be submitted to the **Minister** for approval. The Terrestrial Management Plan must be reviewed, revised and submitted to the **Minister** for approval every five (5) years (unless otherwise agreed by the **Minister** in writing) thereafter for the life of the project. The approved Terrestrial Management Plans, as revised, must be implemented.

***Bare rumped Sheathtail Bat***

31. For the Bare-rumped Sheathtail Bat *(Saccolaimus saccolaimus nudicluniatus)* the approval holder must:

    a. undertake a targeted Bare-rumped Sheathtail Bat survey in the project area, using broad spectrum acoustic monitoring prior to the **commencement of the action**. The survey must cover, as a minimum, the area that was subjected to netting as part of the **Final Environmental Impact Statement**;

    b. support a research program being conducted by the Australian Bat Society which will aim to improve the quality of the reference call library for microbats of the Cape York region;

    c. utilise the reference calls acquired by the research program to analyse the targeted survey results for the Bare-rumped Sheathtail Bat (at minimum for those reference calls collected as part of the **Final Environmental Impact Survey**) and further define habitat preferences for the species; and,

    d. if the Bare-rumped Sheathtail Bat is identified, adaptive management measures to avoid and mitigate impacts from the project must be implemented in the Terrestrial Management Plan at condition 25 within six (6) months of the identification of the species.

32. The approval holder must notify the department in writing within five (5) business days of any confirmed or suspected observation/s (including for condition 31) in the project area of Bare-rumped Sheathtail Bat.

***Rehabilitation Strategy***

**33.** The approval holder must submit an adaptive Rehabilitation **Strategy**, covering the **construction** and **operation** of the project to ensure the rehabilitated areas are functionally equivalent to the pre-disturbance habitat, to enable similar land use to that of the pre-disturbance habitat, by the following **matters of national environmental significance**:

i. Red Goshawk*(Erythrotriorchis radiates)*;

ii. Masked Owl (*Tyto novaehollandiae kimberli*);

iii. Rainbow Bee-eater (*Merops ornatus);*

iv. Oriental Cuckoo (*Cuculus saturatus);*

v. Barn Swallow (*Hirundo rustica*); and,

vi. if identified at condition 31(c) or condition 32, the Bare-rumped Sheathtail Bat *(Saccolaimus saccolaimus nudicluniatus).*

**34.** The land area to be progressively rehabilitated over the life of the project must be no less than 28,880 hectares. Unless otherwise specified in the approved Rehabilitation Strategy at condition 33, rehabilitation works must commence within two (2) years:

i. following mining in the area/s where it has been completed; or,

ii. following decommissioning and removal of any infrastructure, in each area where that infrastructure will not be retained at the end of the project.

**35.** The Rehabilitation Strategy must include adaptive management strategies to benefit the species listed at condition 33. The Rehabilitation Strategy must include measures outlined in the **Final Environment Impact Statement** and address effective management strategies to identify desired outcomes, benchmarks, readily measurable performance indicators and goals, timeframes for reporting and implementation, corrective actions and contingency measures, and, specify the person/s roles with responsibility for implementing actions. The Rehabilitation Strategy must provide information detailing Traditional Owner employment opportunities, and mechanisms for reporting the number of local indigenous person/s actually employed in the implementation of this Strategy (consistent with condition 42).

**36.** The Rehabilitation Strategy must be submitted to the **Minister** for approval within 3 years of the commencement of **operations.** The approved Rehabilitation Strategy must be implemented.

**37.** Unless otherwise agreed to by the **Minister** in writing, every five (5) years from the first anniversary of the approval of the Rehabilitation Strategy at condition 33 a reviewed Rehabilitation Strategy must be submitted to the **Minister**. The approved Rehabilitation Strategy must be implemented.

**38.** If the rehabilitation objectives identified for species identified at condition 33 do not meet any of the success criteria for any of these species as described in the approved Rehabilitation Strategy at condition 33 after 10 years of rehabilitation commencing, or as otherwise agreed in the approved Rehabilitation Strategy, the approval holder must notify the **Minister** in writing within 20 business days of the area (hectares) over which the rehabilitation objectives and success criteria were not met.

39. Within six (6) months of notifying the **Minister** at Condition 38, the approval holder must submit to the **Minister** for approval an Offset Strategy outlining the offset to be provided for the **matters of national environmental significance** identified at condition 33. The related offset must be in accordance with the *Environmental Protection and Biodiversity Conservation Act 1999 Environmental Offset Policy (October 2012)*, or its most current version.

40. An approved Offset Strategy must be implemented.

***Indigenous consultation***

41. The approval holder must consult with Indigenous people in accordance with the process under the Indigenous Land Use Agreement (known as the Western Cape Communities Coexistence Agreement) during preparation of management plans and strategies specified in this approval.

42. The approval holder must identify employment opportunities (e.g. under an Indigenous Land and Sea Program or seed collection associated with rehabilitation activities) for Indigenous persons to facilitate the implementation of the conditions specified in this approval.

***Feral Pig Management Offset Strategy***

43. The approval holder must implement an adaptive Feral Pig Management Offset Strategy to reduce the annual level of feral predation on **listed turtle species** nests for the period of this approval.

44. The Feral Pig Management Offset Strategy must be implemented at a minimum, in the project area as described in Figure 7-23 of the **Final Environmental Impact Statement.**

45. The Feral Pig Management Offset Strategy must include surveying to develop significantly robust baseline data for **listed turtle species** nesting in the project area and desired outcomes, benchmarks, readily measureable performance indicators and goals, timeframes for reporting and implementation, corrective actions and contingency measures, and, specify the person/s roles with responsibility for implementing actions. The Feral Pig Management Offset Strategy must provide information detailing Traditional Owner employment opportunities, and mechanisms for reporting the number of local indigenous person/s actually employed in the implementation of this Strategy (consistent with condition 42).

46. The Feral Pig Management Offset Strategy must adhere to the **department's** *Threat Abatement Plan for Predation, Habitat Degradation, Competition And Disease Transmission By Feral Pigs*, or its most current version. The Feral Pig Management Offset Strategy must also adhere to the *Humane Pest Animal Control: Code of Practice And Standard Operating Procedures* (that is currently being updated), or its most current version.

47. The findings from the Feral Pig Management Offset Strategy must be used to inform the Marine and Shipping Management Plan at condition 5 on an ongoing basis.

48. The Feral Pig Management Offset Strategy must be submitted, within 12 months of the date of this approval, to the **Minister** for approval. The approved Feral Pig Management Offset Strategy must be implemented.

*Inshore Dolphin Offset Strategy*

49. The approval holder must implement an Inshore Dolphin Offset Strategy to inform knowledge about the distribution and abundance of local and regional populations of **listed dolphin species** in the Western Cape York area, and identification of habitat utilised by **listed dolphin species.**

50. The Inshore Dolphin Offset Strategy must be implemented at a minimum, in the marine environment between latitude 12.60°S and latitude 13.35°S and must include provision for the Inshore Dolphin Offset Strategy actions to be undertaken prior to **construction**, during **construction** and periodically after **construction** (for a minimum period of 13 years following the commencement of **construction,** but not necessarily every year) of the Boyd Port and river facilities.

51. The Inshore Dolphin Offset Strategy must contribute to independent research on **listed dolphin species**, and specify targeted outcomes, benchmarks, readily measureable performance indicators and goals, timeframes for reporting and implementation, and the person/s roles with responsibility for implementing actions. The Inshore Dolphin Offset Strategy must provide information detailing Traditional Owner employment opportunities, and mechanisms for reporting the number of local indigenous person/s actually employed in the implementation of this Strategy (consistent with condition 42).

52. The Inshore Dolphin Offset Strategy must be developed in consultation with the **department**.

53. The approval holder must fund the Inshore Dolphin Offset Strategy to a minimum of $800,000 (GST exclusive) and a maximum of $1,200,000 (GST exclusive).

54. The findings from the Inshore Dolphin Offset Strategy, including corrective actions and contingency measures relating to **operations**, must be used to inform the Marine and Shipping Management Plan at condition 5 on an ongoing basis.

55. The Inshore Dolphin Offset Strategy must be submitted, within 12 months of the date of this approval, to the **Minister** for approval. The approved Inshore Dolphin Offset Strategy must be implemented.

***Publication Requirements***

56. All **survey data** and methodology collected for the project must be recorded in accordance with approved management plans. When requested by the **department**, the approval holder must provide to the **department** survey data and information related to **matters of national environmental significance.** This information must be provided within 30 business days of request, or in a timeframe agreed to by the **department** in writing. The **department** may use the survey data for other purposes. The approval holder must also provide the **survey data** and methodology, within 30 business days, to anyone who requests the **survey data** and methodology in writing. Notification of the availability of the **survey data** and methodology must be provided on the approval holder's website for the duration of this approval.

57. Every 12 months after the **commencement of the action**, unless otherwise agreed to in writing by the **Minister**, the approval holder must **publish** on their website, for the duration of the project (including decommissioning), all the survey methodology, reports and related analysis of **survey data** for current program/s, plan/s, strategies or other conditions specified in this approval for each individual **matter of national environmental significance**. The **department** must be notified within ten (10) business days of publication.

58. Within five (5) business days from this approval, the approval holder must publish the **Final Environmental Impact Statement** on their website for the duration of the project, including decommissioning.

59. Unless otherwise agreed to in writing by the **Minister** the approval holder must publish, for the life of the project including decommissioning, all current approved programs/s, plan/s, review/s (including the Independent Peer Reviews) or strategies referred to in these conditions of approval on their website. Each of the approved program/s, plan/s or strategies (including revised versions) must be published on the approval holder's website within one (1) month of approval.

***Independent Review Requirements***

60. Unless otherwise agreed in writing by the **Minister**, each program/s, plan/s, or strategies specified in the conditions must be **independently peer reviewed** prior to submission to the **Minister** for approval. The approval holder must nominate an **Independent Peer Reviewer** to the **Minister**. The person/organisation/technical committee conducting the **independent peer review** must be approved by the **Minister**, prior to the commencement of the review. The **independent peer review** criteria must be agreed to by the **Minister** and any reviews undertaken must address the criteria to the satisfaction of the **Minister**.

61. The reviews undertaken for condition 60 must include an analysis of the effectiveness of the avoidance and mitigation measures in meeting the objectives, targets or management measures identified in the program/s, plan/s or strategies being reviewed.

62. Unless otherwise specified in these conditions or notified in writing by the **Minister**, the approval holder must provide to the **Minister**, a copy of all advice and recommendations made by the **Independent Peer Reviewer** for program/s, plan/s, or strategies, and an explanation of how the advice and recommendations will be implemented, or an explanation of why the approval holder does not propose to implement certain recommendations.

***Minimum timeframe for consideration***

63. If the **Minister** is not satisfied that the final revised version of the plan/s, program/s or strategies specified in this approval adequately addresses the condition/s specified in the approval, the approval holder will be notified in writing by the **Minister** that they must update a plan/s, program/s or strategies to meet the condition/s that have not been adequately addressed.

64. For any plan/s and/or strategy specified in this approval that is to be approved by the **Minister**, the approval holder must ensure the **Minister** is provided at least 60 business days for review and consideration of the programs/s, plan/s, or strategies specified in this approval, unless otherwise agreed in writing by the **Minister**. This does not apply to urgent changes required to protect the environment or repair or mitigate any damage that may or will be, or has been, caused by the action to any matter protected by Part 3 of the EPBC Act for which the approval has effect.

65. To avoid duplication, the approval holder may provide the **Minister** with any plan/s, program/s or strategies prepared for the State provided the plan/s, program/s or strategies meets the conditions specified in this approval. The plan/s, program/s or strategies must include a cross reference table that clearly identifies:

    a. the condition specified in this approval for which the plan/s, strategy or program/s is being provided; and

b. the relevant folder, chapter, section number and page number in the plan/s, program/s or strategies where the condition has been addressed.

*General*

66. Within ten (10) days after the commencement of **preliminary works, construction, operation** and/or **commencement of the action**, the approval holder must advise the **Minister** in writing of the actual date of commencement.

67. The approval holder must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the plan/s or strategies as specified in these conditions and make them available upon request to the **department**. Such records may be subject to audit by the **department** or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **department's** website. The results of audits may also be published through the general media.

68. Within three (3) months of every 12 month anniversary of **commencement of the action**, the approval holder must **publish** a report on their website, for the duration of the project including decommissioning, addressing compliance with the conditions of this approval over the previous 12 months, including implementation of any management plan/s or strategies as specified in the conditions. Non-compliance with any of the conditions of this approval must be reported to the **department** at the same time as the compliance report is **published**. Within five (5) days after publication, the person taking the action must provide the **Minister** with a copy of the report/s.

69. Every three years from the date of this approval, the approval holder must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the **Minister**. The independent auditor must be approved by the **Minister** prior to the commencement of the audit. Audit criteria must be agreed to by the **Minister** and the audit report must address the criteria to the satisfaction of the **Minister**.

70. For the purposes of reporting at Condition 68, where material required under condition 41 and Condition 42 is culturally sensitive and cannot be disclosed at the explicit and written consent of the relevant Indigenous people with rights, claims or interests in the area, the approval holder must advise the **department** of the extent to which it cannot comply with condition 41 and Condition 42 or that reason.

71. Where the conditions require the approval holder to submit a program/s, plan/s or strategies for the **Minister's** approval, the approval holder must maintain a register recording:

    a. the date on which each plan was approved by the **Minister**;

    b. if a plan has not been approved, the date on which it was, or is expected to be, submitted to the **Minister**;

    c. the dates on which reports on the outcomes of reviews have been approved by the **Minister**; and,

    d. the **dates** on which the subsequent reviews are due.

The register must be submitted to the **department**, at the time the annual compliance report is **published**, but does not form part of the report.

72. If the approval holder wishes to carry out any activity otherwise than in accordance with a programs/s, plan/s or strategies as specified in the conditions, the approval holder must submit to the **department** for the **Minister's** written approval a revised version of that programs/s, plan/s or strategies. The varied activity must not commence until the **Minister** has approved the varied programs/s, plan/s or strategies writing. The **Minister** will not approve a varied programs/s, plan/s or strategies unless the revised programs/s, plan/s or strategies would result in an equivalent or improved environmental outcome over time. If the **Minister** approves the revised programs/s, plan/s or strategies they must be implemented in place of the plan/s or strategies originally approved.

73. If, at any time after the first five (5) year anniversary of the date of this approval, the approval holder has not **commenced the action**, then the approval holder must not **commence the action** without the written agreement of the **Minister**.

74. The financial cost of adhering to the conditions specified in this approval will be borne by the approval holder.

75. If the **Minister** believes that it is necessary or convenient for the better protection of World Heritage properties (sections 12 & 15A), National Heritage Place (section 15B &15C), Listed threatened species and communities (sections 18 & 18A), Listed Migratory Species (section 20 & 20A), Commonwealth Marine Area (sections 23 & 24a) and Great Barrier Reef Marine Park (sections 24B and 24C) to do so, the **Minister** may request that the approval holder make specified revisions to the programs/s, plan/s or strategies specified in the conditions and submit the revised programs/s, plan/s or strategies for the **Minister's** written approval. The approval holder must comply with any such request. The revised approved programs/s, plan/s or strategies must be implemented. Unless the **Minister** has approved the programs/s, plan/s or strategies then the approval holder must continue to implement the programs/s, plan/s or strategies originally approved, as specified in the conditions.

76. The approval holder must undertake the action in accordance with, and ensure persons that are under the direction or control of the approval holder for the South of Embley Bauxite Mine and Port Development project comply with, the approved plan/s, program/s or strategies to avoid, mitigate, manage and offset **impacts** to outstanding universal value of the World Heritage properties (sections 12 & 15A), National Heritage Place (section 15B &15C), Listed threatened species and communities (sections 18 & 18A), Listed Migratory Species (section 20 & 20A), Commonwealth Marine Area (sections 23 & 24a) and Great Barrier Reef Marine Park (sections 24B and 24C).

**Definitions**

a) **Capital Dredging** – as defined in the *Australian Government National Assessment Guidelines for Dredging (2009)* being 'dredging for navigation, to enlarge or deepen existing channel and port areas or to create new ones. Dredging for engineering purposes, to create trenches for pipes, cables, immersed tube tunnels, to remove material unsuitable for foundations and to remove overburden for aggregate extraction, etc'.

b) **Commencement of the action / commenced the action** – any works that are required to be undertaken for **construction** (except exploration, site investigation and **preliminary works)**.

c) **Clearing of vegetation / clear vegetation** – the clearing or inundation by water of vegetation, for pest and weed control, or construction of any **infrastructure**.

d) **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 facilitates; dam construction; **clearing of vegetation**; and infrastructure facilities (including power station, roads, and fuels storage). Excludes **preliminary works**.

e) **Department** – the Australian Government department administering the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*.

f) **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.

g) **Final Environmental Impact Statement** – comprises the South of Embley Project Final Environmental Impact Statement (March 2013).

h) **Infrastructure** – operations or activities that are ancillary to **mining**, such as haul and access roads, conveyors, bridges, tailings storage facilities, loading ramps, pumps, pipelines and water management infrastructure, energy generation and transmission, exploration, Boyd Port, beneficiation plant, stockpiles, and the barge and ferry terminals.

i) **Impact/s / impacted** – as defined in section 527E of the EPBC Act.

j) **Independent/ly Peer reviewed/ Independent Peer Reviewer** – assessment of the assumptions, calculations, extrapolations, alternate interpretations, methodologies, performance goals and performance criteria, and conclusions pertaining to the management plans/strategies/programs by a person/organisation/technical committee, independent of the approval holder and/or employed in any subsidiary company of the approval holder. This person/organisation/technical committee must have demonstrated expertise in the **matter of national environmental significance** being reviewed and be approved by the **Minister** prior to commencement of the review.

k) **Listed dolphin species** – listed migratory species under the EPBC Act, specifically Australian Snubfin Dolphin (*Orcaella heinsohni)*; and, Indo-Pacific Humpback Dolphin (*Sousa chinensis).*

l) **Listed flora species** – listed vulnerable threatened species under the EPBC Act, specifically Cooktown Orchid *(Dendrobium bigibbum*); Chocolate Tea Tree Orchid (*Dendrobium johannis (Cepobaculum johannis*)); and Beach nightshade (*Solanum dunalianum).*

m) **Listed migratory birds species** – listed migratory species under the EPBC Act, specifically as identified in Annexure A.

n) **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);*

o) **Maintenance Dredging** – as defined in the *Australian Government National Assessment Guidelines for Dredging (2009)* being 'dredging to ensure that channels, berths or other port areas are maintained at their designed dimensions'.

p) **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).

q) **Mining / Mining area/s-** operations or activities connected with the extraction of bauxite ore (excluding **infrastructure**) or the location where operations or activities connected with the extraction of bauxite ore occur.

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

s) **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.

t) **Operation/s** – commencement of activities associated with bauxite **mining** and production, including shipping activities from the Boyd Port and facilitates in the Hey and Embley Rivers. This does not include activities associated with **construction** or **preliminary works**.

u) **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, 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.

v) **Publish/ed** – documentation available on the approval holder's website for the duration of the action (including decommissioning).

w) **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.

x) **Survey Data** - information obtained from monitoring and survey activities associated with plan/s and/or strategies specified by these conditions and where relevant must include, at minimum, the name of species (common and scientific), time and day of survey, GPS location, number of individuals located, age class (if known), habitat type, and EPBC Act listing status.

## ANNEXURE A: Listed Migratory Bird species for the South of Embley project (EPBC 2010/5642)

| Migratory Avian Group | Species |
|---|---|
| International Migratory Shorebirds | *Actitis hypoleucos* Common Sandpiper |
| | *Calidris acuminata* Sharp-tailed Sandpiper |
| | *Calidris canutus* Red Knot |
| | *Calidris ferruginea* Curlew Sandpiper |
| | *Calidris ruficollis* Red-necked Stint |
| | *Calidris tenuirostris* Great Knot |
| | *Charadrius leschenaultii* Greater Sand Plover |
| | *Charadrius mongolus* Lesser Sand Plover |
| | *Charadrius veredus* Oriental Plover |
| | *Gallinago hardwickii* Latham's Snipe, Japanese Snipe |
| | *Heteroscelus brevipes* Grey-tailed Tattler |
| | *Limnodromus semipalmatus* Asian Dowitcher |
| | *Limosa lapponica* Bar-tailed Godwit |
| | *Limosa limosa* Black-tailed Godwit |
| | *Numenius madagascariensis* Eastern Curlew |
| | *Numenius minutus* Little Curlew, Little Whimbrel |
| | *Numenius phaeopus* Whimbrel |
| | *Pluvialis fulva* Pacific Golden Plover |
| | *Pluvialis squatarola* Grey Plover |
| | *Tringa nebularia* Common Greenshank |
| | *Tringa stagnatilis* Marsh Sandpiper |
| | *Xenus cinereus* Terek Sandpiper |
| Waterbirds | *Acrocephalus stentoreus* Clamorous Reed-Warbler |
| | *Ardea alba* Great Egret, White Egret |
| | *Egretta sacra* Eastern Reef Egret |
| | *Grus Antigone* Sarus Crane |

| Migratory Avian Group | Species |
|---|---|
| | *Plegadis falcinellus* Glossy Ibis |
| Seabirds | *Fregata minor* Great Frigatebird |
| | *Fregata ariel* Lesser Frigatebird |
| | *Sterna albifrons* Little Tern |
| Raptors | *Haliaeetus leucogaster* White-bellied Sea-eagle |
| | *Pandion cristatus* Eastern Osprey |
| Woodland Birds | *Cuculus saturatus* Oriental Cuckoo |
| | *Merops ornatus* Rainbow Bee-eater |
| | *Mylagra cyanoleuca* Satin Flycatcher |
| | *Rhipidura rufifrons* Rufous Fantail |
| | *Monarcha melanopsis* Black-faced Monarch |
| Barn Swallow | *Hirundo rustica* Barn Swallow |
| Aerial Species | *Apus pacificus* Fork-tailed Swift |
| | *Hirundapus caudacutus* White-throated Needletail |

## ANNEXURE B: Pile Driving Observation Zones for the South of Embley project (EPBC 2010/5642)

### Port Development

| Species | | Pipe pile diameters | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1500mm | 1200mm | 1050mm | 750mm | 355.6mm | 1 x 1500mm and 2 x 1050mm |
| | | Minimum observation Distance (metres) | | | | | |
| Bryde's Whale | | ESL | ESL | ESL | ESL | 570 | ESL |
| | | 1330 | 1210 | 930 | 790 | 570 | 1580 |
| Dolphins and Dugong | | 400 | 360 | 270 | 230 | 170 | 500 |
| Marine Turtle | | 470 | 430 | 350 | 280 | 210 | 630 |

Note: ESL = Extends to shoreline from the end of the Stage 1 wharf; n.r.= not relevant

### Humbug terminal

| Species | | Sheet Pile | Pipe Piles | | | |
|---|---|---|---|---|---|---|
| | | 600mm width | 1,050mm | 900mm | 750mm | 600mm |
| | | Minimum observation Distance (metres) | | | | |
| Dolphins and Dugong | | <10 | 170 | 160 | 140 | 130 |
| Marine Turtles | | 60 | 210 | 200 | 180 | 160 |

Note: The distances here have their maximum values in a westerly direction.

### Hornibrook ferry/tug terminal

| Species | | Pipe Piles | | | |
|---|---|---|---|---|---|
| | | 1,050mm | 900mm | 750mm | 600mm |
| | | Minimum observation Distance (metres) | | | |
| Dolphins and Dugong | | 250 | 230 | 210 | 190 |
| Marine Turtles | | 340 | 310 | 280 | 240 |

Note: The distances here have their maximum values in the south-easterly to south-westerly directions.

### Hey River terminal

| Species | | Sheet Piles | Pipe Piles | | | |
|---|---|---|---|---|---|---|
| | | 600mm width | 1,050mm | 900mm | 750mm | 600mm |
| | | Minimum observation Distance (metres) | | | | |
| Dolphins and Dugong | | <10 | 380 | 360 | 330 | 300 |
| Marine Turtles | | 110 | 470 | 440 | 400 | 370 |

Note: The distances here have their maximum values in Northerly and Southerly directions.

### Navigation Aids

| Species | | Pipe Pile - 1050mm diameter |
|---|---|---|
| | | Minimum observation Distance (metres) |
| Dolphins and Dugong | | 280 |
| Marine Turtles | | 360 |

Note: The distances are equal in all directions

# Appendix B: Environmental Authority (EPML00725113)

# Permit

Environmental Protection Act 1994

## Environmental authority EPML00725113

*This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.*

### Environmental authority number: EPML00725113

**Environmental authority takes effect on 19 March 2019**

### Environmental authority holder(s)

| Name(s) | Registered address |
|---|---|
| RTA Weipa Pty Ltd | 123 Albert Street BRISBANE CITY QLD 4000 |

### Environmentally relevant activity and location details

| Environmentally relevant activity/activities | Location(s) |
|---|---|
| Resource Activity, Ancillary 31 - Mineral processing, 2: Processing, in a year, the following quantities of mineral products, other than coke, (b) more than 100,000t | ML7024 |
| Resource Activity, Ancillary 31 - Mineral processing, 2: Processing, in a year, the following quantities of mineral products, other than coke, (b) more than 100,000t | ML6024 |
| Resource Activity, Ancillary 14 - Electricity Generation, 2: Generating electricity by using a fuel, other than gas, at a rated capacity of, (a) 10MW electrical to 150MW electrical | ML7024 |
| Resource Activity, Ancillary 14 - Electricity Generation, 2: Generating electricity by using a fuel, other than gas, at a rated capacity of, (a) 10MW electrical to 150MW electrical | ML6024 |
| Resource Activity, Ancillary 64 - Water treatment, 3: Treating 10ML or more raw water in a day | ML7024 |
| Resource Activity, Ancillary 64 - Water treatment, 3: Treating 10ML or more raw water in a day | ML6024 |



ABN 46 640 294 485

Queensland Government

| Environmentally relevant activity/activities | Location(s) |
|---|---|
| Resource Activity, Ancillary 60 - Waste disposal, 2: Operating a facility for disposing of, in a year, the following quantity of waste mentioned in subsection (1) (b), (c) more than 5000t but not more than 10,000t | ML7024 |
| Resource Activity, Ancillary 60 - Waste disposal, 2: Operating a facility for disposing of, in a year, the following quantity of waste mentioned in subsection (1) (b), (c) more than 5000t but not more than 10,000t | ML6024 |
| Resource Activity, Ancillary 16 - Extraction and Screening, 1: Dredging, in a year, the following quantity of material, (d) more than 1,000,000t | ML7024 |
| Resource Activity, Ancillary 16 - Extraction and Screening, 1: Dredging, in a year, the following quantity of material, (d) more than 1,000,000t | ML6024 |
| Resource Activity, Schedule 2A, 11: Mining bauxite | ML7024 |
| Resource Activity, Schedule 2A, 11: Mining bauxite | ML6024 |
| Resource Activity, Ancillary 58 - Regulated Waste Treatment, Operating a facility for receiving and treating regulated waste or contaminated soil to render the waste or soil non-hazardous or less hazardous | ML7024 |
| Resource Activity, Ancillary 58 - Regulated Waste Treatment, Operating a facility for receiving and treating regulated waste or contaminated soil to render the waste or soil non-hazardous or less hazardous | ML6024 |
| Resource Activity, Ancillary 16 - Extraction and Screening, 2: Extracting, other than by dredging, in a year, the following quantity of material, (a) 5,000t to 100,000t | ML7024 |
| Resource Activity, Ancillary 16 - Extraction and Screening, 2: Extracting, other than by dredging, in a year, the following quantity of material, (a) 5,000t to 100,000t | ML6024 |
| Resource Activity, Ancillary 08 - Chemical Storage, 3: Storing more than 500 cubic metres of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3 under subsection (1)(c) | ML7024 |
| Resource Activity, Ancillary 08 - Chemical Storage, 3: Storing more than 500 cubic metres of chemicals of | ML6024 |

| Environmentally relevant activity/activities | Location(s) |
|---|---|
| class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3 under subsection (1)(c) | |
| Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (d) more than 4000 but not more than 10,000EP | ML7024 |
| Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (d) more than 4000 but not more than 10,000EP | ML6024 |
| Resource Activity, Ancillary 16 - Extraction and Screening, 3: Screening, in a year, the following quantity of material, (a) 5,000t to 100,000t | ML7024 |
| Resource Activity, Ancillary 16 - Extraction and Screening, 3: Screening, in a year, the following quantity of material, (a) 5,000t to 100,000t | ML6024 |
| Resource Activity, Ancillary 50 - Bulk Material Handling, 2: Loading or unloading 100t or more of bulk materials in a day or stockpiling bulk materials | ML7024 |
| Resource Activity, Ancillary 50 - Bulk Material Handling, 2: Loading or unloading 100t or more of bulk materials in a day or stockpiling bulk materials | ML6024 |

**Additional information for applicants**

Environmentally relevant activities

The description of any environmentally relevant activity (ERA) for which an environmental authority (EA) is issued is a restatement of the ERA as defined by legislation at the time the EA is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an EA as to the scale, intensity or manner of carrying out an ERA, the conditions prevail to the extent of the inconsistency.

An EA authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the EA specifically authorises environmental harm.

A person carrying out an ERA must also be a registered suitable operator under the Environmental Protection Act 1994 (EP Act).

Contaminated land

It is a requirement of the EP Act that an owner or occupier of contaminated land give written notice to the administering authority if they become aware of the following:

- the happening of an event involving a hazardous contaminant on the contaminated land (notice must be given within 24 hours); or
- a change in the condition of the contaminated land (notice must be given within 24 hours); or
- a notifiable activity (as defined in Schedule 3) having been carried out, or is being carried out, on the contaminated land (notice must be given within 20 business days);

that is causing, or is reasonably likely to cause, serious or material environmental harm.

For further information, including the form for giving written notice, refer to the Queensland Government website www.qld.gov.au, using the search term 'duty to notify'.

Take effect

Please note that, in accordance with section 200 of the EP Act, an EA has effect:

a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority-on the nominated day; or
b) if the authority states a day or an event for it to take effect-on the stated day or when the stated event happens; or
c) otherwise-on the day the authority is issued.

However, if the EA is authorising an activity that requires an additional authorisation (a relevant tenure for a resource activity, a development permit under the Sustainable Planning Act 2009 or an SDA Approval under the State Development and Public Works Organisation Act 1971), this EA will not take effect until the additional authorisation has taken effect.

If this EA takes effect when the additional authorisation takes effect, you must provide the administering authority written notice within 5 business days of receiving notification of the related additional authorisation taking effect.

If you have incorrectly claimed that an additional authorisation is not required, carrying out the ERA without the additional authorisation is not legal and could result in your prosecution for providing false or misleading information or operating without a valid environmental authority.

Dean Sharpe
Department of Environment and Science
Delegate of the administering authority
Environmental Protection Act 1994

**Date issued: 19 March 2019**

**Enquiries:**
Minerals Business Centre
Department of Environment and Science
Phone: 07 4222 5352
Email: ESCairns@des.qld.gov.au

**Obligations under the Environmental Protection Act 1994**

In addition to the requirements found in the conditions of this environmental authority, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443)

**Conditions of environmental authority**

**Location:** ML6024, ML7024

Weipa.

This **environmental authority** incorporates the following schedules:

Schedule A – General

Schedule B – Air

Schedule C - Land and Rehabilitation

Schedule D - Regulated Dams

Schedule E - General and Regulated waste management

Schedule F - Evans Landing landfill

Schedule G – Noise

Schedule H – Water

Schedule I - Sewage Treatment

Schedule J – Marine

Schedule K - Definitions/Acronyms

Schedule L – Plans

Appendix 1 - Maximum Contaminant Levels in Regulated Waste.

The environmentally relevant activity(ies) conducted at the location as described above must be conducted in accordance with the following site specific conditions of approval.

## SCHEDULE A – GENERAL

### Activity

(A1) This environmental authority authorises environmental harm caused by the carrying out of mining activities by the holder of this environmental authority, provided the mining activities are carried out in accordance with conditions herein. Where a condition in this environmental authority refers to environmental harm the condition is taken to authorise the environmental harm occurring in compliance with the condition. Where there is no condition or the authority is silent on a matter, the lack of a condition or silence shall not be construed as authorising harm.

(A2) The activities to be carried out under this environmental authority are the mining activities defined within Table A1 – Authorised Activities and identified in Schedule L Plan 1 – Weipa General Area Plan, Plan 2 – East Weipa and Andoom Operational Areas and Plan 3 – South of Embley Project Infrastructure and Conceptual Mine Plan.

