

Rio Tinto Alcan Weipa

# Inshore Dolphin Offset Strategy South of Embley Project

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**RioTintoAlcan**



**DOCUMENT CONTROL**

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## 1 PURPOSE

This South of Embley Project (SoE Project) Inshore Dolphin Offset Strategy (the Strategy) documents the survey program to be conducted on the Australian snubfin dolphin (*Orcaella heinsohni*) and the Australian humpback dolphin (*Sousa sahulensis*) within the vicinity of the SoE Project area (Figure 1)

The Strategy has been prepared to address Conditions 49 to 55 of the SoE Project approval (EPBC 2010/5642) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Strategy has been designed to achieve the following:

- obtain knowledge about the distribution and abundance of local and regional populations of Australian snubfin and Australian humpback dolphins in the Western Cape York area (Condition 49);
- identify habitat utilised by these species (Condition 49);
- describe surveys to be undertaken in the marine environment between the latitudes 12.60°S and 13.35°S (Condition 50);
- provide scheduling in support of surveys being undertaken prior to construction, during construction and after construction of the Boyd Port and river facilities (Condition 50);
- contribute to the independent research on Australian snubfin and Australian humpback dolphins (Condition 51);
- specify targeted outcomes, benchmarks and readily measureable performance indicators and goals, and timeframes for reporting and implementation (Condition 51);
- identify the persons responsible for implementing the Strategy (Condition 51);
- provide information on Traditional Owner employment opportunities associated with the implementation of the Strategy (Condition 51);
- identify the mechanisms that will be used to report the number of local indigenous persons actually employed in the implementation of this SoE Strategy (Condition 51).

Survey findings that result from implementation of this Strategy will be used to inform the Marine and Shipping Management Plan for the operational phase of the SoE Project on an on-going basis (Condition 54).

This Strategy has been developed by Rio Tinto Alcan (RTA) for implementation on the SoE Project in consultation with the Commonwealth Department of the Environment (DoE) (Condition 52).

RTA has committed to fund the implementation of this Strategy at a minimum of \$800,000 (GST exclusive) to a maximum of \$1,200,000 (GST exclusive) (Condition 53).

## 2 BACKGROUND

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

### 2.1. Regulatory Requirements

The SoE Project (EPBC 2010/5642) was approved, with conditions, on 14 May 2013 by the Minister for Sustainability, Environment, Water, Population and Communities (now Minister for the Environment). The approval (varied 3 June 2014) requires an Inshore Dolphin Offset Strategy to be prepared and submitted to the Minister for approval at least six months prior to the commencement of construction works (such work excludes preliminary works) (Condition 55). The Strategy must be approved by the Minister prior to the commencement of construction works (i.e. before commencement of the “action”). The conditions relating to the Inshore Dolphin Offset Strategy, and where they are addressed in this document, are outlined in **Table 1**.

Table 1 Inshore Dolphin Offset Strategy EPBC Act Approval Conditions

Condition	Addressed in this Management Plan
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 7
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 the conditions specified in this approval.	Section 3.3
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 <b>listed dolphin species</b> in the Western Cape York area, and identification of habitat utilised by <b>listed dolphin species</b> .	This document
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 <b>construction</b> , during <b>construction</b> and periodically after <b>construction</b> (for a minimum period of 13 years following the commencement of <b>construction</b> , but not necessarily every year) of the Boyd Port and river facilities.	Section 3

Condition	Addressed in this Management Plan
51. The Inshore Dolphin Offset Strategy must contribute to independent research on <b>listed dolphin species</b> , 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).	Sections 3 to 7
52. The Inshore Dolphin Offset Strategy must be developed in consultation with the <b>department</b> .	Section 1
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).	Section 1
54. The findings from the Inshore Dolphin Offset Strategy, including corrective actions and contingency measures relating to <b>operations</b> , must be used to inform the Marine and Shipping Management Plan on an ongoing basis.	Sections 4 to 7
55. The Inshore Dolphin Offset Strategy must be submitted to the <b>Minister</b> for approval at least 6 months prior to the <b>commencement of the action</b> . The <b>commencement of the action</b> must not occur until the Inshore Dolphin Offset Strategy has been approved by the <b>Minister</b> .	Section 1

## 2.2. SoE Project Summary

The SoE Project involves the construction and operation of a bauxite mine and associated processing and port facilities for shipping of bauxite to Gladstone and international markets. The SoE Project involves a staged increase in production up to 50 million dry product tonnes per annum (Mdptpa) of bauxite. The initial production is likely to be approximately 22.5Mdptpa. Actual production rates and the timing and size of capacity expansions will depend on market conditions. The anticipated mine life is approximately 40 years, depending on production rates.

The SoE Project is located near Boyd Point on the western side of Cape York Peninsula (refer Figure 1). Detailed information on the SoE Project is presented in the *South of Embley Project Environmental Impact Statement* (RTA Weipa, 2013).

The main components of the SoE Project associated with this Strategy are illustrated in Figure 1 and summarised below:

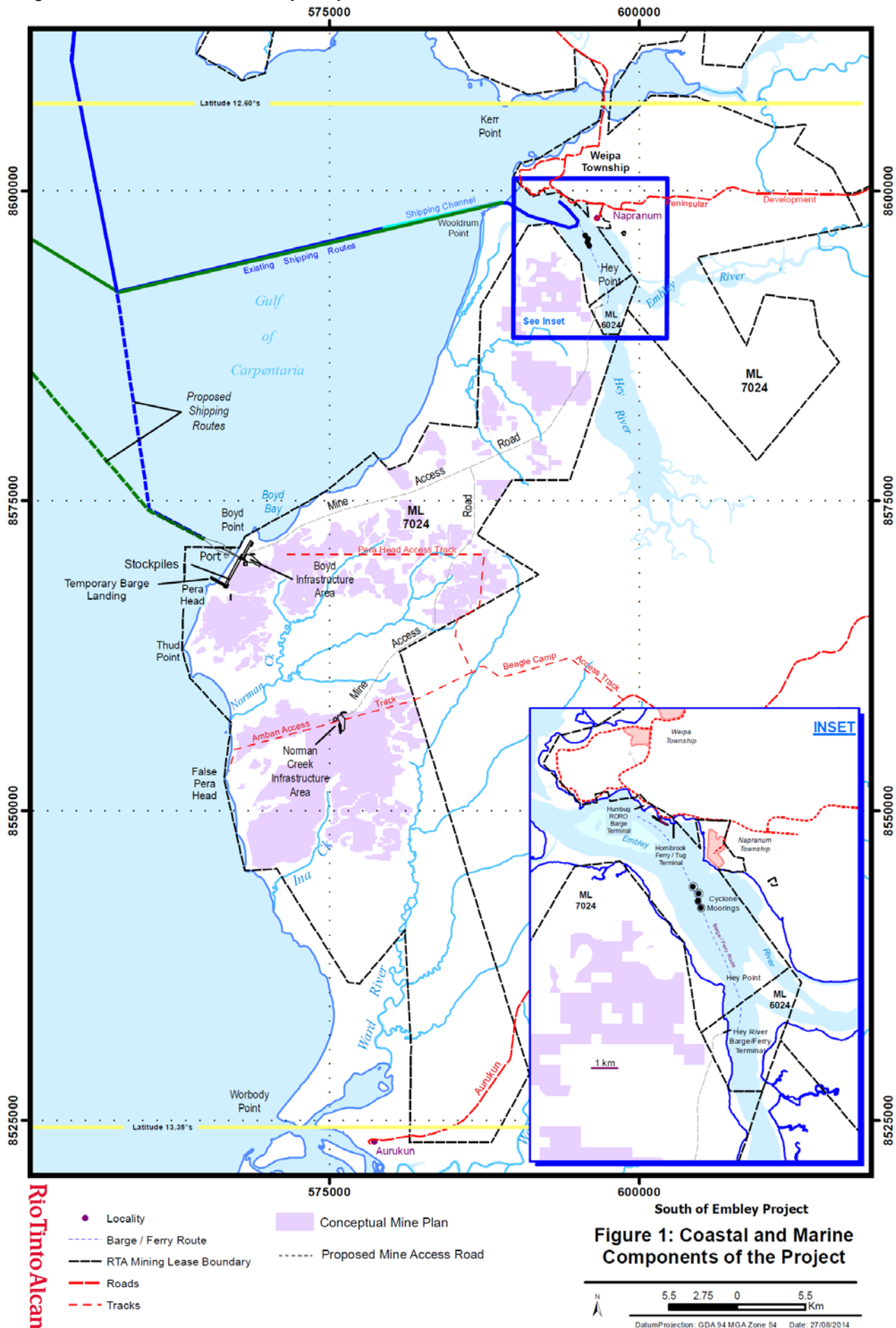
- **barge, ferry and tug facilities** – the construction and operation of a new ferry and tug terminal at Hornibrook Point, a roll on/roll off barge facility at Humbug Wharf, a new barge and ferry terminal on the western bank of the Hey River, and for the initial construction phase, temporary barge and ferry access near the Boyd Port and temporary berthing facilities at the Humbug and Hey River sites. Approximately 8 to 10 months following the commencement of construction, the Humbug and Hey River terminals will be completed and regular passenger ferry services will commence as well as the transport of Project equipment and materials;
- **port and ship-loading facilities** – the construction and operation of Boyd Port, ship-loading and tug mooring facilities between Boyd Point and Pera Head. Works will include a jetty, bulk carrier vessel wharf and berthing structures, tug and line boat moorings, ship-loader and dredging of berth pockets and departure areas;
- **shipping activities** – the transport of bauxite in bulk carriers from Boyd Port to international locations as well as continuing bauxite shipping to the Port of Gladstone, and the transport of cargo and fuel for the Project from international and domestic locations to the existing port of Weipa.

The initial construction phase of the SoE Project is expected to take approximately 30 to 36 months. This is likely to vary as weather conditions or construction progress may accelerate, or delay, various stages.

The Port of Weipa will continue to receive deliveries of fuel, cargo, and equipment for the SoE Project at the Humbug, Evans Landing, and Lorim Point wharves from domestic (mostly the Port of Cairns) and international ports. Materials will then be transferred either to vehicles or smaller barges as required for transport to the SoE Project area. Some construction phase deliveries, such as construction materials and equipment modules, may be made directly to the Boyd Port site or the barge/ferry terminal sites. As such, while direct construction works may occur within the Project area, indirect impacts may occur across a broader geography.



Figure 1 South of Embley Project Site





## 3 INSHORE DOLPHIN OFFSET STRATEGY

### 3.1. Inshore Dolphin Strategy Objectives

The inshore dolphin surveys outlined in this Strategy have two principal objectives:

- provide a better understanding of the distribution, habitat use and abundance of Australian snubfin and Australian humpback dolphins within the study area.
- contribute information towards the '*Coordinated research framework to assess the national conservation status of Australian snubfin dolphins (*Orcaella heinsohni*) and other tropical inshore dolphins*' (hereafter referred to as the National Inshore Dolphin Strategy, Department of Environment (2013)).

The web link to this strategy is provided below.

[http://www.marinemammals.gov.au/\\_\\_data/assets/pdf\\_file/0018/122670/DSEWPaC\\_Research\\_Framework\\_InshoreDolphins\\_FINAL.pdf](http://www.marinemammals.gov.au/__data/assets/pdf_file/0018/122670/DSEWPaC_Research_Framework_InshoreDolphins_FINAL.pdf)

Methods to address both objectives have been described in detail in '*Methods for assessment of the conservation status of Australian inshore dolphins*' (hereafter referred to as the Methods Document: Brooks et al. 2014). The sampling design for the Strategy will closely follow the survey designs and protocols recommended in the Methods Document (see Brooks et al. 2014).

### 3.2. Survey Design

#### 3.2.1. Background

The Australian snubfin dolphin (*Orcaella heinsohni*) and Australian humpback dolphin (*Sousa sahulensis*) are tropical inshore dolphins of northern Australia. Both are newly described species (2005 and 2014 respectively), thought to be endemic to northern Australia and possibly Papua New Guinea (Beasley et al. 2005, Jefferson and Rosenbaum 2014). These little-known dolphin species occur in small, localised populations in often remote regions of northern Australia, from the Fitzroy River on the east coast of Australia across to the Dampier Peninsula on the west coast. Both species are listed as migratory and Matters of National Environmental Significance in Australian legislation (Beasley et al. 2012, Allen et al. 2012, Bejder et al. 2012, Cagnazzi et al. 2013).

There is limited information available on inshore dolphins utilising Western Cape York. Dolphins were initially recorded in aerial surveys conducted by Marsh et al. (1998) along Western Cape York and the southern Gulf in 1997. During these surveys, 18 of the 64 dolphin groups (28%) sighted were confirmed to species, where:

- fourteen groups (78%) were bottlenose dolphins, in groups of up to 23 animals;
- two single Australian humpback dolphins were sighted (one near Albatross Bay and one north of Karumba);
- a group of seven snubfin dolphins were sighted near the Wellesly Islands, and another two groups in Port Musgrave.

