URS

Report

East Arm Wharf Expansion Project

AUSTRALIA

Coastal Offset Plan

3 February 2015
42214011/EAW COP/D-1
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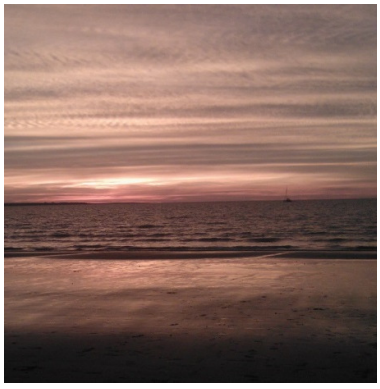

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ABBREVIATIONS

Abbreviation	Description
BIMOS	Biodiversity Impact Mitigation and Offsets Strategy
CDU	Charles Darwin University
COP	Coastal Offset Plan
CSD	Cutter Suction Dredge
DDSPMP	Dredging and Dredge Spoil Placement Management Plan
DLPE	(NT) Department of Lands, Planning and the Environment
DLRM	(NT) Department of Land Resource Management
DoE	(Commonwealth) Department of the Environment
DoT	(NT) Department of Transport
DPC	Darwin Port Corporation
DSEWPaC	(former Commonwealth) Department of Sustainability, Environment, Water, Population and Communities
EAW	East Arm Wharf
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EPBC	Environment Protection and Biodiversity Conservation
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GIS	Geographic Information System
ha	Hectares
ILUA	Indigenous Land Use Agreement
IRP	Indigenous Ranger Program
MBMP	Migratory Bird Management Plan
MSB	Marine Supply Base
MUBRF	Multiuser Barge Ramp Facility
NRETAS	(former NT Department of) Natural Resources, Environment, the Arts and Sport
NT	Northern Territory
NTG	Northern Territory Government
P&W	Parks and Wildlife Commission NT
PEPP	Port Environmental Protection Plan
WQPP	Water Quality Protection Plan
WTT	Wastewater Treatment Plant

EXECUTIVE SUMMARY

The East Arm Wharf Expansion Works were approved under the *Environment Protection and Biodiversity Conservation (EPBC) Act (1999)* by the Department of Environment (DoE), (formerly the Department for Sustainability, Environment, Water, Population and Communities [SEWPAC]) in March 2012 in the form of Approval EPBC 2010/5304. This approval was made subject to conditions that include development and implementation of a Coastal Offset Plan (COP). A consolidated approval notice was issued for the East Arm Wharf Expansion Works in January 2014 (DoE 2014).

This document has been prepared to meet the conditions pertaining to the COP, which are:

- Condition 40 of Approval EPBC 2010/5304 requires the development for submission of a COP addressing consequential and residual impacts to EPBC Act listed threatened and migratory marine fauna from the expansion of East Arm Wharf.
- Condition 41 specifies the identification of 50 hectares (ha) of verified habitat for dolphins in the COP including provision for the protection and management of the protected area in perpetuity.
- Conditions 42 – 44 relate to the timing and requirement to implement the COP upon approval by the Minister.

An area of 50 ha of verified dolphin habitat has been identified through a process considering dolphin sighting data, environmental and social values and stakeholder consultation. A range of management actions have been determined and these provide the basis for ongoing management of the offset area to maintain its value as habitat for dolphins and other marine fauna, whilst not restricting recreational fishing.

A range of existing programs and management plans are in place which will continue to operate and enhance the likelihood of success of this offset area.

The draft COP was circulated to both government and non-government stakeholders for comment, and feedback incorporated into the final document. The Northern Territory (NT) Department of Lands, Planning and the Environment (DLPE) has overall responsibility for the implementation and management of the proposed offset area.

Perpetual protection will be provided by way of a proclamation of a reserve pursuant to the *Crown Lands Act*. Management of the reserve will be achieved by way of a management plan prepared in accordance with this COP. The management plan will take an adaptive management approach allowing for management of the reserve through a system of monitoring and reporting. It will also allow for future changes to legislation for example if vessel speed limits and recreational vessel/operator licensing is introduced to the NT then vessel speed limits can be effectively brought into the COP.

1 INTRODUCTION

1.1 Project overview

The Northern Territory (NT) Department of Lands, Planning and Environment (DLPE) is undertaking an expansion of the East Arm Wharf (EAW) in Darwin Harbour to accommodate the requirements of existing and prospective wharf users. The expansion requires dredging within Darwin Harbour to provide for effective and efficient vessel access and manoeuvring. The expansion also involves the creation of additional land at EAW by reclamation. The major features of the project (refer **Figure 1-1**) are as follows:

- Developing a Marine Supply Base (MSB), primarily to service the existing and developing oil and gas industries in the Timor Sea, Browse Basin and adjacent areas.
- Constructing a Multiuser Barge Ramp Facility (MUBRF) including a barge ramp and hardstand area, berthing for barges and facilities for loading and unloading.
- Development of a moorings facility to accommodate tugs, customs boats and other smaller vessels.

Dredging as part of the EAW Expansion Project will be undertaken at three locations:

- The MSB;
- The MUBRF; and
- The tugs and small vessel berth area.

The EAW Expansion Project was subject to an Environmental Impact Assessment (EIA) and an Environmental Impact Statement (EIS) was developed to investigate the potential impacts of the development on the surrounding marine and terrestrial environments (Northern Territory Government [NTG] 2011). The EIS was submitted to the NT Environmental Protection Agency (EPA)[1] and the Department of Environment (DoE)[2] for consideration.

The EAW Expansion Project received approval under the NT *Environmental Assessment Act 1982* in December 2011 and conditional approval by DoE under sections 103(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in March 2012 in the form of Approval EPBC 2010/5304. A consolidated approval notice was issued for the East Arm Wharf Expansion Works in January 2014 (DoE 2014).

Conditions 40 to 44 of approval EPBC 2010/5304 require the development, approval and implementation of a Coastal Offset Plan (COP) to offset any consequential and residual impacts of the Expansion Project works on dolphins in Darwin Harbour. This COP has been prepared to meet those conditions. The impacts of the Expansion Project are discussed in Chapter 3 of this COP.

[1] Formerly the Department of Natural Resources, Environment, the Arts and Sport (NRETAS)
[2] Formerly Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC)

1.2 Commonwealth Government offsets requirement

1.2.1 EPBC Act and EPBC Environmental Offsets Policy

In October 2012, the Federal Government published the *Environmental Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy (Commonwealth of Australia 2012). The policy outlines the Commonwealth's approach to the use of environmental offsets under the EPBC Act and defines offsets as "measures that compensate for the residual adverse impacts of an action on the environment".

Offsets identified in this plan have been developed to satisfy the requirements of the EPBC Act 1999 Environmental Offsets Policy (Commonwealth of Australia 2012) which states that offsets must:

- Deliver an overall conservation outcome that improves or maintains the viability of the protected matter;
- Be built around direct offsets but may include other compensatory measures;
- Be in proportion to the level of statutory protection that applies to the protected matter;
- Be of a size and scale proportionate to the residual impacts on the protected matter;
- Effectively account for and manage the risks of the offset not succeeding;
- Be in addition to what is already required, determined by law or planning regulations or agreed under other schemes or programs;
- Be efficient, effective, timely, transparent, scientifically robust and reasonable; and
- Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.