**Table A1 – Authorised Activities**

| Mining Activity / Domain | Mine Feature | Tenure | Maximum Surface Area of Disturbance (ha) | Coordinates (GDA94 MGA z54) | |
|---|---|---|---|---|---|
| | | | | Northing | Easting |
| Extraction Areas | Mining Areas | ML7024 | 246,629 | N/A | N/A |
| | Nanum Tawap Sand Quarry | ML7024 | 14.5 | 8595750<br>8595870 | 599248<br>599563 |
| | | | | 8596060<br>8596250 | 599068<br>599482 |
| | Sand extraction areas | ML7024 | 200 | 8596526<br>8596518<br>8595605<br>8595549 | 598726<br>599640<br>598815<br>599599 |
| | Boyd Port dredge extraction area | ML7024 | 78 | 8571105<br>8574142 | 567170<br>561485 |
| | | | | 8573560<br>8570525 | 561175<br>566860 |
| | Hey River Terminal dredge extraction area | ML6024 | 3 | 8590950<br>8590950 | 597005<br>597140 |
| | | | | 8590665<br>8590665 | 597140<br>597005 |
| Processing Activities | Weipa Beneficiation Plant | ML7024 | 2.1 | 8599830<br>8599820 | 594472<br>594636 |
| | | | | 8599690<br>8599700 | 594624<br>594458 |
| | Andoom Beneficiation Plant | ML7024 | 1.8 | 8614370<br>8614320 | 590825<br>590986 |
| | | | | 8614210<br>8614230 | 590952<br>590830 |
| | Boyd Beneficiation Plant (total infrastructure area) | ML7024 | 270 | TBD[2]<br>TBD[2] | TBD[2]<br>TBD[2] |
| | | | | TBD[2]<br>TBD[2] | TBD[2]<br>TBD[2] |
| | Norman Creek Beneficiation Plant (total infrastructure area) | ML7024 | 105 | TBD[2]<br>TBD[2] | TBD[2]<br>TBD[2] |
| | | | | TBD[2]<br>TBD[2] | TBD[2]<br>TBD[2] |
| Regulated Dams | East Weipa Tailings Storage Facility (EW) | ML7024 | 380 | 8600663<br>8600557 | 593810<br>596535 |

| | | | | | |
|---|---|---|---|---|---|
| | | | | 8602613<br>8602229 | 596691<br>594045 |
| | East Weipa 1 Tailings Storage Facility (EW1) | ML7024 | 50 | 8600139<br>8599265 | 595866<br>595760 |
| | | | | 8599278<br>8600093 | 596343<br>596605 |
| | East Weipa 2 Tailings Storage Facility (EW2) | ML7024 | 65 | 8600096<br>8600037 | 596608<br>597208 |
| | | | | 8598967<br>85999063 | 597049<br>596274 |
| | Andoom Tailings Storage Facility | ML7024 | 460 | 8617190<br>8616130 | 590732<br>593374 |
| | | | | 8614020<br>8614880 | 592696<br>589971 |
| | Emergency Dam | ML7024 | 40 | 8600000<br>8599900 | 595057<br>595829 |
| | | | | 8599280<br>8599720 | 595775<br>595030 |
| | West Weipa 2 (WW2) | ML7024 | 159 | 8601590<br>8602090 | 593810<br>591786 |
| | | | | 8600841<br>8602229 | 590547<br>591746 |
| | G & X Dam | ML7024 | 20 | 8600987<br>8600643 | 592356<br>592150 |
| | | | | 8600596<br>8601196 | 592717<br>592813 |
| | G2 Dam | ML7024 | 40 | 8600416<br>8600564 | 592094<br>591318 |
| | | | | 8600048<br>8599803 | 591235<br>591735 |
| | Boyd Tailings Storage Facility | ML7024 | 1100 | 8569720<br>8569720 | 567195<br>569705 |
| | | | | 8565185<br>8565185 | 567195<br>569705 |
| | Norman Creek Tailings Storage Facility | ML7024 | 1100 | 8557545<br>8552305 | 578560<br>578140 |
| | | | | 8553185<br>8556665 | 580320<br>576380 |
| Water Supply Dam | Dam C | ML7024 | 780 | 8566275<br>8566890 | 574055<br>579665 |
| | | | | 8564570<br>8561490 | 581175<br>575595 |
| Waste Disposal / Treatment | Evans Landing Landfill | ML7024 | 37.8 | 8600165<br>8600821 | 590760<br>590805 |
| | | | | 8600142<br>8600308 | 591045<br>591087 |
| | | | | 8600220<br>8600463 | 591654<br>591693 |
| | Awonga Point Sewage Treatment Plant | ML7024 | 6.5 | 8606290<br>8606290 | 597124<br>597223 |
| | | | | 8605800<br>8605810 | 597179<br>597012 |
| | Sewage Treatment Plant for temporary camps in the | ML7024 | N/A[1] | N/A[1] | N/A[1] |

| | | | | | |
|---|---|---|---|---|---|
| | Area south of the Embley River | | | | |
| | Boyd Infrastructure Area Sewage Treatment Plant | ML7024 | N/A[1] | N/A[1] | N/A[1] |
| | Boyd Accommodation Village Sewage Treatment Plant | ML7024 | N/A[1] | N/A[1] | N/A[1] |
| | Norman Creek Infrastructure Area Sewage Treatment Plant | ML7024 | N/A[1] | N/A[1] | N/A[1] |
| Electricity Generation | Andoom Power Station | ML7024 | 0.3 | 8614190<br>8614190 | 590977<br>591045 |
| | | | | 8614150<br>8614150 | 591043<br>590976 |
| | Lorim Point Power Station | ML7024 | 1.6 | 8600050<br>8600040 | 594039<br>594179 |
| | | | | 8599930<br>8599940 | 594167<br>594030 |
| | Boyd Infrastructure Area Power Station | ML7024 | N/A[1] | N/A[1] | N/A[1] |
| | Norman Creek Infrastructure Area Power Station | ML7024 | N/A[1] | N/A[1] | N/A[1] |
| | Electrical Generators | ML6024 & ML7024 | Mobile (defined in Plan of Operations where >1MW) | N/A[1] | N/A[1] |
| Chemical Storage Areas | Andoom Power Station Fuel Storage | ML7024 | 0.1 | 8614060<br>8614060 | 590972<br>591000 |
| | | | | 8614090<br>8614090 | 590972<br>591000 |
| | Weipa Airport | ML7024 | 0.2 | 8597870<br>8597830 | 600444<br>600508 |
| | | | | 8597810<br>8597850 | 600493<br>600430 |
| | Andoom Fuel Farm (Service Bay) | ML7024 | 0.1 | 8613830<br>8613840 | 590368<br>590393 |
| | | | | 8613820<br>8613810 | 590407<br>590382 |
| | East Weipa Fuel Farm (above ground) | ML7024 | 0.2 | 8599800<br>8599800 | 601718<br>601757 |
| | | | | 8599760<br>8599760 | 601757<br>601718 |
| | East Weipa Fuel Farm (underground) | ML7024 | 0.2 | 8599880<br>8599880 | 601646<br>601707 |
| | | | | 8599850<br>8599850 | 601710<br>601647 |
| | For Heavy Equipment in Mining Areas | ML7024 | Mobile/Temporary (defined in Plan of Operations where >10m$^3$) | N/A | N/A |
| | Weipa Main Store | ML7024 | 2.9 | 8599920<br>8599910 | 594001<br>594177 |
| | | | | 8599750 | 594159 |

| | | | | | |
|---|---|---|---|---|---|
| | | | | 8599760 | 593984 |
| | Weipa Environmental Compound | ML7024 | 1.6 | 8602930<br>8602970 | 595322<br>595540 |
| | | | | 8602900<br>8602860 | 595556<br>595337 |
| | Weipa Waste Oil Fuel Farm | ML7024 | 0.1 | 8599390<br>8599390 | 594843<br>594875 |
| | | | | 8599340<br>8599350 | 594873<br>594841 |
| | Temporary camps in the area south of the Embley River | ML7024 | N/A[1] | N/A[1] | N/A[1] |
| | Boyd Infrastructure Area | ML7024 | N/A[1] | N/A[1] | N/A[1] |
| | Norman Creek Infrastructure Area | ML7024 | N/A[1] | N/A[1] | N/A[1] |
| Motor Vehicle Workshops | Town and Industrial Area | ML7024 | Defined in Plan of Operations | N/A | N/A |
| | Mining and Processing Areas<br>Andoom Heavy Equipment workshop | ML7024 | 8.1 | 8613610<br>8613570 | 589948<br>590255 |
| | | | | 8613310<br>8613350 | 590214<br>589907 |
| | Andoom Contractor Workshop | ML7024 | 0.2 | 8613864<br>8613817 | 590459<br>590458 |
| | | | | 8613817<br>8613864 | 590421<br>590421 |
| | East Weipa Heavy Equipment workshop | ML7024 | 9.6 | 8500020<br>8599700 | 601550<br>601550 |
| | | | | 8599700<br>8500020 | 601850<br>601850 |
| | Light vehicle workshop | ML7024 | 0.5 | 8599720<br>8599650 | 594310<br>594310 |
| | | | | 8599650<br>8599720 | 594380<br>594380 |
| | Lorim Point Contractor Workshop | ML7024 | 0.3 | 8600884<br>8600283 | 594426<br>594476 |
| | | | | 8600235<br>8600235 | 594476<br>594426 |
| | Boyd Infrastructure Area | ML7024 | N/A[1] | N/A[1] | N/A[1] |
| | Dam C vehicle workshop | ML7024 | N/A[1] | N/A[1] | N/A[1] |
| | Norman Creek Infrastructure Area | ML7024 | N/A[1] | N/A[1] | N/A[1] |
| Accommodation | Temporary camps in the area south of the Embley River | ML7024 & ML6024 | 55 | 8575795<br>8575795 | 577632<br>578343 |
| | | | | 8575060<br>8575060 | 577632<br>578343 |
| | Boyd Bay Fly-camp | | | 8571458<br>8571458 | 570155<br>570076 |
| | | | | 8571661<br>8571661 | 570155<br>570076 |

| | | | | | |
|---|---|---|---|---|---|
| | Boyd Accommodation Village | | | 8575795<br>8575795 | 577632<br>578343 |
| Port / Ship Loading Facilities | Boyd Port | ML7024 | 10 | 8571220<br>8570465 | 566305<br>567725 |
| | | | | 8570410<br>8571170 | 567695<br>566275 |
| Barge / Ferry Terminal | Hey River Terminal | ML6024 | 0.5 | 8590700<br>8590896 | 596760<br>597108 |
| | | | | 8590668<br>8590620 | 597101<br>596800 |
| | Pera Head Temporary Seaborne Access (Barge Landing) | ML7024 | 0.5 | TBD[2]<br>TBD[2] | TBD[2]<br>TBD[2] |
| | | | | TBD[2]<br>TBD[2] | TBD[2]<br>TBD[2] |
| | Boyd Point Temporary seaborne access (passenger jetty) | ML7024 | TBD[2] | TBD[2]<br>TBD[2] | TBD[2]<br>TBD[2] |
| Water Treatment | Weipa Water Treatment Plant | ML7024 | 0.7 | 8603650<br>8603650 | 595565<br>595627 |
| | | | | 8603530<br>8603530 | 595626<br>595565 |
| | Lorim Point Water Treatment Plant | ML7024 | 0.2 | 8599700<br>8599640 | 594448<br>594442 |
| | | | | 8599640<br>8599700 | 594402<br>594406 |
| | Water Treatment Plant for temporary camps in area south of the Embley River | ML7024 | N/A[1] | N/A[1] | N/A[1] |
| | Boyd Infrastructure Area Water Treatment Plant | ML7024 | N/A[1] | N/A[1] | N/A[1] |
| | Norman Creek Infrastructure Area Water Treatment Plant | ML7024 | N/A[1] | N/A[1] | N/A[1] |
| Transport Corridors | Transport Corridor | ML6024 | Entire Mining Lease | N/A | N/A |
| | Haul Roads / Access Tracks | ML6024 & ML7024 | Defined in Plan of Operations | N/A | N/A |
| Town Activities | Weipa Township | ML7024 | 1079 (within the boundary of the township of Weipa) | As per the current boundary of the township of Weipa as approved by regulation | |

[1] Maximum surface area of disturbance and location included in the total infrastructure area within the mining activity/domain identified as “Extraction Areas”, “Processing Activities” or “Accommodation”.

[2] To be determined and notified to the administering authority upon completion of final design.

**Maintenance of Measures, Plant and Equipment**

(A3) The holder of this environmental authority must:

(a) install measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority;

(b) maintain such measures, plant and equipment in a proper condition; and

(c) operate such measures, plant and equipment in a proper manner.

(A4) No change, replacement or alteration of any plant or equipment is permitted if the change, replacement or alteration increases, or is likely to increase the risk of environmental harm caused by the mining activities.

**Monitoring & Reporting**

(A5) Any management or monitoring plans, systems or programs required to be developed and implemented by a condition of this environmental authority must be reviewed for effectiveness in minimising the likelihood of environmental harm each time a Plan of Operations is prepared or amended, or otherwise in accordance with the relevant timeframe as specified in this environmental authority, and amended as promptly as necessary to meet that objective.

(A6) The holder of this environmental authority must record, compile, evaluate and keep for a period of five (5) years all monitoring results, records and documents required by this environmental authority and any complaints received about the mining activities, and make available for inspection all or any of these records upon request by the administering authority.

(A7) All monitoring referred to in this environmental authority shall be undertaken by a suitable competent person using monitoring equipment that is accurately calibrated and maintained in good working order and condition.

(A8) All analyses and tests required to be conducted under this environmental authority must be carried out by a laboratory that has NATA certification for such analyses and tests, except as otherwise authorised by the administering authority.

**Financial Assurance**

(A9) The environmental authority holder must provide a financial assurance of an amount determined by the administering authority in accordance with the administering authority's Guideline – *Financial assurance under the Environmental Protection Act 1994* and in a form acceptable to the administering authority. The financial assurance must remain in force until the administering authority is satisfied no claim on the assurance will be required.

**Risk Management**

(A10) The holder of this environmental authority must develop and implement a risk management system for mining activities which conforms to the Australian Standard for Risk Management (AS/NZS 31000:2009) or the latest edition of the Australian Standard for Risk Management:

(a) before 31 August 2012 in areas other than on land south of the Embley River before; and

(b) prior to commencement of significant construction work for land south of the Embley River.

**Emergency Response/Contingency**

(A11) An emergency response/contingency plan must be developed and implemented to respond to emergency events and incidents. This plan must be provided to the administering authority upon request.

(A12) The emergency response/contingency plan must be developed in accordance with the most recent version of ISO14001 standard and must include but not be limited to the following matters:

(a) response procedures which aim to minimise the extent and duration of environmental harm;

(a) procedures to investigate the cause of an emergency event or incident and remedial actions to be taken to prevent a recurrence;

(c) timely and accurate reporting of the circumstance and nature of an emergency event or incident to the administering authority;

(d) procedures for accessing monitoring points during an emergency event or incident; and

(e) procedures to notify any person who may be affected by the emergency event or incident within twenty-four (24) hours, with the following information to be provided at a minimum:
  (i) the location of the emergency event or incident;
  (ii) the date and time of the emergency event or incident;
  (iii) the estimated quantity and type of any substances (if in available concentrations) involved in the emergency event or incident; and
  (iv) the potential impacts to environmental values, livestock and public health caused by the emergency event or incident.

**Notification of Emergencies, Incidents and Exceedances**

(A13) The holder of this environmental authority must notify the administering authority by telephone, email or facsimile as soon as reasonably possible (but no later than twenty-four (24) hours after becoming aware of:

(a) any emergency event or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of this environmental authority; or

(b) any monitoring result that indicates an exceedance of any environmental authority limit.

(A14) The notification must include but not be limited to the following:

(a) the environmental authority number and name of the holder;

(b) the name and telephone number of the designated contact person;

(c) the location of the emergency event, incident or exceedance;

(d) the date and time of the emergency event, incident or exceedance;

(e) the time the holder of this environmental authority became aware of the emergency event, incident or exceedance;

(f) the estimated quantity and type of substances involved in the emergency event, incident or exceedance, if known;

(g) the cause of the emergency event, incident or exceedance if known;

(h) a description of the nature and effects of the emergency event, incident or exceedance including risks to the environment, public health or livestock, if known;

(i) immediate actions taken to prevent or mitigate any further environmental harm caused by the emergency event, incident or exceedance release; and

(j) details of any notification of persons who may be affected by the emergency event, incident or exceedance.

(A15) Within fourteen (14) days or as otherwise agreed following the initial notification of an emergency event, incident or exceedance or receipt of monitoring results, whichever is the latter, further written advice must be provided to the administering authority including the following:

(a) results and interpretation of any samples taken and analysed;

(b) outcomes of actions taken at the time to prevent or minimise unlawful environmental harm; and

(c) proposed actions to prevent a recurrence of the emergency event, incident or exceedance.

**Transition to New Standards**

(A16) Where a condition requires compliance with a standard published externally to this environmental authority and the standard is amended or changed subsequent to issue, the holder of this environmental authority must, unless otherwise agreed with the administering authority:

(a) comply with the amended or changed standard within two (2) years, unless a different period is specified in the amended standard or relevant legislation; and
(b) until compliance with the amended or changed standard can be achieved, continue to remain in compliance with the standard that was current immediately prior to the relevant amendment or change.

**Community**

(A17) The holder of this environmental authority must establish, promote and maintain easily accessible lines of communication between residents and land owners to ensure that community impacts are identified and managed.

**Regard for Comment**

(A18) Where comments are provided by the administering authority with respect to any plans, systems or programs required to be developed by a condition of this environmental authority, the holder of this environmental authority must have due regard for these comments.

**Town Activities**

(A19) In carrying out the town activities the environmental authority holder must take all reasonable and practicable measures to minimise environmental harm caused by the town activity and otherwise comply with any specific condition of this environmental authority applicable to that activity.

**Complaints**

(A20) Records must be kept of all environmental complaints received about the mining activities including the following details and must be made available for inspection by the administering authority on request:

(a) name, address and contact number for complainant;
(b) time and date of complaint;
(c) reasons for the complaint;
(d) investigations undertaken;
(e) conclusions formed;
(f) actions taken to resolve complaint;
(g) any abatement measures implemented; and
(h) person responsible for resolving the complaint.

(A21) When requested by the administering authority, the holder of this environmental authority must undertake relevant specified monitoring within a timeframe agreed to by the administering authority to investigate any complaint of environmental harm considered in the opinion of an authorised officer not to be vexatious or frivolous. The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures implemented must be provided to the administering authority within fourteen (14) days of completion of the investigation.

**Third Party Auditing**

(A22) Compliance with the conditions of this environmental authority must be audited by an appropriately qualified third party auditor nominated by the holder of this environmental authority and accepted by the administering authority:

(a) before 31 August 2012 for areas other than land south of the Embley River; and
(b) within twelve (12) months from the commencement of significant construction work for land south of the Embley River; and
(c) then at regular intervals not exceeding once every three (3) years.

A copy of the final audit report must be submitted to the administering authority upon request.

(A23) The holder of this environmental authority must promptly respond to any findings arising from the audit and implement measures or take necessary action to ensure compliance with the conditions of this environmental authority.

**Existing Structures**

(A24) Structures existing on the date of commencement of this environmental authority that were designed and constructed in accordance with relevant practices applicable to the respective structures at the time of their construction are not required to be upgraded to a different standard after commencement. Such structures must be maintained to ensure their performance in accordance with their respective designs. This condition applies to, but is not intended to limit the following types of structures:

(a) railway infrastructure;

(b) bridges, roads, transport infrastructure;

(c) decommissioned Tailings Storage Facilities;

(d) water supply infrastructure;

(e) landfills other than the active Evans Landing landfill; and

(f) erosion control and bank stabilisation structures.

Note: This condition does not apply to the ecological rehabilitation of mined areas.

**Exploration**

(A25) Disturbance due to exploration activities in areas not scheduled to be mined must be rehabilitated in accordance with provisions detailed in the administering authority's *Code of Environmental Compliance for Exploration and Mineral Development Projects*.

END OF CONDITIONS FOR SCHEDULE A

## SCHEDULE B - AIR

### General

(B1) The release of dust, noxious or offensive odour or any other airborne contaminants resulting from the mining activities must not cause environmental harm at any sensitive place or commercial place.

(B2) The holder of this environmental authority must ensure that vehicles (including trains) used for transporting bulk materials from the mining lease, leave the mining lease with appropriate load preparation to minimise the spillage and / or loss of particulate matter and / or windblown dust during transport.

(B3) In the event of a complaint made to the administering authority (which in the opinion of an authorised officer is considered neither frivolous nor vexatious) about airborne contaminants generated in carrying out the authorised activity, dust and particulate matter must not exceed any of the limits identified in Table B1 – Ambient Air Quality Limits when measured at any sensitive or commercial place:

**Table B1 – Ambient Air Quality Limits**

| Contaminant | Limit | Methodology |
|---|---|---|
| Particulate matter with an aerodynamic diameter of less than 10 micrometres ($PM_{10}$) suspended in the atmosphere | 50 micrograms per cubic metre, averaged over twenty-four (24) hours | Monitored in accordance with the most recent version of the relevant Australian Standard for measuring 10 micrometres ($PM_{10}$) suspended<br>Note: Five (5) days of exceedances allowed each year including natural causes |
| Particulate matter (TSP) suspended in the atmosphere | 90 micrograms per cubic metre, averaged over one (1) year | Monitored in accordance with any method for measuring TSP as recommended in the most recent version of the relevant Australian Standard for measuring TSP |

(B4) If monitoring indicates the airborne contaminants specified in Condition (B3) have been exceeded, the holder of this environmental authority must compare the results of the impacted site to that of the reference monitoring site. If the level of airborne contaminants at the impacted site does not exceed the reference monitoring site, then no action is to be taken and the contaminants will be regarded as not having been generated in the carrying out of the authorised activity.

(B5) If monitoring indicates the limits in Condition (B3) have been exceeded, the holder of this environmental authority must promptly implement dust abatement measures so that emissions of dust generated by the mining activities cease to exceed the limits in Condition (B3).

### Ambient Air Quality Monitoring

(B6) Before 1 June 2012, the holder of this environmental authority must develop and implement an Ambient Air Quality Monitoring Program for monitoring particulate emissions at the locations identified in Table B2 – Location of Particulate Monitoring Stations and identified in Schedule L Plan 4 – Air Quality Monitoring Sites.

**Table B2 – Location of Particulate Monitoring Stations**

| Site | Coordinates (GDA94 MGA z54) | | Location |
|---|---|---|---|
| | Northing | Easting | |
| **Compliance** | | | |
| 1 | 8602161 | 593928 | Nanum |
| 2 | 8599189 | 597145 | Napranum |
| 3 | 8604509 | 596646 | Rocky Point |
| **Reference** | | | |
| 4 | 8603081 | 616754 | Scherger RAAF Base |

(B7) Particulate monitoring stations can be put into care and maintenance mode on the receipt of 100 mm of rainfall in one calendar month at the Weipa Meteorological Station or the portable automatic meteorological station described in conditions B20. The Particulate Monitoring Stations must be reinstated by 1 May, or when less than 100 mm of rainfall is recorded in a calendar month, whichever occurs first.

**Light**

(B8) In the event of a complaint about light emissions from any mining activity that, after investigation is in the opinion of an authorised person causing a nuisance at a sensitive place, the administering authority may request the holder of this environmental authority to take appropriate action to mitigate the nuisance and the holder must take appropriate action (e.g. by screening or directing the light away from the sensitive place) within a time set by the administering authority.

(B9) Lighting management and monitoring must be implemented at Boyd Port and the seaborne access location associated with the temporary barge landing area north of Pera Head to minimise light horizon changes on and over the beach that negatively impact on turtles.

(B10) Low-pressure sodium vapour lamps or other lighting demonstrated to have a low impact on the relevant turtle species, that are shielded and appropriately directed to minimise light spill, must be used at Boyd Port and the seaborne access location associated with the temporary barge landing north of Pera Head to minimise impacts on nesting and hatchling turtles.

(B11) Lights must be positioned away from nesting shorebirds, unless otherwise required for the safe operation of vehicle and plant.

**Point Source Releases to Air**

(B12) Power station emissions must only be released to the atmosphere from the release points specified in Table B3 – Release Points.

(B13) Except during engine start up, maintenance and engine shut down, the release of contaminants at the locations specified in Table B3 – Release Points must be:

(a) directed vertically upwards with no impedance; and

(b) released in accordance with the minimum velocity, gas temperature and release height identified in Table B3 – Release Points; and

(c) released at a mass emission rate and concentration that does not exceed the limits stated in Table B3 – Release Points.

**Table B3 - Release Points**

| Release Point / Monitoring Location | Minimum Release Height (m) | Minimum Exit Gas Temperature (°C) | Minimum Efflux Velocity (m/s) | Contaminant Parameter | Mass Emission Rate (g/kw-hr)[4,5] | Frequency of Monitoring |
|---|---|---|---|---|---|---|
| Weipa (Lorim Point) Power Station stacks 1 – 6 | 10 | 300 | 15 | Carbon monoxide | TBD | Monitored in accordance with the Stack Emission Monitoring Program to be developed in accordance with Condition (B13) |
| | | | | Oxides of nitrogen (expressed as $NO_2$) | TBD | |
| Andoom Power Station stacks 1 – 3 | 6 | 300 | 15 | Carbon monoxide | TBD | |
| | | | | Oxides of nitrogen (expressed as $NO_2$) | TBD | |
| Boyd Infrastructure Area Power Station stack TBD[1] | 8.5 | 300 | 15 | Carbon monoxide[6] | 3 | Annually |
| | | | | Oxides of nitrogen[7] (expressed as $NO_2$) | 20 | |
| | | | | Total particulate matter[7] | 0.3 | |
| Norman Creek Infrastructure Area Power Station stack TBD[1] | TBD[1] | TBD[1] | TBD[1,2] | Carbon monoxide[6] | TBD[1] | |
| | | | | Oxides of nitrogen[7] (expressed as $NO_2$) | TBD[1] | |
| | | | | Total particulate matter[7] | TBD[1] | |

[1] To be determined and notified to the administering authority upon completion of the final design plan for the power station.
[2] Average velocity based on four (4) consecutive sampling events.
[3] Contaminant limits are to be determined based on the results of the Stack Emission Monitoring Program completed at the Weipa (Lorim Point) and Andoom Power Stations in accordance with Condition (B15).
[4] All determinations of point source emissions to air are to be taken from isokinetic sample results.
[5] All determinations of point source emissions to air are to be corrected to Dry @ Standard Temperature & Pressure (273K, 101.3KPa).
[6] Limits based on Schedule 1 of the *Environmental Protection (Air) Policy 2008*.
[7] Limits based on Schedule 3 of the *Protection of the Environment Operations (Clean Air) Regulation 2010 (NSW).*

(B14) The holder of this environmental authority must develop and implement a Stack Emission Monitoring Program (SEMP) to monitor and record the release of contaminants from the power stations and ensure that emissions generated by the power station do not exceed the limits identified in Table B3 – Release Points.

(B15) The SEMP must be developed and implemented by 28 February 2014 for existing power stations and upon commissioning of any new power stations and include but not be limited to the following tests performed and recorded for each sample taken at the release locations identified in Table B3 – Release Points:

(a) monitoring provisions for the release points must comply with the most recent edition of Australian Standard AS4323.1 *Stationary source emissions method 1: Selection of sampling provisions*;

(b) all determinations of contaminant releases to the atmosphere must be made in accordance with methods prescribed in the most recent version of the administering authority's *Air Quality Sampling Manual*. If monitoring requirements for specific contaminants are not described in the Air Quality Sampling Manual, monitoring protocols must be in accordance with a method as approved by New South Wales DEC/EPA, Victorian EPA or United States EPA;

(c) the following tests must be performed for each sample taken at each release point specified in Table B3 - Release points:
(i) gas velocity, volume and mass flow rate;
(ii) temperature and oxygen content; and
(iii) water vapour concentration (for non-continuous sampling).

(d) samples taken must be representative of the contaminants discharged when operating under maximum operating conditions; and

(e) during the sampling period the following additional information must be gathered:
(i) plants throughput rate at the time of sampling;
(ii) fuel type and consumption rate;
(iii) any factors that may influence odour and particulates emissions;
(iv) the odour and particulates treatment system operating, system status and flow rate; and
(v) reference to actual test methods and accuracies.

(B16) When requested by the administering authority, the density of smoke released from an exhaust stack at the Weipa (Lorim Point) and Andoom Power Stations must be monitored using the Ringelmann method to investigate any complaint of environmental nuisance at any sensitive place or commercial place. Smoke emissions are not considered to be environmental harm if monitoring shows the density of smoke from any exhaust stack serving a generator unit at the Weipa (Lorim Point) and Andoom Power Stations does not exceed Ringelmann 1 except for a two (2) minute period immediately after engine start-up, maintenance or engine shut down of the power station unit served by the release point.

(B17) The sulphur content of any fuel burned in the Weipa (Lorim Point) and Andoom Power Station units on the mining lease(s) must not exceed 0.5 percent by weight.

(B18) Any power generator must be designed, operated and maintained in accordance with the relevant Australian Standard.

**Land Based Metal Surface Coating**

(B19) The holder of this environmental authority must develop and implement an abrasive blasting and spray painting risk assessment and control plan which considers the following:

(a) coating selection with due regard to types and levels of contaminants within coatings to be removed/ applied;

(b) quantity of coating to be removed/ applied;

(c) type of abrasive blasting media to be used;

(d) sensitivity of receiving environment;

(e) the use of suitable shrouds, barriers, screen or other means of containment in a manner that will localise the collection of spent abrasive material and/or over spray;

(f) the collection and storage of wastes and resultant dusts and other materials from all surfaces as soon as practicable after completion of abrasive blasting and spray painting;

(g) the containment and treatment or disposal of any waters, including stormwater, that may become contaminated as a result of undertaking the activity;

(h) during the period of blasting and/or spray painting, maintenance of daily records that will identify the job particulars, dates and times of blasting and/or spray painting, description of wind conditions and name of the person(s) conducting the activity. Such daily reports are to be verified as correct by the signature of the person responsible for supervision of the activity; and

(i) ensuring that structures requiring abrasive blasting and metal surface coating are maintained regularly.

**Meteorological Monitoring**

(B20) Under circumstances where relevant wind, temperature and rainfall data cannot be provided to the holder of this environmental authority from the Weipa Meteorological Station operated by the Bureau of Meteorology, the holder must promptly deploy a portable automatic meteorological station to continuously measure and record wind speed and direction, temperature and rainfall data when and where these data measurements are required.

(B21) The portable automatic meteorological station referred to in Condition (B23) must be installed in accordance with the latest edition of the Bureau of Meteorology - Observation Specification No.2013.1 - *Guidelines for the siting and exposure of meteorological instruments and observing facilities*.

(B22) The holder of this environmental authority must record, compile, evaluate and keep all monitoring records obtained from the portable automatic meteorological station for a period of 5 years.

END OF CONDITIONS FOR SCHEDULE B

## SCHEDULE C – LAND & REHABILITATION

### General

(C1) Contaminants that will or may cause environmental harm must not be directly or indirectly released to land except as permitted under this environmental authority.

(C2) Any spillage of wastes, contaminants or other materials must be promptly cleaned up. Such spillages must be cleaned up using methods that minimise the release of wastes, contaminants or materials to any stormwater drainage system, roadside gutter or waters.

### Disturbance to Land

(C3) When carrying out mining activities the holder of this environmental authority must:

(a) avoid, minimise or mitigate (in order of preference) any impacts on areas of sensitive vegetation or other areas of ecological value;

(b) minimise the risk of injury, harm, or entrapment to wildlife and stock;

(c) minimise disturbance to land that may otherwise result in land degradation;

(d) ensure that for land that is to be significantly disturbed by mining activities the topsoil layer is removed and handled in a manner that will minimise degradation of its biological, chemical and physical properties and is used for rehabilitation purposes (in accordance with Condition C21 & C22);

(e) prior to carrying out any disturbance activities, make all relevant staff, contractors or agents carrying out those activities, aware of the location of any Category A, B or C Environmentally Sensitive Area (ESA) and the relevant requirements of this environmental authority;

(f) if significant disturbance to land is unavoidable, clear vegetation in a way which minimises fragmentation; and

(g) manage cleared vegetation so that it is stockpiled in a manner that facilitates salvage, respreading or burning and does not impede vehicle, stock or wildlife movements.

Note: This environmental authority does not authorise the taking of protected animals or the tampering with an animal breeding place that is being used by a protected animal to incubate or rear the animal's offspring.

(C4) Subject to Condition (F8), the holder of this environmental authority may burn vegetation cleared in the course of carrying out extraction activities provided the activity does not cause environmental harm at any sensitive place or commercial place.

(C5) The holder of this environmental authority must ensure that mining activities are not conducted:

(a) in or within 200 metres of any listed Category A, B or C ESA;

(b) within 50m of any high bank of a watercourse with stream order 1 or 2;

(c) within 100m of any high bank of a watercourse with stream order 3 or 4;

(d) within 200m of any high bank of a watercourse with stream order 5 and above;

(e) within 100m of any natural wetland; and

(f) within 200m of any natural significant wetland.

(g) within 200 metres of any aquatic habitat where a potential new species of aquatic fauna in the areas south of Embley River has been identified unless otherwise expressly permitted by the administering authority.

Note: Activities which are ancillary to extraction activities such as exploration, the Port, stockpiles, barge and ferry terminals, haul and access roads, conveyors, bridges, loading ramps, pumps and pipelines and water management infrastructure may encroach upon buffer areas (all reasonable measures will be undertaken to minimise such disturbances) and these will be detailed in the Plan of Operations.

**Land Use Management Plan**

(C6) The holder of this environmental authority must develop, implement and submit to the administering authority a Land Use Management Plan (LUMP) before 31 August 2012 for areas other than land south of the Embley River and for land south of the Embley River, prior to significant construction work. The LUMP must include:

(a) plans and procedures for managing vegetation including buffer systems, pre-clearing surveys for any Category A, B or C ESA's and the presence of species classed as endangered, vulnerable, or near threatened under the *Nature Conservation Act 1992*;

(b) plans and procedures for the preparation and burning of vegetation cleared in the course of carrying out mining activities;

(c) plans and procedures for obtaining base line soils information covering the identification of soil units within areas to be disturbed by mining activities as nominated in the Plan of Operations at a scale of 1:100,000, in accordance with the "*Guidelines for Surveying Soil and Land Resources, 2nd Edition*" (McKenzie *et al*. 2008) or "*Australian Soil and Land Survey Handbook, 3rd Edition*" (National Committee on Soil and Terrain 2009) or "*The Australian Soil Classification*" (Isbell 2002) or similar recent guidelines;

(d) plans and procedures for managing acid sulphate soils so that when clearing in areas with acid sulphate soils (soils or potential acid sulphate soils), the holder of this environmental authority must develop and implement an acid sulphate soil environmental management plan prepared in accordance with the "*State Planning Policy 2/02 Guideline Planning and Managing Development Involving Acid Sulphate Soils*" and the administering authority's "*Queensland Acid Sulphate Soil Technical Manual*" (Version 2.2 September 2004) or more recent editions or supplements to these documents when these become available. The holder of this environmental authority must treat and manage acid sulphate soils in accordance with the latest edition of the administering authority's Instructions for the treatment and management of acid sulphate soils.

(e) plans and procedures for the carrying out of mining activities to prevent or minimise harm or the potential risk of causing harm to native fauna. The fauna management procedures must include training and awareness of staff and contractors, or access to appropriately qualified contractors trained in fauna handling, to ensure that any planned fauna handling is undertaken by an appropriately qualified person;

(f) for land south of the Embley River, a survey plan to determine the distribution of the potential new species of freshwater crab identified in Winda Winda Creek and the potential new species of stygofauna identified in the Ward River. In preparing the survey plan, the holder of this environmental authority must liaise with the Queensland Museum and the administering authority and have regard to comments made by those agencies.

Note: The holder of this environmental authority must make a recommendation to the administering authority on any proposed change to the setback distance identified in Condition (C5) (g) within two (2) months of the potential new species of freshwater crab identified in Winda Winda Creek and the potential new species of stygofauna identified in the Ward River being listed as endangered, threatened or near threatened under the Nature Conservation (Wildlife) Regulation 2006.

(g) plans and procedures for an effective pest management program that includes but is not limited to the following:

(i) identification of pest species and infestation areas;
(ii) prevents and/or minimises the introduction and/or spread of pests; and
(iii) control and management of pest outbreaks as a result of mining activities.

(h) where constructed access road crossings of Winda Winda Creek and the southern branch of Norman Creek require culverts, the design will ensure habitat continuity along the riparian corridor is maintained.

(C7) Prior to conducting mining activities that involve significant disturbance to land, an assessment must be undertaken in accordance with the LUMP to determine the type and ecological value of any vegetation in such areas where the activity is proposed to take place.

(C8) The assessment required by Condition (C7) must be undertaken by an appropriately qualified person and include the carrying out of field validation surveys, observations and mapping of any Category A, B or C ESA's and the presence of species classed as endangered, vulnerable or near threatened under the *Nature Conservation Act 1992*, in accordance with the LUMP.

**Terrestrial Biodiversity Offset Plan**

(C9) A final Terrestrial Biodiversity Offset Plan for the land south of the Embley River generally consistent with the requirements of the Queensland Biodiversity Offset Policy (BOP) and Queensland Government Environmental Offsets Policy (QGEOP) must be submitted to the administering authority for approval within twelve (12) months of the final investment decision for the South of Embley project.

(C10) The final Terrestrial Biodiversity Offset Plan for the land south of the Embley River must include the following elements and be consistent with the offset proposal submitted to the Coordinator-General on 5 April 2012.

(a) 2:1 ratio of riparian habitat comprising one or more of RE 3.3.5, RE 3.3.9, RE 3.3.21 (355.2 hectares), of which 110.6 hectares must be RE3.3.9;

(b) translocate and/or propagate 3.5 plants of Cooktown Orchid and Chocolate Tea Tree Orchid as well as any other listed flora species under the *Nature Conservation Act 1992* for each plant found within the footprint of disturbance and establish these within the offset area(s);

(c) the offset area(s) may be located on ML7024 subject to meeting ecological equivalence measures and agreement of Traditional Owners and relevant Government agencies; and

(d) the offset area(s) are to be managed *in accordance with the approved Terrestrial Biodiversity Offset Plan* to protect and enhance environmental values including ecologically appropriate fire protection and feral animal controls.

(C11) The holder of this environmental authority must consult with and gain the approval of the administering authority and traditional owners (where relevant) regarding the location of the proposed offset area(s) for the land south of the Embley and must use its reasonable endeavours to secure the offset area(s) under an appropriate legal mechanism within eighteen (18) months of the final investment decision for the project.

Note: Should the holder of this environmental authority be unable to legally secure all or part of the offset area(s) within the period prescribed in Condition (C11) despite its reasonable endeavours, the holder of this environmental authority may apply to the administering authority for an extension to legally secure the offset. Additionally, should the holder of this environmental authority be unable to legally secure all or part of the offset area(s) despite an extension, the holder of this environmental authority may submit an alternative biodiversity offsets plan to the Coordinator General for approval.

**Species Management Plan**

(C12) The holder of this environmental authority must develop, implement and submit to the administering authority for approval a Species Management Plan for fauna species prescribed as endangered, vulnerable or near threatened under the *Nature Conservation Act 1992* and identified in the EIS as species where impacts may be likely or possible for land south of the Embley River, prior to any clearing of vegetation associated with significant construction work.

(C13) The Species Management Plan must satisfy the requirements of the *Nature Conservation (Wildlife Management) Regulation 2006* relating to tampering with animal breeding places.

(C14) The Species Management Plan must at a minimum address the Red Goshawk, Bare-rumped Sheathtail Bat, Palm Cockatoo, Estuarine Crocodile, Rufous Owl, Square-tailed Kite and Masked Owl.

(C15) The Species Management Plan must include:

(a) protection of riparian, wetland, estuarine, vine forest and coastal vegetation on sand from mining by an environmental buffer system. The buffer system must at a minimum comply with condition (C5);

(b) surveys must be carried out to define the boundaries of mapped sensitive vegetation types in the field prior to disturbance;

(c) surveys must be conducted for red goshawk, masked owl and squaretailed kite nests prior to undertaking significant disturbance to land located within 1km of permanent water supporting riparian gallery forest or paperbark wetland, seasonally inundated coastal wetlands, seasonal water courses supporting riparian gallery forest, or an estuary. If any active red goshawk, masked owl or square-tailed kite nests are found within mining areas, a 200m buffer around the nesting tree must not be mined until the end of the breeding season (being until fledglings no longer use the nest for habitat);

(d) relocation of mature crocodiles, if required due to safety concerns, in consultation with the administering authority; and

(e) for the Bare-rumped Sheathtail bat:

(i) undertake an additional targeted bat survey, using broad spectrum acoustic monitoring, prior to the commencement of significant construction works. The survey must relate to areas planned for initial infrastructure required prior to production;
(ii) support a research program being conducted by the Australian Bat Society which will aim to improve the quality of the reference call library for microbats of the Cape York region;
(iii) utilise the reference calls acquired by the research program to analyse the targeted survey results for the bare-rumped sheathtail bat and further define habitat preferences for the species. Should the species be identified through analysis of survey results, then in liaison with the administering authority, adaptive management measures to avoid and mitigate impacts from the project must be implemented based on the habitats within which it is found.

Note: The Species Management Plan may exist in isolation to or form part of the Land Use Management Plan required under Condition (C6).

**Foreshore Access Management Plan**

(C16) Prior to any clearing of vegetation associated with significant construction work, the holder of this environmental authority must prepare and implement a Foreshore Access Management Plan for the foreshore area between Ina Creek and Winda Winda Creek that restricts access to foreshore areas to permitted persons only in order to protect environmental and heritage values.

Note: The Foreshore Access Management Plan may exist in isolation to or form part of the Communities Heritage and Environment Plan or the Land Use Management Plan required in accordance with Condition (C6).

**Rehabilitation Objectives**

(C17) Land disturbed by mining activities as identified in Schedule L Plan 2 – East Weipa and Andoom Operational Areas and Plan 3 – South of Embley Infrastructure and Conceptual Mine Plan, must be rehabilitated in accordance with Table C1 – Rehabilitation Requirements and the objectives of the Rehabilitation Management Plan required under Condition (C23) and other requirements set out in this environmental authority.

(C18) Areas that are available for rehabilitation must be identified in the current Plan of Operations.

(C19) Rehabilitation must commence progressively as areas become available in accordance with the Plan of Operations.

(C20) Rehabilitation can be considered successful when:

(a) the site can be managed for its designated land-use (e.g. similar to that of surrounding undisturbed areas);
(b) no greater management input than for other land in the area being used for a similar purpose is required and there is evidence that the rehabilitation has been successful;

(c) the rehabilitation is carried out in accordance with the goals, objectives, indicators and completion criteria as specified in Table C1 – Rehabilitation Requirements; and
(d) written agreement is obtained from the landowner/holder and administering authority.