In May and July 2013, Beasley and Golding (2014) conducted nine days of surveys in the Karumba region covering 832km. Eleven dolphin groups were sighted consisting of nine Australian humpback dolphin groups (total group size = 37), one bottlenose dolphin group (total group size = 3) and one group of unknown species – probably humpback dolphins (total group size = 3).

Incidental observations undertaken during habitat mapping at the proposed SoE port site between 2007 and 2010 confirmed the presence of Australian snubfin dolphins and Australian humpback dolphins in the area (RTA Weipa, 2013, Figure 9-6). A nine-day cetacean survey in August 2012 over approximately 220km<sup>2</sup> confirmed the presence of Australian humpback dolphins within the Embley River estuary (14 individuals) and at Boyd Point (four individuals) (RTA Weipa, 2013, Section 9.5.2.3). The Australian snubfin dolphin was not observed in the August 2012 survey. Accordingly, for this Strategy, local inshore dolphin populations are considered to be those that utilise the Boyd Point SoE Project area, while regional inshore dolphin populations are those that utilise some part of the remaining study area.

### 3.2.2. Design Summary

The Strategy survey design has been developed based on best-practice inshore dolphin survey recommendations (Dawson et al. 2008; Brooks et al. 2014; Brooks and Pollock 2014). This is the first intensive study of inshore dolphins along Western Cape York, so dolphin sighting rates, dolphin behaviour, and the logistical difficulties of surveys are largely unknown. Each of these factors may affect the potential success of surveys, and are subsequently discussed within the Strategy. Covering the large study area within the logistical and financial constraints requires some prioritisation of Strategy objectives. Obtaining information on broad-scale occurrence, distribution and habitat use/preferences within the study area has been determined as the highest priority for the Strategy, at least initially. Accordingly, the survey design focuses primarily on achieving this objective, while also seeking to collect data that will obtain absolute abundance estimates of each species. These data will directly contribute to Objective 2 of the National Inshore Dolphin Strategy.

Although the sampling design for occupancy studies (Objective 1 of the National Inshore Dolphin Strategy (Department of Environment (2013))) is described within the Methods Document, the occupancy design cannot be implemented as part of the Strategy until a co-ordinated sampling framework is developed for Queensland.

Trends in seasonal occupancy have not been determined for this region, however, an intensive study of inshore dolphins in the Darwin region (i.e. Darwin and Bynoe Harbours and Shoal Bay) conducted over dry and wet seasons from October 2011-March 2014 concluded that estimates of Australian humpback and Indo-Pacific bottlenose dolphin abundance were relatively stable between seasons, while Australian snubfin dolphin sightings were irregular and varied between sampling occasions (Brooks and Pollock 2014). As a result of difficulties with identifying seasonal differences because of the apparent high site fidelity of individuals, this Strategy has been structured to prioritise collection of primary samples from annual sampling events. These events should be scheduled during the same month(s) each year, targeting the calmest sea conditions (i.e. September-November). This will provide a sampling program that, irrespective of any seasonal differences, will enable abundance estimates, distribution and habitat use data to be appropriately compared between years, and between construction phases.

As discussed in Brooks et al. (2014) even with relatively unbiased and precise estimates, detecting population size changes in small populations (i.e. <100 individuals) is extremely difficult in a short amount of time (i.e. a few years) unless these changes are major (i.e., in the order of >20% per annum) (Taylor et al. 2007). Thus, the power to detect a decline in abundance decreases as populations become smaller. Australian snubfin and Australian humpback dolphins are known to occur in relatively small, isolated, populations making detection of change in populations difficult.

As this is the first intensive study of inshore dolphins along Western Cape York, it is important that power analyses are conducted after pre-construction surveys and the resulting estimates used to gauge the power to detect any trend, and inform the survey effort required for future survey events. A power analysis using the programme TRENDS Windows Version 3.0 (Gerodette 1987; 1993), or similar, should be conducted to estimate the probability of detecting trends in abundance estimates obtained as part of the Strategy.

Brooks et al. (2014) recommend selecting sites in pairs, to compare trends for sites potentially subject to substantial anthropogenic impact with comparable sites that are not. Apart from activities associated with the existing Port of Weipa, which is operated by North Queensland Bulk Ports in the Embley River estuary, the marine ecosystem adjacent the Project area is effectively unmodified (RTA Weipa, 2013). Prawn trawling, commercial fishing and recreational fishing are carried out in the marine areas surrounding the SoE Project area. While the proposed Hey River, Hornibrook and Humbug terminals are located adjacent to existing wharf structures, the proposed Port site (between Boyd Point and Pera Head) has no existing infrastructure and no specific existing land use. The area south of Thud Point, including the Archer, Ward and Watson Rivers (collectively referred to as the Aurukun Estuary in the Strategy) currently has limited anthropogenic influence, and construction is not planned for this region.

Therefore, throughout the Project, the proposed study design will provide comparable results for areas subject to:

- existing Project related anthropogenic impacts (i.e. Port of Weipa) – Site 1;
- planned Project related anthropogenic impacts as part of the SoE Project (Boyd Point) – Site 2;
- a comparable site that is not subject to Project related anthropogenic impacts (i.e. Aurukun Estuary) – Site 3.

### 3.2.3. Capture-Recapture Robust Design

The survey design for the Strategy will systematically cover the study area between latitudes 12.60°S and 13.35°S. Vessel-based surveys will be conducted out to 15km from the coast, covering water depths of at least 1-25m, and at least 15km upstream major rivers in both the Weipa and Aurukun Estuary systems. The survey design has been developed using principles outlined in Dawson et al. (2008), and following accepted methods used for other inshore dolphin surveys (Balmer et al. 2008; Rosel et al. 2011; Beasley et al. 2013; Smith et al. 2013), with consideration of survey design principles based on Brooks et al. (2014) and Brooks and Pollock (2014).

As discussed in Brooks and Pollock (2014), given that impacted and non-impacted sites will be selected for sampling, a Multistate Robust Design model is recommended (Nichols and Coffman. 1999, Kendall and Nichols 2002, Kendall 2013), which is an extension of the Closed Robust Design model (Pollock 1982, Pollock et al. 1990, Kendall et al. 1995, Kendall and Nichols 1995, Kendall et al. 1997) and the multistate model for recapture data (Arnason 1972; 1973, Brownie et al. 1993, Schwarz et al. 1993).

Following recommendations for selecting paired sites for sampling (Brooks et al. 2014), the study area will be separated into three sites (refer Figure 2):

- **Site 1** - Port of Weipa/Embley Estuary south to the tip of the RTA mining lease, including the Embley Estuary (existing anthropogenic impact);
- **Site 2** - From the tip of the RTA mining lease south to Thud Point (SoE construction site);
- **Site 3** - South of Thud Point, including the Archer, Ward and Watson River systems (un-impacted site).