1.2.2 EPBC Approval Conditions

A Biodiversity Impact Mitigation and Offsets Strategy (BIMOS) has been developed by DLPE to satisfy Conditions 32 to 35 of EPBC Approval 2010/5304 which addresses the consequential and residual impacts to EPBC Act listed dolphins, migratory birds, dugongs and marine turtles. The BIMOS was approved on 2nd October 2012 and includes initiatives that will contribute to the success of this COP such as the establishment of a regional Indigenous Ranger program.

EPBC Approval 2010/5304 requires the development, approval and implementation of a COP to offset any consequential and residual impacts of the expansion works on dolphins in Darwin Harbour. The conditions determining the requirements of this COP from this approval are:

40. *The person taking the action must submit a Coastal Offset Plan (COP) to the Minister for approval. The strategy must address the consequential and residual impacts to EPBC Act listed threatened and migratory marine fauna from the expansion of East Arm Wharf, including dredging and increased vessel usage of the area and associated impacts to species.*

41. *The COP must include the identification of 50 hectares of verified habitat for dolphins and provision for the protections and management of the protected area in perpetuity.*

42. *The COP must be submitted for approval by the Minister no later than two years from the commencement of the action.*

43. *The person undertaking the action must not commence work on the tug and small vessel berths or barge ramp and hardstand area as identified in Annexure 1, unless the Minister has approved the COP.*

44. *If the Minister approves the COP then the approved COP must be implemented.*

While this COP will focus on dolphins and protection of dolphin habitat as required by approval Condition 41, it in effect affords the same protection and mitigation of impacts to all threatened and migratory marine fauna listed in Chapter 2 of this COP.

A Migratory Birds Management Plan (MBMP) (Charles Darwin University [CDU] 2013) has been developed to address the impacts of the EAW Expansion Project on migratory birds and a Port Environmental Protection Plan (PEPP) (Darwin Port Corporation [DPC] 2013) has been developed to address impacts to threatened and migratory marine fauna for the life of the project. These plans have been developed to satisfy EPBC 2010/5304 Conditions 36 and 45 respectively.

Condition 36 requires that a MBMP is written to address the residual and consequential impacts of the EAW expansion on EPBC listed migratory birds. Condition 36 specifies that the MBMP must include:

- Protection of Pond D as suitable high tide roosting habitat for migratory birds;
- A provision to undertake at least two summer surveys of migratory birds; and
- Consider capturing, banding and marking migratory shore birds currently using EAW dredge spoil ponds to monitor their response to the construction activity.

Condition 45 requires the implementation of an approved PEPP for the life of the project. The PEPP must:

- Include measures to manage risk of vessel strike to marine fauna;
- Increase capacity for response to accidental spills;
- Minimise the risk of introduced marine pests; and
- Include an educational campaign for all port personnel that fosters a culture of awareness of the environmental values of Darwin Harbour.

The approved MBMP and PEPP are available on the East Arm Wharf Expansion (EAW) Project's Environmental Impact Study (EIS) website (NTG 2014a).

1.3 Objectives

The purpose of this COP is to provide a strategy for implementation in fulfilment of Conditions 40 to 44 of approval EPBC 2010/5304 by:

- Providing a summary of the impacts of the expansion to protected and migratory marine fauna species listed under the EPBC Act 1999;

- Describing the area selected for reservation including the site selection process undertaken;
- Identifying permanent protection mechanisms to achieve the required level of protection and management of dolphin habitat in the area to be reserved; and
- Providing performance indicators and timeframes for the implementation of actions proposed in the COP.

The following sections of this COP focus on the provision and management of dolphin habitat as an offset to mitigate any consequential and residual impacts on dolphins resulting from the expansion works.

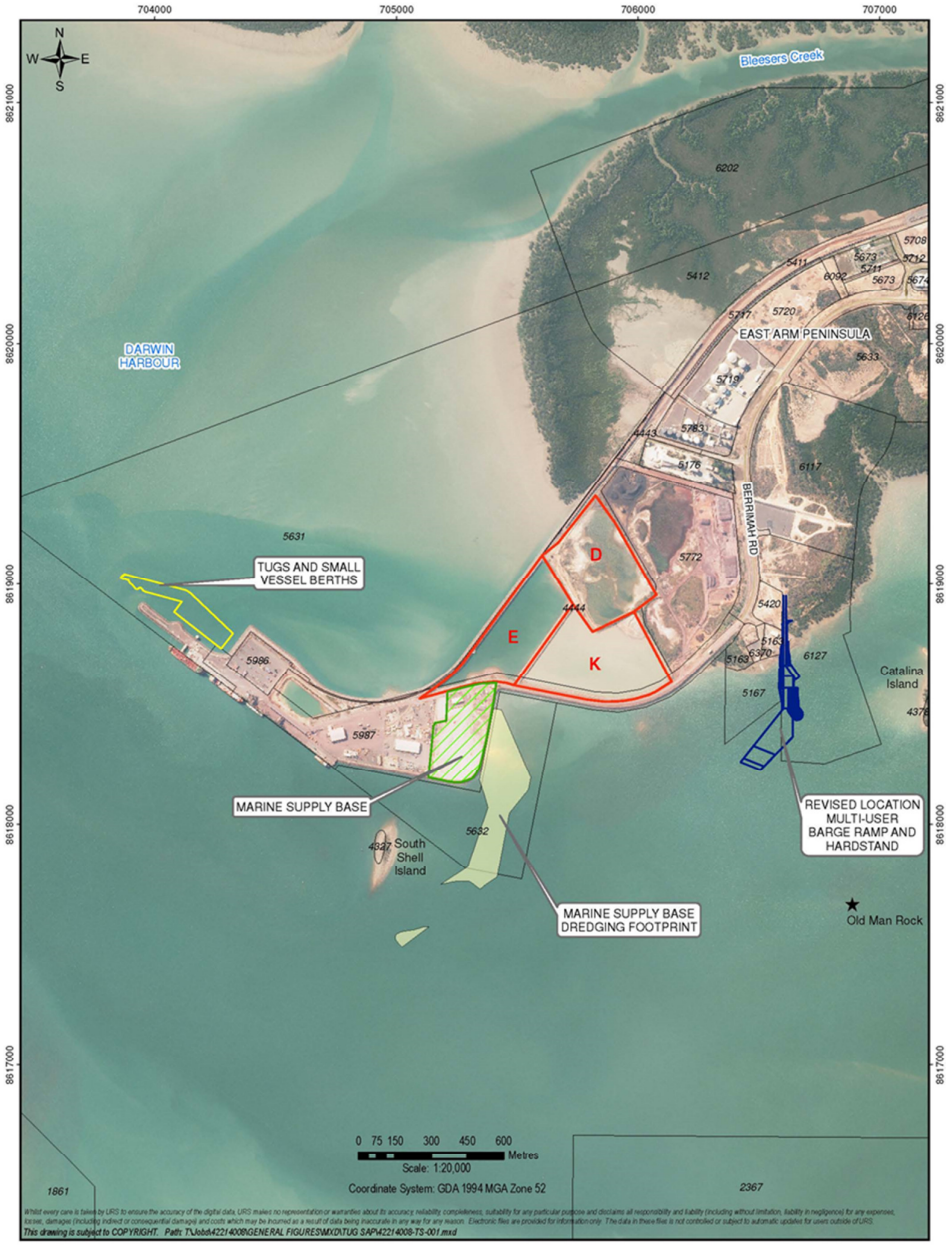

Figure 1-1 East Arm Wharf Expansion Works Area

2 EPBC ACT LISTED THREATENED AND MIGRATORY MARINE FAUNA

The EAW expansion area shown in **Figure 1-1** lies within Darwin Harbour which has been identified as an area frequented or potentially frequented by a number of threatened and migratory marine species listed under the EPBC Act. The Draft EIS (NTG 2011) identifies these species with **Table 2-1** below identifying species listed as threatened and / or migratory under the EPBC Act.