**Table C1 - Rehabilitation Requirements**

| Mine Domain | Mine Feature Name | Rehabilitation Goal | Rehabilitation Objectives | Indicators | Completion Criteria |
|---|---|---|---|---|---|
| **Land north of the Embley River** | | | | | |
| TBD[1] | TBD[1] | All land subject to mining activities must be rehabilitated to meet the requirements of the administering authority's *Guideline - Rehabilitation Requirements for Mining Projects* and will be defined in the Rehabilitation Management Plan | TBD[1] | TBD[1] | TBD[1] |
| **Land south of the Embley River** | | | | | |
| TBD[1] | TBD[1] | All land subject to mining activities must be rehabilitated to meet the requirements of the administering authority's *Guideline - Rehabilitation Requirements for Mining Projects* and will be defined in the Rehabilitation Management Plan | TBD[1] | TBD[1] | TBD[1] |

[1] Post mine land use, rehabilitation indicators and completion criteria are to be nominated in accordance with Condition C23

[2] Post mine land use, rehabilitation indicators and completion criteria are to be nominated in accordance with Condition C24

**Topsoil**

(C21) Topsoil and subsoils must be stripped separately and replaced directly in an area awaiting rehabilitation or else be stockpiled and subsequently used in rehabilitation.

(C22) Topsoil must be managed in accordance with the Rehabilitation Management Plan and stockpiled in a manner that ensures stability. Measures must include:

(a) vegetating topsoil stockpiled during the months 1 November to 1 May;

(b) optimising the height and footprint of stockpiles; and

(c) re-using stockpiles as soon as possible.

**Rehabilitation Management Plan**

(C23) The holder of this environmental authority must develop, implement and submit to the administering authority a Rehabilitation Management Plan before 31 August 2013 for areas other than land south of the Embley River and within three (3) years from commencement of bauxite extraction for land south of the Embley River that must include:

(a) schematic representation of final land form inclusive of drainage features;

(b) slope and cover designs;

(c) drainage design;

(d) erosion controls proposed on reformed land;

(e) revegetation methods inclusive of plant species selection, re-profiling, soil handling (including stockpiling), soil ameliorants/amendments, surface preparation and method of propagation;

(f) materials balance including available topsoil and low permeability capping material;

(g) geotechnical, geochemical and hydrological studies;

(h) chemical, physical and biological properties of soil and water;

(i) agreed post mining land and/or infrastructure use with the landowner/holder and the administering authority;

(j) rehabilitation goal, rehabilitation objective, indicators and measurable completion criteria for each agreed post mining land use within each domain that enables determination of rehabilitation success;

(k) description of experimental design for monitoring of reference and rehabilitated areas inclusive of statistical design;

(l) a rehabilitation monitoring program based on a statistically sound, mutually agreed sampling design;

(m) research program and associated milestones;

(n) programs for maintenance of rehabilitation as required to achieve the nominated rehabilitation objective; and

(o) on-site revegetation trials for the areas south of the Embley River which test:

(i) selected species,
(ii) seeding rates,
(iii) establishment methodologies, and
(iv) the feasibility of the use of felled timber for fauna refuge in rehabilitation areas is feasible.

Note: trials carried out north of the Embley may be utilised for the area south of the Embley River, where relevant.

(C24) An interim Rehabilitation Management Plan for land south of the Embley River must be prepared and submitted to the administering authority for consideration prior to commencement of significant construction work for the South of Embley project and must include rehabilitation goals, rehabilitation objectives, indicators and measurable completion criteria for each agreed post mining land use within each domain that enables determination of rehabilitation success. The plan must also address, as far as practicable, those other matters listed in Condition (C23).

(C25) The holder of this environmental authority must review and update the interim Rehabilitation Management Plan yearly thereafter until the final Rehabilitation Management Plan required in accordance with Condition (C23) and is developed, implemented and submitted to the administering authority.

**Infrastructure**

(C26) All infrastructure, mining equipment and plant erected and/or used for the mining activities must be removed from the licensed place prior to surrender except where agreed in writing by the administering authority and the landowner.

**Post Closure Management Plan**

(C27) A Post Closure Management Plan must be prepared eighteen (18) months prior to final ore processing on site and implemented for a nominal period of:

(a) at least thirty (30) years following final ore processing onsite; or,

(b) a shorter period if the site is proven to be geo-technically and geo-chemically stable and it can be demonstrated to the satisfaction of the administering authority that no release of contaminants from the site will result in environmental harm.

(C28) The Post Closure Management Plan must include, where necessary, the following elements:

(a) operation and maintenance of:

(i) wastewater collection, treatment and reticulation systems;

(ii) the groundwater monitoring network;

(iii) final cover systems; and

(iv) vegetative cover.

(b) monitoring of:

(i) surface water quality;

(ii) groundwater quality;

(iii) erosion rates;

(iv) the integrity and effectiveness of final cover systems; and

(v) the health and resilience of vegetative cover.

**Storage & Handling of Hazardous Materials**

(C29) Before 31 August 2012, conduct an assessment of all explosives, hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids stored and handled on areas other than land south of the Embley River to determine whether these substances are stored and handled in accordance with the relevant Australian Standard. Where this assessment finds an inconsistency between the current Australian Standard and the manner in which the substances are stored and handled, the environmental authority holder must implement actions to comply with the relevant Australian Standard before 27 February 2015.

(C30) Subject to Condition (C29) all explosives, hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids must be stored and handled in accordance with the relevant Australian Standard where such is available. Where no relevant Australian Standard exists, store such materials within an effective on-site containment system in accordance with Condition (C31).

(C31) Not withstanding the requirements of any Australian Standard, any hazardous materials stored on the licensed place that have the potential to cause environmental harm must be stored in or serviced by an effective containment system that is impervious to the materials stored and managed to prevent the release of liquids to waters or land. Where no relevant Australian Standard is available, the following must be applied:

(a) storage tanks must be bunded so that the capacity and construction of the bund is sufficient to contain at least 110% of a single storage tank or 100% of the largest storage tank plus 10% of the second largest storage tank in multiple storage areas; and,

(b) all transportable chemical containers must be stored within a bund, where the capacity of the bund is sufficient to contain 125% of the largest storage container.

(C32) All containment systems for chemicals and flammable or combustible liquids must be designed to minimise rainfall collection within the system.

(C33) Minimise the potential for contamination of land and waters by diverting stormwater around contaminated areas and facilities used for the storage of explosives, hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids.

(C34) Spillage of any contaminant must be contained and land remediated to prevent environmental harm.

**Release of Contaminants to Land**

(C35) The release of contaminants to land from the licensed place must only occur at the release points specified in Table C2 – Release Points.

**Table C2 – Release Points**

| Release Point | | Description of Releases | Description of Receiving Environment | Coordinates (GDA94 MGA z54) | |
|---|---|---|---|---|---|
| | | | | Easting | Northing |
| **Oil Water Separators – Andoom** | | | | | |
| HEQ | Wash Pad | Treated water overflow | Bushland | 590164 | 8613432 |
| | Truck Body Wash | | Bushland | 590200 | 8613968 |
| | Workshop | | Bushland | 590164 | 8613432 |
| Rake Mover RM01 | | | Ground adjacent to CPS unit | 590990 | 8614124 |
| Rake Mover RM02 | | | Ground adjacent to CPS unit | 590890 | 8614133 |
| Service Bay (refuel pad) | | | Bushland | 590200 | 8613984 |
| Service Bay | | | Bushland | 590470 | 8613910 |
| Workshop (Q-Birt) | | | Bushland | 590475 | 8613871 |
| Power Station Tank Farm | | | Bushland | 590972 | 8614097 |
| Fuel Storage Area | | | Bushland | 590475 | 8613825 |
| Power Station | | | Bushland | 590957 | 8614200 |
| **Oil Water Separators – Lorim Point** | | | | | |
| Railway Workshop (loco refuel area) | | Treated water overflow<br>Wash Pad<br>Truck Body Wash<br>Workshop<br>Treated water overflow | Bushland | 593724 | 8600615 |
| Rail Dump Station RM01 | | | Ground adjacent to CPS unit | 594659 | 8600537 |
| Rail Dump Station RM02 | | | Ground adjacent to CPS unit | 594691 | 8600545 |
| Apron Feeder 6&7 | | | Bushland | 594745 | 8600517 |
| Truck Dump Station | | | Low lying sump area | 595025 | 8600160 |
| Tank 11 & 12 | | | Bushland | 594890 | 8599230 |
| Waste Oil Farm | | | Bushland | 594879 | 8599360 |
| Greaser Shed | | | Bushland | 594735 | 8599858 |
| Workshop (Q Birt) | | | Ground adjacent to CPS unit | 594444 | 8600280 |
| Civil Workshop | | | Bushland | 594266 | 8600208 |
| **Oil Water Separators – East Weipa** | | | | | |

| Release Point | | Description of Releases | Description of Receiving Environment | Coordinates (GDA94 MGA z54) | |
|---|---|---|---|---|---|
| | | | | Easting | Northing |
| | | | | | |
| | | Stormwater overflow | | | |
| | | | | | |
| | | Stormwater overflow | | | |
| HEQ | Wash Pad | | Bushland | 601569 | 8599812 |
| | Truck Body Wash | | Bushland | 601550 | 8599908 |
| | Workshop | | Bushland | 601569 | 8599812 |
| Fuel Storage Area | | | Bushland | 601775 | 8599774 |
| Landfill Washdown Pad | | | Ground Adjacent to CPS Unit | 590960 | 8600243 |
| Airport Fuel Bund | | | Ground Adjacent to CPS Unit | 600489 | 8597809 |
| | | | | | |
| Regen Fuel Tank | | | Bushland | 595525 | 8602950 |
| Landfill Washdown Pad | | | Ground adjacent to CPS Unit | 590960 | 8600243 |
| Airport Fuel Bund | | | Ground adjacent to CPS Unit | 600489 | 8597809 |
| | | | | | |
| Bioremediation Area | | | TBD[1] | TBD[1] | TBD[1] |
| | | | | | |
| Bioremediation Area | | | Bushland | 595405 | 8599500 |

[1] To be determined and notified to the administering authority upon final design.

**Contaminated Land**

(C36) Prior to making an application for Surrender or approval for Progressive Rehabilitation the holder of this environmental authority must undertake a contaminated land assessment / investigation of the relevant areas of the licensed place in accordance with the administering authority's *Guideline: Contaminated Land Professionals.*

**Contaminated Site Register**

(C37) For the area south of the Embley River, the environmental authority holder must develop and maintain a contaminated site register.

**Bio-Remediation Areas**

(C38) Soil and absorbent materials potentially contaminated with hydrocarbons must be treated on site in a designated bioremediation area. Treated material will not be used for any purpose unless contamination thresholds defined in Table C3 - TPH Thresholds in Treated Soils are achieved.

**Table C3 - TPH Thresholds in Treated Soils**

| Recoverable Hydrocarbon Fraction | Maximum[1] |
|---|---|
| C6-C9 | 100 mg/kg |
| C10-14 | 100 mg/kg |
| C15 and greater | 1000 mg/kg |

**Bulk Materials Handling and Management**

(C39) Bulk storage and handling of materials for land south of the Embley River must be carried out in a manner which minimises the release of dust and particulate matter, prevents or minimises the contamination of land and stormwater.

(C40) The holder of the environmental authority must develop and implement an operating procedure for land south of the Embley River where bulk materials are handled, which must include, but not be limited to:

(a) the completion of periodic inspections of the mining lease where mining activities are carried out including all structures, plant, equipment and trafficked surfaces to identify and remove or stabilise exposed bulk materials that may be mobilised by wind, water or equipment movement and have the potential to impact sensitive receptors;

(b) an ongoing cleaning and maintenance schedule to minimise any potential release of bulk materials and to ensure there is no accumulation of bulk materials over time in areas where it may be mobilised and have the potential to impact sensitive receptors;

(c) placement of any removed materials in a designated storage area; and

(d) periodic review of the management and operation of bulk materials storage and handling activities including identification of options for continuous improvement.

END OF CONDITIONS FOR SCHEDULE C

## SCHEDULE D – REGULATED DAMS (including structures containing mineral waste)

### General

(D1) The hazard category of all dams must be assessed by a suitably qualified and experienced person at least once every two (2) years, based on documented evidence sufficient to define or confirm the current nature and extent of environmental consequences for potential failure of that dam.

(D2) The holder of this environmental authority must not commence construction of any regulated dam (i.e. dams determined to be in the significant or high hazard category) unless the location, hydraulic performance, size and purpose of that dam are specifically referenced in accordance with this environmental authority in the form of tabulated details as identified in Conditions (D4), (D5) & (D21).

(D3) Tailings must only be stored at the locations and within the parameters described in Table D1 – Location of Regulated Dams and Table D2 – Size and Purpose of Regulated Dams. This condition does not exclude the storage of water or tailings that otherwise comply with other applicable conditions of this environmental authority.

### Location of Regulated Dams

(D4) The construction and operation of regulated dams listed in Table D1 - Location of Regulated Dams, must be located on the mining lease(s) within the polygonal area defined by the co-ordinates listed in Table D1 – Location of Regulated Dams.

**Table D1 - Location of Regulated Dams**

| Name of Regulated Dams | Coordinates (GDA94 MGA z54) | |
|---|---|---|
| | Easting | Northing |
| **East Weipa and Andoom** | | |
| East Weipa Tailings Storage Facility (EW) | 593810 | 8600663 |
| | 596535 | 8600557 |
| | 596691 | 8602613 |
| | 594045 | 8602229 |
| East Weipa 1 Tailings Storage Facility (EW1) | 595866 | 8600139 |
| | 595760 | 8599265 |
| | 596343 | 8599278 |
| | 596605 | 8600093 |
| East Weipa 2 Tailings Storage Facility (EW2) | 596608 | 8600096 |
| | 597208 | 8600037 |
| | 597049 | 8598967 |
| | 596274 | 8599063 |
| Emergency Dam | 595254 | 8600199 |
| | 595860 | 8600143 |
| | 595750 | 8599291 |
| | 594969 | 8599725 |
| West Weipa 2 (WW2) | 593127 | 8601590 |
| | 591786 | 8602090 |

| Name of Regulated Dams | Coordinates (GDA94 MGA z54) | |
|---|---|---|
| | **Easting** | **Northing** |
| | 590547 | 8600841 |
| | 591746 | 8600348 |
| G2 Dam | 592094 | 8600416 |
| | 591318 | 8600564 |
| | 591235 | 8600048 |
| | 591735 | 8599803 |
| G & X Dam | 592356 | 8600987 |
| | 592717 | 8600596 |
| | 592150 | 8600643 |
| | 592813 | 8601196 |
| Andoom Tailings Storage Facility | 593576 | 8616217 |
| | 592791 | 8614046 |
| | 590173 | 8614851 |
| | 590431 | 8617165 |
| **South of Embley** | | |
| Boyd Tailings Storage Facility | 567195 | 8569720 |
| | 569705 | 8569720 |
| | 567195 | 8565185 |
| | 569705 | 8565185 |
| Norman Creek Tailings Storage Facility | TBD[1] | TBD[1] |
| | TBD[1] | TBD[1] |
| | TBD[1] | TBD[1] |
| | TBD[1] | TBD[1] |

[1] To be determined and notified to the administering authority upon completion of final design in accordance with Condition (D6).

(D5) The construction and operation of regulated dams must comply with Table D2 - Size and Purpose of Regulated Dams.

**Table D2 - Size and Purpose of Regulated Dams**

| Regulated Dam | Hazard Category | Maximum Surface Area (Ha) | Maximum Volume ($Mm^3$) | Maximum RL[1] (m) | Purpose |
|---|---|---|---|---|---|
| **East Weipa and Andoom** | | | | | |
| East Weipa Tailings Storage Facility (EW) | High | 380 | 104 | 40 | Storage of tailings |
| East Weipa 1 Tailings Storage Facility (EW1) | Significant | 50 | Rehabilitated | N/A[2] | |
| East Weipa 2 Tailings Storage Facility (EW2) | Significant | 65 | Rehabilitated | N/A[2] | |
| Emergency Dam | Significant | 40 | 8 | 40 | |
| West Weipa 2 (WW2) | Very low | 159 | Decommissioned[2] | N/A[2] | |
| G2 Dam | Very low | 40 | Decommissioned[2] | N/A[2] | |
| G & X Dam | Very low | 20 | Decommissioned[2] | N/A[2] | |
| Andoom Tailings Storage Facility | Significant | 460 | 116 | 40 | |
| **South of Embley** | | | | | |
| Boyd Tailings Storage Facility | High | 1100 | 240 | 55 | Storage of tailings |
| Norman Creek Tailings Storage Facility | Significant | 1100 | 260 | 80 | |

[1] RL represents a height above the Australian Height Datum (A.H.D.).
[2] Maximum volume and RL not applicable as the dam has been decommissioned.

**Regulated Dams - Certification and Operation**

(D6) Every regulated dam must be constructed in accordance with a certified design plan that has been submitted to the administering authority and developed so that the resulting dam will deliver the performance identified in the submitted design plan and is compliant with this environmental authority.

(D7) The holder of this environmental authority must not commence construction of a regulated dam unless the holder has submitted to the administering authority two (2) electronic copies (including one (1) locked and one (1) working copy) of a design plan together with the certification of a suitably qualified and experienced person that the design of the regulated dam will deliver the performance stated in that submitted design plan and that dam is compliant with this environmental authority.

(D8) A containment used for the storage of tailings from the processing of bauxite must be designed and operated to minimise impact on the environment, including any potential impact on people and the community.

(D9) Where the hazard associated with a regulated dam involves a population at risk , within the meaning of the Guidelines on Acceptable Flood Capacity for Dams February 2007 or its successor pursuant to the *Water Supply (Safety and Reliability) Act 2008* (that Act), the holder must demonstrate to the satisfaction of the administering authority that adequate design, operational and emergency

procedures have been put in place consistent with the requirements for that population at risk under that Act.

(D10) When construction or modification of any regulated dam is complete and prior to commencing operation of that dam, the holder must submit to the administering authority two (2) electronic copies (including one (1) locked and one (1) working copy) of 'as constructed' drawings, together with the certification of a suitably qualified and experienced person that the dam 'as constructed' will deliver the performance stated in the submitted design plan and that the dam is compliant with this environmental authority.

(D11) An operational plan must be kept current for each regulated dam, and cover all matters relevant to its operation and maintenance so as to be consistent with conditions in this environmental authority.

(D12) Where an operational plan covers decommissioning and rehabilitation, those operations are to be consistent with the design plan for the regulated dam and the rehabilitation requirements of this environmental authority.

(D13) Any operational plans and certified design plans for regulated dams on the licensed place must be consistent with the Erosion and Sediment Control Plan required in accordance with Condition (H25) & (H26).

**Inspection of Regulated Dams**

(D14) A suitably qualified and experienced person must inspect all regulated dams annually before 1 November each year and at any time when abnormal or otherwise unsatisfactory conditions are observed.

(D15) At each annual inspection, the condition and adequacy of each regulated dam must be assessed for dam safety and in terms of the necessary structural, geotechnical and hydraulic performance criteria.

(D16) At each annual inspection if a mandatory reporting level is required it must be determined and marked on each regulated dam.

(D17) A final assessment of the adequacy of available storage in each regulated dam must be based on a dam level observed within the month of October each year and result in an estimate of the level in that dam as at 1 November each year.

(D18) For each annual inspection, two (2) electronic copies (including one (1) locked and one (1) working copy) of a final report on the condition and adequacy of each regulated dam, certified by the suitably qualified and experienced person and including any recommended actions to be taken to ensure the integrity of each regulated dam, must be provided to the administering authority by 1 December each year.

(D19) The holder of this environmental authority must, upon receipt of the final annual inspection report, consider the report and its recommendations and within one month of receipt of the annual inspection report, formulate actions to ensure that each regulated dam safely performs to its intended functions. Taking into account the weather conditions at the time, the holder of this environmental authority must promptly implement the formulated actions where practicable.

(D20) All containment embankments within all regulated dams must be monitored for signs of embankment deterioration in accordance with the monitoring requirements of the design plan.

**Hydraulic Performance Criteria**

(D21) Regulated dams constructed on the mining lease(s) must comply with the hydraulic performance criteria shown in Table D3 - Hydraulic Performance Criteria for Regulated Dams.

**Table D3 - Hydraulic Performance Criteria for Regulated Dams**

| Name of Regulated Dam | Design Storage Allowance (Dams other than levees) AEP | Spillway Capacity or Diversion Capacity (Levees) AEP | Mandatory Reporting Level[1] (Dams other than levees) AEP[2] |
|---|---|---|---|
| **East Weipa and Andoom** | | | |
| East Weipa Tailings Storage Facility | 1 in 10 AEP, 2 month wet season plus other net inputs for the 2 month wet season, to be available on 1st November each year | PMF[3] | 1 in 100 AEP, 72 hour duration rainfall event or wave allowance |
| Emergency Dam | 1 in 10 AEP, 2 month wet season plus other net inputs for the 2 month wet season, to be available on 1st November each year | 1 in 100 AEP | 1 in 100 AEP, 72 hour duration rainfall event or wave allowance |
| West Weipa 2 (WW2) | N/A[4] | 1 in 10000 AEP | N/A[4] |
| G2 Dam | N/A[5] | N/A[5] | N/A[5] |
| G & X Dam | N/A[5] | N/A[5] | N/A[5] |
| Andoom Tailings Storage Facility | 1 in 10 AEP, 2 month wet season plus other net inputs for the 2 month wet season, to be available on 1st November each year | 1 in 1000 AEP | 1 in 100 AEP, 72 hour duration rainfall event or wave allowance |
| **South of Embley** | | | |
| Boyd Tailings Storage Facility | 1 in 20 AEP, 2 month wet season plus other net inputs for the 2 month wet season, to be available on 1st November each year | 1 in 1000 AEP | 1 in 10 AEP, 72 hour duration rainfall event or wave allowance |
| Norman Creek Tailings Storage Facility | 1 in 20 AEP, 2 month wet season plus other net inputs for the 2 month wet season, to be available on 1st November each year | 1 in 1000 AEP | 1 in 10 AEP, 72 hour duration rainfall event or wave allowance |

[1] Refers to the level below the spillway crest, required to contain either the AEP (design risk) 72hr storm or the AEP (design risk) wave allowance, whichever is lower.

[2] AEP means the Annual Exceedance Probability, which is the probability that at least one event in excess of a particular magnitude will occur in any given year.

[3] PMF refers to the Probable Maximum Flood.

[4] Not applicable as Dam is low consequence for overtopping.

[5] Not applicable as the dam has been decommissioned

(D22) The spillway for any regulated dam constructed within the operational land must be designed and maintained to withstand the peak flow from the critical design storm in Table D3 - Hydraulic Performance Criteria for Regulated Dams.

(D23) The holder of this environmental authority must notify the administering authority as soon as possible, but within twenty-four (24) hours, of the level in any regulated dam reaching the mandatory reporting level in Table D3 - Hydraulic Performance Criteria for Regulated Dams; and must promptly act to prevent or minimise the risk of environmental harm.

**East Weipa Tailings Facility**

(D24) Tailings must not be placed against the walls of Cell 2A until such time as either:

(a) the tailings storage capacity of Cell 2B has been filled to the authorised RL25 or,

(b) the placement procedure for tailings in Cell 2B has demonstrated to the satisfaction of the administrating authority that the tailings placed on beaches are non-flowable under all possible scenarios.

(D25) At least forty-eight (48) hours prior to the commencement of earthworks on Cell 2A & Cell 2B of the East Weipa Tailings Storage Facility, the holder of this environmental authority must complete a program of public notification for the Nanum community providing information on the works to be completed. Details must include but should not be limited to the following:

(a) the nature of the works to be completed;

(b) the date works are expected to begin and the timeframe for completion;

(c) the expected hours of operation of plant and machinery;

(d) where the works will and are likely to be conducted;

(e) the measures in place to mitigate impacts on the Nanum community from noise, vibration, dust or light nuisance; and

(f) a contact phone number to assist in recording and responding to community concerns.

**Decommissioning of Regulated Dams – Objective**

(D26) Regulated dams must be dealt with in accordance with the conditions of this environmental authority and must not be abandoned.

(D27) On cessation of operation of any regulated dam, that regulated dam must be maintained so as to avoid environmental harm until that regulated dam is decommissioned.

(D28) Prior to the cessation of mining activities, each regulated dam must be decommissioned such that it either:

(a) becomes a stable landform that safely confines flowable substances;

(b) is approved or authorised under relevant legislation for a beneficial use;

(c) is a void authorised by the administering authority to remain after decommissioning; or

(d) is compliant with the rehabilitation requirements of this environmental authority.

(D29) The holder of this environmental authority must, prior to surrender of the mining leases implement either:

(a) a plan for de-commissioning the regulated dams such that, amongst other things, the regulated dams and their contents will be structurally stable and resistant to erosion and any seepage or other emissions will not cause environmental harm; or

(b) a site management plan for the continued operation and maintenance of the regulated dams.

**Decommissioning of Regulated Dams – Documentation and Compliance**

(D30) Decommissioning activities for regulated dams must be documented. Where the detailed documentation is not already contained in the design plan for the dam the detailed documentation is considered to be an amendment to the design plan and must be submitted as an amendment to the design plan.

(D31) All engineering aspects, including but not limited to stability, cover and drainage design of the proposed land forms forming part of any decommissioning and rehabilitation, must be provided as a design plan and certified by a suitably qualified and experienced person.

(D32) The design plan for the Boyd and Norman Creek Tailings Storage Facilities must include a plan for the decommissioning and rehabilitation of the regulated dam at the end of its operational life.

END OF CONDITIONS FOR SCHEDULE D

## SCHEDULE E – GENERAL AND REGULATED WASTE MANAGEMENT

### General & Regulated Waste Disposal

(E1) This schedule does not apply to the Evans Landing Landfill.

(E2) The following wastes may be disposed of on the mining lease at locations beyond the boundary of the Evans Landing Landfill in accordance with the requirements of this environmental authority:

(a) mine waste including green waste, waste bauxite and tailings; and

(b) sewage sludge in drying beds located at the Awonga Point Sewage Treatment Plant (STP), the Lorim Point STP, the STP for the temporary camps in the area south of the Embley River, and Boyd Infrastructure Area STP and Norman Creek Infrastructure Area STP.

(E3) General and regulated waste generated in the mining activity can be temporarily stored on site awaiting removal provided it is handled, stored and transferred to ensure there is minimal risk of causing fire or contamination to land or waters.

### Waste Management Program

(E4) Before 28 August 2013 a Waste Management Program in accordance with Part 5 of the *Environmental Protection (Waste Management) Policy 2008* must be developed, implemented and maintained for all mining activities on the mining lease(s). The waste management program must include:

(a) a description of the mining activities that may generate waste;

(b) the types and amounts of wastes generated by the mining activities;

(c) a program for reusing, recycling or disposing of all wastes;

(d) how the waste will be dealt with in accordance with the waste and resource management hierarchy, including a description of the types and amounts of waste that will be dealt with under each of the waste management practices in the waste and resource management hierarchy (i.e. avoidance, reuse, recycling, energy recovery, disposal);

(e) how the waste will be stored, handled and transferred in a proper and effective manner;

(f) procedures for identifying and implementing opportunities to minimise the amount of waste generated, promote efficiency in the use of resources and improve the waste management practices employed;

(g) procedures for dealing with accidents, spills, and other incidents that may impact on waste management;

(h) details of any accredited management system employed, or planned to be employed, to deal with the waste;

(i) how often the performance of the waste management practices will be assessed;

(j) the indicators or other criteria on which the performance of the waste management practices will be assessed; and

(k) staff training and induction to the waste management program.

### Regulated Waste

(E5) Regulated waste, other than that authorised to be disposed of onsite under this authority, must only be removed and transported from the site by a person who holds a current authority to transport such wastes to a facility that is lawfully able to accept the waste under the *Environmental Protection Act 1994*.

(E6) Each container of regulated waste stored awaiting movement off-site must be clearly marked to identify the contents.

END OF CONDITIONS FOR SCHEDULE E

## SCHEDULE F - EVANS LANDING LANDFILL

### Activity

(F1) General and regulated waste is authorised to be stored and disposed of at the Evans Landing Landfill located within the Cook Shire Local Authority Reserve identified as the Gonbung Refuse Tip on ML7024 and identified in Schedule L Plan 5 – Evans Landing Landfill, or can be removed to an alternative facility that can lawfully accept these wastes.

### Site Development Plan

(F2) A Site Development Plan must be developed and implemented for the Evans Landing Landfill before 1 March 2012. The Site Development Plan must be revised every three (3) years and must include details of at least the following:

(a) dimensions of landfill units used for waste disposal or storage;

(b) an accurate level survey of any area to be utilised for the disposal or storage of wastes. The levels must be reduced to a common datum and related to contour plans;

(c) the dimensions of the active waste disposal face;

(d) location of any new site infrastructure or extensions such as a new waste disposal cell, leachate dam, pond, or pump well or other plant and equipment required for the leachate collection, storage and recirculation infrastructure installed to serve the new cell;

(e) location of any new stormwater drains, diversion embankments or settling ponds required to serve any new cell;

(f) location of any areas to be capped (both final and interim capping where the next stage on the completed cell will not commence within twelve (12) months), the proposed capped surface levels and contours, surface drainage system and species of vegetation to be planted as part of a rehabilitation program;

(g) location of any new groundwater monitoring or collection bores required to serve any new cell; and

(h) progressive recording of waste deposition such that the location of a deposited load can be readily identified.

### Continual Improvement in Waste Management Practices

(F3) For the purpose of minimising the disposal of recyclable waste to the landfill (excluding commingled waste) in accordance with the waste management hierarchy and the principles of the *Environmental Protection (Waste Management) Policy 2008*, the holder of this environmental authority must implement a Waste Management Plan that addresses at least the following matters:

a) waste management practices that will ensure that recyclables are diverted from the landfill;

b) procedures for identifying and implementing opportunities to improve the waste management practices employed including information and education packages for waste generators to assist in maximising the diversion of recyclable materials from landfill;

c) details of any accredited management system employed, or planned to be employed, to implement the waste management practices;

d) training programs and guidance for waste transport contractors in the identification and source separation of recyclable materials;

e) procedures for auditing waste loads to identify material to be removed for recycling;

f) how often the performance of the waste management practices will be assessed (at least annually);

g) the indicators or other criteria taking into account economic, social and environmental factors on which the performance of the waste management practices will be assessed; and

h) submission to the administering authority on the date the annual return is due each year of operation, an annual report for the preceding financial year, on the implementation of the Waste Management Plan. This report must include the following:

i) any new measures adopted or materials newly diverted from landfill disposal; and

ii) a summary (expressed in tonnes/year wherever appropriate) of the following information including wastes received, recyclable material recovered, fate of recyclables (e.g. transported off site for reuse/recycling, reused/recycled on site or stored on site) and a calculated percentage diversion rate for the materials specified below:

- Amount of green and organic waste collected and recycled;
- Amount of green and organic waste disposed to landfill;
- Amount of biosolids collected and recycled;
- Amount of construction and demolition waste collected and recycled;
- Amount of construction and demolition waste disposed to landfill;
- Amount of commercial and industrial waste (including agricultural) recycled;
- Amount of commercial and industrial waste (including agricultural) disposed to landfill;
- Amount of electrical equipment collected for recycling;
- Amount of Tallow and Vegetable oil collected;
- Number of scrap tyres collected for recycling (Equivalent Passenger Units - EPUs);
- Number of batteries collected for recycling;
- Amount of waste oil recycled;
- Total amount of paper and cardboard recycled;
- Total amount of plastics recycled;
- Total amount of aluminium cans recycled;
- Total amount of steel recycled;
- Other types and quantities of recyclables (please specify) recycled;
- Amount of waste disposed to landfill;
- Amount domestic waste disposed to landfill; and
- Total amount of landfill cover material used.

Note: Recoverable buried storage of recyclable material on the licensed place is not regarded as landfill disposal for the purposes of this approval, where such burial and recovery is unlikely to cause any environmental harm

**Security**

(F4) Measures must be taken to prevent unauthorised access to the facility.

(F5) While the facility is open, staffing of the facility must provide for:

(a) controlling the reception, storage and removal of waste;

(b) maintaining the facility;

(c) controlling all employees working in the facility; and

(d) supervising all persons entering the facility.

**Litter**

(F6) Litter control methods must be implemented in order to effectively capture wind-blown litter within the active waste disposal area.

**Waste Storage and Reprocessing Areas**

(F7) All storage and reprocessing of wastes must only be carried out on a hard stand area(s):

(a) constructed of compacted clay or other low permeability material to minimise soil infiltration;

(b) graded to prevent rainwater ponding;

(c) bunded to contain the materials stored; and

(d) graded to facilitate the collection of leachates and contaminated stormwater runoff for discharge to first flush ponds.

**Fire Management**

(F8) The holder of this environmental authority must not:

(a) burn waste at or on the Evans Landing Landfill;

(b) allow waste to burn or be burnt at or on the Evans Landing Landfill; or

(c) remove waste (other than large items of green waste) and burn such waste elsewhere.

(F9) Clear access to the water supply must be provided for fire-fighting vehicles at all times.

(F10) An effective fire break must be provided and maintained around the boundary of the waste management facility.

**Access Roads**

(F11) The holder of this environmental authority must ensure all weather access roads are installed and maintained so that at all times whilst the site is open for receiving wastes, vehicles have access to any waste storage or treatment area or any active waste disposal area.

**Storage of Tyres**

(F12) Tyres stored must be stockpiled in stable stacks in volumes less than 3m in height and 200$m^2$ in area and at least 10m from any other tyre storage area or combustible or flammable material including vegetation.

**Asbestos Disposal**

(F13) All asbestos waste must be:

a) disposed to a designated asbestos landfill area:

i) that is separate to the active waste disposal area; and

ii) where no excavation will take place following the disposal of asbestos waste;

b) promptly covered after disposal with a minimum of 200 mm of consolidated earth or equivalent cover material; and

c) placed to ensure that a minimum distance of two (2) metres is achieved from both the surface and boundary of the landfill excluding any final cover system required by this approval.

**Battery Storage**

(F14) Waste wet cell batteries may only be temporarily stored for a period no longer than six (6) months in a covered enclosure that has been bunded to contain spillages and leakages.

**Car Bodies**

(F15) Car bodies must be drained of all fluids prior to compaction and must only be stored in the scrap steel storage and processing area. All fluids must be collected and appropriately managed for recycling and/or treatment.

**Waste Acceptance Criteria**

(F16) The following wastes may be disposed of at the Evans Landing Landfill:

(a) domestic waste;

(b) commercial waste;

(c) industrial waste;

(d) regulated waste in accordance with Condition (F19); and

(e) construction and demolition waste.

(F17) Segregated recyclable materials including tyres, scrap steel and aluminium, lead acid batteries and waste oil must not be disposed of in the landfill area but must be dealt with in accordance with the following hierarchy with the preference reducing down the list:

(a) reuse;

(b) recycling; or

(c) energy recovery.

(F18) Notwithstanding any condition of this environmental authority, the following waste materials (other than where the following materials are commingled in waste received) are not permitted to be disposed of in the landfill:

- hot ash;
- material that is smoldering or aflame;
- material containing a substance which is ignitable, corrosive, reactive or toxic (other than materials containing a toxic substance from domestic premises);
- radioactive wastes;
- explosives;
- ammunition, other than ammunition that no longer contains explosives, pyrotechnics or propellants apart from trace residues that are no longer capable of supporting combustion or an explosive reaction;
- cytotoxic wastes;
- tallow and vegetable oils unless rendered incapable of yielding free liquids;
- liquid or semi-liquid waste other than liquid or semi-liquid waste which has been generated on the Evans Landing Landfill;
- wastes yielding free liquid;
- sludges from acid, alkaline and solvent baths;
- waste oil and oil/water emulsions;
- tyres;
- filled or partly filled drums containing liquid wastes;
- waste pesticide containers or other drums which have not been triple rinsed, pressure rinsed or otherwise thoroughly cleaned;
- soluble chemical wastes;
- car bodies;
- wet cell batteries;
- nickel metal hydride or nickel cadmium batteries;
- waste pesticides;
- waste paints and solvents;
- gas bottles;
- treatment tank sludge or residues unless dewatered;
- biosolids (sewage sludges) unless dewatered;
- grease trap wastes unless dewatered; and
- green waste (other than mulch used for day cover).

(F19) A regulated waste (excluding commingled waste) must not be disposed of at the Evans Landing Landfill:

(a) if it exhibits any of the hazard characteristics listed in Table F1 – Hazard Characteristics; and

(b) unless the holder of this environmental authority effectively implements risk assessment practices and procedures for sampling and contaminant testing to ensure that the material accepted contains less than the maximum contaminant levels in Appendix 1 – Maximum Contaminant Levels in Regulated Waste; Table 1 – Maximum Contaminant Levels and/or the maximum leaching contaminant levels prescribed in Table 2 - Maximum Leaching Contaminant

Levels or Table 3 - Maximum Contaminant Levels in Soils and Table 4 - Maximum Leaching Contaminant Levels in Soils.