Transit lines that run parallel to the coast will be placed between these sites, spaced 2km apart. These transit lines are designed to provide less intensive coverage of areas between sites, providing information on habitat use and movements between sites.

Encounter rates and abundance estimates will be calculated for each species for each site, with consideration of sites being combined if sample size is inadequate (Brooks and Pollock 2014). To achieve systematic survey across all three sites inshore and offshore transects should be surveyed. Transect location will be influenced by habitat, water depth, on site observations and survey time-frames. Indicative transects are visually represented on Figure 2 and may vary according to program implementation requirements.

Data collection under this survey plan will be based on photo-identification of individual dolphins within a capture-recapture model for estimating abundance. Using this method, individual dolphins will be identified from photographs based on patterns of nicks and notches on the leading and trailing edges of the dorsal fin which are visible from both sides of the individuals, which results in a database of individuals (Würsig and Jefferson 1990; Urian et al. 1999; Brown et al. 2014, Brooks and Pollock 2014).

Capture-recapture analysis will be undertaken in the programs MARK (White and Burnham 1999) and POPAN (on collapsed data), as required. As discussed by Brown et al. (2014), in order for the closed capture-recapture estimate to be robust, the basic assumptions are that:

1. all individuals have equal probability of being captured within a sampling occasion (secondary sample);
2. capture and recapture probabilities are equal (i.e. no trap response);
3. marks are unique, permanent and identified correctly;
4. the sampling occasion (secondary sample) is instantaneous;
5. the population is closed to immigration and emigration during the sampling period;
6. each individual's probability of capture is independent of all others;
7. all individuals have equal probability of survival between sampling occasions.

There is a reasonably high likelihood that assumption 5 (the population is closed to immigration and emigration during the sampling period) will be violated because of dolphin movements in and out of the study area. The importance of incorporating temporary emigration into capture-recapture studies to accurately estimate abundance of inshore dolphins has been demonstrated in other studies and will be applicable for this Strategy (Nicholson et al. 2012; Smith et al. 2013).

In capture-recapture analysis, two potential sources of bias are misidentification of individuals and heterogeneity in capture probability (Friday et al. 2000; Gowans and Whitehead 2001; Nicholson et al. 2012; Brown et al. 2014). When using photo-identification as a method of capture, these sources of bias can be addressed through appropriate grading of photographs and scoring of images for quality and distinctiveness of individuals, respectively (Brown et al. 2014). The methods for grading and scoring will follow established methods (Urian et al. 1999, Rosel et al. 2011, Nicholson et al. 2012, Tyne et al. 2014, Brown et al. 2014) and will be described in the associated Strategy protocols document. The proportion of unmarked individuals in the population will subsequently be calculated based on established methods and included in the abundance estimate (Wilson et al. 1999, William et al. 2002, Burnham et al. 1987).

Adopting the Multistate Robust Design recommended by Brooks et al. (2014) provides a data collection framework that will enable analysis across a combination of open and closed population models to allow abundance to be accurately estimated in the presence of heterogeneity for each primary sampling event. The design will also allow apparent survival and temporary emigration to be estimated between primary sampling events (Kendall et al. 1995; 1997, Kendall and Nichols 1995).

### 3.2.4. Sampling Intensity – Primary Samples

To achieve robust estimates of absolute abundance, it is necessary to carefully consider survey design and sampling intensity. Using a Robust Design, sampling consists of a primary sampling event, with a pre-determined number of secondary sampling events within the primary event.

At a minimum, an abundance estimate may be obtained from one primary sample using a closed population model, and two primary samples using a Robust Design. However, as discussed in Brooks et al. (2014), the model becomes increasingly informative about rates of apparent survival and temporary emigration as the number of primary samples increases. As recommended by Brooks et al. (2014), in order to maximise the potential to obtain reliable estimates of abundance, apparent survival and temporary emigration, at least five primary samples will be conducted within this Strategy, consisting of:

- one pre-construction survey;
- one survey during each year of construction (maximum three years), preferably during the same month each year to avoid confounding observations by introducing a temporal variable;
- at least one post-construction survey, to be conducted during the operational phase (i.e. once the port is fully operational).

As discussed above, as a result of small inshore dolphin population sizes (Beasley et al. 2012), the subsequent difficulty to detect seasonal differences (Parra et al. 2006a, DoE 2013), and apparent lack of seasonal differences in well-studied inshore dolphin populations (Brooks and Pollock 2014), it is recommended that surveys are conducted at the same time each year, rather than conducting two surveys in a year in an attempt to detect seasonal differences. This design will mean that regardless of seasonal differences, reliable abundance estimates could be compared between years. The primary samples would ideally be scheduled for the best predicted weather month(s) (i.e. calm seas), to ensure that there are limited delays caused by poor weather, and to increase capture probabilities as a result of searching for dolphins in calm sea conditions (Dawson et al. 2008).

In order to potentially lengthen the post-construction sampling time-frame, analysis of the pre-construction and construction survey data will provide indication of whether post-construction surveys could be undertaken using two primary sampling events over two years, consisting of two (rather than four) secondary samples a year. Such a design may be justified if capture rates using four secondary samples (i.e. collapsing these four secondary samples into one sample) have been insufficient to obtain reliable abundance estimates. The survey design would then revert to comparing relative abundance, distribution and habitat use post-construction. Similar difficulties with obtaining abundance estimates have been described in Brooks and Pollock (2014), where irrespective of intensive survey effort, reliable estimates of Australian snubfin dolphin abundance have been difficult to obtain for the Darwin region.

### 3.2.5. Sampling Intensity – Secondary Samples

Following the Robust Design, pre-determined transects will be placed throughout the study area (secondary samples), with these transects being replicated a minimum number of times throughout a primary sampling event.

When using capture-recapture studies based on identification of animals from their natural marks (i.e. photo-identification), apparent behavioural response and individual heterogeneity may arise in the process of capturing marks, assessing mark quality, and assigning marks to individuals (matching). Modelling these forms of heterogeneity comes at the cost of requiring more secondary samples within each primary sample (Brooks et al. 2014). Recent inshore dolphin capture-recapture studies have also recommended extended secondary samples and/or more boats to allow for assessment of the heterogeneity assumption, providing a basis for a meaningful



description of temporary emigration process and improvement of the precision of the estimates (Palmer et al. 2014). As a result of the large study area and logistical difficulties undertaken boat-based surveys along remote regions of Western Cape York, it is recommended that a minimum of three vessels are used daily to conduct surveys, preferably with one of these vessels being a live-aboard vessel.