Table 2-1 EPBC Act 1999 Listed Threatened Species that may be present near or within East Arm

Scientific Name	Common Name	EPBC Act 1999 Listing*
Cetaceans		
Balaenoptera edeni	Bryde's whale	M
Dugong dugon	Dugong	M
Megaptera novaeangliae	Humpback whale	V, M
Orcaella heinsohni	Australian snubfin dolphin	M
Orcinus orca	Killer whale	M
Sousa sp[#]	Humpback dolphin Sousa sp.	M
Tursiops aduncus	Spotted bottlenose dolphin	M
Reptiles		
Caretta caretta	Loggerhead turtle	M, E
Chelonia mydas	Green turtle	M, V
Dermochelys coriacea	Leatherback turtle	M, E
Eretmochelys Imbricate	Hawksbill turtle	M, V
Lepidochelys olivacea	Pacific ridley turtle	M, E
Natator depressus	Flatback turtle	V
Sharks		
Pristis clavata	Dwarf sawfish	V
Pristis pristis	Freshwater sawfish	V
Pristis zijsron	Green sawfish	V
Rhincodon typus	Whale shark	V

* V: Vulnerable, E: Endangered, M: Migratory

[#] New species of Sousa yet to be named; determined in October 2013 (Mendez, M., Jefferson, T.J., et al, 2013).

While these marine fauna were identified in the Draft EIS as having the potential to be present near or within East Arm, the Draft EIS provides further information about the distribution of the threatened fauna listed in **Table 2-1** as follows:

- Humpback whales: Migrate to northern Australia from June to August but rarely venture as far north east as the NT;
- Turtles: Green, hawksbill and flatback turtles are seen foraging for food in Darwin Harbour. There are no known turtle nesting sites in Darwin Harbour as the mangroves and mudflats do not provide suitable nesting grounds[3]. Other turtle species (ridley and loggerhead) are thought to be infrequent users of Darwin Harbour. Leatherback turtles are typically oceanic and unlikely to occur within the harbour;
- Sawfish: Dwarf sawfish, freshwater sawfish and green sawfish have not been recorded in Darwin Harbour; and
- Whale shark: This species is not known to occur within Darwin Harbour.

In relation to the distribution of migratory marine fauna in Darwin Harbour, the Draft EIS summarises that:

- Dugongs have been observed in Darwin Harbour, including at Channel Island in Middle Arm, where they were thought to be feeding on macroalgae. Dugongs could potentially utilise algal communities within East Arm (such as those around Old Man Rock) as a food source[4].
- Bryde's whales and killer whales are not known to occur within Darwin Harbour, though pods of false killer whales (*Pseudorca crassidensis*) are known to visit the harbour (Palmer et al., 2009).

2.1 Coastal dolphins

Three species of coastal dolphin inhabit Darwin Harbour and surrounding waters between Gunn Point and Bynoe Harbour. The humpback, snubfin and bottlenose dolphins are all EPBC Act listed migratory species and as such are matters of national environmental significance under that Act (Griffiths & Palmer 2013).

The population size of each species within Darwin Harbour is small with approximately 100 individual humpback dolphins, 45 bottlenose dolphins and 30 snubfin dolphins (Brooks & Pollock 2012).

The EPBC Act lists three other species of dolphin that may occur, or whose species habitat may occur, in the Darwin Harbour region. These are the common dolphin (*Delphinus delphis*), Risso's dolphin (*Grampus griseus*) and spotted dolphin (*Stenella attenuata*) (NTG 2011).

[3] T. Griffiths (pers. comm. April 2014) advised green and flatback turtles have now been recorded nesting in the outer areas of Darwin Harbour

[4] T. Griffiths (pers. comm. April 2014) advised dugong have now been recorded at Blaydin Point, within the East Arm of Darwin Harbour.

With respect to the distribution of dolphins in Darwin Harbour, the EIS notes:

- The density of snubfin dolphins (*Orcaella heinsohni*) observed in the western parts of Darwin Harbour was substantially higher than that observed near East Arm and Blaydin Point over the two year period 2008 to 2010. This is consistent with observational reports indicating that the highest abundance was in the north-western parts of the harbour.
- The density of Indo-Pacific humpback dolphins (*Sousa chinensis*) observed in the western parts of the harbour was comparable to that observed near East Arm and Blaydin Point over the two year period from 2008 to 2010.
- The density of Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) observed in the western parts of the harbour is comparable to that observed in the eastern parts of the harbour but less than that observed in the northern parts of the harbour.

3 IMPACTS OF EAST ARM WHARF EXPANSION

The EAW Expansion Project has been approved subject to Conditions in Approval EPBC 2010/5304 including the requirement to address consequential and residual impacts to EPBC Act listed threatened and migratory marine fauna.

The EIS included a risk assessment for the three main proposed developments; the marine supply base, barge ramp and hardstand area, and tug and small vessel berth (**Figure 1-1**). Additional impacts of project-associated dredging were assessed in the Darwin Marine Supply Base Dredging and Dredge Spoil Placement Management Plan (URS 2013).

The BIMOS provides a summary of the impacts as assessed in the EIS and the consequential and residual impacts on EPBC Act listed dolphins, migratory birds, dugongs and marine turtles after proposed management actions have been implemented to mitigate the identified risks.

This COP focuses on those impacts to dolphins and in doing so also addresses the impacts on dugong and marine turtles. Impacts to EPBC Act listed migratory birds are separately addressed in the MBMP.

This section addresses impacts[5] identified through this risk assessment process focusing on any residual impacts identified after the implementation of any mitigation actions proposed.

The main activities identified as sources of potentially unavoidable residual impacts both during construction and operation of the expanded East Arm Wharf facility are:

- Dredging and dredge spoil management;
- Land reclamation;
- Piling; and
- Increased shipping activity in Darwin Harbour and at EAW.

Table 3-1 summarises the impacts associated with each of these activities. Further discussion of how these impacts are addressed by the implementation of offsets under Conditions 40 – 44 of Approval EPBC 2010/5304 is provided in Section 5.2.

[5] In this section, 'impact' is used to describe a source of potential impact to receptors, rather than an indication that receptors will actually be impacted.

Table 3-1 Potential Impacts associated with the EAW Expansion Project

Activity	Impact	Description
Dredging and spoil disposal	Direct Impact: Alteration of benthic habitat due to dredging	Approximately 15.1 hectares (ha) of benthic habitat (predominantly sand and reef substrates with less than 5% epibenthos) in the dredge footprint will be altered (deepened) due to dredging.
	Potential Indirect Impact: Increased underwater noise (temporary during construction) may impact on marine receptors	Increased underwater noise from operation of the cutter suction dredge (CSD) and support vessels.
	Potential Indirect Impact: Elevated suspended solids (temporary during construction) may impact on marine life receptors	During dredging activity, there will be elevated suspended solids in the dredge footprint and in the modelled dredge plume area.
Land reclamation	Direct Impact: Loss of benthic habitat	Permanent loss of benthic habitats due to smothering where land is reclaimed for development.
Piling	Potential Indirect Impact: Temporary increase in underwater noise and vibration due to piling-related activities may impact on marine life receptors	Piling will result in some elevation of noise and vibration in the surrounding marine environment.
Operation of extended port facilities on completion	Potential Indirect Impact: Elevated noise on a more regular basis may impact on marine life receptors	Increased shipping activity will result in more frequent occurrences of increased underwater noise to the local East Arm Wharf area and shipping channel.
	Potential Direct Impact: Increased risk of vessel interaction with marine fauna	Increased vessel traffic in the East Arm Wharf area and shipping channel will result in an increased risk of vessel interaction with marine fauna.