**Table F1 – Hazard Characteristics**

| Hazard Characteristic | Description of the Hazard Characteristic |
|---|---|
| **Ignitability** | Regulated wastes that are capable of causing a fire when ignited through friction, absorption of moisture, or spontaneous chemical changes under standard temperature and pressure. |
| **Corrosivity** | Regulated wastes which on dissolution exhibit a pH of 2 or less or 12.5 or greater. |
| **Reactivity** | Regulated wastes that have any of the following properties:<br>• react violently with water; and/or,<br>• form potentially explosive mixtures with water and other substances likely to be disposed of in the landfill facility; and/or,<br>• generate toxic gases, vapours, or fumes dangerous to human health or the environment when mixed with water and other substances likely to be disposed of in the landfill facility; and/or,<br>• contain substances which generate toxic gases, vapours or fumes when exposed to pH conditions between 2 and 12.5; and/or,<br>• are capable of detonation or explosive reaction when subjected to a strong initiating source or if heated under confinement; and/or,<br>• are readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure. |
| **Toxicity** | Regulated wastes that have:<br>• contaminant concentrations in the waste exceeding the maximum contaminant levels in Appendix 1 – Maximum Contaminant Levels in Regulated Waste; Table 1 – Maximum Contaminant Levels; or,<br>• leaching contaminant levels in the waste when measured in accordance with Toxicity Characteristic Leaching Procedure (TCLP), exceeding the concentrations prescribed in Appendix 1 – Maximum Contaminant Levels in Regulated Waste; Table 2 - Maximum Leaching Contaminant Levels.<br><br>For any soil contaminated by radioactive material:<br>• the gross alpha and gross beta activity concentration in the Toxicity Characteristic Leaching Procedure (TCLP) extracts from the material are no more than one hundred (100) times the concentrations for the screening of gross alpha and gross beta activity concentrations specified in the NHMRC/ARMCANZ Australian Drinking Water Guidelines, 2004. |

(F20) Records of the volumes and type of waste accepted at the landfill facility must be kept and maintained and made available for inspection upon request by the administering authority.

Note: The submission of an annual report on these volumes for the local government's waste management strategic plan or otherwise required by the administering authority will be deemed to satisfy the reporting requirement of this condition.

**Contaminated Soils and Bio-solids**

(F21) Contaminated soils or aged bio-solids may be used for day cover material upon waste disposal cells if contaminated levels are less than the:

(a) maximum contaminant levels in Appendix 1 – Maximum Contaminant Levels in Regulated Waste; Table 3 – Maximum Contaminant Levels in Soils; and,

(b) maximum leaching contaminant levels prescribed in Appendix 1 – Maximum Contaminant Levels in Regulated Waste; Table 4 - Maximum Leaching Contaminant Levels in Soils.

**Removal or Disposal of Prohibited Waste**

(F22) In the event the holder of this environmental authority becomes aware of any prohibited waste being received at the Evans Landing Landfill, the holder must:

(a) cease depositing such waste if it is still occurring;

(b) remove the prohibited waste and store in a covered and bunded area; and

(c) arrange for a person who can lawfully transport such waste to promptly collect it after it being identified and remove it to a facility that can lawfully accept it.

(F23) If the holder of this environmental authority becomes aware that a person has removed regulated waste from the Evans Landing Landfill and/or disposed of regulated waste in a manner that is improper or unlawful or which is not authorised by this environmental authority, then the holder of this environmental authority must, as soon as practicable, notify the administering authority of all relevant facts, matters and circumstances known concerning the disposal.

**Waste Oil Storage**

(F24) Waste oil may be temporarily stored for a period no longer than six (6) months in drums or other containers provided that the drums or containers are:

(a) stored in a covered area designated for this purpose;

(b) bunded to contain spillages and leakages; and

(c) securely sealed when full to prevent spillage.

**Equipment Containing Ozone Depleting Gases**

(F25) Waste refrigerators, freezers, air conditioners or any other equipment containing ozone depleting gases received at the Evans Landing Landfill must be either degassed by an appropriately qualified person at the Evans Landing Landfill or, if degassed off site, accompanied by a degassing certificate signed by a qualified person.

**Regulated Waste Loading and Unloading**

(F26) All loading and unloading of liquid regulated wastes must only take place in bunded areas capable of containing and permit recovery of any spillage.

(F27) The holder of this environmental authority must ensure that sufficient equipment is available for the containment and recovery of spillages of liquid regulated waste.

**Mixing of Regulated Wastes**

(F28) The holder of this environmental authority must not cause or permit the mixing of incompatible regulated wastes.

**Movement of Regulated Wastes**

(F29) All vehicles used to transport regulated waste must be registered with the administering authority.

(F30) Where regulated waste is removed from the Evans Landing Landfill other than as permitted under another schedule of this environmental authority, the holder of this environmental authority must ensure that:

(a) the removal and transport of such wastes, where it constitutes an environmentally relevant activity under the *Environmental Protection Regulation 2008*, is carried out by a person licensed for carrying out this activity to a facility that is lawfully able to accept the waste under the *Environmental Protection Act 1994*; and

(b) records are kept of the following:

(i) the date, quantity and type of waste removed;
(ii) name of the regulated waste transporter(s) that removed the waste; and
(iii) the intended treatment/disposal destination of the waste.

Note: Records of documents maintained in compliance with a waste tracking system established under the *Environmental Protection Act 1994* or any other law for regulated waste will be deemed to satisfy this condition.

(F31) All vehicles (including load areas), containers and secondary containers used to transport regulated waste must be:

(a) maintained in a proper and efficient condition at all times to prevent spillage or leakage of waste;

(b) kept clean at all times whilst regulated waste is not being transported; and

(c) mounted securely, sealed and maintained in a condition that will prevent spillage or leakage of the waste.

(F32) Each container of regulated waste stored awaiting movement off site must be clearly marked to identify the contents.

(F33) Regulated waste is not permitted to be released from any vehicle or any container transported by that vehicle other than at the designated regulated waste disposal area located at the Evans Landing Landfill.

(F34) All asbestos transport must be:

(a) placed in bins/containers on the vehicle and double wrapped with 0.2mm thick polyethylene sheets and sealed with adhesive tape;

(b) labelled to indicate the presence of asbestos and the asbestos risk safety phrases;

(c) securely stored on the vehicle during transit in such way as not to cause the packaging to rupture;

(d) off loaded in such a manner as to not cause the packaging to rupture; and

(e) repackaged promptly if rupturing of the package(s) occurs.

**Disposal of Clinical Waste**

(F35) Untreated clinical waste must be disposed of under supervised burial in a designated area.

(F36) Promptly after disposal has taken place, untreated clinical waste must be covered with a layer of compacted waste or earth to a minimum depth of one (1) metre.

**Clinical Waste Acceptance Criteria**

(F37) Notwithstanding any condition of this environmental authority, the following clinical waste materials are not permitted to be disposed of in the landfill:

(a) cytotoxic;

(b) human body parts;

(c) pharmaceutical;

(d) radioactive; and

(e) chemical waste.

**Landfill Liner Construction**

(F38) A landfill liner system must be installed and maintained for any newly constructed waste cell at the Evans Landing Landfill in accordance with the administering authority's *Guideline – Landfill Siting, Design, Operation and Rehabilitation* to effectively prevent any release of contaminants to waters.

**Leachate Management**

(F39) Measures must be implemented to prevent hazardous leachate being directly or indirectly released or likely to be released as a result of any landfill activity to any groundwater or surface water.

(F40) A leachate collection system must be installed and maintained at the Evans Landing Landfill to effectively and efficiently:

(a) collect any leachate generated within the landfill footprint;

(b) deliver the collected leachate to a leachate storage or disposal facility; and

(c) for any newly constructed waste cell, control the leachate head on any leachate collection sump serving the landfill so that it does not exceed 0.3 metres.

(F41) Any leachate collection system or first flush pond must be maintained in an effective operating condition as per the design criteria and managed so that stored leachate or stormwater volumes are minimised following each rainfall event to reinstate holding capacity in readiness for the next rainfall event.

(F42) Leachate or contaminated stormwater intercepted by the leachate collection system may only be managed:

(a) by evaporation in a pond constructed on the Evans Landing Landfill;

(b) by recirculation back into the landfilled waste;

(c) by irrigation over exposed wastes on the Evans Landing Landfill; or

(d) by disposal to a sewage treatment plant.

(F43) All ponds used for the storage of leachate on the Evans Landing Landfill must be constructed to a standard no more permeable than $1x10^{-9}$ m/sec and $1x10^{-8}$ m/sec for all first flush stormwater ponds. All ponds must be maintained to prevent release of contaminated water through the bed or banks of the pond to any waters including ground water.

(F44) Leachate pumping stations must be fitted with pump-failure alarms as well as high-level alarms to warn of imminent pump station overflow. Backup pumps must be readily available on site in the event of pump system failure. All alarms must be able to operate without mains power if such a power failure occurs and when in operation, must notify the appropriate person to respond to the alarm.

**Leachate Management and Monitoring**

(F45) The holder of this environmental authority must develop and implement a leachate quality and quantity management and monitoring program for the leachate generated and recirculated at the Evans Landing Landfill that includes at least the following:

(a) measurement and recording of daily rainfall or rainfall events (if an event is longer than twenty-four (24) hours) at the Evans Landing Landfill;

(b) daily measurement and recording of the quantity of recirculated leachate during the wet season (1 Nov – 31 March) and weekly measurement and recording of the quantity of recirculated leachate during other periods;

(c) for any newly constructed waste cell, during the wet season (1 Nov – 31 March) weekly calculation of the volume of leachate in the landfill based on monitoring of the level of leachate at any leachate collection sump or monitoring well correlated to both AHD (Australian Height Datum) and the level of the top of the closest perimeter bund to the sump or monitoring well and monthly calculation during other periods;

(d) calculation of an annual water balance for the landfill that includes but is not necessarily limited to, incident rainfall, evapotranspiration and leachate recirculation rates;

(e) a sufficient number of monitoring locations to establish the composition and volume of leachate generated within the landfill;

(f) sampling of leachate (when present) from the landfill on at least a quarterly basis each year. If no leachate is present, the environmental authority holder must record that no leachate is present; and

(g) analysis of leachate samples for the quality characteristics identified for leachate in Table F3 – Monitoring Requirements.

**Stormwater Management**

(F46) Contaminated stormwater runoff from any waste handling, processing, storage or disposal area on the Evans Landing Landfill or any vehicle maintenance, washdown area or wheel washer must not be released directly or indirectly to any waters except as permitted under the conditions of this environmental authority.

**Surface Water Monitoring**

(F47) The release of contaminants from the landfill must only occur at the release points specified in Table F2 – Release Points.

**Table F2 - Release Points**

| Release Point | Description of Water Released | Contaminant Source | Description & Nature of Receiving | Coordinates (GDA94 MGAz54) Monitoring Location | |
|---|---|---|---|---|---|
| | | | | Northing | Easting |
| **Stormwater Ponds** | | | | | |
| Spillway 1 | Surface Area Drainage (SW1) | Surface of waste disposal cells | Bushland and Embley River | 8600491 | 590797 |
| Spillway 2 | Surface Area Drainage (SW2) | | | 8600277 | 590780 |
| Spillway 3 | Surface Area Drainage (SW3) | | | 8600190 | 591055 |
| Spillway 4 | Surface Area Drainage (SW4) | | | 8600344 | 591144 |
| Spillway 5 | Surface Area Drainage (SW5) | | | 8600307 | 591264 |

(F48) The release of contaminants from the release points must be monitored at the monitoring locations listed in Table F2 – Release Points and at a frequency specified in Condition (F49).

(F49) The release of contaminants at the release points specified in Table F2 – Release Points, waters must be monitored for each quality characteristic specified for surface water in Table F3 – Monitoring Requirements. For any release, waters must be monitored if it is safe to do so:

(a) promptly and within twenty-four (24) hours of the commencement of release;

(b) daily during release for seven (7) days;

(c) weekly thereafter for one (1) month; and

(d) monthly for the remainder of the wet season.

**Groundwater Monitoring**

(F50) An effective groundwater monitoring program must be developed in accordance with the ANZECC (2000) methodology and submitted to the administering authority before 31 August 2012. The program must include:

a) installation of a groundwater monitoring network which:

i) establishes the reference quality of groundwater up gradient of the landfill site;

ii) are installed and maintained by a person possessing appropriate qualifications and experience in the fields of hydrogeology and groundwater monitoring program design to be able to competently make recommendations about these matters;

iii) include a sufficient number of "compliance bores" to detect any impact on groundwater as a consequence of landfill operations, constructed in accordance with the "Minimum Construction Requirements for Water Bores in Australia" (Agricultural and Resource Management Council of Australia and New Zealand 1997), that are located not more than 150 metres from the landfill area or at the boundary of the landfill facility whichever is the closer; and

iv) provides representative groundwater samples for the aquifers being sampled;

b) analysis of groundwater samples for at least the quality characteristics identified for groundwater in Table F3 – Monitoring Requirements;

c) collection of groundwater quality samples from groundwater bores at least quarterly; and

d) quarterly assessment of monitoring results to determine whether or not there has been any adverse change for each groundwater quality characteristic at locations hydraulically down gradient of the landfill unit when compared to reference values.

**Table F3 – Monitoring Requirements**

| Quality Characteristic | Leachate | Surface Water | Groundwater |
|---|---|---|---|
| pH | X | X | X |
| electrical conductivity | X | X | X |
| Total dissolved solids | X | X | X |
| dissolved oxygen | X | X | |
| bicarbonate ($HC0_3$) | X | | X |
| Nitrate | X | X | X |
| Ammonia | X | X | X |
| Calcium | X | X | X |
| Sulphate | X | X | X |
| Chloride | X | X | X |
| hexavalent chromium | X | X | |
| Cadmium | X | X | |
| Manganese | X | X | X |
| total iron | X | X | X |
| Copper | X | X | X |
| Lead | X | X | X |
| Zinc | X | X | X |
| pesticides (organochlorines and organophosphates) | X | | |
| Polynuclear Aromatic Hydrocarbons (PAHs) | X | | |
| Total Recoverable Hydrocarbons | X | X | X |
| BTEX (Benzene, Toluene, Ethyl Benzene and Xylene) | X | | |
| Chemical Oxygen Demand (COD) | X | X | X |
| 5-Day Biological Oxygen Demand ($BOD_5$) | X | X | |
| Total Organic Carbon (TOC) | X | | |

**Receiving Environment Monitoring Program**

(F51) A Receiving Environment Monitoring Program (REMP) must be developed and implemented by 1 July 2012 to monitor and record the effects of the release of contaminants on the receiving environment periodically and whilst contaminants are being discharged from the licensed place, with the aim of identifying and describing the extent of any adverse impacts on local environmental values and to monitor any changes in receiving waters (including groundwater). A copy of the REMP and any update or variation of the REMP following adoption of a new Plan of Operations must be provided to the administering authority prior to its implementation and due consideration given to any comments made on the REMP by the administering authority.

Note: For the purposes of the REMP, the receiving environment is the waters and connected waterways (including groundwater) downstream of any release associated with the Evans Landing Landfill.

(F52) The REMP must address (but not necessarily be limited to) the following:

(a) description of potentially affected receiving groundwaters and surface waters including key communities and reference water quality and sediment characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality);

(b) description of applicable environmental values and water quality objectives to be achieved (i.e. as scheduled pursuant to the Environmental Protection (Water) Policy);

(c) any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment to which the REMP applies;

(d) water and sediment quality targets within the receiving environment to be achieved and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the period upon which the REMP applies;

(e) monitoring for any potential adverse environmental impacts caused by a release;

(f) monitoring of stream flow or alternative estimation method to gain an understanding of the hydrology of the receiving waters and the circumstances under which releases occur;

(g) monitoring of toxicants that must consider the indicators specified in Table F3 – Monitoring Requirements to assess the extent of compliance of concentrations with water quality objectives and/or the ANZECC & ARMCANZ (2000) Guidelines for slightly to moderately disturbed ecosystems;

(h) monitoring of physical and chemical parameters including as a minimum those specified in Table F3 – Monitoring Requirements (in addition to dissolved oxygen saturation and temperature). The list of quality characteristics required to be monitored as per Table F3 - Monitoring Requirements will be reviewed once the results of the monitoring data become available. If it is determined that there is no need to monitor for certain individual quality characteristics then these can be removed from Table F3 - Monitoring Requirements;

(i) monitoring of biological indicators in accordance with the administering authority's monitoring and sampling manual using recognised standard methodology approved by the administering authority and monitoring metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ (2000), Simpson et al (2005) *Handbook for Sediment Quality Assessment* and/or the most recent version of AS5667.*1 Guidance on Sampling of Bottom Sediments*);

(j) the locations of monitoring points (including the locations of reference/upstream and downstream potentially impacted sites for each release point). Reference sites must comply with the following criteria:

(i) be from the same bio-geographic and climatic region;
(ii) have similar geology, soil types and topography;
(iii) contain a range of habitats similar to those at the potentially impacted sites;
(iv) have a similar flow regime; and
(v) not be so close to the potentially impacted sites that any disturbance at the potentially impacted sites also results in a change at the reference site;

(k) a frequency or scheduling of sampling and analysis that is sufficient to determine water quality objectives and to derive site specific reference values within two (2) years (depending on wet

season flows) in accordance with the *Queensland Water Quality Guidelines*. For ephemeral streams, this should include periods of flow irrespective of landfill or other discharges;

(l) specify sampling and analysis methods and quality assurance and control;

(m) any historical datasets to be relied upon;

(n) description of the statistical basis on which conclusions are drawn;

(o) any spatial and temporal controls to exclude potential confounding factors; and

(p) inclusion of additional monitoring points at least twelve (12) months prior to potential impact on the site as set out in the Plan of Operations.

(F53) A report outlining the findings of the REMP including all monitoring results and interpretations in accordance with Condition (F52) must be prepared and submitted in writing to the administering authority by 31 January 2015. This should include an assessment of reference water quality, any assimilative capacity for those contaminants monitored and the suitability of current discharge limits to protect downstream environment values and include recommendations to monitor appropriate quality characteristics.

**Active Waste Disposal Cell Management**

(F54) The holder of this environmental authority must ensure that waste disposal activities do not extend beyond the boundary of the active waste cell.

(F55) The holder of this environmental authority must ensure that all wastes accepted for disposal at the Evans Landing Landfill are not disposed of:

(a) outside any active waste disposal cell;

(b) into waters or leachate collected at the base of any active waste disposal cell; and

(c) beyond the catchment of any leachate collection drains installed as part of a leachate collection system.

(F56) All wastes must be deposited in lifts not exceeding a vertical height of four (4) metres.

(F57) Every lift of waste deposited in the active waste disposal cell must be effectively compacted in order to maximise waste density within the cell. Accurate boundary and topographic surveys must be completed prior to each lift.

(F58) Large items for disposal must be compacted before and/or after being deposited to minimise residual void space in the landfill.

(F59) Wastes deposited in any active waste disposal cell must be consolidated, compacted and covered with a layer of inert earthen material or mulch, as often as is necessary, but at least daily, to effectively minimise the quantity of wind-blown litter, odour and fly nuisance resulting from exposure of putrescibles waste.

**Waste Disposal Cell Interim Cover**

(F60) The holder of this environmental authority must apply interim cover on waste disposal cells. This cover is to be placed on areas that are inactive for a period of four months or greater and does not include the operational areas at the cell face. The interim cover must conform to the following criteria:

a) consists of at least 300 mm of compacted material; and,

b) to achieve a maximum permeability of $1 \times 10^{-7}$ metres per second;

c) minimise infiltration of water into the waste and ponding of water on the surface of the cell; and

d) is resistant to erosion by surface water flows.

(F61) Material for day cover must be readily available at all times in a quantity sufficient for not less than two weeks normal operation of the waste disposal cell. Day cover is to be applied to operational areas of the cell face to conceal waste.

(F62) The holder of this environmental authority must ensure that any day cover on a cell is removed promptly prior to any subsequent waste disposal.

**Landfill Capping**

(F63) A trial capping program must be finalised at least twelve (12) months prior to the completion of waste receipt operations for the landfill. This program must include but should not be limited to the following:

(a) schematic representation of final land form inclusive of drainage features;

(b) slope designs;

(c) cover design;

(d) drainage design;

(e) erosion controls proposed on reformed land;

(f) description of experimental design for monitoring of analogue and rehabilitated areas inclusive of statistical design;

(g) proposed revegetation criteria including but not limited to:

(i) species diversity, abundance and composition,

(ii) projective cover, and

(iii) dry matter production;

(h) proposed revegetation methods inclusive of plant species selection, re-profiling, re-spreading soil, soil ameliorants/amendments, surface preparation and method of propagation;

(i) materials balance including available topsoil for all sites and low permeability encapsulation media; and

(j) research program and associated milestones.

**Rehabilitation**

(F64) Rehabilitation of disturbed areas must take place progressively as waste disposal cells are completed.

(F65) Access to areas awaiting rehabilitation or being rehabilitated must be restricted by suitable barriers to prevent disturbance of these areas.

**Closure and Post Closure Care Plan**

(F66) A Closure and Post Closure Care Plan must be submitted to the administering authority at least twelve (12) months prior to the completion of waste receipt operations for the landfill.

(F67) The Closure and Post Closure Care Plan for the Evans Landing Landfill must be implemented for a nominal period of:

(a) at least thirty (30) years after completion of waste disposal activities; or

(b) a shorter period such that the landfill unit and surrounding Evans Landing Landfill are geo-technically stable and it can be demonstrated to the administering authority that there will be no likely release of waste materials, leachate or other contaminants to the environment.

(F68) The post closure care element of the Closure and Post Closure Care Plan must include at least the following:

(a) monitoring of:

(i) the leachate collection and recirculation system;

(ii) the groundwater monitoring network;

(iii) leachate quality;

(iv) groundwater quality; and

(v) surface water quality;

(b) maintenance of:

(i) the leachate collection and recirculation system;

(ii) the groundwater monitoring network; and

(iii) the integrity and effectiveness of final cover systems.

END OF CONDITIONS FOR SCHEDULE F

## SCHEDULE G – NOISE

### General

(G1) Noise from any mining activity must not cause environmental harm at any sensitive place or commercial place.

(G2) In the event of a complaint made to the administering authority (considered in the opinion of an authorised officer to be neither frivolous or vexatious) about noise generated in carrying out the mining activity and the noise is considered by the administering authority to be an unreasonable noise, the holder of this environmental authority must take action to ensure that it is no longer an unreasonable noise.

### Noise Monitoring

(G3) Ensure that noise generated by the mining activities (excluding public roads, railway and port) does not cause the limits of goals in Table G1 – Noise Limits to be exceeded.

**Table G1 - Noise Limits**

| Noise Level dB(A) measured as: | Monday to Saturday | | | Sundays and Public Holidays | | |
|---|---|---|---|---|---|---|
| | 7am to 6pm | 6pm to 10pm | 10pm to 7am | 9am to 6pm | 6pm to 10pm | 10pm to 9am |
| $L_{Aeq, adj, 1 hour}$ | 45 | 45 | 43 | 45 | 45 | 43 |
| $L_{A1, adj, 1 hour}$ | 50 | 50 | 45 | 50 | 50 | 45 |

(G4) When requested by the administering authority, noise monitoring and recording must be undertaken within a timeframe nominated by the administering authority to investigate any complaint of environmental nuisance (considered in the opinion of an authorised officer to be neither frivolous or vexatious) at any sensitive place or commercial place and the results must be provided to the administering authority within fourteen (14) days following completion of monitoring.

(G5) Noise monitoring and recording must include the following descriptor characteristics and matters:

(a) $L_{Aeq,}$ and $L_{A1}$ (where N equals the statistical levels of 1, 10 and 90 and T = 60 mins);

(b) background noise $L_{A90,}$;

(c) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels;

(d) atmospheric conditions including temperature, relative humidity and wind speed and directions;

(e) effects due to any extraneous factors such as traffic noise;

(f) location, date and time of monitoring;

(g) if the complaint concerns low frequency noise, Max $Lp_{LIN,T}$; and

(h) if the complaint concerns low frequency noise, one third octave band measurements in dB(LIN) for centre frequencies in the 10 – 200 Hz range.

(G6) The method of measurement and reporting of noise levels must comply with the most recent edition of the administering authority's Noise Measurement Manual or the most recent version of *AS1055 Acoustics – Description and measurement of environmental noise.*

END OF CONDITIONS FOR SCHEDULE G

## SCHEDULE H – WATER

### General

(H1) Contaminants that will, or have the potential to cause environmental harm must not be released directly or indirectly to any waters except as permitted under the conditions of this environmental authority.

(H2) The maintenance and cleaning of vehicles and any other equipment or plant must be carried out in areas and in a manner which minimises the potential for environmental harm.

(H3) All determinations of water quality must be:

(a) made in accordance with methods prescribed in the latest edition of the administering authority's *Monitoring and Sampling Manual*; and

(b) carried out on representative samples.

(H4) The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format when requested:

(a) the date and time upon which the sample was taken;

(b) the monitoring point at which the sample was taken;

(c) the measured or estimated daily quantity of the contaminants released from all release points identified in Table H1 – Release Points (point source release);

(d) where practicable flow rate at the time of sampling for each release point identified in Table H1 – Release Points (point source release);

(e) the results of all monitoring and details of any exceedances with the conditions of this environmental authority; and

(f) water quality monitoring data provided electronically in the specified format.

### Contaminant Release to Waters

(H5) The *r*elease of contaminants to waters from mining activities must only occur:

(a) at the release points specified in Table H1 – Release Points (point source release); and

(b) from extraction areas specified in Table H2 – Release from Extraction Areas

**Table H1 - Release Points (point source release)**

| Release Point | Description of Water Released | Contaminant Source | Description & Nature of Receiving Waters | Release Monitoring Locations | |
|---|---|---|---|---|---|
| | | | | Northing (GDA94) | Easting (GDA94) |
| North of the Embley | | | | | |
| Andoom TSF Emergency Spillway | Tailings decant water | Andoom TSF Cells 1 - 4 | Andoom Creek | 8616705 | 590654 |
| East Weipa TSF Emergency Spillway | | East Weipa TSF Cells 1, 2A, 2B & 3 | Trunding Creek | 8602123 | 594652 |
| East Weipa TSF (20MG) Reclaim Dam Spillway | | | Embley River | 8600684 | 594977 |

| Release Point | Description of Water Released | Contaminant Source | Description & Nature of Receiving Waters | Release Monitoring Locations | |
|---|---|---|---|---|---|
| | | | | Northing (GDA94) | Easting (GDA94) |
| East Weipa 55 MG Process Water Dam | Process Water | East Weipa TSF Cells 1, 2A, 2B & 3, Shallow Aquifer & Artesian Aquifer | Embley River | 8600178 | 594051 |
| East Weipa Infrastructure Area | Tailings decant water<br>East Weipa Processing area drainage<br>Perry's Pond discharges | Emergency Dam Perry's Pond<br>Plant Infrastructure | Embley River | 8599182 | 595069 |
| East Weipa 1&2 Spillway | Tailings decant water | East Weipa 1&2 TSF | Embley River | 8599495 | 595414 |
| Lake Mcleod and Lake Patricia Overflow Causeway | Stormwater runoff | West Weipa TSF G & X Dam & West Weipa 2 | Mission River via Lake McLeod | 8602097 | 591668 |
| Andoom Processing Area – Kings Canyon | Processing Area Drainage | Plant Infrastructure | Saleng Tea Tree Swamp | 8612996 | 589730 |
| **South of the Embley** | | | | | |
| Boyd TSF North Cell Spillway | Tailings decant water | Boyd TSF | Norman Creek Tributary | 8569004 | 569657 |
| Boyd TSF South Cell Spillway | | | | 8567457 | 569657 |
| Boyd Tailings Recovery Slot | | | Unnamed Creek near Pera Head | TBD[1] | TBD[1] |
| Norman Creek TSF North Cell Spillway | | Norman Creek TSF | Ward River Tributary | TBD[1] | TBD[1] |
| Norman Creek TSF South Cell Spillway | | | | TBD[1] | TBD[1] |
| Norman Creek Tailings Recovery Slot | | | | TBD[1] | TBD[1] |
| Boyd Process Water Pond | | Boyd TSF | Gulf of Carpentaria via unnamed drainage | 8569850[2] | 568250[2] |
| Boyd MIA Drainage Slot | Processing area drainage | Plant Infrastructure | | 8570981 | 568918 |

| Release Point | Description of Water Released | Contaminant Source | Description & Nature of Receiving Waters | Release Monitoring Locations | |
|---|---|---|---|---|---|
| | | | | Northing (GDA94) | Easting (GDA94) |
| Boyd Northern Stockpile Sediment Pond | Stormwater runoff | Ore stockpiles | | 8570648[2] | 567952[2] |
| Boyd Southern Stockpile Sediment Pond | | | Unnamed Creek near Pera Head | 8568446[1] | 566886[1] |
| Norman Creek Stockpile Sediment Pond | | | Gulf of Carpentaria via unnamed drainage | TBD[1] | TBD[1] |
| Norman Creek Process Water Pond | Tailings decant water | Norman Creek TSF | Norman Creek Tributary | TBD[1] | TBD[1] |
| Norman Creek MIA Drainage Slot | Processing area drainage | Plant Infrastructure | | TBD[1] | TBD[1] |

[1] To be determined and notified to the administering authority three (3) months prior to construction.

[2] If the release is directed via site drainage to the Boyd MIA Drainage Slot, and not directly to receiving environment, the Release Monitoring Location is the Boyd MIA Drainage Slot and monitoring is only required when a release occurs from the Boyd MIA Drainage Slot.

**Table H2 – Release from Extraction Areas**

| Monitoring Location | Description of Water Releases | Contaminant Source | Description of Receiving Waters | Coordinates (GDA94 MGAz54) Monitoring Location | |
|---|---|---|---|---|---|
| | | | | Northing | Easting |
| **Downstream Sites** | | | | | |
| Defined in Plan of Operations in accordance with the REMP | Release of contaminated stormwater via sediments dams | Extraction area | Streams, creeks, rivers and coastal environment in and adjacent to ML 7024 and ML 6024 | As described in the current Plan of Operations in accordance with the REMP | As described in the current Plan of Operations in accordance with the REMP |
| **Reference Sites** | | | | | |
| Defined in Plan of Operations in accordance with the REMP | Release of stormwater uncontaminated by mining activities | NA | Streams, creeks, rivers and coastal environment in and adjacent to ML 7024 and ML 6024 | As described in the current Plan of Operations in accordance with the REMP | As described in the current Plan of Operations in accordance with the REMP |

(H6) The release of contaminants to waters from the release points must be monitored at the monitoring locations listed in Table H1 – Release Points (point source release) in accordance with the frequency specified in condition H8. The release of contaminants to waters from extraction areas must be monitored at the monitoring locations Table H2 – Release from Extraction Areas in accordance with the REMP.

(H7) The release of contaminants to waters from release points specified in Table H1 - Release Points (point source release) must not exceed the contaminant limit specified in Table H3 – Release Water Contaminant Limit.

(H8) Where there is a release to waters at the release points specified in Table H1 – Release Points (point source release) waters must be monitored for each quality characteristic specified in Table H3 – Release Water Contaminant Limit. For any release, waters must be monitored if it is safe to do so:

(a) promptly and within twenty-four (24) hours of the commencement of release;

(b) daily during release for seven (7) days;

(c) weekly thereafter for one (1) month; and

(d) monthly for the remainder of the wet season.

**Table H3 – Release Water Contaminant Limit**

| **Quality Characteristic** | **Contaminant Limit** |
|---|---|
| Suspended Solids (mg/L) | 70[1] |
| Dissolved Aluminium (µg/L) | 320[2] |
| pH/EC/DO | For interpretation purposes |

1. 99th percentile of three wet seasons of North of Embley Release Point data; excluding high suspended solids data from King Canal Sediment Dam
2. 99th percentile of three wet seasons of North of Embley Release point data; excluding data from King Canal and Lorim Point Polishing Pond.

(H9) The release of contaminants directly or indirectly to waters must not:

(a) produce any slick or other visible or odorous evidence of oil, grease or petrochemicals; or

(b) contain visible floating oil or grease.

(H10) Releases to waters from the mining activities must be undertaken so as not to cause erosion of the bed and banks of the receiving waters or cause a material build-up of sediment in such waters.

(H11) The authorised mining activities must not cause an exceedance of any limit for any quality characteristics as specified in Table H4 – Receiving Water Trigger Levels (Wet Season – December to April) (North of Embley) and Table H6 - Receiving Water Trigger Levels (Wet Season – December to April) (South of Embley).

If a release of contaminants to waters from extraction areas specified in Table H2 – Release from Extraction Areas exceed any limit for any quality characteristics as specified in Table H4 – Receiving Water Trigger Levels (Wet Season – December to April) (North of Embley) and Table H6 - Receiving Water Trigger Levels (Wet Season – December to April) (South of Embley) , the holder of this environmental authority must investigate the exceedance of the limit to determine if it is a result of the authorised mining activities in accordance with condition (H14).

**Table H4 – Receiving Water Trigger Levels (Wet Season – December to April) (North of Embley)**

| **Quality Characteristic** | **Trigger Levels - freshwater** | **Trigger Levels – estuarine waters** | **Limit type** |
|---|---|---|---|

| | | | |
|---|---|---|---|
| pH (pH unit) | 5.4 [1,3] (minimum)<br>6.3 [1,3] (maximum) | 7.0 [4] (minimum)<br>8.5 [4] (maximum) | Median measured over the wet season |
| Turbidity (NTU) | 21 [2,3] | 37 [2,3] | Median measured over the wet season |
| Suspended Solids (mg/L) | 8 [2,3] | 30 [2,3] | Median measured over the wet season |
| Aluminium (µg/L) | 90 [2,3] | 104 [2,3] | Median measured over the wet season |
| Dissolved Oxygen (mg/L) | For interpretation purposes | | |
| Temperature (°C) | | | |
| EC (µS/cm) | | | |

1 Trigger levels based on 80th percentile (maximum) and 20th percentile (minimum) of at least 10 reference site wet season samples derived using the DERM (2009) methodology.

2 Trigger levels are based on the 80th percentiles of at least 10 consecutive reference site wet season samples, derived using the DERM (2009) methodology (Table D1, and section 3.4.3.1).

3 Reference sites are to be determined in accordance with Condition (H17).

4 Default trigger levels – from ANZECC (2000) trigger levels for aquatic ecosystems indicative of slightly disturbed tropical Australian estuarine ecosystems.
Note: Aluminium must be measured as total (unfiltered) and dissolved (<0.45µm filtered). Trigger levels for aluminium apply if dissolved results exceed trigger.

(H12) If there is an exceedance in accordance with condition H11 identified that will or has potential to cause environmental harm, the holder of the environmental authority must notify the administering authority in accordance with conditions A13, A14 and A15.

**Receiving Waters Monitoring**

(H13) Receiving waters must be monitored at the locations specified in Table H5 - Receiving Water Reference and Downstream Monitoring Locations monthly during the wet season (December to April) for each quality characteristic stated in Table H4 – Receiving Water Trigger Levels (Wet Season-December to April) (North of Embley) and Table H6 - Receiving Water Trigger Levels (Wet Season – December to April) (South of Embley).

**Table H5- Receiving Water Reference and Downstream Monitoring Locations**

| Release Point | Description of Water Released | Contaminant Source | Description & Nature of Receiving Waters | Downstream Receiving Waters Monitoring Locations | | Release Reference Monitoring Locations | |
|---|---|---|---|---|---|---|---|
| | | | | Coordinates (GDA94 MGAz54) | | | |
| | | | | Northing | Easting | Northing | Easting |
| **North of Embley** | | | | | | | |
| Andoom TSF Emergency Spillway | Tailings decant water | Andoom TSF Cells 1 - 4 | Andoom Creek | 8617302 | 591806 | 8616946 | 603924 |
| | | | | | | 8614977 | 604598 |
| | | | | | | 8598327 | 621077 |
| | | | | | | 8597092 | 618804 |
| | | | | 8602725 | 594683 | 8616946 | 603924 |

| Release Point | Description of Water Released | Contaminant Source | Description & Nature of Receiving Waters | Downstream Receiving Waters Monitoring Locations | | Release Reference Monitoring Locations | |
|---|---|---|---|---|---|---|---|
| | | | | Coordinates (GDA94 MGAz54) | | | |
| | | | | Northing | Easting | Northing | Easting |
| East Weipa TSF Emergency Spillway | | East Weipa TSF Cells 1, 2A, 2B & 3 | Trunding Creek | | | 8614977 | 604598 |
| | | | | | | 8598327 | 621077 |
| | | | | | | 8597092 | 618804 |
| East Weipa TSF (20MG) Reclaim Dam Spillway | | | Embley River | 8599804 | 592987 | 8593092 | 618204 |
| | | | | | | 8608448 | 603973 |
| East Weipa 55 MG Process Water Dam | Process Water | East Weipa TSF Cells 1, 2A, 2B & 3, Shallow Aquifer & Artesian Aquifer | Embley River | 8599804 | 592987 | 8593092 | 618204 |
| | | | | | | 8608448 | 603973 |
| East Weipa Infrastructure Area East Weipa 1&2 Spillway | Tailings decant water Processing area drainage Perry's Pond discharges | Emergency Dam Perry's Pond Plant Infrastructure | Embley River | 8598748 | 595061 | 8593092 | 618204 |
| | | | | | | 8608448 | 603973 |
| Lake Mcleod and Lake Patricia Overflow Causeway | Stormwater runoff | West Weipa TSF G & X Dam & West Weipa 2 | Mission River via Lake McLeod | 8603213 | 590670 | 8593092 | 618204 |
| | | | | | | 8608448, | 603973 |
| Andoom Processing Area – Kings Canyon | Processing Area Drainage | Plant Infrastructure | Saleng Tea Tree Swamp | 8612758 | 588893 | 8616946 | 603924 |
| | | | | | | 8614977 | 604598 |
| | | | | | | 8598327 | 621077 |
| | | | | | | 8597092 | 618804 |
| **South of Embley** | | | | | | | |
| **Tailings Storage Facilities** | | | | | | | |
| Boyd TSF North Cell Spillway | Tailings decant water | Boyd TSF | Norman Creek Tributary | TBD[1] | TBD[1] | TBD[1] | TBD[1] |
| Boyd TSF South Cell Spillway | | | | TBD[1] | TBD[1] | TBD[1] | TBD[1] |

| Release Point | Description of Water Released | Contaminant Source | Description & Nature of Receiving Waters | Downstream Receiving Waters Monitoring Locations | | Release Reference Monitoring Locations | |
|---|---|---|---|---|---|---|---|
| | | | | Coordinates (GDA94 MGAz54) | | | |
| | | | | Northing | Easting | Northing | Easting |
| Boyd Tailings Recovery Slot | | | Unnamed Creek near Pera Head | TBD[1] | TBD[1] | TBD[1] | TBD[1] |
| Norman Creek TSF North Cell Spillway | | Norman Creek TSF | Ward River Tributary | TBD[1] | TBD[1] | TBD[1] | TBD[1] |
| Norman Creek TSF South Cell Spillway | | | | TBD[1] | TBD[1] | TBD[1] | TBD[1] |
| Norman Creek Tailings Recovery Slot | | | | TBD[1] | TBD[1] | TBD[1] | TBD[1] |
| **Beneficiation Plant/Infrastructure Areas** | | | | | | | |
| Boyd Process Water Pond | Tailings decant water | Boyd TSF | Gulf of Carpentaria via unnamed drainage | TBD[1] | TBD[1] | TBD[1] | TBD[1] |
| Boyd MIA Drainage Slot | Processing area drainage | Plant Infrastructure | | TBD[1] | TBD[1] | TBD[1] | TBD[1] |
| Boyd Northern Stockpile Sediment Pond | Stormwater runoff | Ore stockpiles | | TBD[1] | TBD[1] | TBD[1] | TBD[1] |
| Boyd Southern Stockpile Sediment Pond | | | Unnamed Creek near Pera Head | TBD[1] | TBD[1] | TBD[1] | TBD[1] |
| Shiploader Stockpile Sediment Pond | | | Gulf of Carpentaria via unnamed drainage | TBD[1] | TBD[1] | TBD[1] | TBD[1] |
| Norman Creek Process Water Pond | Tailings decant water | Norman Creek TSF | Norman Creek Tributary | TBD[1] | TBD[1] | TBD[1] | TBD[1] |

| Release Point | Description of Water Released | Contaminant Source | Description & Nature of Receiving Waters | Downstream Receiving Waters Monitoring Locations | | Release Reference Monitoring Locations | |
|---|---|---|---|---|---|---|---|
| | | | | Coordinates (GDA94 MGAz54) | | | |
| | | | | Northing | Easting | Northing | Easting |
| Norman Creek MIA Drainage Slot | Processing area drainage | Plant Infrastructure | | TBD[1] | TBD[1] | TBD[1] | TBD[1] |
| **Extraction Areas: North of Embley and South of Embley** | | | | | | | |
| Defined in the Plan of Operations | Release of contaminated stormwater via sediment dams. | Extraction areas | Streams, creeks, rivers and coastal environments in and adjacent to ML6024 and ML7024. | TBD[1] | TBD[1] | TBD[1] | TBD[1] |

[1] To be determined and notified to the administering authority within three (3) months prior to the completion of construction . Note; a single reference monitoring location may apply to more than one release point and may be located in another sub-catchment.