As recommended in Brooks et al. (2014), in order to obtain absolute estimates of abundance using the Robust Design, sampling intensity for the Strategy should consist of at least four secondary samples per primary sample. However, a Robust Design model can be fitted to data on two secondary samples per primary sample, should it be necessary to collapse over secondary samples. All transects within a secondary sample must be completed before the next secondary sample begins.

Irrespective of contingencies to be pre-planned into the survey design, some flexibility may be required, in the event that:

- a large number of dolphin groups are sighted (i.e. more time is required for observations, photo-identification and analysis);
- dolphins are difficult to approach (i.e. difficulty to obtain photographs and more time is required for photographs);
- logistical difficulties are greater than anticipated (secondary samples take longer than expected).

As a result of this being the first dedicated study along Western Cape York determining broad-scale distribution and potentially important habitats are considered a higher initial priority that obtaining robust estimates of abundance (at least initially), although the survey design has maximised the potential to address both objectives.

Some flexibility was required in the survey design to adequately address both objectives and increase capture probabilities, where:

- survey effort was intensified within sites;
- survey lines were not placed within a 15km stretch of coast between Site 1 and Site 2, and a 15km stretch of coast between Site 2 and Site 3 in order to clearly delineate sites, and enable survey effort to be intensified within sites;
- transit lines were placed between sites (spaced 2km apart), in order to obtain some information on habitat preferences and movements between sites;

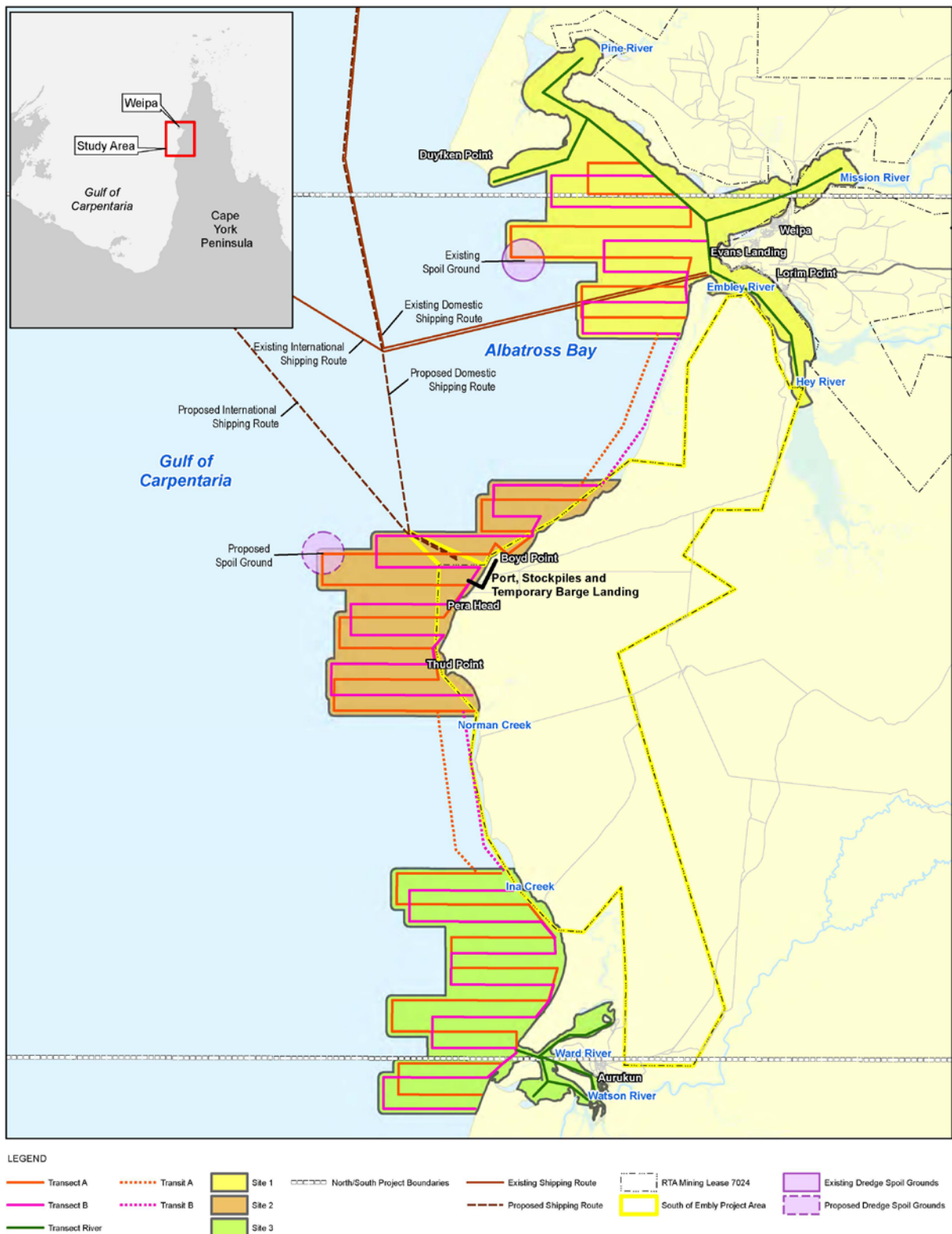
### 3.2.6. Vessel-based Sampling Protocol

A systematic sampling design using vessel-based surveys will facilitate collection of required data across the study area, from latitude 12.60°S (Weipa) to latitude 13.35°S (Aurukun). Surveys will provide relatively even coverage of the study area, be stratified within coastal, riverine and offshore waters, and sample a range of water depths (i.e. 1-25m).

The total straight-line distance from the northern-most to southern-most transect line is 95km, and total study area approximately 1,014km<sup>2</sup> (Figure 2), separated into:

- Site 1 – 410km<sup>2</sup>
- Site 2 – 287km<sup>2</sup>
- Site 3 – 317km<sup>2</sup>

Figure 2 Strategy Study Area Showing Sites and Indicative Survey Lines





The study area, total transect distance and survey coverage (assuming observers can reliably site dolphins an average of 250m from the transect line) for each site are shown in Table 2.