Mitigating measures implemented to reduce impacts identified in **Table 3-1** to the residual levels are presented in the relevant sections of the Darwin Marine Supply Base Dredging and Dredge Spoil Placement Management Plan (DDSPMP) (URS 2013).

As a result of the predicted impacts relating to greater vessel traffic on an ongoing basis, the PEPP (DPC 2013) produced in accordance with Condition 45a of Approval EPBC 2010/5304 contains measures to manage the risk of vessel strike to marine fauna.

4 OFFSET PROVISION - PROTECTION OF DOLPHIN HABITAT

This section details the intended offsets that will be implemented to satisfy Condition 41 under approval EPBC 2010/5304. Condition 41 includes the requirement to identify and protect in perpetuity 50 ha of verified dolphin habitat in recognition of the impact that the EAW Expansion Project may have on local dolphin populations. A study was undertaken by Griffiths and Palmer (2013) for the NT Department of Land Resource Management (DLRM) to determine suitable sites to be reserved under this COP.

4.1 Dolphin habitat area selection process

In preparing this COP, an analysis of coastal dolphin distribution and abundance data for the three dolphin species (bottlenose, humpback and snubfin) listed under the EPBC Act was undertaken to identify areas of verified dolphin habitat.

The analysis was undertaken by the NT DLRM and utilised the extensive dolphin observation data collected and maintained by the Department. These data were collected between 2007 and 2012 on standardised boat based surveys as well as incidental observations (Palmer 2010; Brooks & Pollock 2012).

The analysis was completed by importing these data into a Geographic Information System (GIS) and overlaying an 800 m x 800 m grid over the Darwin Harbour region. The grid cells (each 64 ha) were then colour-coded based on the total abundance of dolphin observations in each cell (light yellow is <5, orange is 6-10, red is 11-20, pink 21-30, blue 31-40 and purple >41). The results of this analysis are shown for Shoal Bay (**Figure 4-1**), Darwin Harbour (**Figure 4-2**) and Bynoe Harbour (**Figure 4-3**).

Griffiths and Palmer (2013) summarised the analysis and outcomes and included the following points:

- A total of 423 records of dolphin sightings were used in the analysis from Darwin Harbour, Bynoe Harbour and Shoal Bay;
- The humpback dolphin was the most commonly recorded species followed by the bottlenose and snubfin;
- In general, the whole of Darwin Harbour, Bynoe Harbour and Shoal Bay can be considered verified dolphin habitat;
- Bynoe Harbour appears more significant for the snubfin dolphin compared to Darwin Harbour and Shoal Bay;
- Outer western areas of Darwin Harbour and Shoal Bay yield more observations of bottlenose dolphins compared to Bynoe Habour; and
- The upper reaches of all three locations (Darwin Harbour, Bynoe Harbour and Shoal Bay) appear to be favoured by the humpback dolphin.

Using the summary data generated by the analysis described above, further analysis was undertaken to identify potential sites for protection under this COP. This secondary analysis used the following criteria for ranking grid cells:

- Associated with grid cells containing records of at least one dolphin species (i.e. dolphin habitat);
- Ranked more highly if more than one species is recorded in the area (protection would be afforded to a number of dolphin species);
- Ranked more highly if there are a large number of dolphin records (more frequently used dolphin habitat); and
- Avoid areas that are likely to be subject to development involving coastal reclamation (avoidance of future habitat loss).

Identified locations are circled in **Figures 4-1, 4-2** and **4-3.**

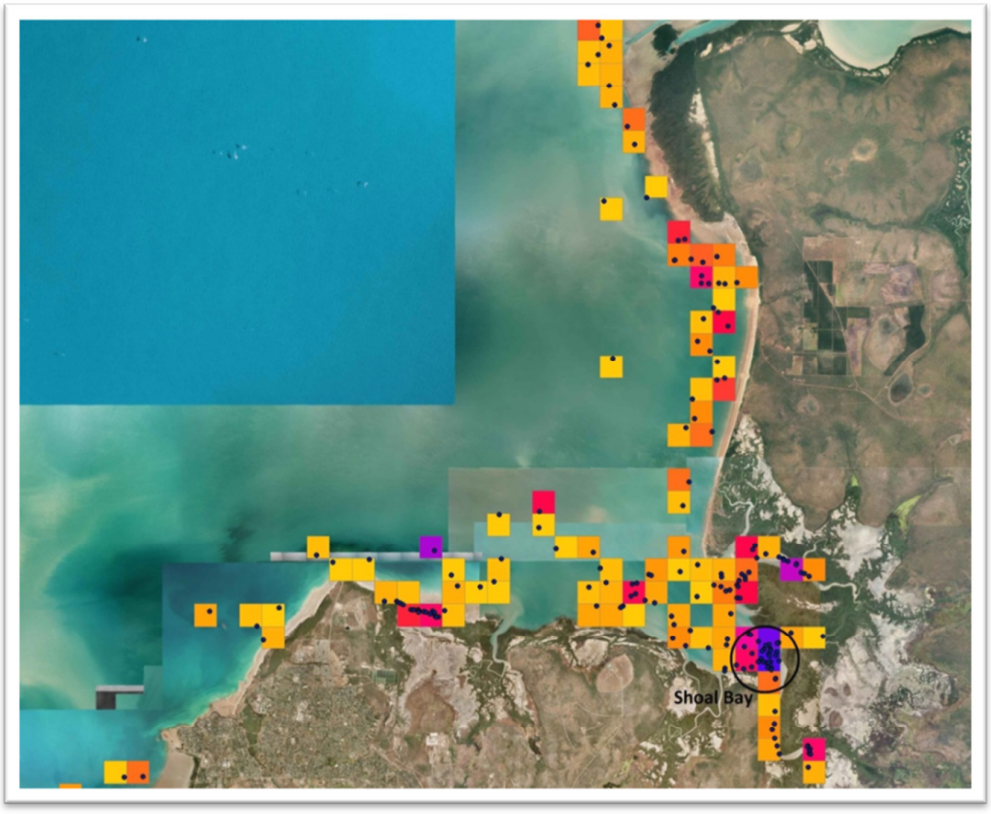

Figure 4-1 Analysis of Dolphin Sighting Data in the Shoal Bay - Gunn Point Region

Source: Griffiths and Palmer (2013)