(H14) If the wet season (December – April) median of the quality characteristics of the receiving water monitored at the downstream monitoring locations defined in Table H5 - Receiving Water Reference and Downstream Monitoring Locations exceed any of the trigger levels specified in Table H4 – Receiving Water Trigger Levels (Wet Season – December to April) (North of Embley) and Table H6 - Receiving Water Trigger Levels (Wet Season – December to April) (South of Embley), the holder of this environmental authority must:

a) notify the administering authority in accordance with conditions A13, A14 and A15.

b) complete an investigation in accordance with the ANZECC & ARMCANZ (2000) methodology into the potential for environmental harm and provide a written report to the administering authority outlining:

i. details of the investigation carried out; and

ii. assessment as to whether the exceedance caused environmental harm; and

iii. if the investigation determines the exceedance caused environmental harm, outline the details of investigations taken and actions taken to prevent environmental harm ; and

iv. report all values above the trigger levels.

**Table H6 – Receiving Water Trigger Levels (Wet Season – December to April) (South of Embley)**

| Quality Characteristic | Trigger Levels – freshwater | Trigger Levels – estuarine waters | Limit type |
|---|---|---|---|
| pH | 20th percentile[1, 2, 4, 6] of reference[3] or 6.0[7] (minimum), whichever is lower<br>80th percentile[1, 2, 4, 6] of reference[3] or 8.0[7] | 20th percentile[1, 2, 4, 6] of reference[3] or 7.0[8] (minimum), whichever is lower.<br>80th percentile[1, 2, 4, 6] of reference[3] or 8.5[8] | Median measured over the wet season |

| | | | |
|---|---|---|---|
| | (maximum), whichever is higher | (maximum), whichever is higher. | |
| Turbidity | 80th percentile[1, 2, 4, 6] of reference[3] or 15 (NTU)[7], whichever is higher | 80th percentile[1, 2, 4, 6] of reference[3] or 20 (NTU)[8], whichever is higher | Median measured over the wet season |
| Suspended Solids | 80th percentile[1, 2, 4, 6] of reference[3] | 80th percentile[1, 2, 4, 6] of reference[3] | Median measured over the wet season |
| Aluminium (µg/L) | 80th percentile[1, 2, 4, 6] of reference[3] or 27 [9], whichever is higher | 80th percentile[1, 2, 4, 5, 6] of reference[3] | Median measured over the wet season |
| Total Nitrogen[10] (µg/L) | 80th percentile[1, 2, 4, 6] of reference[3] or 200-300 [7], whichever is higher | N/A | Median measured over the wet season |
| Total Phosphorus[10] (µg/L) | 80th percentile[1, 2, 4, 6] of reference[3] or 10 [7], whichever is higher | N/A | Median measured over the wet season |
| Ammonia-N[10] (µg/L) | 80th percentile[1, 2, 4, 6] of reference[3] or 10 [7], whichever is higher | N/A | Median measured over the wet season |
| Dissolved Oxygen (mg/L) | For interpretation purposes | | |
| Temperature (°C) | | | |
| EC (µS/cm) | | | |

[1] An interim trigger value can be derived from ≥ 8 but ≤17 consecutive reference site samples, derived using the DERM (2009) methodology (Table D1, and section 3.4.3.1).
[2] Trigger values are based on the 80th percentile of at least 10 consecutive reference site samples, derived using the DERM (2009) methodology (Table D1, and section 3.4.3.1).
[3] Reference sites are to be determined in accordance with Condition (H17).
[4] 80th percentiles are calculated using ANZECC (2000) methodology (section 7.4.4.1).
[6] To be determined based on Receiving Environment Monitoring Program.
[7] ANZECC 2000, default trigger value for tropical Australia for slightly disturbed ecosystems, lowland river.
[8] ANZECC 2000, default trigger value for tropical Australia for slightly disturbed ecosystems, estuaries and marine
[9] ANZECC 2000, default trigger value for tropical Australia for high conservation/ecological value systems, freshwater.
[10] Monitoring of this quality characteristic only applies to receiving freshwater monitoring locations associated with a release from the Boyd MIA Drainage Slot and/or Norman Creek MIA Drainage Slot.
Note: Trigger levels for aluminium apply if dissolved results exceed trigger.

(H15) The holder of this environmental authority must develop and adopt a suitable methodology to determine and record stream flows at the locations upstream of each release point as specific in Table H1 – Release point (point source releases) for any receiving water into which a release occurs.

**Receiving Environment Monitoring Program**

(H16) A Receiving Environment Monitoring Program (REMP) must be developed and implemented to monitor and record the effects of the release of contaminants on the receiving environment periodically and whilst contaminants are being discharged from the licensed place with the aim of identifying and describing the extent of any adverse impacts on local environmental values and to monitor any changes in the receiving water (including groundwater) by:

(a) 1 July 2012 for the area north of the Embley River; and
(b) prior to commencement of significant construction work for the area south of the Embley River.

A copy of the REMP and any update or variation of the REMP following adoption of a new Plan of Operations must be provided to the administering authority prior to its implementation and due consideration given to any comments made on the REMP by the administering authority.

For the purposes of the REMP, the receiving environment is the waters and connected waterways (including groundwater) downstream of any release associated with the following:

(a) release points specified in Table H1 – Release Points (point source release); and
(b) extraction areas specified in Table H2 – Release from Extraction Areas.

(H17) The REMP must address (but not necessarily be limited to) the following:

(a) description of potentially affected receiving groundwaters and surface waters including key communities and reference water quality and sediment characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality);
(b) description of applicable environmental values and water quality objectives to be achieved (i.e. as scheduled pursuant to the *Environmental Protection (Water) Policy*);
(c) any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment to which the REMP applies;
(d) water and sediment quality targets within the receiving environment to be achieved and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the period upon which the REMP applies;
(e) monitoring for any potential adverse environmental impacts caused by a release;
(f) monitoring of stream flow or alternative estimation method to gain an understanding of the hydrology of the receiving waters and the circumstances under which releases occur;
(g) monitoring of toxicants that must consider the indicators specified in Table H3 - Release Water Contaminant Limits or H6 – Receiving Water Trigger Levels (Wet Season – December to April) (South of Embley) and to assess the extent of the compliance of concentrations with water quality objectives and/or the ANZECC & ARMCANZ (2000) Guidelines for slightly to moderately disturbed ecosystems;
(h) monitoring of physical and chemical parameters including as a minimum those specified in Table H3 - Release Water Contaminant Limits or H6 – Receiving Water Trigger Levels (Wet Season – December to April) (South of Embley) (in addition to dissolved oxygen saturation and temperature). The list of quality characteristics required to be monitored as per Table H3 - Release Water Contaminant Limits and H6 – Receiving Water Trigger Levels (Wet Season – December to April) (South of Embley) will be reviewed once the results of the monitoring data become available. If it is determined that there is no need to monitor for certain individual quality characteristics then these can be removed from Table H3 - Release Water Contaminant Limits or H6 – Receiving Water Trigger Levels (Wet Season – December to April) (South of Embley);
(i) monitoring of biological indicators in accordance with the administering authority's monitoring and sampling manual using recognised standard methodology approved by the administering authority and monitoring metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ (2000), Simpson et al (2005) *Handbook for Sediment Quality Assessment* and/or the most recent version of AS5667.*1 Guidance on Sampling of Bottom Sediments*;
(j) the locations of monitoring points (including the locations of reference/upstream and downstream potentially impacted sites for each release point). Reference sites must be as representative as possible of the following criteria:
    (i) be from the same bio-geographic and climatic region;
    (ii) have similar geology, soil types and topography;
    (iii) contain a range of habitats similar to those at the potentially impacted sites;
    (iv) have a similar flow regime; and
    (v) not be so close to the potentially impacted sites that any disturbance at the potentially impacted sites also results in a change at the reference site; and,
(k) a frequency or scheduling of sampling and analysis that is sufficient to determine water quality objectives and to derive site specific reference values within two (2) years (depending on wet season flows) in accordance with the *Queensland Water Quality Guidelines*. For ephemeral streams, this should include periods of flow irrespective of mine or other discharges;
(l) specify sampling and analysis methods and quality assurance and control;

(m) any historical datasets to be relied upon;

(n) description of the statistical basis on which conclusions are drawn;

(o) any spatial and temporal controls to exclude potential confounding factors; and

(p) inclusion of additional monitoring points at least twelve (12) months prior to potential impact on the site as set out in the Plan of Operations.

(H18) A report outlining the findings of the REMP including all monitoring results and interpretations in accordance with Condition (H16) must be prepared and submitted in writing to the administering authority:

(a) for the area north of the Embley River by 31 January 2015; and

(b) for the area south of the Embley River within two (2) years of the submission of the REMP.

This should include an assessment of reference water quality, any assimilative capacity for those contaminants monitored and the suitability of current discharge limits to protect downstream environment values and include recommendations to set appropriate contaminant limits for the purpose of Conditions (H11) and (H14).

**Water Supply Dam (South of Embley)**

(H19) Groundwater abstracted from artesian bores located on ML7024 must not be directed to the Water Supply Dam (Dam C).

(H20) Water may be released from the Water Supply Dam (Dam C) at the release point identified as Dam C valve or spillway.

**Groundwater**

(H21) Groundwater monitoring bores installed after 30 August 2011 must be constructed and operated in accordance with methods prescribed in the latest edition of the manual titled *Minimum Construction Requirements for Water Bores in Australia.*

(H22) Annual groundwater monitoring reports analysing groundwater chemistry and hydro-geological status of all sub-artesian groundwater bores and groundwater conditions must be prepared and submitted to the administering authority on request.

**Groundwater Monitoring (South of Embley)**

(H23) Groundwater level (surface RL[1]) and water quality must be monitored if it is safe to do so at the locations and frequencies specified in Table H7 - Groundwater Monitoring Locations (South of Embley).

**Table H7 - Groundwater Monitoring Locations (South of Embley)**

| Monitoring Location | Coordinates (GDA94 MGA z54) | | Quality Characteristic | Monitoring Frequency |
|---|---|---|---|---|
| | Northing | Easting | | |
| GM1 (Boyd MIA) | TBD[2] | TBD[2] | Surface RL[1] (m)<br>Total P, Total N, Ammonia, pH, Electrical Conductivity | Quarterly |
| GM2 (Boyd MIA) | TBD[2] | TBD[2] | | |
| GM3 (Norman Creek MIA) | TBD[2] | TBD[2] | | |
| GM4 (Norman Creek MIA) | TBD[2] | TBD[2] | | |
| GM5 (Boyd TSF North) | 8569770 | 568507 | Surface RL[1] (m)<br>pH, Electrical Conductivity | |
| GM6 (Boyd TSF East) | 8568410 | 569696 | | |
| GM7 (Boyd TSF South) | 8565436 | 569696 | | |
| GM8 (Boyd TSF West) | 8567655 | 567152 | | |

| Monitoring Location | Coordinates (GDA94 MGA z54) | | Quality Characteristic | Monitoring Frequency |
|---|---|---|---|---|
| | Northing | Easting | | |
| GM9 (Norman Creek TSF North) | TBD[2] | TBD[2] | | |
| GM10 (Norman Creek TSF East) | TBD[2] | TBD[2] | | |
| GM11 (Norman Creek TSF South) | TBD[2] | TBD[2] | | |
| GM12 (Norman Creek TSF West) | TBD[2] | TBD[2] | | |
| GM13 (upgradient of mining areas) | TBD[2] | TBD[2] | | |
| GM14 (within mining areas) | TBD[2] | TBD[2] | | |
| GM15 (downgradient of mining areas) | TBD[2] | TBD[2] | | |
| GM16 (upgradient of mining areas) | TBD[2] | TBD[2] | | |
| GM17 (within mining areas) | TBD[2] | TBD[2] | | |
| GM18 (downgradient of mining areas) | TBD[2] | TBD[2] | | |
| Bore 1 | 8570666 | 573297 | | |
| Bore 3 | 8572656 | 576494 | | |
| MB01 | 8564656 | 567707 | | |
| MB02 | 8563676 | 570084 | | |
| MB03a | 8569770 | 568507 | | |
| MB04 | 8566660 | 572490 | | |
| SOE10 | 8566680 | 565313 | | |

[1] RL must be measured to the nearest 5cm from the top of the bore casing.
[2] To be determined and notified to the administering authority upon construction of the bore.
Note: Groundwater monitoring locations in the area north of the Embley River are identified in the REMP (in accordance with Condition H17)

(H24) The Environmental Authority holder may request, as a part of the report prepared under Condition (H22) that the Administering Authority reduce the frequency of monitoring or vary the water quality parameters monitored.

**Stormwater, Sediment and Erosion Controls**

(H25) An Erosion and Sediment Control Plan must be developed by an appropriately qualified person and implemented for all stages of mining activities on the mining lease(s) to prevent or minimise erosion and the release of sediment to receiving waters and the contamination of storm water for:

(a) areas other than land south of the Embley River by 1 March 2013; and

(b) prior to commencement of significant construction work for areas south of the Embley River.

(H26) The Erosion and Sediment Control Plan must provide for at least the following stormwater management functions and be made available to the administering authority upon request:

(a) prevent or minimise the contamination of stormwater;

(b) diverting uncontaminated stormwater run-off around areas disturbed by mining activities or where contaminants or wastes are stored or handled;

(c) contaminated stormwater runoff, incident rainfall and leachate is collected; and treated, reused, or released in accordance with the conditions of this environmental authority;

(d) roofing where practicable or minimising the size of areas where contaminants or wastes are stored or handled;

(e) using alternate materials and or processes (such as dry absorbents) to clean up spills that will minimise the generation of contaminated waters;

(f) erosion and sediment control structures are placed to minimise erosion of disturbed areas and prevent the contamination of any waters;

(g) procedures to ensure that erosion and sediment control structures are maintained and adequate storage is available in sediment dams in accordance with design criteria; and

(h) training of staff that will be responsible for maintenance and operations of erosion and sediment control structures.

(i) for areas south of the Embley River the plan must also provide for:
  (i) restrict clearing to areas essential for mining and associated facilities;
  (ii) vegetation clearing and topsoil stripping will occur following the wet season where possible;
  (iii) backfilled pits will be revegetated as soon practicable;
  (iv) in the event that active or backfilled pits are not fully internally draining, storm water runoff must be directed via a sediment pond;
  (v) disturbed areas around construction sites must be rehabilitated promptly if not in an area subject to mining or infrastructure;
  (vi) sediment traps must be included as part of the drainage designs at points where haul roads cross watercourses; and
  (vii) relevant aspects of the engineering Guidelines for Queensland for Soil Erosion and Sediment Control will be followed.

(H27) Erosion protection and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment and contamination of stormwater as described in the Erosion and Sediment Control Plan.

(H28) Any spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable to minimise the release of wastes, contaminants or materials to any stormwater drainage system or receiving waters.

(H29) Sediment dams identified in Table H1 - Release Points (point source release) in the area south of Embley River must be designed and constructed with a minimum volume equivalent to a 1 in 10 year Annual Exceedance Probability (AEP) 24-hour storm event and must be maintained above the maximum sediment deposition levels.

(H30) Sediment dams constructed in the area south of Embley River as part of erosion and sediment control measures that treat releases of water from extraction areas to surface waters or to a place that is reasonably expected to reach surface water are to be built at a minimum with a volume equivalent to a 1 in 10 year Annual Exceedance Probability (AEP) 24-hour storm event and must be maintained above the maximum sediment deposition levels.

**Water Management Plan**

(H31) A Water Management Plan must be developed and implemented for areas other than land south of the Embley River by 31 August 2012 and prior to commencement of significant construction work for areas south of the Embley River. The Water Management Plan shall provide for the proper and effective management of the actual and potential environmental impacts resulting from the mining activity and to ensure compliance with the conditions of this environmental authority.

(H32) The Water Management Plan must include at least the following components:

(a) contaminant source study;
(b) site water balance and model;
(c) water management system;
(d) saline drainage prevention and management measures;
(e) emergency and contingency planning; and
(f) monitoring and review.

(H33) Each year the holder of this environmental authority must undertake a review of the Water Management Plan no later than 1 November to ensure that proper and effective *measures, practices or procedures are in place so that the mine is* operated in accordance with the conditions of this environmental authority and that environmental harm is prevented or minimised.

(H34) A copy of the Water Management Plan and/or a copy of the final review document of the Water Management Plan must be provided to the administering authority on request.

**Vehicle Wash Down Bays (South of Embley)**

(H35) Water from the heavy and light vehicle wash bays in the infrastructure areas south of the Embley River must be treated with oil water separators prior to release.

END OF CONDITIONS FOR SCHEDULE H

## SCHEDULE I – SEWAGE TREATMENT

### Awonga Point STP - Release to Waters

(I1) Treated sewage effluent must only be released to surface waters at the release point identified in Table I1 – Release Point & Schedule L Plan 6 – Awonga Point Sewage Treatment Plant Water Release & Water Quality Monitoring Sites.

**Table I1 – Release Point**

| Description | Coordinates (GDA94 MGA z54) | | Release Point |
|---|---|---|---|
| | Easting | Northing | |
| Awonga Point Sewage Treatment Plant submerged outfall | 597148 | 8606756 | Mission River - 60m offshore |

(I2) Treated sewage effluent must:

(a) be monitored at the location identified in Table I2 – Monitoring Location and Schedule L Plan 6 – Awonga Point Sewage Treatment Plant Water Release & Water Quality Monitoring Sites; and

(b) not exceed the contaminant limits stated in Table I3 – Release Water Contaminant Limits and the conditions of this environmental authority.

**Table I2 – Monitoring Location**

| Description | Location |
|---|---|
| Awonga Point Sewage Treatment Plant outflow pipeline | Awonga Point Sewage Treatment Plant |

**Table I3 – Release Water Contaminant Limits**

| Quality Characteristic | Unit | Release Limit | Limit Type | Frequency |
|---|---|---|---|---|
| 5 day Biochemical oxygen demand (BOD) | mg/L | 30<br>10<br>5 | Maximum<br>50th percentile short term<br>50th percentile long term | Weekly |
| Total Suspended Solids | mg/L | 45<br>15<br>10 | Maximum<br>50th percentile short term<br>50th percentile long term | |
| Total Residual Chlorine | mg/L | 0.55 | Maximum | |
| Dissolved Oxygen | mg/L | 2 | Minimum | |
| pH | pH units | 6.0 - 8.5 | Range | |
| Temperature | °C | <2% increase | Range | |
| Thermo-tolerant Coliforms | CFU / 100ml | 1000 | Maximum | Fortnightly |
| Ammonia | mg/L | 6<br>2<br>1 | Maximum<br>50th percentile short term<br>50th percentile long term | |

| Quality Characteristic | Unit | Release Limit | Limit Type | Frequency |
|---|---|---|---|---|
| Total Nitrogen | mg/L | 10<br>5 | Maximum<br>50th percentile long term | |
| Total Phosphorus | mg/L | 2<br>1 | Maximum<br>50th percentile long term | |

(I3) Calculate and keep records of daily, median monthly and annual mass loads of total nitrogen and total phosphorus released to waters at the monitoring point identified in Table I2 – Monitoring Point. Mass loads must be calculated by the following formula:

(a) Daily Mass Load = Measured value[1] of contaminant (mg/L) x Daily Flow for release point;

(b) Monthly Mass Load = the sum of all the daily mass loads for that month; and

(c) Annual Load = the sum of the daily mass loads released for that calendar year

[1] The measured value being the value measured that day or on the most recent sampling occasion if not measured that day.

(I4) The total quantity of contaminants released to waters via the release points listed in Table I1 – Release Point, must not exceed the respective quantities stated in Table I4 - Maximum Permitted Quantity of Release for each release point on any dry weather day or on any one day.

**Table I4 - Maximum Permitted Quantity of Release**

| Release Point | Maximum Release on Any Dry Weather Day | Maximum Release on Any One Day |
|---|---|---|
| Mission River - 60m offshore | 2.7 ML/day | 3.4 ML/day |

(I5) The daily volume of contaminants released to waters must be determined or estimated by an appropriate method, for example a flow meter and records kept of such determinations and estimates.

(I6) The release of contaminants to waters must not:

(a) produce any slick, discoloration of ambient waters or visible evidence of oil or grease;

(b) contain visible floating oil, grease, scum, litter or other objectionable matter; or

(c) have any other properties nor contain any other contaminants in concentrations that may cause environmental harm.

**Awonga Point STP - Receiving Waters**

(I7) The quality of the receiving waters must be monitored at the locations specified in Table I5 - Receiving Water Reference Sites and Downstream Monitoring Points for each quality characteristic and at the frequency stated in Table I6 - Receiving Waters Contaminant Trigger Levels.

**Table I5 - Receiving Water Reference Sites and Downstream Monitoring Points**

| Monitoring Points | Receiving Waters Location Description | Coordinates (GDA94 MGA z54) | |
|---|---|---|---|
| | | Easting | Northing |
| **Reference[1] Monitoring Points** | | | |
| SW/MIS/UPS | Mission River | 603973 | 8608448 |
| SW/EMB/UPS | Embley River | 618204 | 8593092 |
| **Downstream Monitoring Points** | | | |
| SW/MIS/MID | Mission River | 597137 | 8607542 |

[1] A minimum of two (2) sites must be nominated for reference monitoring points
[2] To be determined based on Receiving Environment Monitoring Program.

(I8) If the quality characteristics of a downstream monitoring point exceed any of the trigger levels specified in Table I6 - Receiving Waters Contaminant Trigger Levels, the holder of this environmental authority must compare the results of the downstream monitoring site to the data from reference monitoring sites and:

(a) if the level of contaminants at the downstream site does not exceed the reference monitoring site data, then no action is to be taken; or

(b) if the level of contaminants at the downstream site is greater than the reference monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ (2000) methodology into the potential for environmental harm and provide a written report to the administering authority within three (3) months outlining:

(i) details of the investigations carried out; and
(ii) actions taken to prevent environmental harm, if any actions have occurred.

Note: Where an exceedance of a trigger level has occurred and is being investigated in accordance with I11 (b) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic within the three month investigation period.

**Table I6 - Receiving Waters Contaminant Trigger Levels**

| Quality Characteristic | Unit | Trigger Level | Trigger Type | Frequency |
|---|---|---|---|---|
| Dissolved Oxygen | mg/L | 2.6mg/L | Minimum | Monthly |
| pH | pH units | 7.0[1] (minimum)<br>8.5[1] (maximum) | Range<br>*The median pH level of 12-month period should be within trigger level range.* | |
| Thermo-tolerant Coliforms | CFU / 100ml | 1000 | Maximum<br>*The median bacterial content of a 12-month period should not exceed 1000 faecal coliform organisms/100mL.* | |
| Ammonia | µg/L | 36 | Maximum<br>*A trigger for further investigation will be deemed to have occurred when the median concentration of samples taken over a 12-month period at a test site exceeds the trigger level.* | |
| Total Nitrogen | µg/L | 310 | | |
| Total Phosphorus | µg/L | 20 | | |
| Oil & Grease | | No visible film | Observation during each sampling run. | |
| Temperature | For interpretation purposes only | | | |

[1] Default trigger levels – from ANZECC (2000) trigger levels for aquatic ecosystems indicative of slightly disturbed tropical Australian estuarine ecosystems.

**Awonga Point STP - Receiving Environment Monitoring Program**

(I9) A Receiving Environment Monitoring Program (REMP) must be developed and implemented by 1 July 2012 to monitor and record the effects of the release of contaminants on the receiving environment periodically and whilst contaminants are being discharged from the mining lease(s) with the aim of identifying and describing the extent of any adverse impacts on local environmental values and to monitor any changes in the receiving water (including groundwater). A copy of the REMP and any

update or variation of the REMP following adoption of a new Plan of Operations must be provided to the administering authority prior to its implementation and due consideration given to any comments made on the REMP by the administering authority.

Note: For the purposes of the REMP, the receiving environment is the waters and connected waterways downstream (including groundwater) of any release associated with the Awonga Point Sewage Treatment Plant.

(I10) The REMP must address (but not necessarily be limited to) the following:

(a) description of potentially affected receiving groundwaters and surface waters including key communities and reference water quality and sediment characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality);

(b) description of applicable environmental values and water quality objectives to be achieved (i.e. as scheduled pursuant to the *Environmental Protection (Water) Policy);*

(c) any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment to which the REMP applies;

(d) water and sediment quality targets within the receiving environment to be achieved and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the period upon which the REMP applies;

(e) monitoring for any potential adverse environmental impacts caused by a release;

(f) monitoring of stream flow or alternative estimation method to gain an understanding of the hydrology of the receiving waters and the circumstances under which releases occur;

(g) monitoring of toxicants that must consider the indicators specified in Table I6 - Receiving Waters Contaminant Trigger Levels to assess the extent of the compliance of concentrations with water quality objectives and/or the ANZECC & ARMCANZ (2000) Guidelines for slightly to moderately disturbed ecosystems;

(h) monitoring of physical and chemical parameters including as a minimum those specified in Table I6 - Receiving Waters Contaminant Trigger Levels (in addition to temperature). The list of quality characteristics required to be monitored as per Table I6 - Receiving Waters Contaminant Trigger Levels will be reviewed once the results of the monitoring data become available. If it is determined that there is no need to monitor for certain individual quality characteristics then these can be removed from Table I6 - Receiving Waters Contaminant Trigger Levels;

(i) monitoring of biological indicators in accordance with the administering authority's monitoring and sampling manual using recognised standard methodology approved by the administering authority and monitoring metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ (2000), Simpson et al (2005) *Handbook for Sediment Quality Assessment* and/or the most recent version of AS5667.*1 Guidance on Sampling of Bottom Sediments*;

(j) the locations of monitoring points (including the locations of reference/upstream and downstream potentially impacted sites for each release point). Reference sites must comply with the following criteria:

  (i) be from the same bio-geographic and climatic region;
  (ii) have similar geology, soil types and topography;
  (iii) contain a range of habitats similar to those at the potentially impacted sites;
  (iv) have a similar flow regime; and
  (v) not be so close to the potentially impacted sites that any disturbance at the potentially impacted sites also results in a change at the reference site;

(k) a frequency or scheduling of sampling and analysis sufficient to determine water quality objectives and to derive site specific reference values within two (2) years (depending on wet season flows) in accordance with the *Queensland Water Quality Guidelines*. For ephemeral streams, this should include periods of flow irrespective of mine or other discharges;

(l) specify sampling and analysis methods and quality assurance and control;

(m) any historical datasets to be relied upon;

(n) description of the statistical basis on which conclusions are drawn;

(o) any spatial and temporal controls to exclude potential confounding factors;

(p) inclusion of additional monitoring points at least twelve (12) months prior to potential impact on the site as set out in the Plan of Operations.

(I11) A report outlining the findings of the REMP including all monitoring results and interpretations in accordance with Condition (I10) must be prepared and submitted in writing to the administering authority by 31 January 2015. This should include an assessment of reference water quality, any assimilative capacity for those contaminants monitored and the suitability of current discharge limits to protect downstream environment values and include recommendations to set appropriate contaminant limits for the purpose of Condition (I10).

**Awonga Point STP - Waste Management**

(I12) Screenings, grit, sewage and wastewater treatment plant sludge generated by the sewage treatment process at the Awonga Point Sewage Treatment Plant must not be stored at the Awonga Point Sewage Treatment Plant for any period of time longer than necessary to dewater the screenings, grit and sludge and prepare it for transport and disposal at the Evans Landing Landfill.

(I13) Screenings, grit, sewage and wastewater treatment plant sludge's generated must be stored, managed and utilised so as not to cause environmental harm.

(I14) Sewage sludge generated on the mining lease(s) must be monitored at least annually to obtain the following information:

(a) the estimated annual quantity and nature of each sludge produced; and

(b) the current method(s) of pre-treatment or disposal.

**Awonga Point STP - Sewage Pump Stations**

(I15) Pump stations must be fitted with stand-by pumps and pump-failure alarms as well as high level alarms to warn of imminent pump station overflow. All alarms must be able to operate without mains power.

(I16) Plant and equipment must be designed to allow for continued operation during flood events and inundation of the site.

**Awonga Point STP - Sewage Treatment Pond Conditions**

(I17) The Awonga Point Sewage Treatment lagoon must be available to hold at least 10ML, excluding the freeboard allowance.

(I18) All ponds used for the storage or treatment of contaminants, sewage or wastes at the Awonga Point Sewage Treatment Plant must be constructed, installed and maintained:

(a) to minimise the likelihood of any release of effluent through the bed or banks of the pond to any waters (including ground water);

(b) so that a freeboard of not less than 300mm is maintained for all design conditions;

(c) to ensure the stability of the ponds' construction; and

(d) to prevent access to waters by all livestock and minimise access by native fauna.

**Boyd and Norman Creek Mine Infrastructure Area (MIA) STP - Release to Waters**

(I19) Treated sewage effluent must only be directly released to receiving waters from the release points identified in Table I7 – Release Points for the Boyd and Norman Creek MIA STP, and in accordance with the conditions of this environmental authority.

**Table I7 – Release Points for the Boyd and Norman Creek MIA STP**

| Release Point | Description of Water Released | Contaminant Source | Description & Nature of Receiving Waters | Monitoring Location | Coordinates (GDA94 MGAz54) | |
|---|---|---|---|---|---|---|
| | | | | | Easting | Northing |
| Boyd MIA Drainage Slot spillway | Treated effluent mixed with other waters from the water management structures | Boyd MIA Sewage Treatment Plant | Gulf of Carpentaria via unnamed drainage. | Boyd MIA Sewage Treatment Plant | 0568779 | 8570784 |
| | | Boyd Accommodation Village Sewage Treatment Plant | | Boyd Accommodation Village Sewage Treatment Plant | 577711 | 8575105 |
| Norman Creek MIA Drainage Slot spillway | | Norman Creek MIA Sewage Treatment Plant | TBD[1] | Norman Creek MIA Sewage Treatment Plant | TBD[1] | TBD[1] |

[1] To be determined and notified to the administering authority upon commissioning.

(I20) Treated sewage effluent released to receiving waters must:

(a) be monitored at the location identified in Table I7 – Release Points for the Boyd and Norman Creek MIA STP;

(b) not exceed the contaminant limits stated in Table I8 – Release Water Contaminant Limits.

**Table I8 – Release Water Contaminant Limits**

| Quality Characteristic | Unit | Contaminant Limit | Limit Type | Frequency |
|---|---|---|---|---|
| 5 day Biochemical Oxygen Demand (BOD) | mg/L | 30<br>20 | Maximum<br>Median | Weekly |
| Total Suspended Solids | mg/L | 45<br>15<br>10 | Maximum<br>50th percentile short term<br>50th percentile long term | |
| pH | pH units | 6.0 - 8.5 | Range | |
| Thermo-tolerant Coliforms | CFU / 100ml | 1000[3]<br>10[2] | Maximum[3]<br>Median [1,2] | Fortnightly |

[1] Median value must be based on at least 5 but no more than 10 consecutive samples.

[2] Note: Based on Class A recycled water, as outlined under the Queensland Water Recycling Guidelines, December 2005, Table 6.2b.

[3] Note: Based on Class C recycled water, as outlined under the Queensland Water Recycling Guidelines, December 2005, Table 6.2b.

(I21) The release of contaminants to waters must not:

(a) produce any slick, discoloration of ambient waters or visible evidence of oil or grease;

(b) contain visible floating oil, grease, scum, litter or other objectionable matter; or

(c) have any other properties or contain any other contaminants in concentrations that may cause environmental harm.

**Waste Management (South of Embley)**

(I22) Upon decommissioning, screenings, grit and sewage treatment plant sludge in drying beds located at the Boyd Infrastructure Area Sewage Treatment Plant, the Norman Creek Infrastructure Area Sewage Treatment Plant, the Boyd Accommodation Village Sewage Treatment Plant and temporary camps in the south of the Embley River must be rehabilitated using a low permeability cap, or removed to a licensed facility. The cap must conform to the following criteria:

(a) consists of at least 300 mm of compacted material;

(b) achieve a maximum permeability of 1 x $10^{-7}$metres per second;

(c) minimise infiltration of water into the waste and ponding of water on the surface of the site; and

(d) is resistant to erosion by surface water flows.

(I23) Screenings, grit, sewage and wastewater treatment plant sludge's generated at the Boyd Infrastructure Area Sewage Treatment Plant, the Norman Creek Infrastructure Area Sewage Treatment Plant, the Boyd Accommodation Village Sewage Treatment Plant and temporary camps in the area south of the Embley River must be stored, managed and utilised so as not to cause environmental harm.

(I24) Sewage sludge generated at the Boyd Infrastructure Area Sewage Treatment Plant and the Norman Creek Infrastructure Area Sewage Treatment Plant, the Boyd Accommodation Village Sewage Treatment Plant and temporary camps in the area south of the Embley River must be monitored at least annually to obtain the following information:

(a) the estimated annual quantity and nature of each sludge produced; and

(b) the current method(s) of pre-treatment or disposal.

(I25) Plant and equipment must be designed to allow for continued operation during flood events and inundation of the site.

**Release to Land**

(I26) Sewage effluent (including treated sewage effluent released to land within the nominated irrigation areas) must only be released to land within the areas identified in Table I9 – Release Points to Land and Schedule L Plan 7 - Release Points to Land (East Weipa) and Plan 8 - Release Points to Land (South of Embley).

(I27) Monitoring of the release of contaminants to land from sewage systems must be undertaken at the monitoring locations and in accordance with the monitoring frequency identified in Table I9 – Release Points to Land for the quality characteristics identified in Table I10 – Contaminant Release Limits to Land.

**Table I9 – Release Points to Land**

| Release Point | Description of Land Releases | Contaminant Source | Coordinates (GDA94 MGA z54)/ Monitoring Location | | Monitoring Frequency |
|---|---|---|---|---|---|
| | | | Easting | Northing | |
| **Sewage Systems – North of Embley** | | | | | |
| Rail Workshop | Treated Effluent - Trench Discharge | Septic System | 593687 | 8600564 | N/A |
| Beneficiation Control Area | | | 594613 | 8599711 | |
| Occupational Training Centre | | | 594720 | 8599781 | |
| Heavy Equipment Workshop | Treated Effluent - Evapotranspiration Bed Discharge | Icon Septech System | 601739 | 8599814 | N/A |

| | | | | | |
|---|---|---|---|---|---|
| Domestic Airport | Treated Effluent - Trench Discharge | Septic System | TBD[1] | TBD[1] | |
| **Sewage System – South of Embley** | | | | | |
| Temporary camps in area south of Embley River | Treated Effluent - Irrigation Discharge to Irrigation Area | Package Sewage Treatment Plant | TBD[1]<br>578224 | TBD[1]<br>8575242 | Fortnightly |
| Boyd Accommodation Village | Treated Effluent - Irrigation Discharge to Irrigation Area | Boyd Accommodation Village Sewage Treatment Plant | 577711 | 8575105 | |
| **Sewage System – North of Weipa** | | | | | |
| North of Weipa camp | Treated Effluent – Trench Discharge | Septic System | TBD[2] | TBD[2] | N/A |

[1] To be determined and notified to the administering authority upon final design.

[2] To be determined and notified to the administering authority on completion of installation.