Table 2 Survey design calculations

Site area	Site Area (km <sup>2</sup> )	Transect Length (transect A + River) (km)	Transect Length (transect B + River) (km)	Proportion of area covered by transects (Transect A Length/Site Area)	Proportion of area covered by transects (Transect B Length/Site Area)
Site 1	410.4	154.5	147.4	0.4	0.4
Site 2	287.0	112.4	103.4	0.4	0.4
Site 3	316.9	137.5	129.2	0.4	0.4
		<b>404.4</b>	<b>380.0</b>		

Surveys will be required to be undertaken from vessels that have 360 degree viewing, with the viewing not obstructed by glass panels. As a result of safety and viewing requirements, the minimum vessel size recommended is 5.2m. There is no maximum vessel size, but larger vessels should only survey coastal waters, and not rivers or shallow estuarine systems.

Surveys will be undertaken at vessel speeds between 12-15km/hr, with a minimum of three observers per vessel. Observers should preferably have extensive previous experience with boat-based marine mammal surveys. Surveys will not be conducted in Beaufort State >3 (i.e. >11 knots wind speed). Monitoring protocols should follow those established for other inshore dolphin monitoring programs (Griffiths and Palmer 2012, Beasley 2013, Brown et al. 2014, Brooks and Pollock 2014).

Given the deficiency of baseline data on inshore dolphin distribution and habitat use for Western Cape York, it is important to systematically survey throughout the study area during pre-construction surveys, to determine whether there are areas of high inshore dolphin occurrence. If areas of high inshore dolphin occurrence are encountered, the survey design may change for subsequent construction surveys to focus effort in these areas, and reduce effort in the areas of low occurrence. These alterations will not affect comparisons of trends in abundance estimates, rather they are designed to improve the precision of estimates by enhancing capture probabilities. This would improve the power to detect changes in populations. An assessment of the adequacy of the survey design should be reviewed following collection of the pre-construction data.

Throughout all surveys, all vessel GPS tracks will be stored at 10 second (minimum) to one minute intervals (maximum), and survey data will be collected on (but not be limited to):

- total time on the water and kilometres travelled;
- total time conducting transects and kilometres travelled on transects;
- total kilometres searched on transect in each Beaufort state.

In addition to photographs for capture-recapture, data obtained from dolphin sightings will include (but not be limited to):

- sighting location;
- sighting date and time;
- beaufort state at time of sighting;
- species;
- group size;
- group composition (i.e. newborn, calf, juvenile, adult);
- unusual or interesting behaviour (i.e. sponge throwing, obvious feeding events);
- time spent observing dolphin group.

Environmental parameters such as depth, temperature, salinity, turbidity, pH, moon state and tide state will be collected by each survey team at pre-determined sites throughout the study area, as well as at sighting locations. This data will contribute to habitat preference studies, complement data collected from external sources, and provide new data where existing data does not exist.

In addition to dolphin sightings, additional data will be collected on all other cetacean species (i.e. baleen whales) and megafauna (i.e. dugong, turtles, large sharks, rays and sea-snakes) sighted during surveys, with associated information on (but not limited to):

- date and time sighted;
- number of individuals in group;
- group composition (i.e. newborn, juvenile, adult);
- depth;
- temperature.

In association with the Strategy, the following monitoring plan protocols will be developed prior to pre-construction surveys to standardise surveys throughout the project:

- boat-based survey protocols;
- observer protocols;
- data collection protocols;
- data entry protocols;
- photographic grading and analysis protocols;
- estimating the marked proportion of individuals;
- calculating encounter rates;
- data analysis protocols.

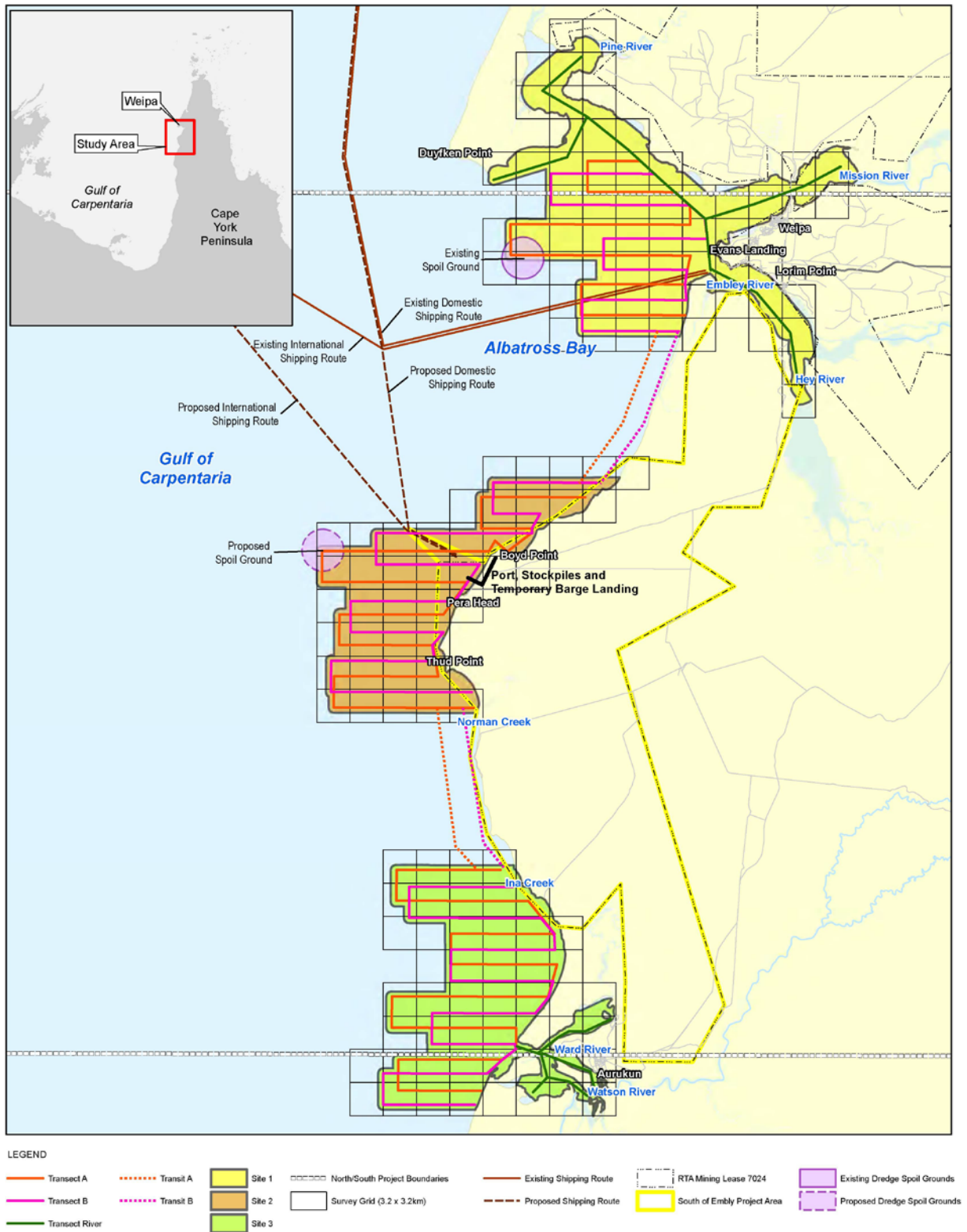
### 3.2.7. Habitat Preferences

A dolphin population may change the relative frequency that it uses different parts of its habitat according to habitat preferences and/or seasonal or other environmental variations (Brooks and Pollock 2014). Habitat preference studies for the Strategy will follow standard methodologies as described in Parra et al. (2006b), Redfern et al. (2006), Brooks et al. (2014) and Brooks and Pollock (2014), as appropriate.