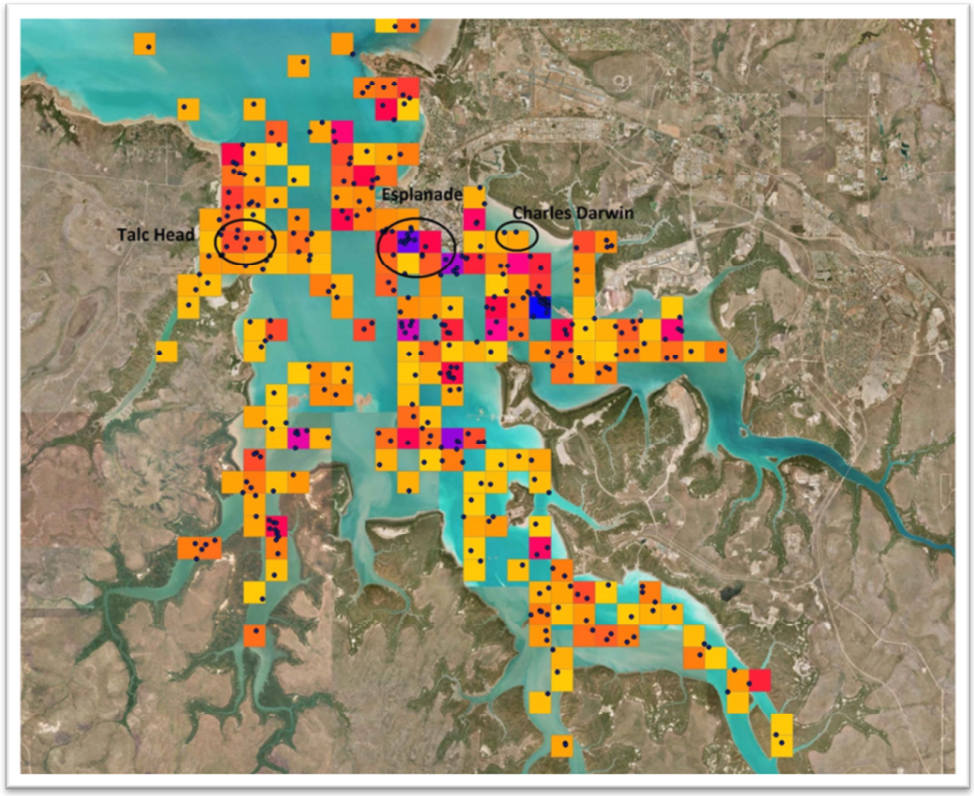

Figure 4-2 Analysis of Dolphin Sighting Data in Darwin Harbour

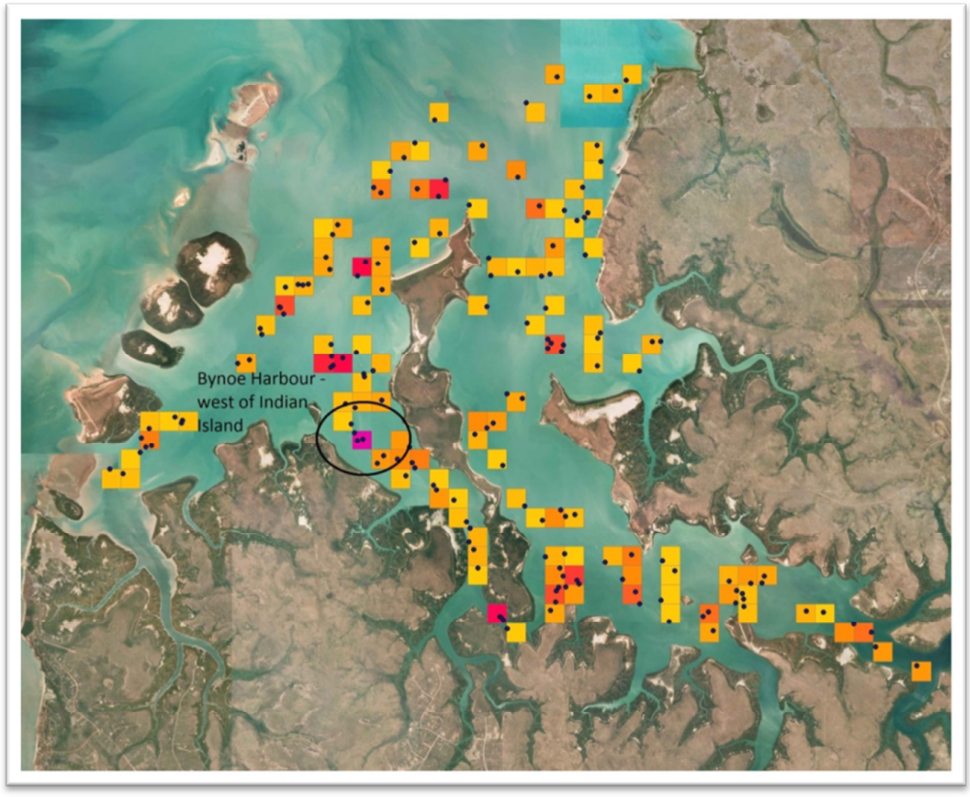

Figure 4-3 Analysis of Dolphin Sighting Data in Bynoe Harbour

Source: Griffiths and Palmer (2013)

4.2 Site selected for protection of dolphin habitat

Table 4-1 provides a summary of the five sites shortlisted and the merits of each site in being selected for the purpose of dolphin habitat protection under this COP. Following this review, 50 ha at Hope Inlet, Shoal Bay was selected as the nominated site, and is shown in **Figure 4-4**[6]. The Hope Inlet area is located within the closest mangrove harbour to the east of Darwin Harbour.

This site was chosen for its value as verified foraging dolphin habitat (with a nearby upstream area identified as a probable nursery area for *Sousa sp* mothers and calves), the proximity to existing conservation reserves and the opportunity to expand the conservation value of the area to include a zone of marine habitat. The surrounding waters, although popular with recreational fishers, are not heavily impacted by fishing or other recreational use due to the shallow nature of the water.

The surrounding parks and reserves are promoted to those interested in observing coastal native habitat and wildlife, and the addition of the offsets area further increases the capacity to promote and maintain the conservation values of the area into the future.

[6] Figure 4.4 The Department of Primary Industry and Fisheries suggested the area previously proposed be modified slightly to a north south orientation, thereby reducing the coverage of the channel leading into Hope Inlet and likely interaction of dolphins with recreational boats.

Table 4-1 Summary of Potential Sites for Protected Dolphin Habitat under EAW Expansion COP

Name	Description of Location	Dolphin Habitat	Potential Advantages	Potential Disadvantages
Shoal Bay	Mouth of the Howard River or Hope Inlet	Humpback and some bottlenose dolphins, possibly a nursery area for mothers with calves	– Adjacent to existing protected areas (Shoal Bay Coastal Reserve and Tree Point Conservation area) – Limited access and low potential for future development due to very shallow waters	– Popular fishing area – More difficult to demonstrate "additionality" in management
Esplanade	Area close to shore adjacent to Esplanade in Darwin CBD	Bottlenose and humpback dolphins	– Highly visible to the public (adjacent to Deck Chair Cinema and tour boats) – Very easy access for management	– Large number of commercial and recreational users in the area – May require restriction of vessel speed limits – Proposed development projects
Charles Darwin National Park	Mangrove fringe on the south west border of park	Bottlenose and humpback dolphins	– Adjacent to existing protected area – Very easy access for management	– Close to current construction and dredging
Talc Head	North of Talc Head on the Western side of Darwin Harbour	An important area for snubfin and humpback dolphins	– Lower visitation rates – Also contains seagrass beds and is recognised as very good dugong habitat	– Low visibility to public – Popular fishing area
Bynoe Harbour	West side of Indian Island	An important area for snubfin and humpback dolphins	– Lower visitation rates	– Difficult to access for management

Griffiths and Palmer (2013)