(I28) The release of contaminants to land from the release points defined in Table I9 – Release Points to Land must not exceed the contaminant limits stated in Table I10 - Contaminant Release Limits to Land (for irrigation systems only).

**Table I10 – Contaminant Release Limits to Land**

| Quality Characteristic | Unit | Release Limit | Limit Type |
|---|---|---|---|
| 5 day Biochemical oxygen demand (BOD) | mg/L | 20[1] | Maximum |
| Total Suspended Solids | mg/L | 30 | Maximum |
| Nitrogen | mg/L | 30<br>10<br>5 | Maximum<br>50th percentile short term<br>50th percentile long term |
| Phosphorus | mg/L | 15<br>8<br>5 | Maximum<br>50th percentile short term<br>50th percentile long term |
| *E coli* | Organisms/100ml | 200 | Maximum |
| | | 10[2] | 95% of samples taken over 12 months[2] |
| Faecal Coliforms | CFU/100ml | 1000[1] | Maximum |
| | | 10[2] | 95% of samples taken over 12 months[2] |
| pH | pH units | 6.0 - 8.5 | Range |

[1] Based on at least 5 but no more than 10 consecutive samples.

[2] Contaminant release limits and limit type applies only to the release point identified as the temporary camp in area south of Embley River in Table I9 – Release Points to Land.

**Septic Systems**

(I29) Septic systems specified in Table I9– Release Points to Land must be designed, operated and maintained in accordance with the relevant Australian standard.

**Irrigation of Treated Sewage Effluent**

(I30) Treated effluent release to land through an irrigation system identified in Table I9 – Release Points to Land must utilise a minimum area 1000m$^2$ of land, excluding any necessary buffer zones, for the irrigation of treated sewage effluent.

(I31) The daily volume of effluent released to land must be determined or estimated by an appropriate method, for example a flow meter and records kept of the volumes of effluent released.

(I32) Any sewage system with a total daily peak design capacity of less than twenty-one (21) equivalent persons must be designed, operated and maintained in accordance with the relevant Australian Standard.

(I33) Excluding the sewage treatment plant for the temporary camp in the area south of the Embley River, treated sewage effluent may only be released to land by irrigation in accordance with the following outcomes:

(a) efficient application of effluent;

(b) control of sodicity in the soil;

(c) minimal degradation of soil structure;

(d) control of the build-up of nutrients and heavy metals in the soil and subsoil from effluent and other sources;

(e) prevention of subterranean flows of effluent to waters;

(f) prevention of impacts on the groundwater resource through infiltration;

(g) prevention of the run-off of effluent or seepage from disposal areas by limitation of application rates and the use of structures such as bunds and catch dams;

(h) prevention of surface ponding; and

(i) prevention of damage to native vegetation;

(I34) Treated sewage effluent from the temporary camp in the area south of the Embley River may only be released to land by irrigation in accordance with the following outcomes:

(a) efficient application of effluent;

(b) prevention of subterranean flows of effluent to waters;

(c) prevention of impacts on the groundwater resource through infiltration;

(d) prevention of the run-off of effluent or seepage from disposal areas by limitation of application rates and the use of structures such as bunds and catch dams where required;

(e) prevention of surface ponding; and

(f) prevention of damage to native vegetation;

(I35) The holder of this environmental authority must take all measures to ensure that persons are not exposed to pathogens in treated sewage effluent released to land by irrigation as identified in Table I9 – Release Points to Land including, but not limited to:

(a) prevention of spraydrift or overspray from effluent disposal areas through the selection of irrigator equipment with low exposure risk;

(b) appropriate timing of irrigation;

(c) restriction of access to areas either being irrigated or that are freshly irrigated;

(d) buffers between irrigation areas and areas of human occupation; and

(e) provide prominent signage in areas irrigated with effluent and which are accessible, advising that effluent should not be consumed or used;.

END OF CONDITIONS FOR SCHEDULE I

## SCHEDULE J – MARINE

### Release to Waters

(J1) In carrying out dredging activities, the release of contaminants (including any release caused by extraction of material from the bed and banks of waters) must:

(a) only occur from the permitted areas identified in the plan(s) referred to in Condition (J22).

(b) only occur in accordance with conditions of this environmental authority.

(c) be carried out taking all practical measures necessary to minimise the concentration of suspended solids released during the loading of the vessel.

(J2) Once a vessel has berthed, the use of the vessel's propulsion system must be minimised to the extent practicable and safe to reduce the risk of disturbance to the seabed during loading/unloading operations at the Hey River barge/ferry terminal ramp.

(J3) Bed levelling activities must not result in the release of contaminants to waters.

(J4) Treat and manage acid sulphate soils in accordance with the latest edition of the Queensland Acid Sulfate Soil Technical Manual.

### Dredging - General

(J5) The administering authority must be advised in writing at least (5) business days prior to the date of commencement of a capital or maintenance dredging campaigns.

(J6) The administering authority must be advised in writing within ten (10) days following completion of the capital or maintenance dredging campaigns.

### Trained/Experienced Operators

(J7) All persons engaged in the conduct of dredging activities including but not limited to employees and contract staff must be:

(a) trained in the procedures and practices necessary to:

(i) comply with the conditions of this environmental authority; and

(ii) prevent environmental harm during normal operation and emergencies, or

(b) under the close supervision of a trained person.

### Measures and Equipment

(J8) Any dredging activities must be conducted using equipment that is in survey and registered and, in relation to environmental performance, is equal to or superior to the following equipment:

(a) Trailing Suction Hopper Dredge that is equipped, at a minimum, with:

(i) below keel discharge of tail waters via an anti-turbidity control valve;

(ii) on-board systems for determining solids to water ratio or density of dredged material;

(iii) electronic positioning and depth control system for defining the location and depth of dredging activities; and

(iv) dredge heads capable of, and where appropriate, depth control and fitted with marine wildlife protection or fauna exclusion devices (e.g. turtle deflector, deflector plates, tickler chains or drag heads) prior to and during operation.

(b) Cutter Suction Dredge that is equipped, at a minimum, with:

(i) electronic positioning and depth control system for defining the location and depth of dredging activities;

(ii) a system or process to ensure the delivery system integrity is maintained at all times; and

(iii) systems for determining solids to water ratio or density of dredged material during operations.

(c) Grab Dredge or barge mounted back hoe that is equipped, as a minimum, with:

(i) electronic positioning system for defining the location and depth of dredge activities.

(J9) Where trailer suction dredging is carried out, an effective turtle exclusion device must be fitted to the dredge head. Evidence that this device has been installed and used on the dredge for the entire period of the dredging activity must be provided to the administering authority on request.

**Dredge Management Plans**

(J10) The following Dredge Management Plans must be provided to the administering authority for review no later than 6 months or any other period as agreed by the administering authority prior to dredging commencing:

(a) any capital dredge campaign at Boyd Port;

(b) any capital dredge campaign at Hey River terminal;

(c) any long term maintenance dredge program.

(J11) Dredging activities can only be carried out when the final dredge management plans are approved by the administering authority.

(J12) All dredging must be undertaken in accordance with a dredge management plan/s (DMP/s) based on the draft DMP/s in the Supplementary Report to the Environmental Impact Statement approved by DEHP prior to dredging commencing.

(J13) The final Initial Capital Dredge Management Plan for Boyd Port must be consistent with the conditions of this environmental authority and must:

(a) include results of 3D modelling, or alternative methodology as agreed with the administering authority, to:

(i) estimate sediment plumes generated by capital dredging and spoil disposal operations for Boyd Port;
(ii) details the turbidity through the water column;
(iii) define the Zones of Influence of the dredging and spoil disposal sediment plumes;
(iv) identify high, moderate and low risk periods for key Concern Sites (i.e. where sensitive receptors are situated);
(v) inform where key Concern Site monitoring locations should be situated; and
(vi) provide risk estimates that are based on the key water quality parameters, specifically increases in turbidity, sedimentation rates, and reduction in photosynthetically active radiation (PAR), for the key Concern Sites.

(b) establish turbidity-based trigger values as shown in Table J1 - Initial Boyd Port Capital Dredge Monitoring: Water Quality Trigger Levels, that:

(i) considers, and is informed by, the findings of all relevant published studies, including available water quality guidelines, trigger values from other comparable dredging programs with similar environmental conditions, and site specific baseline data;
(ii) considers the most sensitive receptor type and the most relevant water quality parameters (e.g. turbidity, PAR, sedimentation rate) and the reported impacts of turbidity on coral health from the literature and other dredging programs in areas with near shore coral reefs;
(iii) includes season-specific turbidity trigger values;
(iv) considers sediment plume intensity, duration and frequency of occurrence in establishing trigger values;
(v) considers the additive effect of multiple stressors; and
(vi) considers the effect of depth and water column variation as predicted from the 3D modelling.

(c) implement a water quality monitoring program that includes, as a minimum, telemetered monitoring of turbidity at Reference and Concern Sites, and details:

(i) the appropriateness of established Reference Sites to specific key Concern Sites based on demonstrated similarity of physicochemical parameter trends; and
(ii) relationship between turbidity, PAR and sedimentation rate from baseline data at each of the Boyd Port key Concern Sites.

(d) include the telemetered monitoring system being operated and maintained for 3 months before dredging operations commence, during dredging operations, and for a period after dredging operations cease, to demonstrate that turbidity concentrations have returned to ambient levels.

(e) include a QA/QC procedure that validates and records the telemetered systems' state of calibration when performing routine maintenance, including as a minimum the measurement of turbidity and total suspended solids.

(f) develop and implement a coral health monitoring program that includes:

(i) routine monitoring, and reactive monitoring based on exceedance of turbidity trigger values as identified in Table J1 Initial Boyd Port Capital Dredge Monitoring: Water Quality Trigger Levels;
(ii) establishing indicator (s) that are capable of detecting adverse change in health of coral assemblages;
(iii) a monitoring methodology that includes the use of diver-less technology appropriate for reporting on the selected coral health indicators, that maximises the data quality to provide an appropriate level of statistical power to detect change in coral health indicators; and
(iv) a methodology that ensures that coral monitoring assessment results are not compromised due to dredging operations active at the time of monitoring.

(g) implement adaptive management processes and measures, as detailed in dredge management plans in:

(i) Water Quality Management Process;
(ii) Coral Health Management Process;
(iii) Turtle and Marine Mammal Management Procedure (Dredging); and
(iv) Turtle and Marine Mammal Management Procedure (Spoil Disposal).

(h) include reporting and review by the BPDTAG (as per condition J31).

(J14) The final Capital and Maintenance Dredge Management Plans for the Hey River facilities must be consistent with the conditions of this environmental authority and must include details of:

(a) water quality or PAR monitoring programs to be implemented or utilised;

(b) adaptive management measures; and

(c) reporting and review by the NQBP TACC in accordance with condition (J33).

**Table J1 - Initial Boyd Port Capital Dredge Monitoring: Water Quality Trigger Levels**

| Monitoring Locations | Coordinates (GDA94 MGA z54) | | Quality Characteristic | Unit | Trigger Level | | | | | | Frequency |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Easting | Northing | | | Wet season | | | Dry season | | | |
| Reference Sites: TBA[3] | TBA[3] | TBA[3] | Turbidity (as a surrogate WQ parameter for PAR[1] and SR[2]) | NTU | Site | 85 | 95 | Site | 85 | 95 | Continuous, Telemetered, Logged at 15 minute intervals |
| | | | | | I1 | 32 | 90 | I1 | 5 | 9 | |
| | | | | | I2 | 11 | 42 | I2 | 4 | 6 | |
| | | | | | I3 | 20 | 72 | I3 | 5 | 6 | |
| | | | | | I4 | 15 | 57 | I4 | 6 | 8 | |
| | | | PAR | Mol./m$^2$/d | N/A | | | N/A | | | TBD[5] |
| | | | SR | mg/cm$^2$/d | N/A | | | N/A | | | TBD[5] |
| Concern Sites: TBA[3] | TBA[3] | TBA[3] | Turbidity (as a surrogate WQ parameter for PAR and SR) | NTU | TBD[4] | | | TBD[4] | | | Continuous, Telemetered, Logged at 15 minute intervals |
| | | | PAR | Mol/m$^2$/d | N/A | | | N/A | | | TBD[5] |
| | | | SR | mg/cm$^2$/d | N/A | | | N/A | | | TBD[5] |

[1] PAR means Photosynthetically Active Radiation.
[2] SR means Sedimentation Rate.
[3] To be advised based on results of modelling.
[4] To be determined in approved Dredge Management Plans: statistically derived turbidity trigger, based on site specific baseline data and trigger values from other dredging programs with similar environmental conditions together with literature on potential impacts of turbidity on coral health.
[5] To be determined in approved Initial Capital Dredge Management Plan.
Note: Trigger values may vary at different monitoring locations and the number of monitoring locations will be determined through DMP.

(J15) The long term maintenance Dredge Management Plans for Boyd Port must be consistent with the conditions of this environmental authority and must:

(a) consider results of modelling, or alternative assessment methodology as agreed with the administering authority, to:

(i) estimate sediment plumes that may be generated by maintenance dredging and spoil disposal operations for Boyd Port;
(ii) provide risk estimates relevant to sensitive receptors that are based on the key water quality parameters, specifically increases in turbidity, sedimentation rates, and reduction in photosynthetically active radiation (PAR), for the key Concern Sites(i.e. where sensitive receptors are situated); and
(iii) define the zones of Influence of the dredging and spoil disposal sediment plumes.

(b) implement a water quality monitoring program, as informed by previous dredging campaigns in consultation with the BPDTAG in accordance with condition (J31).

(c) in considering the maintenance dredging schedule consider any potential adverse effects on:

(i) coral spawning; and
(ii) marine turtle nesting.

(d) include reporting to and review by the BPDTAG in accordance with condition (J31).

(J16) All subsequent Capital Dredge Management Plans for Boyd Port must be consistent with the conditions of this environmental authority and must:

(a) consider results of modelling, or alternative assessment methodology as agreed, to:

(i) estimate the extent, duration and intensity of sediment plumes under a range of tidal and oceanic current conditions that are likely to be generated by dredging and spoil disposal operations for Boyd Port;

(ii) provide risk estimates relevant to sensitive receptors that are based on the key water quality parameters, specifically increases in turbidity, sedimentation rates, and reduction in photosynthetically active radiation (PAR), for the key Concern Sites (i.e. where sensitive receptors are situated); and

(iii) define the Zones of Influence of the dredging and spoil disposal sediment plumes;

(b) implement a Water Quality Monitoring Program, as informed by the Initial Capital Dredge Management Program and recommended by the BPDTAG (as per condition J31), with trigger values as shown in Table J2 - Boyd Port Subsequent Capital Dredge Monitoring: Water Quality Trigger Levels;

(c) implement a Coral Health Monitoring Program, as informed by the Initial Capital Dredge Management Program and recommended by the BPDTAG (as per condition J31); and

(d) include reporting and review by the BPDTAG (as per condition J31).

**Table J2** - **Boyd Port Subsequent Capital Dredge Monitoring: Water Quality Trigger Levels**

| Monitoring Locations | Coordinates (GDA94 MGA z54) | | Quality Characteristic | Unit | Trigger Level | | Frequency |
|---|---|---|---|---|---|---|---|
| | Easting | Northing | | | Wet season | Dry season | |
| Reference Sites: TBA[3] | TBA[3] | TBA[3] | Turbidity (as a surrogate WQ parameter for PAR[1] and SR[2]) | NTU | N/A | N/A | Continuous, Telemetered, Logged at 15 minute intervals |
| | | | PAR | Mol/m$^2$/d | N/A | N/A | TBD[5] |
| | | | SR | mg/cm$^2$/d | N/A | N/A | TBD[5] |
| Concern Sites: TBA[3] | TBA[3] | TBA[3] | Turbidity (as a surrogate WQ parameter for PAR and SR) | NTU | TBD | TBD | Continuous, Telemetered, Logged at 15 minute intervals |
| | | | Any other parameters in accordance with (J15(b)) | | | | |

[1] PAR means Photosynthetically Active Radiation.
[2] SR means Sedimentation Rate.
[3] To be advised based on results of modelling and initial capital dredging monitoring program.
[4] To be determined in approved Subsequent Capital Dredge Management Plans: statistically derived turbidity trigger, based on site specific baseline data, initial capital dredging data and trigger values from other dredging programs with similar environmental conditions together with literature on potential impacts of turbidity on coral health.
[5] To be determined in approved Subsequent Capital Dredge Management Plans

Note: Monitoring locations, quality characteristic, trigger levels and frequency will be determined in the approved subsequent Capital Dredge Management Plans which will be informed by results from the Initial Capital Dredge Management Program's Water Quality Monitoring Program.

(J17) If dredge monitoring trigger levels specified in Table J1: Initial Boyd Port Capital Dredge Monitoring: Water Quality Trigger Levels or J2 Boyd Port Subsequent Capital Dredge Monitoring: Water Quality Trigger Levels are exceeded as a result of the dredging activity:

(a) the administering authority must be advised within 24 hours of the event of the corrective action that has been or will be implemented.

(b) measures must be implemented in accordance with corrective actions specified in the approved dredge management plan.

(J18) The administering authority and the Department of Agriculture, Fisheries and Forestry must be consulted during preparation of all final Dredge Management Plans

(J19) North Queensland Bulk Ports must be consulted during preparation of the final Dredge Management Plan for Hey River.

(J20) All dredging activities must be undertaken in accordance with the relevant approved final dredge management plan.

**Limit of Dredging Approved**

(J21) The holder of this environmental authority must not commence dredging activities at Boyd Port and the Hey River barge/ferry terminal unless the holder has submitted to the administering authority plans for dredging activities certified by a Registered Professional Engineer of Queensland.

(J22) Dredging activities must be confined to the removal of capital or maintenance dredge material at the location shown on the plan(s) referred to in Condition (J21).

(J23) The maximum volume of material to be removed as a result of Boyd Port and Hey River capital dredging activities are identified in Table J3 - Volumes of Capital Dredged Material.

**Table J3 - Volumes of Capital Dredged Material**

| Location | Volume of Capital Dredged Material ($m^3$) |
|---|---|
| Boyd Port – Stage 1[1] | 6 500 000 |
| Boyd Port – Stage 2[2] | 2 400 000 |
| Hey River | 37 380 |

[1] Boyd Port – Stage 1 is Berths 1 & 2 of wharf and shipping channel. Capital dredge campaigns will be undertaken incrementally, with no campaign exceeding 2 600 000$m^3$
[2] Boyd Port – Stage 2 is Berths 3 & 4 of wharf and shipping channel

**Disposal of Dredge Spoil Material**

(J24) Unless otherwise authorised, dredge spoil must not be disposed of on the mining lease.

(J25) Dredge spoil material must not be disposed of on land unless otherwise authorised.

(J26) Dredging activities must not start until provision has been made to lawfully place or dispose of the dredge spoil material. Evidence of applicable approvals must be made available to the administering authority on request.

**Dredging Operations**

(J27) The transportation of dredge material must be carried out such that the dredge material is kept wet at all times.

(J28) Prior to the commencement of the capital or maintenance dredging and prior to commissioning of the Port, hydrographic surveys of the bed levels of the area dredged must be completed.

**Monthly Report**

(J29) A monthly monitoring report must be prepared and submitted to the administering authority throughout the period that initial capital dredging and spoil disposal works are being undertaken. This report must include:

(a) a summary of results of all monitoring required by the environmental authority and dredge management plan, with raw data provided in an electronic format appendix (i.e. spreadsheet);

(b) an evaluation and explanation of the data from these monitoring programs;

(c) a daily summary of dredge movements (specifying the boundaries of the dredged area by GPS coordinates and disposal activity;

(d) details of turtle captures by the dredge and species involved;

(e) details of any complaints received including investigations undertaken, conclusions formed and action taken;

(f) a summary of significant equipment failures or events that have potential environmental management consequences;

(g) an outline of corrective actions that will or have been taken to minimise or reduce environmental harm, and

(h) the quantity (volume in cubic metres) and location of dredging material removed and disposed of; or

(i) different details and frequency of reporting as agreed to by the administering authority.

**Boyd Port Dredging**

(J30) The holder of this environmental authority must establish a Boyd Port Dredging Technical Advisory Group (BPDTAG) which must include representatives from the Administering Authority and Department of Agriculture, Fisheries and Forestry (DAFF) for dredging at Boyd Port.

(J31) The holder of this environmental authority must report to the BPDTAG on proposed dredging activities for Boyd Port and implementation of the Dredge Management Plan(s) for the South of Embley port, including monitoring results, management triggers and response actions. The group will assist in the establishment, where appropriate, of longer term management for the maintenance dredging program.

**Hey River Dredging**

(J32) The administering authority, Department of Agriculture, Fisheries and Forestry and North Queensland Bulk Ports must be consulted during preparation of the final Dredge Management Plan for the Hey River.

(J33) The holder of this environmental authority must report on the implementation of the final Dredge Management Plan for the Hey River to the North Queensland Bulk Ports Technical Advisory and Consultative Committee for the Port of Weipa.

(J34) All reasonable and practicable measures must be taken to minimise the potential for turbidity plumes to cause environmental harm to seagrass meadows adjacent to the dredge site at the Hey River barge/ferry terminal.

(J35) The dredging campaign at the Hey River barge/ferry terminal must not occur for a period longer than fourteen (14) consecutive days. Dredging may extend over a longer time period, provided:

(a) there is a pause in dredging of at least three (3) days between periods of dredging at each dredging site in the river; or

(b) where turbidity monitoring is employed, turbidity levels have not increased significantly above background levels as defined in the final Dredge Management Plan.

**Marine Fauna Management**

(J36) Mobile dredging operations:

(a) must not commence if dugongs, turtles or cetaceans are observed within 300 meters of the dredge;
(b) where underway, must alter the course if dugongs, turtles or cetaceans are likely to be struck or captured.

(J37) Stationary dredging operations:
(a) must not commence if dugongs, turtles or cetaceans are observed within 300 metres of the dredge;
(b) must cease if dugongs, turtles or cetaceans are observed within 50 metres of the dredge head.

(J38) Daily monitoring for impacted turtles must be undertaken at the dredge and at the shoreline down-current from the dredging operation. If monitoring indicates that more than two (2) turtles are killed within a 24 hour period as a result of dredging, the dredge must relocate from the area until an incident investigation has been carried out and relevant preventative actions implemented.

(J39) Operating procedures must be developed prior to the commencement of dredging activities that minimise the risk of turtle capture by the dredge head and the risk from all activities of injury to marine species of conservation significance.

(J40) The administering authority must be immediately notified of any turtle captures by the dredge or injury to any marine species of conservation significance.

(J41) All reasonable and practicable measures must be taken to minimise the impact of dredging activities on marine fauna.

**Marine Turtle Offset Plan**

(J42) The holder of this environmental authority must prepare and submit to the administering authority a marine turtle offset plan for approval within six (6) months of the final investment decision for the South of Embley project. The final marine turtle offset plan must include the following, and be consistent with, the offset proposal submitted to the Coordinator General on 5 April 2012 and presented in the Coordinator-General's report dated 23 May 2012 as Appendix 5:
(a) annual control of feral pigs on ML7024 in the coastal zone between Ina Creek and Winda Winda Creek and associated riparian hinterland areas
(b) annual monitoring of beaches for turtle nesting and nest predation rates.

(J43) The holder of this environmental authority must implement the marine turtle offset plan referred to in condition (J42).

**Marine Works - General**

(J44) All Marine works (excluding dredging and site establishment works) must be undertaken in accordance with a marine works environmental management plan (marine works EMP) and be approved by the administering authority prior to any marine works commencing.

(J45) The marine works environmental management plan (marine works EMP) must include management strategies to minimise impacts on the receiving environment, including but not limited to:
(a) environmental commitments - a commitment by senior management to achieve specified and relevant environmental goals;
(b) identification of environmental issues and potential impacts (including stormwater management / erosion and sediment control measures, water, land disturbance and controls, waste, noise and air).
(c) the actual and potential release of all contaminants;
(d) the potential impact of these sources and contaminants;
(e) what actions will be taken to minimise the impacts on the receiving environment (including stormwater management / erosion and sediment control measures, water, land disturbance and controls, waste, noise and air).
(f) monitoring of contaminant releases including contaminant release locations and conducting environmental impact assessments, if relevant;;

(g) contingency plans including the practices and procedures to be employed to restore the environment or to mitigate impacts on the receiving environment;
(h) including emergency and notification procedures for emergency events, incidents to minimise the risk of environmental harm arising from emergency events
(i) organisational structure and responsibility;
(j) effective communication;
(k) staff training;
(l) periodic review of environmental performance and continual improvement.

(J46) The holder of this environmental authority must not commence construction of any marine works unless the holder has submitted to the administering authority design drawings certified by a Registered Professional Engineer of Queensland.

(J47) The holder of this environmental authority must construct the marine works in accordance with the certified design drawings referred to in Condition (J46).

(J48) A report from a Registered Professional Engineer of Queensland must be submitted to the administering authority within three (3) months of the date of commissioning of marine works certifying that:

(a) The marine works (including any other associated works) have been constructed in accordance with the drawings referred to in Condition (J46);

(b) The coastal works:

(i) are structurally adequate for the anticipated use

(ii) comply with all relevant codes including the administering authority's operational policy.

Note: This approval does not constitute a ruling on the structural safety of the coastal works. It is the responsibility of the holder of this environmental authority to ensure adequacy of the design, construction and ongoing maintenance of the works.

(J49) All temporary marine works associated with construction must be removed from the site at the completion of the works unless otherwise authorised by the administering authority and all wastes must be collected from the site by the holder of this environmental authority and reused or disposed of at a licensed waste facility.

(J50) All rock, stone, gravel, sand or other fill material used in construction must be:

(a) suitable for the purpose having regard to the location of the land and the proposed use of the land;

(b) free from contaminants that may cause environmental harm.

(J51) Acid sulphate soils must be managed so that contaminants are not directly or indirectly released to any waters.

(J52) The design, construction and ongoing maintenance of coastal works must maintain local and regional drainage and hydrological systems, other than to the extent provided for under the approved plans as required under condition (J46).

(J53) The holder of this environmental authority must remove any debris, other than material from the authorised activities that are deposited outside of the alignment of the coastal works shown on the approved plans as required under condition (J46) or any debris that falls or is deposited on tidal lands or into tidal waters during the construction of the works.

**Marine Transport – Temporary Seaborne Access facility**

(J54) The temporary seaborne access facility comprising a barge landing north of Pera Head and passenger jetty in Boyd Bay are to be removed following commissioning of the barge and ferry terminals in the Hey River and mine access road unless otherwise agreed to by the administering authority.

(J55) After removal of the temporary seaborne access facility, the surrounding land and marine environment are to be reinstated to the condition that existed previously to the satisfaction of the administering authority.

(J56) The temporary seaborne access facilities must be located in the area that minimise impact on seagrass, live coral and reef habitat, taking into account other factors, including stakeholder concerns.

(J57) Prior to construction the holder of the environmental authority must carry out a survey of the landform in the area to be disturbed by the temporary seaborne access facility.

(J58) The holder of the environmental authority must monitor erosion both within and outside the authorised disturbance area and localised repair work must be carried out if erosion caused by the works is detected.

(J59) The holder of this environmental authority must construct and maintain a defined pathway for the barge landing access to minimise disturbance to the adjacent beach and fauna.

(J60) The holder of this environmental authority must develop and implement a rehabilitation plan for the temporary seaborne access facility prior to decommissioning. The rehabilitation must ensure that:

(a) material placed in tidal waters is removed within six (6) months of decommissioning unless otherwise agreed with the administering authority;
(b) the area is re-profiled to match, as near as practicable, the land contours existing prior to disturbance within 12 months of decommissioning; and
(c) post rehabilitation, bathymetric, landform and revegetation surveys of the disturbed area must be carried out and corrective actions undertaken where necessary..

Note: The rehabilitation plan may exist in isolation to or form part of the interim Rehabilitation Management Plan required under Condition (C24).

**Hey River Infrastructure**

(J61) The holder of this environmental authority must report on the implementation of the marine works environmental management plan (marine works EMP) to the North Queensland Bulk Ports.

**Pile Driving**

(J62) Pile driving activities must be carried out in a manner that minimise impacts on the surrounding environment and must include the following:

(a) soft-start approach to disperse of any marine fauna in the vicinity of proposed works;
(b) monitoring by an observer prior to commencing and during normal pile driving activities; and
(c) normal pile driving operations:
i. must not commence if turtles, dugongs or cetaceans are within the exclusion zone specified under the marine works environmental management plan as required in Condition (J44);
ii. must cease if turtles, dugongs or cetaceans are within the exclusion zone specified under the marine works environmental management plan as required in Condition (J44)

**Boyd Port Infrastructure**

(J63) Catch tray(s) or similar equipment must be installed under the Boyd Port ship loader tripper to minimise spillage.

(J64) The holder of this environmental authority must capture and pump any contaminated runoff from the Boyd Port tripper catch tray, belt cleaning at the conveyor head pulley, and the sealed maintenance area at the end of the wharf at Boyd Port to the onshore to the sedimentation ponds or the mine infrastructure area.

(J65) Transfer of minerals and bulk materials to ships at the Boyd Port must be carried out in a manner that minimises the likelihood of any release of minerals or bulk materials to the atmosphere or waters.

END OF DEFINITIONS FOR SCHEDULE J

## SCHEDULE K – DEFINITIONS/ACRONYMS

Key terms and/or phrases used in this document are defined in this section and **bolded** throughout this document. Applicants should note that where a term is not defined, the definition in the *Environmental Protection Act 1994*, its regulations or environmental protection policies must be used. If a word remains undefined it has its ordinary meaning.

### Interpretation - Word definitions/acronyms

**"active waste disposal cell"** means a cell currently being used for the disposal of wastes accepted under a condition of this approval and includes all or part of a disposal cell.

**"administering authority"** means the Department of Environment & Science or its successor.

**"AEP"** means the Annual Exceedance Probability, which is the probability that at least one event in excess of a particular magnitude will occur in any given year.

**"ambient (or total) noise"** at a place, means the level of noise at the place from all sources (near and far), measured as the Leq for an appropriate time interval.

**"ANZECC"** means the Australian and New Zealand Environment Conservation Council

**"appropriately qualified person"** means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods or literature.

**"ARMCANZ"** means Agriculture and Resource Management Council of Australia and New Zealand

**"assess"** by a suitably qualified and experienced person in relation to a hazard assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

(a) exactly what has been assessed and the precise nature of that assessment;
(b) the relevant legislative, regulatory and technical criteria on which the assessment has been based;
(c) the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
(d) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.

**"background noise"** means the existing acoustic environment including both near and far noise sources under normal mining operations.

**"beneficial use"** in respect of dams means that the current or proposed owner of the land on which a dam stands, has found a use for that dam that is:

(a) of benefit to that owner in that it adds real value to their business or to the general community,
(b) in accordance with relevant provisions of the *Environmental Protection Act 1994*,
(c) sustainable by virtue of written undertakings given by that owner to maintain that dam, and
(d) the transfer and use have been approved or authorised under any relevant legislation.

**"animal breeding place"** means a bower, burrow, cave, hollow, nest or other thing that is commonly used by the animal to incubate or rear the animal's offspring.

**"capital dredging"** means dredging for navigation to enlarge or deepen existing channel and port areas or to create new channel and port areas and dredging for engineering purposes to create trenches for pipes, cables, immersed tube tunnels or to remove material unsuitable for foundations or overburden for aggregate extraction.

**“capping"** means the covering of a landfill with suitable material as outlined within this EA to inhibit penetration by liquids.

**"certification"**, **"certifying"** or **"certified"** by a suitably qualified and experienced person in relation to a design plan or an annual report regarding dams, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

(a) exactly what is being certified and the precise nature of that certification.
(b) the relevant legislative, regulatory and technical criteria on which the certification has been based;
(c) the relevant data and facts on which the certification has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
(a) the reasoning on which the certification has been based using the relevant data and facts, and the relevant criteria.

**"clinical waste"** means waste that has the potential to cause disease including, for example, the following:

- animal waste;
- discarded sharps;
- human tissue waste;
- laboratory waste.

**“coastal works”** means marine works.

**“concern site”** means a location relating to an environmental value, such as water quality, a coral reef, fishing ground, or other feature as defined in the Queensland Water Quality Guidelines that is likely to be affected by a disturbance caused by the proposed activity. The proposed activity has been identified to place the environmental value under some level of risk and therefore is termed a Concern Site. Specifically in relation to dredging activities to which this environmental authority relates, Concern Sites includes coral reef locations that have been identified to be at some level of risk of elevated turbidity, suspended solids and sedimentation rates through 3D modelling, and consequently, reduced photosynthetically active radiation. Concern Sites do not include areas that are expected to experience extreme levels of disturbance that are likely, or certain, to result in severe levels of impact which has been authorised under this environmental authority. Concern Sites are sometimes also referred to as Impact or influence sites.

**"construction" or "constructed"** in relation to a dam includes building a new dam and modifying or lifting an existing dam, but does not include investigations and testing necessary for purposes of preparing a design plan.

**"commercial place"** means a place used as an office or for business or commercial purposes, other than a place within the boundaries of the operational land.

**"completion criteria"** means the measures by which the actions implemented to rehabilitate the land are deemed to be complete. The completion criteria indicate the success of the decommissioning and rehabilitation outcomes or remediation of areas which have been significantly disturbed by the mining activities. Completion criteria may include information regarding:

- stability of final land forms in terms of settlement, erosion, weathering, pondage and drainage;
- control of geochemical and contaminant transport processes;
- quality of runoff waters and potential impact on receiving environment;
- vegetation establishment, survival and succession;
- vegetation productivity, sustained growth and structure development;
- fauna colonisation and habitat development;
- ecosystem processes such as soil development and nutrient cycling, and the re-colonisation of specific fauna groups such as collembola, mites and termites which are involved in these processes;
- microbiological studies including recolonisation by mycorrhizal fungi, microbial biomass and respiration;
- effects of various establishment treatments such as deep ripping, topsoil handling, seeding and fertiliser application on vegetation growth and development;
- resilience of vegetation to disease, insect attack, drought and fire;
- vegetation water use and effects on ground water levels and catchment yields.

**"commingled waste"** means waste that is mixed in such a way that it cannot be reasonably expected that the individual waste types can be segregated.

**"dam"** means a land-based structure or a void that is designed to contain, divert or control flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works. However; a dam does *not* mean a fabricated or manufactured tank or container designed to a recognised standard, *nor* does a dam mean a land-based structure where that structure is designed to an Australian Standard. In case there is any doubt, a levee (dyke or bund) is a dam, but (for example) a bund designed for spill containment to AS1940 is *not* a dam.

**"dB"** means decibel. The unit used to measure sound level.

**"decommissioned"** means plant, infrastructure or equipment that has been removed or retired from active service.

**"design plan"** is the documentation required to describe the physical dimensions of the dam, the materials and standards to be used for construction of the dam, and the criteria to be used for operating the dam. The documents must include all investigation and design reports, plans and specifications sufficient to hand to a contractor for construction, and planned decommissioning and rehabilitation outcomes; so as to address all hazard scenarios that would be identified by a properly conducted hazard assessment for the structure. Documentation must be such that a 'suitable qualified and experience person' could conduct an independent review without seeking further information from the designer.

**"design storage allowance"** or **"DSA"** means an available volume, estimated in accordance with the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995), that must be provided in a dam as at the first of November each year in order to prevent a discharge from that dam to a probability (AEP) specified in that guideline. The DSA is estimated based on 100% runoff of wet season rainfall at the relevant AEP, taking account of process inputs during that wet season, with no allowance for evaporation.

**"dredge material"** means mud, sand, coral, ballast, shingle, gravel, clay, earth and other material removed by dredging from the bed of Queensland tidal and non-tidal waters.

**"dredging"** means extraction of mud, sand, coral, ballast, shingle, gravel, clay, earth and other material from the bed of Queensland tidal and non-tidal waters. Dredging does not include the banks of a waterway.

**"domain"** means a parcel of land for which the same rehabilitation goal, rehabilitation objective, indicators and measurable completion criteria for each agreed post mining land use can be defined.

**"EIS"** means the Environmental Impact Statement for the South of Embley Project (August 2011) and the Supplementary report to the EIS for the South of Embley Project (February 2012).

**"environmental authority"** means an environmental authority granted in relation to a mining activity under the *Environmental Protection Act 1994*.

**"environmentally sensitive areas"** means areas as described in the codes of compliance for tenures relating to mining and Chapter 5A (*Environmental Protection Regulation 2008*) activities, towns and roads.

**"equivalent passenger-tyre unit (EPU)"** is equivalent to one passenger tyre from a normal sedan or station wagon.

**"extraction areas"** include any areas of ML6024 and ML7024 disturbed by mining activities associated with the extraction of bauxite or that facilitate the extraction of bauxite including but not limited to pits, haul roads, access tracks, pipelines and conveyors.

**"flowable substance""** means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.

**"hazard"** in relation to a dam as defined, means the potential for environmental harm resulting from the collapse or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.

**"hazard category"** means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995).

**"high bank"** of a watercourse is the level to which water rises during normal season peak flows and may include a flood plain area.

**"hydraulic performance"** means the capacity of a regulated dam to contain or safely pass flowable substances based on a probability (AEP) of performance failure specified for the relevant hazard category in the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995).

**"levee", "dyke" or "bund"** means a long embankment that is designed only to provide for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from releases from other works, during the progress of those stormwater or flood flows or those releases; and does not store any significant volume of water or flowable substances at any other times.

***"$L_{A90,T}$"*** *is the A-weighted sound pressure level exceeded 90% of the sample duration T.*

**"land"** in the 'land schedule' of this document means land excluding waters and the atmosphere.

**"land capability"** as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

**"land suitability"** as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

**"land use"** term to describe the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

**"large items of green waste"** means oversize items of green waste that are incapable of being processed by a tub grinder.