Brooks and Pollock (2014) used a Binary Logistic Mixed Effects model to examine changes in the spatial habitat use of inshore dolphins in the Darwin Region, where a 3.2km x 3.2km grid was placed over a map of the three sites, and data on sightings of inshore dolphin groups and sampling intensity in each grid cell in each secondary sample were modelled. This analysis identified apparent habitat preferences in the local region, where Australian humpback dolphins were widely distributed, while Indo-Pacific bottlenose (*Tursiops aduncus*) and Australian snubfin dolphins preferred specific areas (Brooks and Pollock 2014). A similar 3.2km x 3.2km grid design is shown in Figure 3.

Given the limited information about inshore dolphin distribution, abundance and habitat preferences along the coast of Western Cape York, the sampling design will systematically cover the entire study area, including a broad-range of water depths, and habitat types to investigate habitat preferences. The survey design will build on existing knowledge of known habitat preferences based on east coast studies (Parra et al. 2006b); however, these habitat preferences are based on a limited sample size, and from only a few regions of known occurrence. There are also increasing indications that Australian snubfin dolphins may prefer deep-water areas adjacent to shallow coastal regions, such as in channels of deeper water (i.e. 10-20 m) in Roebuck Bay (Brown et al. 2014) and 20-30 m deep-water 'holes' between Vanderlin and Centre Islands, Gulf of Carpentaria (Isabel Beasley unpublished data).

Figure 3 Strategy Study Area Showing Sites and Indicative Survey Lines, With 3.2km x 3.2km Grids for Indicative Habitat Analysis



### 3.2.8. Training Workshops

Prior to boat-based surveys being undertaken, a minimum two-day training workshop will be held for all project personnel joining surveys, including Indigenous participants. Training will ideally follow existing inshore dolphin survey training formats, which have been developed with other intensive inshore dolphin projects (Griffith and Palmer 2012) and Traditional Owner and Indigenous ranger groups (see Marsh et al. 2012). Training will include information on:

- Aims and objectives of the project;
- Job Safety Analysis and risk assessment;
- Marine mammal identification (with a focus on inshore dolphins and dugongs);
- Turtle identification (with a focus on species that can be found within the study area)
- Mapping of areas dolphins have previously been sighted within, and outside, the study area, and discussion of culturally important sites that survey vessels should not traverse;
- An introduction to survey and observer protocols;
- Data collection protocols;
- Introduction to survey equipment
- Information regarding vessels that will be used for surveys, including safe-operating procedures when working on-board vessels;

Such training will enable standardisation of methodologies implemented by field survey teams for quality assurance during data collection. Intent is for the training workshop to occur prior to each primary sample.

Ideally, at least half a day will be dedicated to at sea trials, to ensure all vessels are appropriately equipped for the surveys before the first secondary sample of each primary sampling event begins.

### 3.2.9. Indicative Survey Schedule

Based on discussions with the Department of Environment on the 18<sup>th</sup> September 2014 and taking into consideration Condition 53 of the approval, the following indicative dolphin survey schedule has been developed.

- one survey prior to the commencement of the action (pre-construction survey);
- three annual surveys during the initial construction period;
- one survey to be conducted within 12 months of bauxite shipping from Boyd Port becoming fully operational; and,
- one additional survey after the initial operational survey (to be conducted within 10 years of bauxite shipping from Boyd Port becoming fully operational). The timing and intensity of this survey will be determined based on the results of previous surveys.

The actual timing of the commencement of the action will depend on the timing of the investment commitment by Rio Tinto. The timing of surveys after the commencement of the action will proceed in accordance with the above criteria, however actual dates shall depend on the date of the investment commitment by Rio Tinto.

### 3.3. Indigenous Engagement and Employment

In 2001, the Western Cape Communities Coexistence Agreement (WCCCA) was signed by 11 Traditional Owner Groups, four Aboriginal Shire Councils, Comalco, the Queensland Government and the Cape York Land Council, and was registered as an Indigenous Land Use Agreement (ILUA) with the Native Title Tribunal under the Native Title Act 1993 on 24 August 2001. The Agreement covers RTA's mining lease areas ML7024 and ML6024, and it formally acknowledges the rights and responsibilities of RTA and Traditional Owners over this area including, but not limited to environmental and cultural heritage management (RTA Weipa 2012). Of relevance to the Strategy, Section 4.3.8 of the SoE Communities, Heritage and Environment Management Plan (RTA Weipa 2012) states that 'Traditional Owners expressed interest in understanding any impacts and management requirements for turtles, dugong, dolphins and other sea animals. RTAW is required to undertake considerable survey work to understand the number of marine turtles and other marine animals, and where they live and nest in the area'. Sites of cultural importance (i.e. the Mouth of Norman Creek) will also be identified to determine where survey vessels can, and cannot transit. The Strategy will work within this Agreement, and in close consultation with the WCCCA, with regards to indigenous engagement throughout the project.

The importance of engaging with Traditional Owners and Indigenous ranger programs to obtain inshore dolphin occurrence and distribution information (particularly in remote regions of northern Australia), is acknowledged by the National Inshore Dolphin Strategy. A key aim of the National Inshore Dolphin Strategy is to develop an indigenous engagement strategy (Department of the Environment 2013), and involve indigenous ranger groups in monitoring inshore dolphin populations. The Strategy is in a unique position to contribute significantly towards this objective, through existing RTA policies regarding indigenous involvement in project activities, such as those described within the SoE Communities, Heritage and Environment Management Plan (RTA Weipa 2012).

#### 3.3.1. Traditional Owner Employment Opportunities and Training

Traditional Owners will be given the opportunity to participate in all surveys as observers, and to assist researchers during each survey. Typically, participants in the surveys will need to:

- Be available to attend the pre-survey training;
- Be available to work on the surveys for extended survey duration over multiple consecutive days;
- Be able to undertake long survey days on water, ideally actively assisting with observations and data recording.