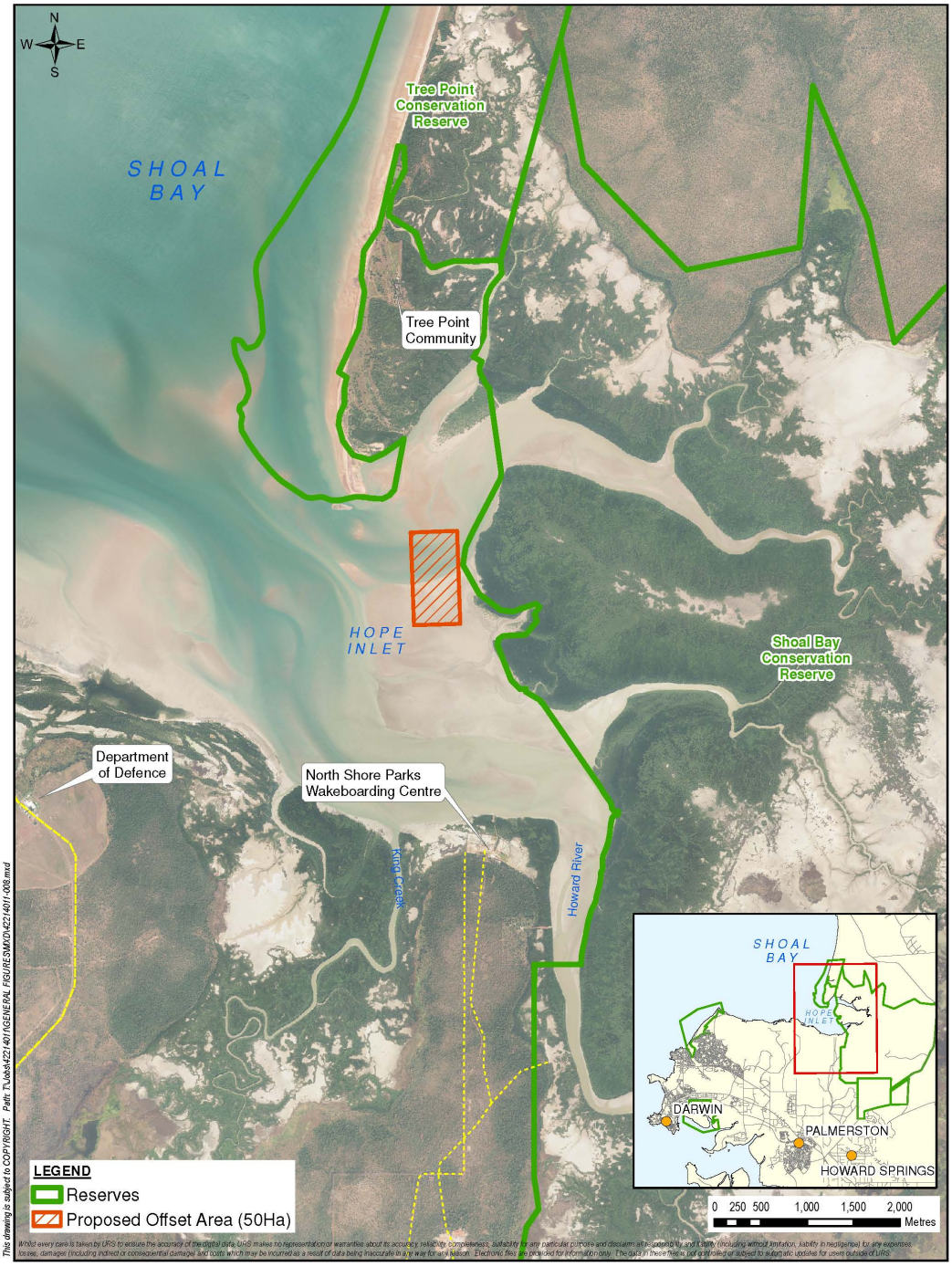

Figure 4-4 Area of Proposed Dolphin Habitat Protection Offset

5 PROTECTION AND MANAGEMENT OF DOLPHIN HABITAT AT THE SHOAL BAY (HOPE INLET) SITE

Condition 41 stipulates that this COP must provide for the protection and management of the protected area in perpetuity. This will be achieved through protection of the area described in Section 4.2 of this COP by means outlined in this section.

5.1 Protection of the offset area

Perpetual protection will be provided by way of a proclamation of a reserve pursuant to the *Crown Lands Act*. Once created Section 79 of the *Crown Lands Act* provides that it can only be revoked by a decision of the Legislative Assembly of the NT.

It is anticipated that implementation of protection through this mechanism will provide the best level of protection for dolphin habitat into the future while allowing for continued use of the area for the mutual benefit of the community and marine fauna.

5.2 Management of the offset area

Management of the reserve will be achieved by way of a management plan prepared in accordance with this COP.

The area to be protected in fulfilment of Condition 41 of approval EPBC 2010/5304 has been verified as dolphin habitat through the process outlined in Section 4.1. The Site will be managed such that its values for dolphin habitat are protected and enhanced through the ongoing management of pressures potentially impacting dolphins in the area.

The management of the offset area will be undertaken with the aim of offsetting any residual impacts identified in Chapter 3 (summarised in **Table 3-1**), taking into consideration the current uses of the area and any opportunities for additional indirect offsets through community engagement and education.

5.2.1 Existing pressures impacting on dolphins in the offset area

Griffiths and Palmer (2013) identified a range of pressures affecting dolphin habitat in the Darwin Harbour region. These include:

- Injury or death from boat strikes;
- Reduced water quality and pollution (marine and terrestrial sources); and
- Loss of foraging habitat.

These pressures are also present to varying extents on a local scale at the proposed offset area and will require some management to ensure protection of this area as dolphin habitat.

Vessel strikes would be expected to be fairly low due to the shallow nature of the waters in the offset area, which limits boat access and vessel size. However there have been some vessel strikes within the Shoal Bay area reported to the NTG's *Marine WildWatch*, a hotline in place to help manage and respond to marine wildlife incidents.

Water quality and reduction of foraging habitat pressures are likely lower at the offset area than in other Darwin Harbour region areas, as the surrounding land and coast is included

within conservation reserves, and the offset area is fed by small rivers and creeks from relatively undeveloped catchments (as opposed to larger rivers with catchments impacted by agricultural, marine, industrial and residential developments). The 2013 Darwin Harbour Region Report Card for Shoal Bay (DLRM, 2014) states that Shoal Bay is characterised by shallow embayment waters and sandbars, sediments and nutrient loads are received from the Howard River catchment during the wet season, and that water quality at the monitoring sites is in very good condition.

There is a low risk that water quality at the offset area may be reduced by discharge from the Leanyer-Sanderson Wastewater Treatment Plant (WTT) into Buffalo Creek, which flows into the southwest area of Shoal Bay, approximately 10 km west of the proposed offset area. However, the proposed offset area is verified dolphin habitat regardless of this possible influence and the operator of the WTT states that improvements and further investigations to improve the quality of the discharged treated water are ongoing (PWC, 2013).

5.2.2 Existing use and management of offset area

Existing uses of the marine offset area include:

- Recreational boating / fishing / crabbing;
- Traditional hunting and gathering; and
- Limited land based activities in neighbouring foreshore areas.

Swimming is generally not undertaken in NT coastal waters, especially not in proximity to mangrove areas, due to risks associated with crocodiles and jellyfish.

Current uses of the neighbouring foreshore (refer **Figure 4-4**) include:

- Tree Point Conservation Area (to the north);
- Tree Point Community (Outstation) (to the north);
- Shoal Bay Coastal Reserve (to the east);
- Howard Springs Hunting Reserve (to the south);
- North Shore Parks Wakeboarding Centre (to the south); and
- Department of Defence (Commonwealth) land (to the south-west).

The coastline around the vicinity of the proposed offset area is recognised as a popular recreational fishing area, especially ‘the Rock’ located at the southern tip of Tree Point. A secure boat ramp facility at Buffalo Creek, located to the west of the proposed offset zone, provides boating access to the area. Recreational fishing will not be restricted within the proposed offset area.