**"leachate"** means a liquid that has passed through or emerged from, or is likely to have passed through or emerged from, a material stored, processed or disposed of at the operational land which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.

**"leaching contaminant levels"** means the results of the "Toxicity Characteristic Leaching Procedure (TCLP)" means the test described in "U.S. EPA: Toxicity Characteristic Leaching Procedure (TCLP)" Federal Register, 40 CFR, Vol. 51, No. 286, Appendix 2, Part 268, page 40643 or as modified to reflect non-acidic leaching procedures suitable for waste characteristic assessment where co-disposal with putrescible wastes will not occur.

**"long term 50$^{th}$ percentile"** means that not more than twenty-six (26) of the measured values of the quality characteristic are to exceed the stated release limit for any fifty-two (52) consecutive samples where:

- the consecutive samples are taken over a one (1) year period;
- the consecutive samples are taken at approximately equal periods; and
- the time interval between the taking of each consecutive sample is not less than three (3) days or greater than eleven (11) days.

**"maintenance dredging"** means dredging to ensure that channels, berths or other port areas are maintained at their designed dimensions.

**"mandatory reporting level"** or **"MRL"** means a warning and reporting level determined in accordance with the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995). An MRL is the lowest level required in a regulated dam to allow either of the following to be retained:

(a) the runoff from a 72 hour duration storm at a relevant AEP (design risk); or

(b) a wave allowance at that AEP as estimated using a recognised engineering method.

**"marine works"** means all work (other than dredging activities) including construction and maintenance works being carried out over marine waters, on the beach and foreshore areas.

**"measures"** includes any measures to prevent or minimise environmental impacts of the activity such as bunds, silt fences, diversion drains, capping, and containment systems.

**"MIA"** means mine infrastructure area.

"**mining activities**" means an activity as described in section 110 of the *Environmental Protection Act 1994*.

Note: Mining activities authorised on ML6024 and ML7024 under the *Mineral Resources Act 1989* are those authorised under the *Commonwealth Aluminium Corporation Pty Ltd Agreement Act 1957*.

**"mining related infrastructure"** The facilities, structures and installations needed for mining including but not limited to mining transportation networks, processing plant, communications systems and tailings storage facilities.

**"NATA"** means National Association of Testing Authorities.

**"natural flow"** means the flow of water through waters caused by nature.

**"noxious"** means harmful or injurious to health or physical well-being, other than trivial harm.

**"non-polluting"** means having no adverse impacts upon the receiving environment.

**"offensive"** means causing reasonable offence or displeasure; is disagreeable to the sense; disgusting, nauseous or repulsive, other than trivial harm.

**"operational plan"** means a document that amongst other things sets out procedures and criteria to be used for operating a dam during a particular time period. The operational plan as defined herein may form part of a plan of operations or plan otherwise required in legislation.

**"permeability"** means a measure of the rate at which a fluid will pass through a medium. The coefficient of permeability of a given fluid is an expression of the rate of flow through unit area and thickness under unit differential pressure at a given temperature. Synonymous with hydraulic conductivity when the fluid is water.

**"progressive rehabilitation"** means rehabilitation (defined below) undertaken progressively OR a staged approach to rehabilitation as mining operations are ongoing.

**"Queensland waters"** means a stretch of water for which Queensland has jurisdictional powers. The limit of Queensland waters is defined by a line three nautical miles seaward of the territorial sea baseline.

**"receiving environment"** means all groundwater, surface water, land, and sediments that are not disturbed areas authorised by this environmental authority.

**"receiving waters"** means all groundwater and surface water that are not disturbed areas authorised by this environmental authority.

**"Reference Site"** means a location relating to an environmental value, such as water quality, a coral reef, fishing ground, or other feature as defined in the Queensland Water Quality Guidelines that will not be affected by a disturbance caused by the proposed activity. Where a proposed activity has been identified to place one or more environmental values under some level of risk, Reference Site(s) serve to indicate the state of the natural condition outside of the influence of the proposed activity. Reference sites are typically matched or correspond to one or more Concern Sites. Reference Sites are sometimes referred to as Control Sites when they do not strictly comply with the true definition of Reference Sites in the QWQG and ANZECC & ARMCANZ (2000).

**"regulated dam"** means any dam in the significant or high hazard category as assessed using the Manual for Assessing Hazard Categories and Hydraulic Performance of Dams published by the administering authority.

**"rehabilitation" the** process of reshaping and revegetating land to restore it to a stable landform and in accordance with the completion criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.

**"representative" means** a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.

**"Ringelmann method"** refers to a chart that provides shades of grey by which the density of columns of smoke rising from stacks may be compared.

**"self-sustaining" means** an area of land which has been rehabilitated and has maintained the required completion criteria without human intervention for a period nominated by the administering authority.

**"sensitive place" means**:

- a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
- an educational institution; or
- a medical centre or hospital; or
- a protected area under the Nature Conservation Act 1992, the Marine Parks Act 1992 or a World Heritage Area; or
- a public park or gardens; or
- a place used as a workplace, an office or for business or commercial purposes which is not part of the mining activity and does not include employees accommodation or public roads.

**"short term 50th percentile"** means not more than five (5) of the measured values of the quality characteristic are to exceed the stated release limit for any ten (10) consecutive samples for a release/monitoring point at any time during operation.

**"significant construction works"** means construction works to facilitate or support mining activities but does not include early site access works or activities to support exploration, site investigation or site establishment works where approvals are held.

**"significant wetlands"** are those designated under the Ramsar Convention as containing representative, rare or unique wetlands, or wetlands that are important for conserving biological diversity. They are listed on the List of Wetlands of International Importance because of their ecological, botanical, zoological, limnological or hydrological importance.

**"South of Embley"** means the area on ML7024 and ML 6024 south of the Embley River.

**"spillway"** means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges form the dam, normally under flood conditions or in anticipation of flood conditions.

**"stable"** in relation to land, means land form dimensions are and will remain within tolerable limits now and in the foreseeable future. Issues to be properly considered in regard to whether or not the landform is stable include geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, leachate and related contaminant generation.

**"stream order"** denotes a stream classification system where a watercourse is given a classification according to the number of additional tributaries associated with the watercourse.

**"suitably qualified and experienced person"** in relation to dams means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the Professional Engineers Act 1988, OR registered as a National Professional Engineer (NPER) with the Institution of Engineers Australia, OR holds equivalent professional qualifications to the satisfaction of the administering authority for the Act; AND the administering authority for the Act is satisfied that person has knowledge, suitable experience and demonstrated expertise in relevant fields, as set out below:

(b) knowledge of engineering principles related to the structures, geomechanics, hydrology, hydraulics, chemistry and environmental impact of dams; and
(c) a total of five years of suitable experience and demonstrated expertise in the geomechanics of dams with particular emphasis on stability, geology and geochemistry, and
(d) a total of five years of suitable experience and demonstrated expertise each, in three of the following categories:
    - investigation and design of dams.
    - Construction, operation and maintenance of dams.

- hydrology with particular reference to flooding, estimation of extreme storms, water management or meteorology.
- hydraulics with particular reference to sediment transport and deposition, erosion control, beach processes.
- hydrogeology with particular reference to seepage, groundwater.
- solute transport processes and monitoring thereof.
- dam safety.

**"temporary seaborne access facility"** means the temporary barge access and/or temporary passenger jetty.

**"tolerable limits"** means a range of parameters regarded as being sufficient to meet the objective of protecting relevant environmental values. For example, a range of settlement for a tailings capping, rather than a single value, could still meet the objective of draining the cap quickly, preventing ponding and limiting infiltration and percolation.

"**town activities**" means the activities carried out by the holder of this environmental authority pursuant to the Commonwealth Aluminium Corporation Pty Limited Agreement Act 1957 in connection with the operation of the township of Weipa.

**"TPH"** means total petroleum hydrocarbon.

**"µS/cm"** means micro Siemens per centimetre.

**"void"** means any constructed, open excavation in the ground.

**"waters"** - includes all or any part of a river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water in natural or artificial watercourses, bed and banks of a watercourse, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater.

"**water release event**" means release of any waters that are or maybe contaminated by the mining activity.

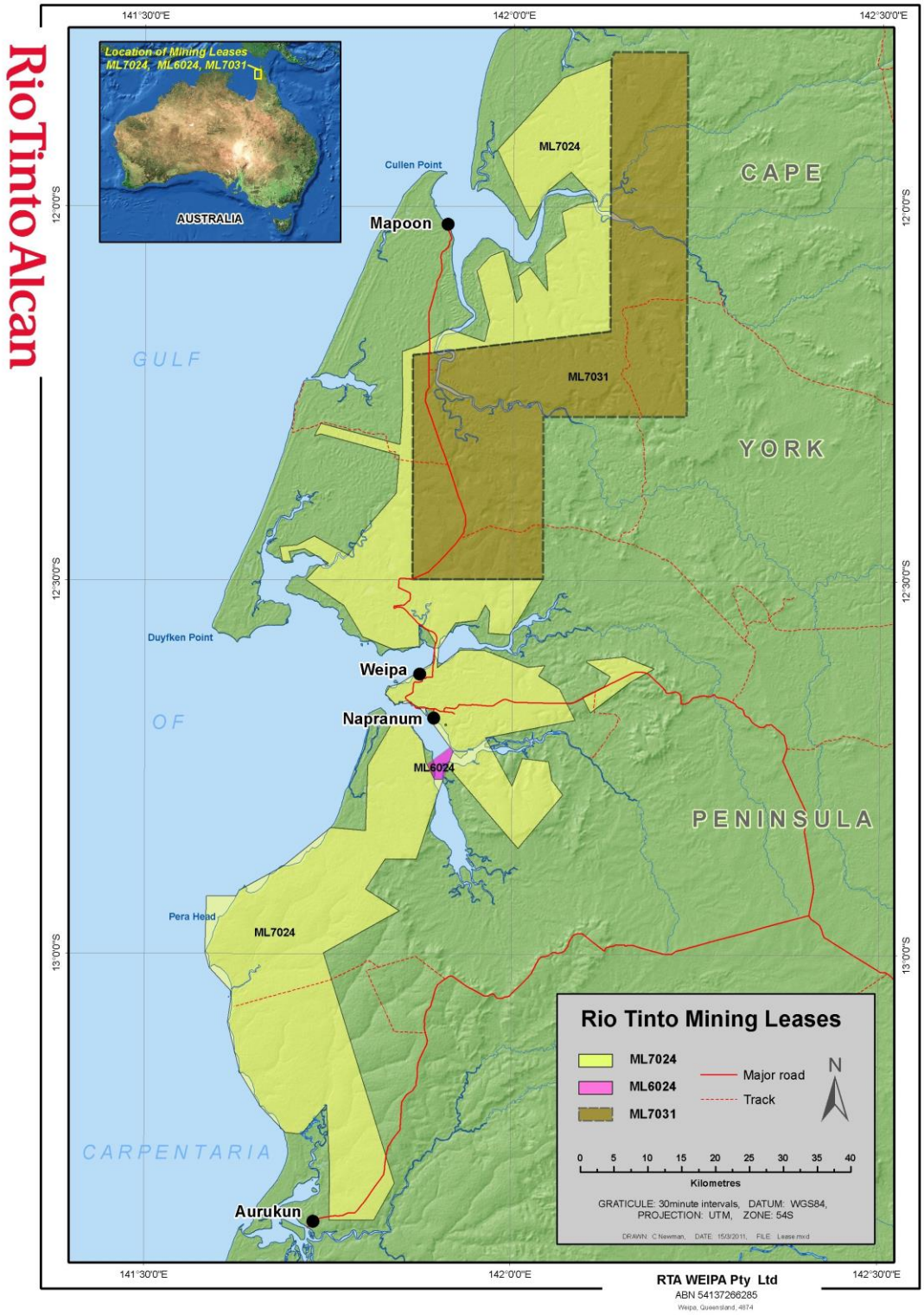
**"wetlands"** are areas of permanent or periodic/intermittent inundation, with water that is static or flowing fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed 6 metres. To be classified as a wetland, the area must have one or more of the following attributes:

a) at least periodically, the land supports plants or animals that are adapted to and dependent on living in wet conditions for at least part of their life cycle, or
b) the substratum is predominantly undrained soils that are saturated, flooded or ponded long enough to develop anaerobic conditions in the upper layers, or
c) the substratum is not soil and is saturated with water, or covered by water at some time.

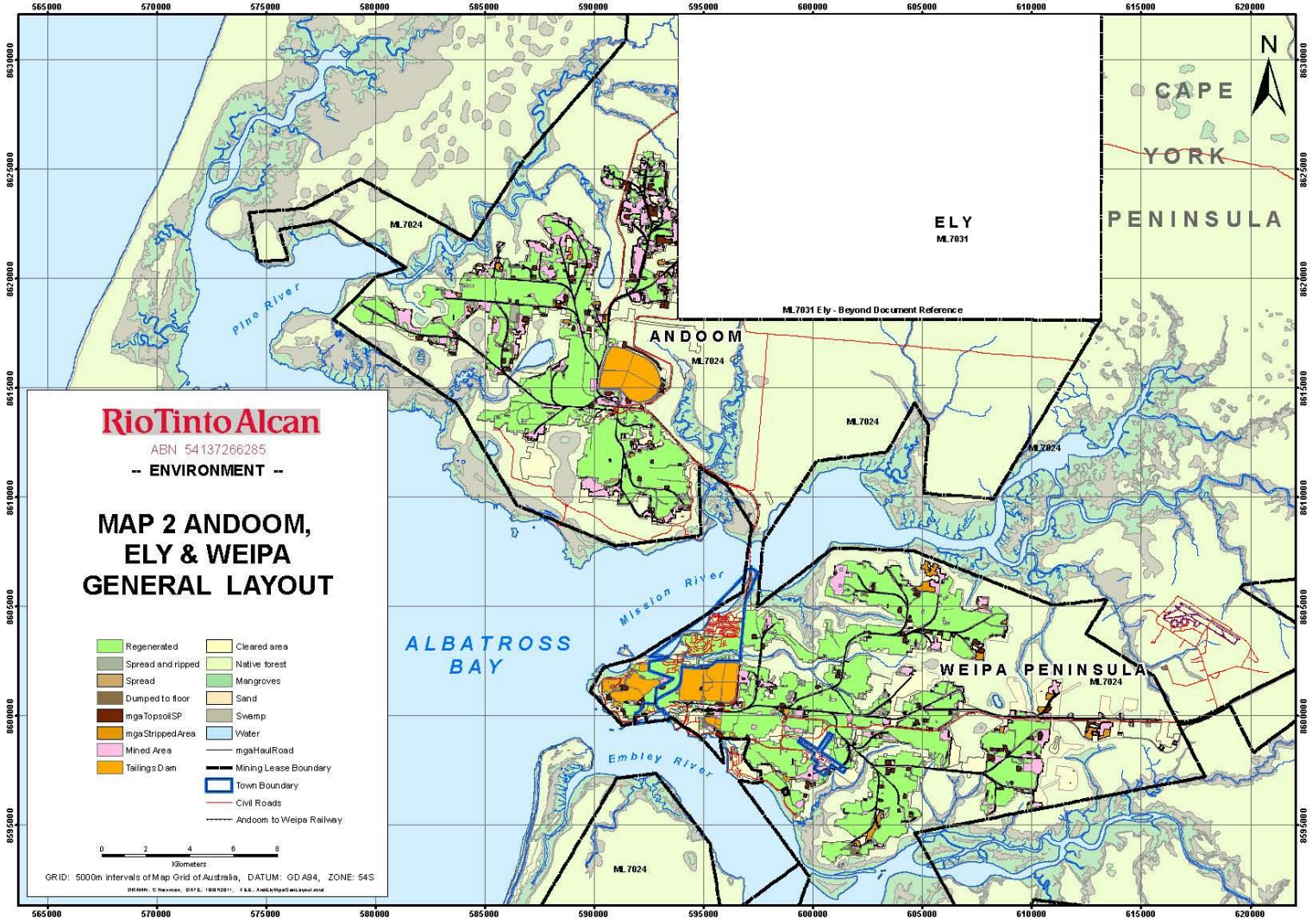
END OF DEFINITIONS FOR SCHEDULE K

**SCHEDULE L – PLANS**

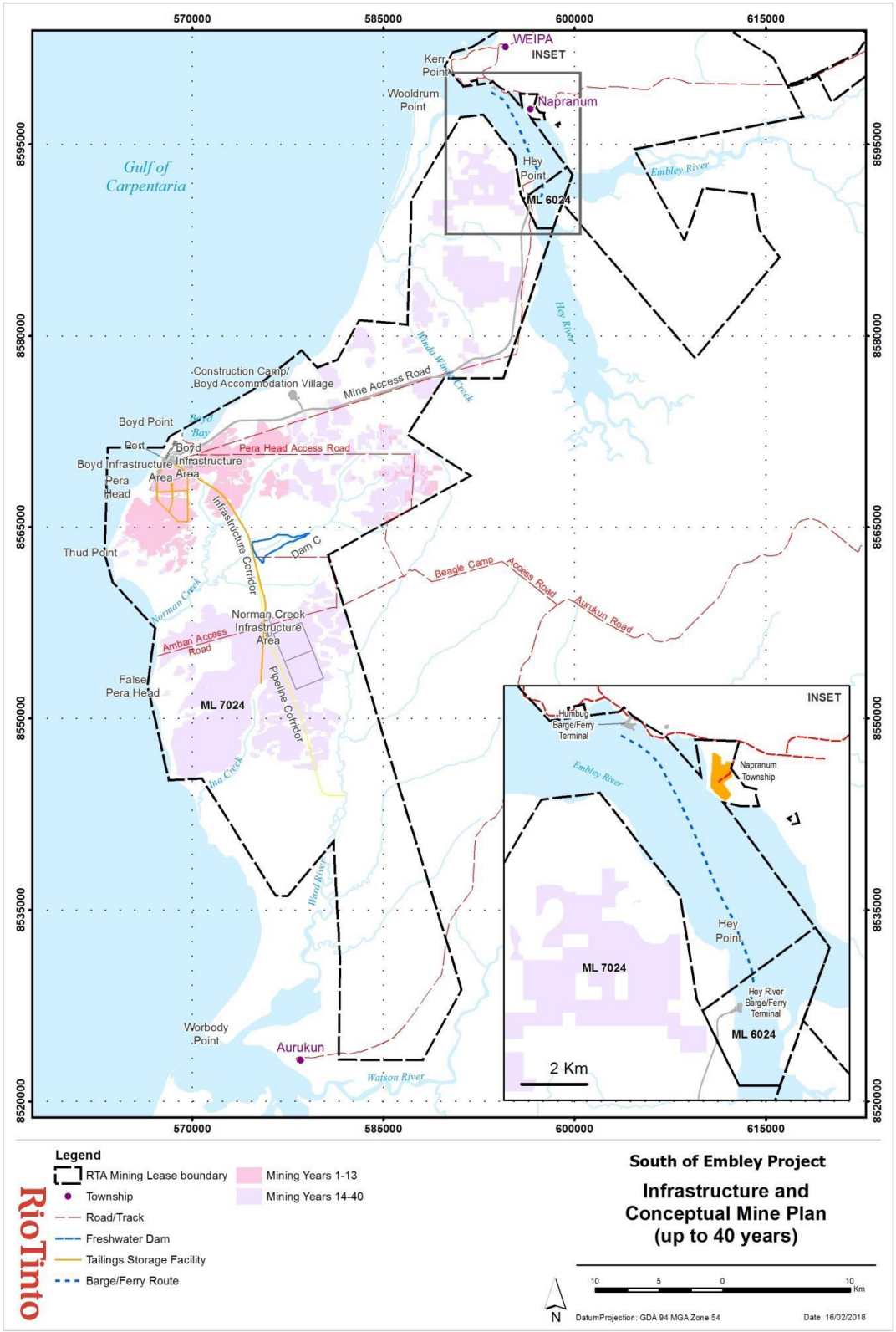
**Plan 1 – Weipa General Area Plan**



**Plan 2 – East Weipa and Andoom Operational Areas**



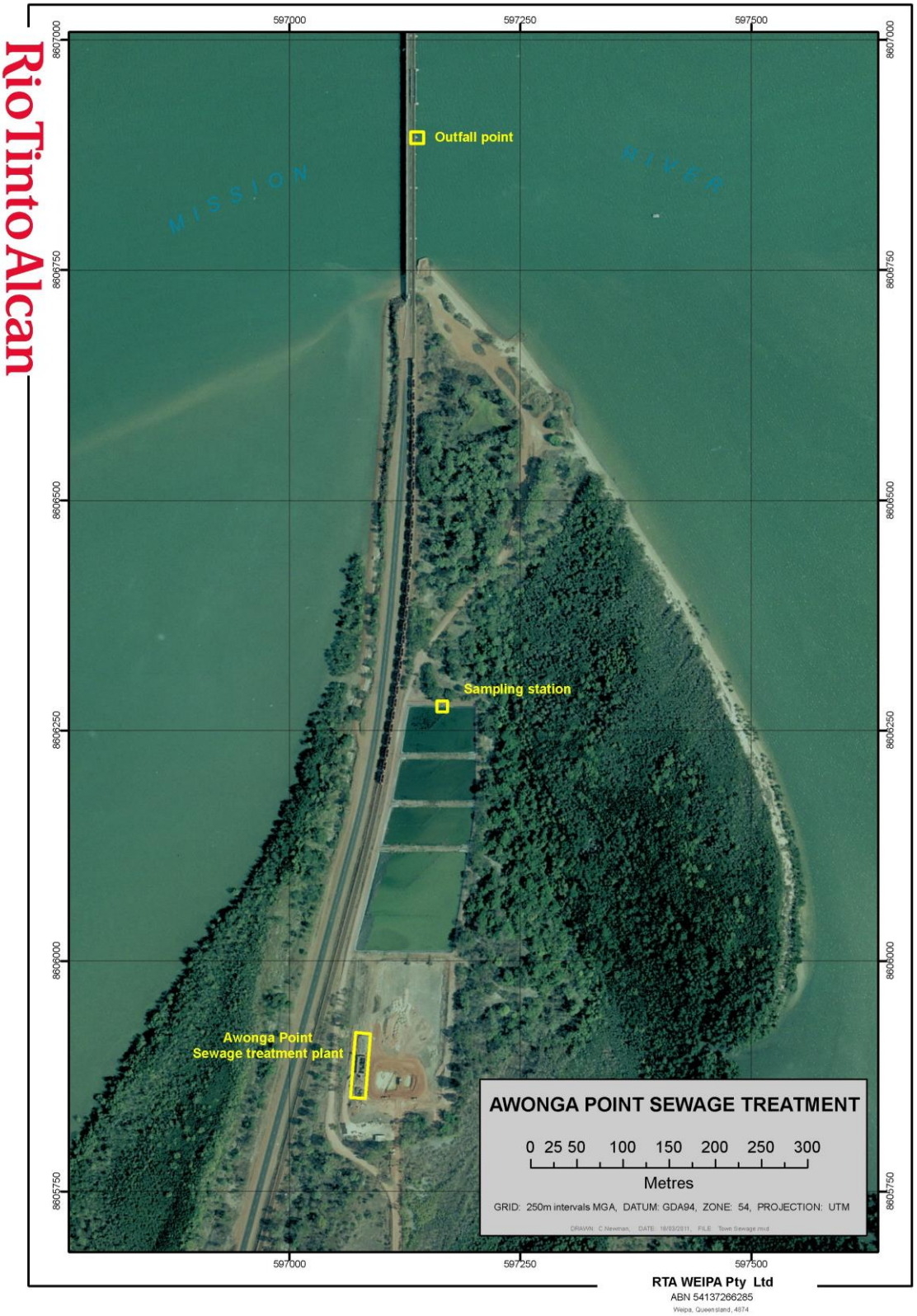
**Plan 3 – South of Embley Infrastructure and Conceptual Mine Plan**



**Plan 4 - Air Quality Monitoring Sites**

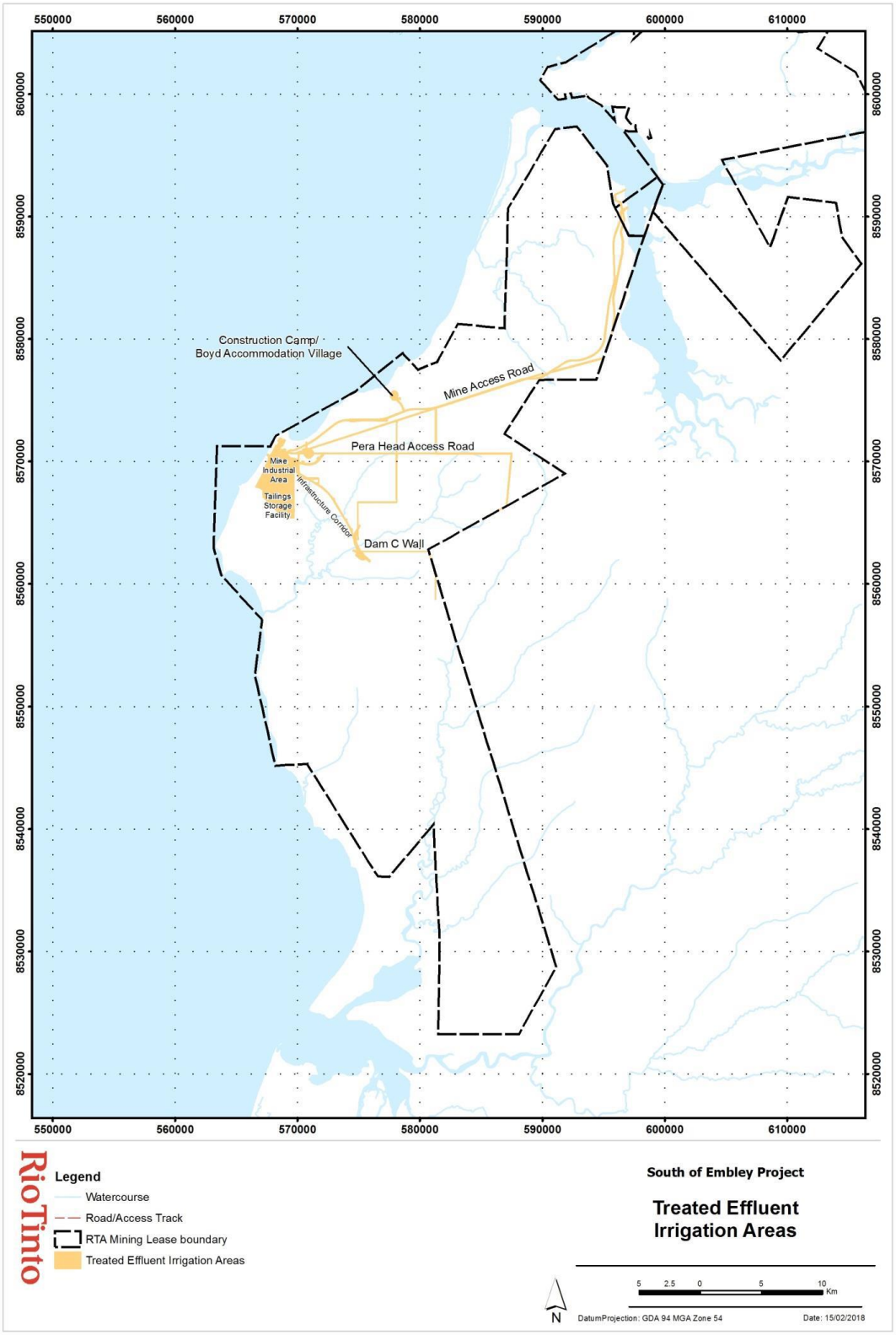
**Plan 5 – Evans Landing Landfill**

**Plan 6 – Awonga Point Sewage Treatment Water Release & Water Quality Monitoring Sites**

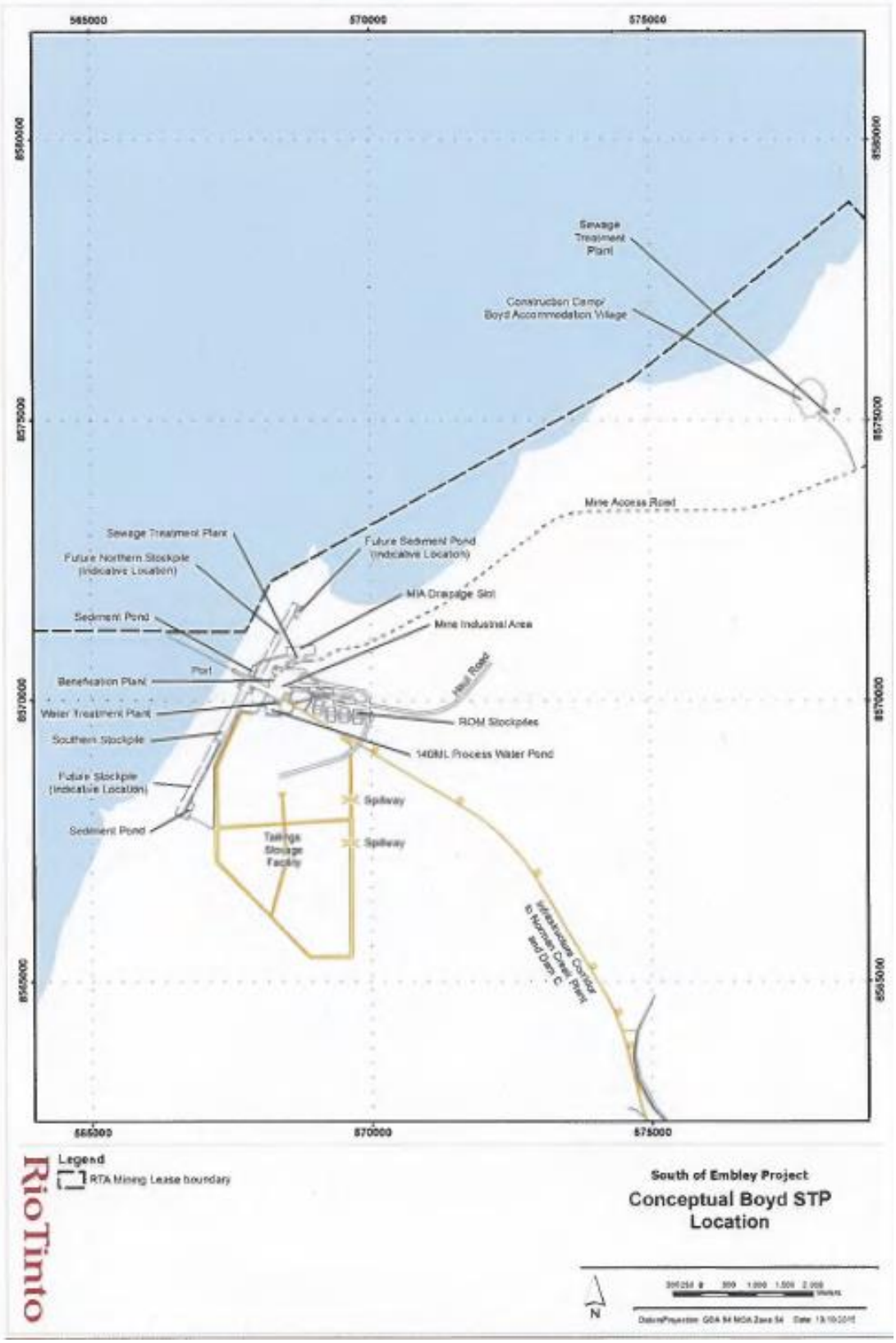


**Plan 7 – Release Points to Land (East Weipa)**

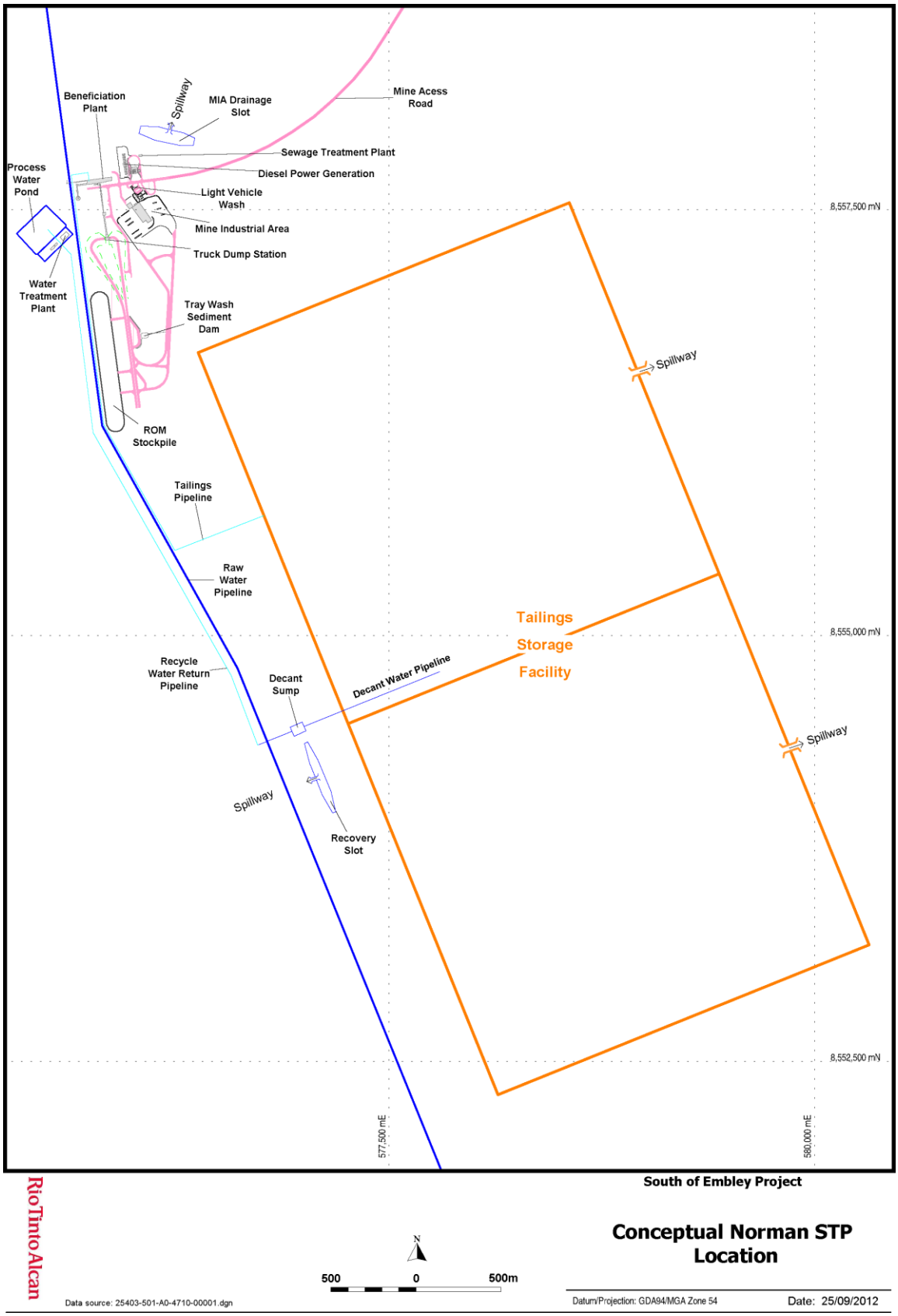
**Plan 8 – Release Points to Land (South of Embley)**



**Plan 9 - Conceptual Boyd STP Location**



**Plan 10 - Conceptual Norman STP Location**



**Appendix 1 – Maximum Contaminant Levels in Regulated Waste**

**Table 1 – Maximum Contaminant Levels**

| Contaminant | Maximum Contaminant Level (mg/kg) |
|---|---|
| **Monocyclic Aromatic Hydrocarbons(MAH)** | |
| Benzene | 20 |
| Ethyl Benzene | 1000 |
| Toluene | 600 |
| Xylene | 500 |
| Total MAH | 1 000 |
| **Polycyclic Aromatic Hydrocarbons(PAH)** | |
| Total PAH | 1 000 |
| **Phenolic Contaminants** | |
| *Non halogenated compounds:* | |
| Phenol | 250 |
| m-cresol | 500 |
| o-cresol | 500 |
| p-cresol | 500 |
| Total non halogenated phenol | 500 |
| *Halogenated phenol:* | |
| Chlorophenol | 5 |
| Trichlorophenol | 20 |
| Pentachlorophenol | 20 |
| Total halogenated phenol | 20 |
| **Chlorinated Hydrocarbons** | |
| *Chlorinated Aliphatic Compounds:* | |
| Carbon tetrachloride | 10 |
| 1,2 Dichloroethane | 20 |
| l,1 Dichloroethene | 1 |
| Tetrachloroethene | 20 |
| Trichloroethene | 25 |
| Total chlorinated aliphatic compounds | 50 |
| *Chlorinated Aromatic Compounds:* | |
| Chlorobenzene | 200 |
| Hexachlorobenzene | 1 |
| Total Chlorinated Aromatic compounds | 200 |
| **Pesticides** | |
| Total organochlorine | 50 |
| Total herbicides | 50 |
| Total carbamates | 50 |
| Total organophosphorus | 50 |
| **Petroleum Hydrocarbons** | |
| Total petroleum hydrocarbons(C6-C9) | 1 000 |
| Total petroleum hydrocarbons(C10-C14) | 10 000 |
| Total petroleum hydrocarbons(C15-C28) | 50 000 |
| Total petroleum hydrocarbons(C28-C36) | 50 000 |
| **Non Scheduled Solid Polychlorinated Biphenyls (PCBs)** | 50 |