Traditional Owners interested in assisting with dolphin and marine megafauna observations will be asked, via RTA Weipa Community Relations Department, to nominate suitable individuals to be involved in surveys.

As discussed in Section 3.2.6., training for Traditional Owners will be undertaken prior to each primary sample, and will involve species identification, survey methods, data entry and data management required for each survey. Interested Traditional Owners also have the opportunity to gain skills in data entry and analysis if required.

The number of Traditional Owners employed during the implementation of the Strategy will be reported as part of RTA Weipa's reporting obligations under the Indigenous Land Use Agreement. Quarterly, annual and three yearly review reports on indigenous employment and training obligations are made to Traditional Owners. It is anticipated that during a survey day a minimum of three Traditional Owners will be required to assist with surveys, one from North of Embley (NoE) and two from SoE. One Traditional Owner will work on each of the three vessels, with two other project staff already trained to undertake marine mammal observations.



### 3.4. Informing the Marine and Shipping Management Plan

The findings from the Inshore Dolphin Offset Strategy, including corrective actions and contingency measures relating to operations, will be used to inform the Operations Marine and Shipping Management Plan, in accordance with Condition 54 of the EPBC Act approval.

## 4 TARGETED OUTCOMES, BENCHMARKS AND GOALS

The targeted outcomes and goals associated with the implementation of this Strategy are as follows:

- knowledge on the distribution and abundance of the local and regional populations of Australian snubfin and Australian humpback dolphins in the Western Cape York area has increased;
- knowledge on habitat utilised by these species has increased;
- the Strategy has contributed to independent research on Australian snubfin and Australian humpback dolphins;
- findings as a result of implementing this Strategy are used to inform the Marine and Shipping Management Plan for the operational phase of the SoE Project on an on-going basis;
- nominated Traditional Owners have had the opportunity to be trained in marine mammal observation and participate in dolphin surveys.

The benchmark for this Strategy is *Methods for assessment of the conservation status of Australian inshore dolphins* (Brooks et al, 2014).

## 5 PERFORMANCE INDICATORS

The following performance indicators are associated with the Strategy:

- the survey plan is implemented in accordance with the Strategy;
- funding of the implementation of the Strategy is a minimum of \$800,000, and a maximum of \$1,200,000 (GST exclusive);
- data collected is adequate to increase knowledge on the distribution and abundance of local and regional populations of Australian snubfin and Australian humpback dolphins in the Western Cape York area;
- data collected is adequate to increase the knowledge on the habitat utilised by these species;
- nominated Traditional Owners have been adequately trained as marine observers and have therefore increased their skill set.

## 6 REPORTING AND IMPLEMENTATION

Suitably qualified specialists will be engaged by RTA to implement the Inshore Dolphin Offset Strategy. Timing of implementation of the Strategy will be dependent on the Project schedule, but will be implemented in accordance with the survey plan outlined.

A summary report following each primary sample will be required to be submitted to RTA by the suitably qualified specialists engaged to implement the Strategy. Each summary report as a minimum will contain the following information:

- survey conditions and personnel present;
- survey effort;
- basic analysis of sightings (distribution of sightings and group sizes and composition);
- summary of encounter rates;
- summary of identification and re-sight rates;
- estimates of abundance;
- estimates of habitat preferences;
- summary of individual movements;
- mapping of effort and dolphin sightings.

A final report will be required to be submitted to RTA by the suitably qualified specialists at the conclusion of implementation of the Strategy that includes the following:

- gap analysis of literature reviewed to date;
- results of all surveys including mapping;
- analysis of data;
- analysis of methodology;
- discussion;
- conclusion.

Survey reports will be published on the RTA website in accordance with Condition 57 of EPBC Act Approval 2010/5642.

Progress on the implementation of this Strategy will be included in the annual report to be published on the RTA website and provided to the Minister in accordance with Condition 68 of EPBC Act Approval 2010/5642.

## 7 INDIGENOUS CONSULTATION

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

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

In addition, Traditional Owners will be consulted regarding sacred sites and no-go areas within the survey area prior to the commencement of the first survey. These sacred sites and no-go areas



will be documented and their locations entered into a GPS and avoidance of any sites identified will be as determined by Traditional Owners.

## 8 ACCOUNTABILITIES AND RESPONSIBILITIES

GHD Pty Ltd and Orcaella Pty Ltd, suitably qualified specialists, were engaged by RTA to prepare this Strategy. The opinions, conclusions and any recommendations in this Strategy are based on conditions encountered and information reviewed at the date of preparation. GHD and Orcaella retain background (prior to this project) intellectual property.

A suitably qualified specialist engaged by RTA will be responsible for implementing this Strategy. The nominated environmental professional for the SoE Project will be responsible for enabling pre-construction, construction and post-construction surveys to be conducted.

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## 10 GLOSSARY

**Aurukun estuary** – estuarine area of the Ward, Watson and Archer Rivers

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

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

**DoE** – Commonwealth Department of the Environment

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

**Local inshore dolphin population** – those dolphin population/s that utilise the Boyd Point SoE Project area

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

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

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

**Regional inshore dolphin population** - those dolphin population/s which utilise some part of the study area

**RTA** – Rio Tinto Alcan

**SoE Project** – South of Embley Project

**Strategy** – Inshore Dolphin Offset Strategy

**Study Area** – an area bounded between latitudes 12.60°S and 13.35°S, out to 15 km from the coast and at least 15km upstream major rivers in both the Weipa and Aurukun estuary systems.



## Appendix A DoE Approval Letter



Australian Government  
Department of the Environment

Our Reference: EPBC 2010/5642

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

Dear Mr Dewar

**EPBC 2010-5642 – South of Embley Bauxite mine and port development  
Approval of Inshore Dolphin Offset Strategy – conditions 49-55**

I refer to the updated Inshore Dolphin Offset Strategy, January 2015 (Strategy), submitted pursuant to the requirements of conditions 49-55 of the EPBC 2010/5642 approval granted to RTA Weipa Pty Ltd on 14 May 2013.

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

In accordance with condition 55 of the approval, the approved plan must be implemented. Under condition 72, if RTA Weipa Pty Ltd wants to act other than in accordance with the approved plan, a revised plan must be submitted for approval. Until the Minister (or his delegate) has approved the revised plan, the original plan must be implemented.

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

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

Yours sincerely

A handwritten signature in black ink, appearing to read 'S. Gaddes'.

Shane Gaddes  
Assistant Secretary  
Compliance and Enforcement Branch

28/7/2015