The Tree Point Conservation Area to the north, the Shoal Bay Coastal Reserve (to the east), and the Howard Springs Hunting Reserve (and Nature Park beyond) to the south are all managed by the Parks and Wildlife Commission NT. Within these areas are several Indigenous sites, the locations of which are known to Traditional Owners but are not publicised or readily accessible; however there are access tracks to at least one midden within the Shoal Bay Coastal Reserve. The proposed location provides opportunities for public and tourist

participation and education programs in association with these areas, as suggested in Section 5.2.3.3.

It is likely that there are traditional Indigenous uses of the area however it is not anticipated that creation of the reserve would impact on continued use of the area by Indigenous or non-Indigenous users. It should be noted that any restriction on access to the area would likely give rise to native title implications and possibly a requirement to negotiate an Indigenous land use agreement (ILUA).

Beyond these conservation areas (zoned as CN), land is generally zoned as Rural (R) or Rural Living (RL), with some existing residential and agricultural infrastructure as well as newer developments in the vicinity of Howard Springs (to the south), including the new Darwin prison and the INPEX accommodation village.

Land to the south-west is outside the Planning regulations as it is Commonwealth Land and contains the Australian Defence Force Robertson Barracks facility. Also to the south are a number of hard rock quarries.

While there may be some risk to dolphins associated with marine and adjacent foreshore land uses, and potential impacts on water quality, these would be minimised by the management actions detailed in Section 5.2.3.

The offset area is not currently managed outside of the existing management regimes covering the wider Darwin Harbour Region. Existing management and protection plans currently running in Darwin Harbour that encompass the Shoal Bay area and their relevance to the management of this offset area are summarised in **Table 5-1**. These management and protection plans will form the basis for ongoing management and monitoring of marine fauna and habitat values present in the offset area and will continue under their current format with investigations to be undertaken concurrently to identify how future management under these plans can be applied to greater effect at the offset area.

Table 5-1 Existing Management and Monitoring Plans contributing to the Maintenance of the Shoal Bay Offset Area as Dolphin Habitat

Program / Plan	Description	Relevance
Marine WildWatch www.nt.gov.au/marinewildwatch Free call 1800 453 941	A hotline to report marine wildlife sightings and to help manage and respond to marine wildlife incidents in the NT seas and rivers in a coordinated manner.	Monitoring of marine sightings and vessel strikes, and response to marine fauna strandings or injury in the Shoal Bay offset area.
NT Darwin Harbour Water Quality Protection Plan (WQPP)	Identifies management actions being undertaken by government, industry and community stakeholders to help ensure the harbour's multiple values and uses can be maintained into the future (NTG 2014a).	Water quality management and associated monitoring for the Darwin Harbour region which includes water quality and dolphin monitoring in Shoal Bay.

Program / Plan	Description	Relevance
NTG (DLRM) dolphin monitoring program	Dolphin population monitoring surveys in Darwin Harbour region.	Hope Inlet / Shoal Bay is included in annual DLRM dolphin monitoring surveys.
INPEX marine surveys	Aerial dugong and turtle surveys incorporated into dredging management plans.	Aerial surveys include Shoal Bay and the information is used to supplement the information logged by the DLRM surveys.
Darwin Harbour clean-up	Community and industry clean-up day removing rubbish from Darwin Harbour.	Contributes to habitat quality in Darwin Harbour through removal of rubbish.
Tree Point Conservation Area	In place to protect coastal habitat around the Tree Point headland.	Existing adjacent conservation area.
Shoal Bay Coastal Reserve	In place to protect coastal habitat including mangroves around Shoal Bay.	Existing adjacent conservation area.
Howard Springs Hunting Reserve	Existing nature park and hunting reserve.	Covered by a Territory Parks and Wildlife Plan of Management since 1992.

5.2.3 Management actions

The ongoing protection and management of the offset area for its value as dolphin habitat will be achieved through the implementation of a number of management actions. These management actions are described in the following sections and summarised in **Table 5-2**.

5.2.3.1 Protection of benthic habitat

By setting aside and managing this area for the purpose of habitat protection, a contribution will be made to directly offset the impact of the EAW Expansion Project which will result in some loss of benthic habitat. Protection of habitat from direct loss due to future development will be provided through administrative means (protection of the area from future development and detrimental use). Further protection from secondary habitat loss due to poor water quality is expected to be achieved through the implementation of the Darwin Harbour WQPP (NTG 2014b).

5.2.3.2 Demarcation of protected area and management of vessel activity

During the development of the COP, various management strategies regarding the demarcation of the offset area and restrictions on recreational vessel activity were discussed.

Demarcation of the area by marker buoys or other fixed signage in Shoal Bay is not being recommended due to the navigational risks posed to vessels, eg collisions could occur. Restrictions on boat speed, anchoring and approach distances to marina fauna were

investigated, but current NT legislation does not accommodate these activities and their compliance.

Darwin Harbour is controlled by the Darwin Port Corporation through the *Darwin Port Corporation Act 2005* and with the exception of specific areas where registered international/commercial vessels operate, Darwin Harbour is not speed regulated in relation to recreational vessels. However international / commercial shipping does not traverse the Shoal Bay area, and Shoal Bay falls outside the jurisdiction of the Port, where no speed limits are in place.

Further, (unlike several states of Australia) there is no recreational vessel registration or operator licencing in the NT and there is no infringement scheme in the NT for vessels speeding on Territory Waters. On this basis no speed restrictions are envisaged for the area at this time. Recreational vessel speed it generally dictated by conditions. Darwin Harbour has tide movements in excess of 8 metres and Shoal Bay is a relatively shallow area, most vessels fishing move at low speeds with the consequential reduction in the possibility of dolphin strike except in the channel areas where boats tend to remain at economical planing speeds at the lower tides to reduce their in water profile for safety because of the shallower water.

Therefore, it is deemed that a public awareness campaign discussed in the following section is appropriate as a management strategy.

5.2.3.3 Public awareness and education

In addition to the existing management and monitoring plans outlined in **Table 5-1**, an important part of this offset will be the opportunity for public awareness of the fauna visiting the area and the pressures that face endangered and migratory marine fauna of Darwin Harbour.

The proximity of the offset area to other land / coastal conservation areas was a key factor in selecting this site for protection. By establishing the habitat adjacent to the reserve, greater opportunity is provided to include the offset area in educational programs and for the general public and tourists to visit, although road access is limited. Parks and Wildlife management will include information about the habitat in their future brochures and website data and signage programs as they are developed for the Shoal Bay Reserve.

A range of methods are available to increase public awareness and appreciation of dolphins and other marine fauna in the Darwin Harbour region through education including:

- The Marine WildWatch program;
- Indigenous Ranger Program (IRP) – providing information to the public both on site and as requested. The IRP outlined in the BIMOS for the East Arm Wharf Expansion Project commenced in 2013 to operate within Darwin Harbour, however this was expanded to include the offset area;
- A signage program (signs to be installed at relevant boat ramps around the harbour) to provide interpretive information on marine mammals present in and around the Darwin Harbour region including safe approach distances to marine mammals.

- Inclusion of the habitat area into “Notice To Mariners’ to then be included on marine charts of the area and any communications plans that include dissemination of educational material to the public;
- Inclusion of habitat area on harbour fishing and tourist maps. Marine tour operators have expressed interest in having information available about the area to add value to their harbour tours and for dolphin watching; and
- Inclusion of the reserve and dolphin matters in Parks and Wildlife signage, fact and information sheets and on their web page relating to Shoal Bay Coastal Reserve as these items are updated.