**Table 2 - Maximum Leaching Contaminant Levels**

| Contaminant | Maximum Leaching Contaminant Levels (mg/L) |
|---|---|
| **Non Specific Contaminants** | |
| Biochemical Oxygen Demand | 20 000 |
| Total 0rganic Carbon | 10 000 |
| Petroleum Hydrocarbons | 50 |
| **Metals/Non-Metals** | |
| Antimony | 5.0 |
| Arsenic | 5.0 |
| Barium | 100.0 |
| Cadmium | 0.5 |
| Chromium | 5.0 |
| Cobalt | 5.0 |
| Copper | 200.0 |
| Lead | 5.0 |
| Mercury | 0.1 |
| Molybdenum | 5.0 |
| Nickel | 5.0 |
| Selenium | 1.0 |
| Silver | 10.0 |
| Thallium | 1.0 |
| Tin | 3.0 |
| Vanadium | 5.0 |
| Zinc | 500.0 |
| **Inorganic Anions** | |
| Bromide | 50.0 |
| Chloride | 6 000 |
| Cyanide (total) | 8 |
| Fluoride | 150.0 |
| Sulphate | 50 000 |
| Nitrate | 5 000 |
| **Monocyclic Aromatic Hydrocarbon(MAH)** | |
| Benzene | 1.0 |
| Ethyl benzene | 50.0 |
| Toluene | 80.0 |
| Xylene | 60.0 |
| Total MAH | 80.0 |
| **Polycyclic Aromatic Hydrocarbons(PAH)** | |
| Anthracene | 0.7 |
| Benz (a) anthracene | 0.05 |
| Benz (c) phenanthrene | 0.05 |
| Benzo (a) pyrene | 0.02 |
| Benzo (b) fluoranthene | 0.05 |
| Benzo (k) fluoranthene | 0.05 |
| Chrysene | 0.1 |
| Dibenz (a,h) anthracene | 0.02 |
| Dibenz (a,h) pyrene | 0.1 |
| Dimethylbenz (a) anthracene | 0.05 |
| Fluoranthene | 0.2 |
| Indeno (1,2,3-cd) pyrene | 0.1 |
| Naphthalene | 0.7 |

| | |
|---|---|
| Phenanthrene | 0.1 |
| Pyrene | 0.7 |
| Total PAH | 1.0 |
| **Phenolic Contaminants** | |
| *Non halogenated compounds:* | |
| Phenol | 10.0 |
| m-Cresol | 20.0 |
| o-Cresol | 20.0 |
| p-Cresol | 20.0 |
| *Halogenated phenols:* | |
| Chlorophenol | 0.1 |
| Trichlorophenol | 1.0 |
| Pentachlorophenol | 1.0 |
| **Chlorinated Hydrocarbons** | |
| *Chlorinated Aliphatic Compounds:* | |
| Carbon tetrachloride | 0.3 |
| 1,2 Dichloroethane | 1.0 |
| 1,1 Dichloroethene | 0.03 |
| Tetrachloroethene | 1.0 |
| Trichloroethene | 3.0 |
| *Chlorinated Aromatic Compounds:* | |
| Chlorobenzene(total) | 30.0 |
| Hexachlorobenzene | 0.02 |
| **Pesticides** | |
| *Organochlorine:* | |
| Aldrin | 0.03 |
| Chlordane | 0.1 |
| Dieldrin | 0.03 |
| DDT | 2 |
| Endrin | 0.03 |
| Heptachlor | 0.03 |
| Lindane | 2 |
| Methoxychlor | 30 |
| Toxaphene | 0.05 |
| *Herbicides:* | |
| 2,4-D | 3 |
| 2,4-DB | 2.0 |
| MCPA | 2.0 |
| 2,4,5 –T | 10 |
| *Carbamates:* | |
| Carbaryl | 3 |
| Carbofuran | 1 |
| *Organophosphorus:* | |
| Diazinon | 0.3 |
| Parathion | 1 |
| Methyl Parathion | 10 |

**Table 3 – Maximum Contaminant Levels in Soils**

| Contaminant | Maximum Contaminant Levels in Soils (mg/kg) |
|---|---|
| Arsenic (total) | 200 |
| Beryllium | 40 |
| Cadmium | 40 |
| Chromium (iii) | 240 000 |
| Chromium (vi) | 200 |
| Copper | 2000 |
| Lead | 600 |
| Manganese | 3000 |
| Methyl Mercury | 20 |
| Mercury (inorganic) | 30 |
| Nickel | 600 |
| Zinc | 14000 |
| **Monocyclic Aromatic Hydrocarbons(MAH)** | |
| Benzene | 10 |
| Ethyl Benzene | 500 |
| Toluene | 300 |
| Xylene | 250 |
| Total MAH | 500 |
| **Polycyclic Aromatic Hydrocarbons(PAH)** | |
| Total PAH | 500 |
| **Phenolic Contaminants** | |
| Phenol | 100 |
| m-cresol | 250 |
| o-cresol | 250 |
| p-cresol | 250 |
| Total non halogenated phenol | 250 |
| Chlorophenol | 1 |
| Trichlorophenol | 5 |
| Pentachlorophenol | 5 |
| Total halogenated phenol | 5 |
| **Chlorinated Hydrocarbons** | |
| Carbon tetrachloride | 5 |
| 1,2 Dichloroethane | 10 |
| l,1 Dichloroethene | 1 |
| Tetrachloroethene | 10 |
| Trichloroethene | 25 |
| Total chlorinated aliphatic cpds | 50 |
| Chlorobenzene | 100 |
| Hexachlorobenzene | 1 |
| Total Chlorinated Aromatic cpds | 100 |
| **Pesticides** | |
| Total organochlorine | 5 |
| Total herbicides | 25 |
| Total carbamates | 25 |
| Total organophosphorus | 10 |
| **Petroleum Hydrocarbons** | |
| Total petroleum hydrocarbons(C6-C9) | 500 |
| Total petroleum hydrocarbons(C10-C14) | 5 000 |
| Total petroleum hydrocarbons(C15-C28) | 10 000 |
| Total petroleum hydrocarbons(C28-C36) | 10 000 |

**Table 4 - Maximum Leaching Contaminant Levels in Soils**

| Contaminant Analysis | Maximum Leaching Contaminant Levels in Soils (mg/L) |
|---|---|
| **Non Specific Contaminants** | |
| Biochemical Oxygen Demand | 20 000 |
| Total 0rganic Carbon | 10 000 |
| Petroleum Hydrocarbons | 25 |
| **Metals/Non-Metals** | |
| Antimony | 0.5 |
| Arsenic | 0.5 |
| Barium | 10.0 |
| Cadmium | 0.05 |
| Chromium | 0.5 |
| Cobalt | 0.5 |
| Copper | 10.0 |
| Lead | 0.5 |
| Mercury | 0.01 |
| Molybdenum | 0.1 |
| Nickel | 0.5 |
| Selenium | 0.1 |
| Silver | 0.5 |
| Thallium | 0.1 |
| Tin | 0.3 |
| Vanadium | 0.5 |
| Zinc | 50.0 |
| **Inorganic Anions** | |
| Bromide | 5.0 |
| Chloride | 6 000 |
| Cyanide (total) | 1.0 |
| Fluoride | 15.0 |
| Sulphate | 2 500 |
| Nitrate | 100.0 |
| **Monocyclic Aromatic Hydrocarbon(MAH)** | |
| Benzene | 0.1 |
| Ethyl benzene | 5.0 |
| Toluene | 3.0 |
| Xylene | 2.0 |
| Total MAH | 5.0 |
| **Polycyclic Aromatic Hydrocarbons(PAH)** | |
| Anthracene | 0.07 |
| Benz (a) anthracene | 0.005 |
| Benz (c) phenanthrene | 0.005 |
| Benzo (a) pyrene | 0.002 |
| Benzo (b) fluoranthene | 0.005 |
| Benzo (k) fluoranthene | 0.005 |
| Chrysene | 0.10 |
| Dibenz (a,h) anthracene | 0.002 |
| Dibenz (a,h) pyrene | 0.01 |
| Dimethylbenz (a) anthracene | 0.005 |
| Fluoranthene | 0.02 |
| Indeno (1,2,3-cd) pyrene | 0.01 |
| Naphthalene | 0.07 |
| Phenanthrene | 0.01 |

| | |
|---|---|
| Pyrene | 0.07 |
| Total PAH | 0.1 |
| **Phenolic Contaminants** | |
| *Non haloqenated compounds:* | . |
| Phenol | 1.0 |
| m-Cresol | 2.0 |
| o-Cresol | 2.0 |
| p-Cresol | 2.0 |
| *Halogenated phenols:* | . |
| Chlorophenol | 0.01 |
| Trichlorophenol | 0.1 |
| Pentachlorophenol | 0.1 |
| **Chlorinated Hydrocarbons** | |
| *Chlorinated Aliphatic Compounds:* | . |
| Carbon tetrachloride | 0.03 |
| 1,2 Dichloroethane | 0.1 |
| 1,1 Dichloroethene | 0.003 |
| Tetrachloroethene | 0.1 |
| Trichloroethene | 0.3 |
| *Chlorinated Aromatic Compounds:* | . |
| Chlorobenzene(total) | 1.0 |
| Hexachlorobenzene | 0.002 |
| **Pesticides** | |
| *Organochlorine:* | . |
| Aldrin | 0.001 |
| Chlordane | 0.006 |
| Chlorpyrifos | 0.01 |
| Dieldrin | 0.001 |
| DDT | 0.003 |
| Endrin | 0.001 |
| Heptachlor | 0.003 |
| Lindane | 0.1 |
| Methoxychlor | 0.1 |
| Toxaphene | 0.005 |
| *Herbicides:* | . |
| 2,4-D | 0.1 |
| 2,4-DB | 0.2 |
| MCPA | 0.2 |
| 2,4,5 –T | 0.002 |
| *Carbamates:* | . |
| Carbaryl | 0.06 |
| Carbofuran | 0.03 |
| *Organophosphorus:* | . |
| Diazinon | 0.01 |
| Parathion | 0.03 |
| Methyl Parathion | 0.006 |
| *Triazines:* | . |
| Atrazine | 0.01 |
| Simazine | 0.01 |

END OF APPENDIX 1
**END OF ENVIRONMENTAL AUTHORITY**

# Appendix C: Sea Dumping Permit (SD2020-3999)

*ENVIRONMENT PROTECTION (SEA DUMPING) ACT 1981*

SEA DUMPING PERMIT No. SD2020-3999

for

**RTA Weipa Pty Ltd**
(ACN: 137 266 285)

I, ANU DATTA, a delegate of the Minister for the Environment, acting under Sections 19 and 21 of the *Environment Protection (Sea Dumping) Act 1981*, hereby grant a sea dumping permit to RTA Weipa Pty Ltd, 123 Albert Street, Brisbane, Queensland, 4000 (ACN: 137 266 285), to load for the purposes of dumping, and to dump up to 480,000 cubic metres *in-situ* of dredged material, derived from maintenance dredging of the Amrun Port and River Facilities commencing on the date of signature of this permit and extending until 31 January 2031, subject to conditions which are specified in Appendices 1 and 2.

DATE.....20th.....day of.....JANUARY.....2021

.....

ANU DATTA
Delegate of the Minister

*This permit comprises Seven (7) pages, including Appendices 1 & 2.*

# CONDITIONS FOR DUMPING AT SEA OF MAINTENANCE DREDGED MATERIAL DERIVED FROM AMRUN PORT BERTH POCKET AND DEPARTURE CHANNEL, AND HUMBUG AND HEY RIVER FACILITIES, QUEENSLAND

**Definitions**
In this permit:

| | |
|---|---|
| "**Act**" | means the *Environment Protection (Sea Dumping) Act 1981*; |
| "**Application**" | means the Application for a permit under the *Environment Protection (Sea Dumping) Act 1981* submitted by **RTA Weipa Pty Ltd** and received by **the Department** on 15 September 2020 with further information received on 5 November 2020; |
| "**Department**" | means the Australian Government Department responsible for administering the **Act**; |
| "**Disposal Site**" | means the **Amrun** disposal area (site code: AU81A) at the following co-ordinates (WGS84), with a radius of 0.53996 nautical miles, |

| Latitude | Longitude |
|---|---|
| 12° 54.77'S | 141° 28.88'E |

and the **Albatross Bay** disposal area (site code: AU0008) bound by the following co-ordinates (GDA94) with a radius of 1.1 nautical miles.

| Latitude | Longitude |
|---|---|
| -12.659717°S | 141.637922°E |

| | |
|---|---|
| "**Dumping activities**" | means all activities associated with the dumping permitted under this permit, including:<br>(i) the loading for the purpose of dumping of dredged material;<br>(ii) the dumping of the material at the prescribed **disposal site**; |
| "**Environmental incident**" | means any event which has the potential to, or does impact, on the environment; |
| "**Environmental risk**" | means any risk, which has the potential to, or does impact, on the environment; |
| "**GPS**" | means Global Positioning System; |
| "**Marine Species**" | means all whales, dolphins, dugongs and marine turtles listed under the *Environment Protection and Biodiversity Conservation Act 1999*; |

| | |
|---|---|
| **"Minister"** | means the Australian Government Minister administering the *Environment Protection (Sea Dumping) Act 1981* and includes a delegate of the Minister; |
| **"Monitoring and Management Plan"** | means the Amrun Port and River Facilities Long-term Maintenance Dredge Management Plan 2021-2031 dated January 2021; |
| **"Monitoring zone"** | means the area within a 300 metre radius of the **vessel**; |
| **"RTA"** | means **RTA Weipa Pty Ltd,** 123 Albert Street, Brisbane, Queensland, 4000 (ACN: 137 266 285) |
| **"Vessel"** | means any vessel or vessels used for or in connection with **dumping activities**. |

1. Except so far as the contrary intention appears, terms used in the conditions of this permit have the same meaning as such terms in the **Act**.

**Material to be dumped**

2. **RTA** must ensure that no more than 480,000 cubic metres (*in-situ*) of material derived from maintenance dredging of the Amrun Berth Pocked and Departure Channel (440,000 cubic metres) and the Humbug and Hey River Facilities (40,000 cubic metres) as specified in the **Application,** is loaded and dumped.

**Disposal Site**

3. **RTA** must only dump within the **disposal site**.
4. **RTA** must ensure that each load of dredged material is dumped so that the dumped material is evenly distributed over the whole **disposal site**.
5. **RTA** must establish by **GPS** that, prior to dumping, the **vessel** is within the **disposal site**.

**Monitoring and Management Plan**

6. **RTA** must implement the approved **Monitoring and Management Plan**.
7. **RTA** may submit for the **Minister's** approval a revised version of the **Monitoring and Management Plan** specified under Condition 6. If the **Minister** approves such a revised Monitoring and Management Plan, the revised **Monitoring and Management Plan** must be implemented in place of the original **Monitoring and Management Plan** specified at Condition 6.
8. If the **Minister** believes that it is necessary or desirable for the better protection of the environment to do so, the **Minister** may request **RTA** to make specified revisions to the **Monitoring and Management Plan** approved under Condition 6 and submit the revised Monitoring and Management Plan for the **Minister's** approval. If the **Minister** approves a revised Monitoring and Management Plan pursuant to this condition, **RTA** must implement that Monitoring and Management Plan instead of the original **Monitoring and Management Plan**.
9. The **Monitoring and Management Plan** must be made available for the life of the permit (electronically) on the **RTA** website within 30 days of the **Monitoring and Management Plan** being approved by the **Minister**.
10. **RTA** may revise the **Monitoring and Management Plan** specified under Condition 6 without submitting it for re-approval, if the taking of the action in accordance with the revised **Monitoring and Management Plan** would not be likely to have a new or increased impact, or reduce the public accessibility of information.

**Mitigation Measures for Protection of Marine Species**

11. Prior to the commencement of the **dumping activities**, **RTA** must ensure that a check is undertaken, using binoculars from a high observation platform, for **marine species** within the **monitoring zone.**

12. If any **marine species** are sighted in the **monitoring zone**, **RTA** must not commence **dumping activities** until either 20 minutes after the last **marine species** is observed in the **monitoring zone**, or the **vessel** has moved to another area of the **disposal site** where it can maintain a minimum distance of 300 metres between the **vessel** and any **marine species.**

**Environmental Risk and Incidents**

13. If, at any time during the course of the **dumping activities**, an **environmental incident** occurs or an **environmental risk** is identified, all reasonable measures must be taken immediately by **RTA** to minimise or mitigate the risk or the impact. **RTA** must provide a report on the **environmental incident** or **environmental risk** to the **Department** within 72 hours, with details of the incident or risk, the measures taken, the success of those measures in addressing the incident or risk and any additional measures proposed to be taken.

14. **RTA** must document any incidents involving the **dumping activities** that result in injury or death to any **marine species**. The date, time and nature of each incident and the species involved, if known, must be recorded, and the incident is to be reported to the **Department** within 72 hours.

**Compliance of all Parties engaged in dumping activities**

15. **RTA** must ensure that all persons engaged in the **dumping activities** under this permit, including the owner(s) and person(s) in charge of the **vessel**, comply with this permit and the requirements of the **Act**. The fulfilment of these conditions remains the responsibility of **RTA.**

**Access for Observers**

16. If requested by the **Department**, **RTA** must provide access for at least two nominees of the **Department** to witness, inspect, examine and/or audit any part of the operations, including any **dumping activities** or monitoring activities, the **vessel** or any other equipment, or any documented records. **RTA** must provide all reasonable assistance to the nominees of the **Department** for carrying out their duties.

**Record-keeping and Reporting**

17. **RTA** must make and retain records comprising either weekly plotting sheets or a certified extract of the ship's log which detail:

    a) the dates and times of when each dumping run commenced and finished;

    b) the position (as determined by **GPS**) of the dumping **vessel** at the beginning and end of each dumping run, including the path of each dumping run;

    c) the volume of dredged material (*in-situ* cubic metres) dumped and quantity in dry tonnes for the specified operational period and compared to the total amount permitted under the permit;

    d) the person(s) undertaking the **marine species** observation required in Condition 11 and any **marine species** observed within the **monitoring zone** for each run, including the date, time and approximate distance from the **vessel**, and the action taken to comply with Condition 12; and

    e) the person(s) responsible for the operation of the vessel at any time during **dumping activities**.

18. **RTA** must retain the records required by Conditions 13, 14 and 17 for verification and audit purposes.

19. **RTA** must ensure that a bathymetric survey of the **disposal site** is undertaken by a suitably qualified person:

    a) prior to the commencement of **dumping activities** under this permit; and

    b) within 1 month of the completion of all **dumping activities** authorised under this permit.

20. Within 2 months of the final bathymetric survey being undertaken, **RTA** must provide a digital copy of each of the bathymetric surveys to the Australian Hydrographic Office, Locked Bag 8801, Wollongong, NSW 2500.

21. **RTA** must provide a report on the bathymetry to the **Department** within 2 months of the final bathymetric survey being undertaken. The report must include a chart showing the change in sea floor bathymetry as a result of **dumping activities** and include written commentary on the volumes of dumped material that appear to have been retained within the **disposal site**.

22. To facilitate annual reporting to the International Maritime Organization, **RTA** must report to the **Department** by 31 January each year, including on the day of the expiry of the permit or completion of all **dumping activities** under this permit, information at Appendix 2 to this permit, or in a format as approved by the **Department** from time to time.

Sea Dumping Permit International Reporting Requirements

Please fill in this form and return it by **email** to the Department, **by 31 January each year**. This information is required for Australia's international reporting obligations under the London Protocol.
**Email:** seadumping@environment.gov.au, quoting the permit reference number.

| |
|---|
| Permit Holder: RTA<br>Address:<br>Submitted by:<br>Phone:<br>Email: Date: *(dd/mm/yyyy)* |

**Permit Details:**
1) Sea Dumping Permit number: SD2020-3999

2) Permit start date: *(dd/mm/yyyy)* Permit end date: *(dd/mm/yyyy)*

3) Description of material *Please tick relevant box or boxes*

Capital Dredged Material☐, Maintenance Dredged Material☐, Fish Waste☐,
Vessels☐, Platforms or other man-made structures☐, Sewage Sludge☐, $CO_2$☐,
Organic Material of Natural Origin☐, Bulky Waste☐, Inert-Inorganic Geological Material☐

4) Total permit quantity (cubic metres/number): _____

**Annual Report:**
5) Specify the calendar year this report applies to: _____ *(Reporting period)*

6) Quantity dumped in the specified calendar year. Where multiple sites are used, please specify volume per site.

**Geodetic Datum:**

| **Site Code** | **Latitude** *(North/South degrees, minutes)* | **Longitude** *(East/West degrees, minutes)* | **Number/ Volume/ Type** *For dredged material, please provide 'in-situ cubic metres' AND 'dry weight tonnes'* |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

| **Site Code** | **Latitude** *(North/South degrees, minutes)* | **Longitude** *(East/West degrees, minutes)* | **Number/ Volume/ Type** *For dredged material, please provide 'in-situ cubic metres' AND 'dry weight tonnes'* |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

For dredged material, please briefly describe any conversion rates used for calculating disposal volumes:

7) Please specify the remaining permit quantity: _____

8) Additional comments:

9) Was monitoring of the disposal sites conducted during the reporting period? Yes ☐ No☐
If yes, please complete questions 10-13 of this form.

**Monitoring of the disposal sites**
If multiple sites were used, please specify the site codes in the response to questions 10-13.

10) What type(s) of field monitoring was undertaken?

Biological☐, Geological☐, Chemical☐, Physical☐, Other ☐ (explain)_____

11) When was field monitoring conducted?

Before dumping☐, During dumping☐, After Dumping☐, Other ☐ (explain, provide dates)

12) Where any adverse impact(s) found beyond those that were predicted? Yes☐, No☐
If yes, briefly describe the impacts (e.g. physical, chemical or biological) and their spatial or temporal variation.

13) Provide a website/URL link to Field Monitoring Reports, or any additional information.

# Appendix D: Independent Peer Review

RioTinto

# Amrun port and river facilities: long-term maintenance dredge management plan

Amrun | Independent Peer Review

0419 914 569

6 KITCHENER ST
NEDLANDS, WA 6009

**Attn: Glenn Woodrow**

Principal Advisor – Environment

Rio Tinto

Dear Glenn,

**Long-Term Maintenance Dredge Management Plan – Amrun Port and River Facilities**

**Close Out of Peer Review**

Thank you for the opportunity to provide a peer review of the Long-Term Maintenance Dredge Management Plan for the Amrun Port (the Plan). I have reviewed the responses provided to my initial review of an early draft of the Plan and am satisfied that they have dealt with the issues I raised. Based on the relatively low-risk nature of the maintenance dredging covered herein, Rev. H of the Plan provides an appropriate management document which, in my opinion, is compliant with the EPBC terms of reference and their intent.

Best Regards,

**Dr James A Stoddart**
CHIEF SCIENTIST

31 August 2020

# Amrun Port and River Facilities
# Long-term Maintenance Dredge Management Plan 2021-2031
# Independent Peer Review

**Document Reviewed**: Amrun Port and River Facilities: Long-term Maintenance Dredge Management Plan 2021 - 2031.

**Version**: Draft Rev. H, 31 August 2020

**Independent Peer Reviewer**: Dr James Stoddart
Date of Review: 31 August 2020

**Scope of Review**:
Condition 60 of EPBC Approval 2010/5642 requires Rio Tinto Weipa Pty Ltd (RTAW) to obtain an Independent Peer Review of certain criteria relating to their Long-term Maintenance Dredge Management Plan (LMDMP) for the Amrun Project at South Embley in northern Queensland. On 24 July 2019, RTAW obtained approval from the Department of the Environment and Energy (on behalf of the Minster for the Environment) for the terms of reference of that Independent Peer Review and for Dr James Stoddart to act as the reviewer.

This review has considered the document referenced above, supported by the following documents:

*Amrun Port Maintenance Dredging - Marine Environmental Monitoring Plan*; Rev.5, 5 May 2020 (the MEMP)

This document presents an Executive Summary of the Independent Peer Review findings followed by a detailed treatment of each review criterion.

Note:
The terms of reference agreed for this review are stated to be for a review of the Amrun Maintenance Dredge Management Plan (MDMP), however, the plan reviewed was the Long-term Maintenance Dredge Management Plan (LMDMP). By their nature, 'Long-term' plans provide a framework to produce specific plans for maintenance campaigns. While some of the terms of reference relate specifically to long-term plan requirements, others are more focussed on the level of detail that would be found in a specific plans for actual campaigns. In the case of these latter criteria, the review has focussed on the likelihood that the framework of the LMDMP will result in inclusion of requirements in the individual MDMPs that would be compliant with the terms of reference.

**Conduct of the Review**:
The review was undertaken on a desktop basis from documents supplied by RTAW and NQBP. An earlier version of the LMDMP (Rev. B) was reviewed and Rev. H has been adapted to respond to comments made on Rev. B. This review addresses only Rev.H.

The review was undertaken consistent with the EPBC Approval definitions relating peer review, stated as:

*Independent/ly Peer reviewed/ Independent Peer Reviewer – assessment of the assumptions, calculations, extrapolations, alternate interpretations, methodologies, performance goals and performance criteria, and conclusions pertaining to the management plans/strategies/programs by a person/organisation/technical committee, independent of the approval holder and/or employed in any subsidiary company of the approval holder.*

*This person/organisation/technical committee must have demonstrated expertise in the matter of national environmental significance being reviewed and be approved by the Minister prior to commencement of the review.*

**Limitations of this Review**:
Assessment of calculations relating to project design components as provided in the Plan, and calculations within the supporting documents have been accepted as correct. An independent assessment of the basis of these numbers would require detailed review of project documents by an expert in project engineering. This has been considered to be beyond the scope normally included for an environmentally focused Peer Review.

**Findings**:

Assessment categories
*Compliant*: meets the criterion without further change;
*Compliant with recommendation*: item meets the criterion but could be improved;
*Non-compliant*: item does not meet the criterion in part or whole. (text in red)

Table 1 contains the summary findings.
Table 2 contains rationale for findings.

Overall Assessment
Based on the relatively short dredging campaigns and low volumes of spoil described within the Plan, the LMDMP Rev. H is fit for the purpose for which it is intended and compliant with the Terms of Reference provided for this Independent Peer Review.

**TABLE 1: Findings of the Independent Peer Review**

| # | Criterion from Terms of Reference | Finding |
|---|---|---|
| 1 | identifies avoidance and mitigation measures for impacts associated with maintenance dredging activities on the Commonwealth Marine Area, listed turtle species, listed dolphin species, Dugong and Bryde's Whale; | Compliant |
| 2 | is consistent with relevant management measures contained in relevant threat abatement plans published by the Department of Environment and Energy; | Compliant |
| 3 | has been prepared in accordance with the most current version of the Australian Government National Assessment Guidelines for Dredging (2009); | Compliant |
| 4 | has been prepared in accordance with the most current version of the Long Term Monitoring and Management Plan Requirements for 10 year Permits to Dump Maintenance Dredge Material at Sea (July 2012); | Compliant |
| 5 | has generally been prepared to align with the relevant broad principles of the Maintenance Dredging Strategy for Great Barrier Reef World Heritage Area Ports; | Compliant |
| 6 | demonstrates that in developing the plan all feasible options to reuse or dispose of the dredged material have been properly considered and evaluated; | Compliant |
| 7 | contains a framework to ensure compliance with the conditions of permit(s) obtained under the *Environment Protection (Sea Dumping) Act 1981;* | Compliant |
| 8 | details Traditional Owner employment opportunities, and mechanisms for reporting the number of local indigenous person/s actually employed in the implementation of the Amrun Maintenance Dredge Management Plan – Port and River as per EPBC Approval Condition 42); | Compliant |
| 9 | has been prepared in consultation with interested and affected stakeholders; and adequately identifies publication arrangements enabling access for interested persons | Compliant |

James A Stoddart
MScience Pty Ltd & Oceans Institute, University of Western Australia
31 August 2020

TABLE 2: Rationale for assigning review categories to criteria.

| Criterion and Rationale | LMDMP Section |
|---|---|
| *1: identifies avoidance and mitigation measures for impacts associated with maintenance dredging activities on the Commonwealth Marine Area, listed turtle species, listed dolphin species, Dugong and Bryde's Whale ;* | |
| ***Compliant***<br><br>Section 9 of the LMDMP sets out a framework for developing a plan (the Environmental Management Plan) for each maintenance dredging campaign to identify avoidance and mitigation measures relevant to that campaign. The section within that framework which discusses mitigation of the impacts of turbidity suggests that management based on thresholds and triggers implemented within a monitoring program would be of little practical value. I agree with this statement for the short timeframe and scale of maintenance dredging campaigns described under this LDMDMP. | S 9.1 & 9.2 |
| 2: is consistent with relevant management measures contained in relevant threat abatement plans published by the Department of Environment and Energy; | |
| ***Compliant***<br><br>The only Threat Abatement Plan approved, or in draft on the DotEE website at the time of review was:<br>Threat abatement plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans – 2018<br><br>Waste management is listed as a heading for each campaign EMP to address. | S. 9.2 |

| Criterion and Rationale | LMDMP Section |
|---|---|
| *3: has been prepared in accordance with the most current version of the Australian Government National Assessment Guidelines for Dredging (2009);* | |
| ***Compliant***<br><br>The layout and content of the LMDMP is consistent with the current version of the NAGD. The section on alternatives to ocean disposal is particularly strong and presents a good model for other areas where maintenance dredging occurs. | Throughout |
| *4. has been prepared in accordance with the most current version of the Long Term Monitoring and Management Plan Requirements for 10 year Permits to Dump Maintenance Dredge Material at Sea (July 2012);* | |
| ***Compliant***<br><br>Cells below refer to the requirements listed within the 2012 guidelines. Requirements below have been paraphrased for brevity and should be referred to the original document for more detailed information. My paraphrasing of requirements is shown in *[ ]* with my assessment following each. | |
| *[- Explain how the plan fits within the overall management of the port:]* Predicted requirements for maintenance dredging at both Amrun Port and the River Port are described based on a detailed review of past dredging and sedimentation studies for the area. | S.5 |
| *[- Describe the dredging activity, the material for disposal and the spoil grounds:]* – A summary is provided of a September 2017 survey of potential dredge material and a requirement is listed for surveys to be conducted every 5 years. Events which would cause a shorter frequency of sampling are set out appropriately. | S.5.1 |

| Criterion and Rationale | LMDMP Section |
|---|---|
| *[- Describe the existing environment and potential impacts:]* – Environmental values for the relevant marine areas have been well studied over some years and are described. While it is difficult to conduct an accurate risk assessment without a specific project, the generic assessment presented here provides an adequate basis for management planning – and specifically requires a new assessment if a maintenance campaign is outside of these parameters. It might add value to future operations here if some auditing of whether predictions were met was conducted after each campaign. (see next item) | S.3, S.8, MEMP |
| *[- Describe the management strategies and actions and how they will be supported by monitoring:]* As described earlier, management actions are specified generically in a framework management plan and will not be fully specified until campaign-specific EMPs are developed.<br><br>The LDMDMP and supporting documents suggest that the impacts of small-scale maintenance dredging (as described here) are understood sufficiently to justify no "impact monitoring" | S.10, MEMP |
| *[- Describe contingency plans for emergency dredging and what will happen if additional testing discovers sediments unfit for disposal:]* Previous cyclonic impacts on the need for maintenance dredging have been reviewed and the conclusion that the current program should not require an 'Emergency Dredging" scenario appears justified. | S. 7.1 |
| *[- How will sediment quality information be kept current over the life of the permit and is there an approved SAP;]* The LMDMP sets out the current and historic sediment quality within the Port and outlines how that will be kept current. The MEMP provides further details on likely sampling regimes. | S. 5.1, MEMP |
| *[- Outline a reporting and documentation strategy including actions to report non-compliances;]* Section 11 sets out a requirement for reporting non-compliances, however, it would help if this was consolidated as a specific section in the draft EMP (the current draft has a header but no details). The EMP will be a primary operational document and should hold that procedure. | S.9.2, S.11 |
| *[- State when reviews will occur and how the Plan may be improved over time:]* Audits to be conducted following each campaign, with consultation from the TACC should be sufficient to fill this requirement. The LMDMP is also reviewed for consistency as new conditions from the Sea Dumping Permit may arise. | S.11, S1.2 |
| *[- Set out details of the TACC and its operation:]* The BPDTAG has been established to fill the TACC role.The membership and function of that group is well described and its role in consultation is discussed. | S.4 |

| Criterion and Rationale | LMDMP Section |
|---|---|
| *[ - Specify how the Plan is to be published.]* – The LMDMP is to be published and kept current on the Rio Tinto website. | S.1.2 |
| *5. has generally been prepared to align with the relevant broad principles of the Maintenance Dredging Strategy for Great Barrier Reef World Heritage Area Ports;* | |
| ***Compliant***<br><br>Cells below refer to the requirements listed within the 2012 guidelines. Requirements below have been paraphrased for brevity and should be referred to the original document for more detailed information. My paraphrasing of requirements is shown in *[ ]* with my assessment following each. | |
| *[Principle 1 – Develop LMDMPs]* – The document reviewed is an LMDMP consistent with guidelines for long term planning. | LMDMP |
| *[Principle 2: Develop the knowledge base]* – The LMDMP and the Sustainable Sediment Management studies undertaken in its support provide a considerable amount of new knowledge and a synthesis of past knowledge on the mechanisms appropriate to dredging and spoil management in the area. In addition, the ambient monitoring program seeks to improve understanding of the local environment. | S.5, S.6, MEMP |
| *[Principle 3: Avoid or minimise the need for maintenance dredging]* – The Sustainable Sediment Management study describes the processes leading to the need for maintenance dredging in this area, but does not consider whether there may be practical measures available to reduce the volume of sediment requiring dredging. Principle 3 is qualified that avoidance of a requirement for maintenance dredging is best addressed during planning for capital dredging and may not be practical at later stages. | S.5, S.6 |
| *[Principle 4: Limit volumes]* – The Plan is clear throughout that it only covers maintenance and not capital dredging. | S.1, S2. |
| *[Principle 5: Maintenance dredging not to be capital dredging]* – As above – the plan is clear in targeting maintenance of existing infrastructure. | S.1, S2. |
| *[Principle 6: Beneficial reuse ]* – The sustainable sediment management study provides a sound basis for evaluating beneficial reuse of sediments. | S. 6 |

| Criterion and Rationale | LMDMP Section |
|---|---|
| *[Principle 7: Comply with NAGD 2009]* – The layout and content of the LMDMP is consistent with the current version of the NAGD. The section on alternatives to ocean disposal is particularly strong and presents a good model for other areas where maintenance dredging occurs. | Throughout |
| *[Principle 8: Show a consultative, comparative risk-based analysis of maintenance dredging]* – Considerable consultation with the BPDTAG and Traditional Owners is described and a risk-based analysis has been conducted for a generic case. | S.4, S.8 |
| *[Principle 9: Justify dredging plant and operational approach]* – This will form part of individual campaigns. General environmental specifications are set out for dredging plant in the LMDMP, but only consider a trailer suction hopper dredge. There is no discussion as to whether a backhoe dredger could be used in some locations | S.9.2 |
| *[Principle 10: New plant or methods must be justified on improved environmental performance]* – Not relevant: No new plant or methods are specified. | |
| *[Principle 11: Identify environmental windows]* – Environmental windows (either windows for dredging or avoiding dredging) are described as unlikely to be relevant. However, the Plan sets out that timing of dredging should be developed for an individual EMP and specifies that the need for environmental windows should be examined. This is an appropriate response in a plan that needs to cover a range of dredging scenarios. | S.9.2 |
| *[Principle 12: Cumulative impacts, offsets, net benefits]* – This principle is more relevant to the GBR than in this part of the Gulf. The prediction within the LMDMP is for minor impacts which would not rate an offsets program. | |
| *[Principle 13: risk-based monitoring programs]* – The selection of monitoring programs has been made on the basis of an environmental risk assessment. | S.9.2 |
| *[Principle 14: use leading practice management]* – The work done around sustainable use of sediments and understanding the sedimentary regime of the port area would classify as leading practice. Its use here should be an example for other projects. | S.5, S.6 |

| Criterion and Rationale | LMDMP Section |
|---|---|
| *[Principle 15: make reporting available]* – Regular updates are to be provided to the BPDTAG and as part of the Performance Review, annual reports will be made available on the Rio website to update other stakeholders. | S.11 |
| *[Principle 16: provide stakeholders access to monitoring results]* – Regular updates are to be provided to the BPDTAG and as part of the Performance Review. It is assumed those updates will include monitoring. | S.11 |
| *[Principle 17: Review this strategy]* – Review of the GBRWHAP Dredging Strategy is not applicable to any individual LMDMP. | |
| *6: demonstrates that in developing the plan all feasible options to reuse or dispose of the dredged material have been properly considered and evaluated;* | |
| ***Compliant***<br><br>The LMDMP sets out the detailed process which has been undertaken to consider sustainable management of sediment from maintenance dredging for both Weipa and Amrun Ports. The variety of options considered and the results are well-supported by a series of reports from studies underpinning this work. | S.5, S.6 |
| *7: contains a framework to ensure compliance with the conditions of permit(s) obtained under the* Environment Protection (Sea Dumping) Act 1981; | |
| ***Compliant***<br><br>The LMDMP sets out the various instruments imposing conditions on the conduct of dredging. The Sea Dumping Permit is explicitly listed in the framework for developing campaign specific EMPs. | S.9.2 |

| Criterion and Rationale | LMDMP Section |
|---|---|
| *8: details Traditional Owner employment opportunities, and mechanisms for reporting the number of local indigenous person/s actually employed in the implementation of the Amrun Maintenance Dredge Management Plan – Port and River as per EPBC Approval Condition 42);* | |
| ***Compliant***<br><br>Employment opportunities for Traditional Owners and mechanisms for identifying these are set out and reference is made to the structure for reporting the success of employment and training schemes. | S. 4.3 |
| 9: has been prepared in consultation with interested and affected stakeholders; and adequately identifies publication arrangements enabling access for interested persons. | |
| ***Compliant***<br><br>Consultation with the BPDTAG and Traditional Owners is documented in the LMDMP. The LMDMP is to be published on the Rio website and annual performance reports are to be made available on the website. | S.4, S.1.2, S.11 |