5.2.3.4 Monitoring of EPBC listed species

Monitoring of the habitat area will be assisted by the Indigenous Ranger Program.

Ongoing Dolphin Population Monitoring in the proposed offset area and surrounding areas is undertaken by DLRM in collaboration with INPEX. The current program includes Shoal Bay and Hope Inlet and DLRM advice suggests no further benefit in widening the dolphin monitoring program in those areas.

5.2.3.5 Maintenance of water quality

Future development impacts from the landward side are expected to be fairly minimal, with the presence of the Tree Point Conservation Area to the north, the Shoal Bay Coastal Reserve (to the east), and the Howard Springs Hunting Reserve (and Nature Park beyond) to the south.

However, as the Darwin region continues to grow and develop, development pressures could increase in the wider area, including within the catchments of the creeks that flow into Hope Inlet and Shoal Bay. Therefore there is the potential for a reduction of water quality in the proposed offset area.

The area identified for protection, although small in the context of the greater Darwin Harbour area, will benefit from current NTG water quality programs and the implementation of the NT Darwin Harbour WQPP. The reporting mechanisms under the WQPP will provide an ongoing tool by which water quality in the area can be tracked. These include a regime of water quality monitoring (beach water quality monitoring and marine and estuarine water quality monitoring) and the production of annual report cards relating to marine ecosystem health. Shoal Bay is defined as one of the reporting areas within the Report Card system (DLRM, 2014).

These programs are part of the Darwin Harbour Integrated Monitoring Research Program, a collection of over twenty environmental monitoring programs in the Darwin Harbour region.

Table 5-2 Management Actions and Timeframes

Management Action for the COP	Responsible Party	Indicative timeframes
Protection of 50 ha of verified dolphin habitat in Darwin Harbour region	DLPE	Gazettal within 2 years ~~12 months~~ of DoE approval of this plan
Installation of signage at nearby boating facilities	DLPE	Within 6 months of Gazettal
Develop and implement a public awareness campaign to notify users of the new Dolphin Reserve	DLPE	Within 12 months of Gazettal
Conduct regular monitoring of EPBC Listed threatened and endangered populations	DLRM	Ongoing
Develop a strategy to formally link the newly created Offset area into existing IRP, WWP and WQMP programs in Darwin Harbour.	DLRM	Within 12 months of Gazettal
Investigate opportunities to support and participate in Darwin Harbour Clean-up program at the offset site	DLRM	Within 12 months of Gazettal

* DLPE: Department of Lands, Planning and Environment
* DLRM: Department of Land Resource Management

6 IMPLEMENTATION

Conditions 43 and 44 of EPBC Approval 2010/5304 refer to the timing of submission and implementation of this COP.

In accordance with Condition 43, work will not commence on the Multiuser Barge Ramp Facility or the tugs and small vessel berths until the COP has been approved by the Minister.

Once approved, the COP will be implemented in accordance with Condition 44. The implementation plan presented in this section fulfils these requirements.

The overall responsibility for implementation of the COP lies with the DLPE, with assistance from relevant government departments as identified in **Table 5-2**.

Timeframes for the actions are also included in **Table 5-2**.

The success of these management actions will be determined based on measurable objectives, targets and indicators that have been set and are summarised in the following section.

6.1 Objectives, Targets and Indicators

In order to monitor the success or failure of this COP, a series of Objectives, Targets and Indicators are presented in **Table 6-1**.

These Objectives, Targets and Indicators provide measurable indicators by which the success of the offset can be assessed on an ongoing basis. They have been selected to align with the management action proposed and the overall desired outcomes that these management actions aim to achieve.

Table 6-1 Objectives, Targets and Indicators

Objective	Target	Indicator
Provide protection for an area of verified dolphin habitat to offset the impacts of the EAW Expansion Project on coastal dolphins in Darwin Harbour	Formal protection of 50 ha of verified dolphin habitat	– Administrative protection secured for 50 ha of dolphin habitat.
Implement 'fishing community' information program to raise awareness of the offset area and emphasise the need to avoid vessel interactions with dolphins	No vessel / dolphin collisions in the offset area	– Number of reported incidents – WildWatch program response records and Indigenous Ranger Program reports
Maintain or improve habitat quality for dolphins in the offset area	No decrease in dolphin habitat quality in the offset area	– Number of dolphin sightings recorded by monitoring programs and Indigenous Ranger program – Quantity of rubbish

Objective	Target	Indicator
		removed from the area on regular patrols and days such as Darwin Harbour clean up – Water quality monitoring results and annual report cards
Minimise ongoing impact at the EAW site and manage residual impacts to as low as reasonably practicable	Minimal ongoing residual impact resulting from EAW expansion	– Number of dolphin sightings recorded by monitoring programs – Number of vessel strikes on dolphins and other marine fauna reported – Marine WildWatch response reports – Water quality monitoring results and annual report cards
Increase public awareness of marine megafauna in the Darwin Harbour region through provision of a habitat area that remains accessible to the public	Increased public awareness and interest in marine fauna in the Darwin Harbour region	– Number of inquiries to DLRM/P&W information lines – Number of dolphin sightings reported by public/tour operators – Interpretive signage in place

7 MONITORING, REPORTING AND REVIEW

A monitoring, reporting and review process will be implemented as part of this COP. The monitoring, reporting and review process will aim to:

- Track the progress in implementation and compliance with requirements of the approval conditions; and
- Provide offset performance measuring, monitoring and reporting to determine the success or failure of the protected area as a suitable offset.

The EPBC Act Environmental Offsets Policy requires all offsets under the EPBC Act to be measurable and auditable. This will be achieved through the implementation of the monitoring program presented in **Table 7-1**.

DoE may undertake audits of this COP and performance of offsets and will be assisted as required by the DLPE.

Table 7-1 Responsibility for Monitoring and Review

#	Monitoring / Review	Responsible Party	Frequency / timing
1.	**Implementation and compliance with approval conditions**		
1.1	Progress audit of management actions	DLPE	Annually following approval of COP
1.2	Annual review of COP performance against the Objectives, Targets and Performance indicators (Table 6-1)	DLPE*	Annually until 3 years after completion of EAW Expansion.
1.3	Participation in DoE audits of COP	DoE / DLPE*	As required
2	**Offset performance monitoring**		
2.1	Dolphin monitoring programs	DLRM	Linked with existing Indigenous Ranger / DLRM monitoring
2.2	Asset maintenance monitoring / inspections of signage	DLPE	Twice-yearly
2.3	Participation in DoE audits of offset performance	DoE / DLPE*	As required
2.4	Existing monitoring and reporting programs (Table 5-1).	Various	As per individual programme schedule. Summary provided in annual review of COP (1.2 in this table)

*The DLPE may contract suitably qualified consultants to assist with the monitoring and compliance responsibilities of the COP.

It is anticipated that an annual report will be produced resulting from the annual review of the COP (item 1.2 in **Table 7-1**). This report will provide a measure of the performance of the COP and an assessment of the effectiveness of the COP as a mechanism for implementing or modifying the proposed management actions (Section 5) and achieving the objectives and targets set out in **Table 6-1** based on the performance criteria in the same table. The report will also summarise the results of other contributing monitoring programs in **Table 5-1**.

Interim reports will be produced as a result of any audits undertaken. These reports will include the results of the audit, any corrective actions required and timeframes for implementation of corrective actions. Corrective actions will be followed up and reported on in the next annual report.

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9 LIMITATIONS

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