

CEMP Appendix B2

Biodiversity Management Plan

Kamay Ferry Wharves

June 2023

THIS PAGE LEFT INTENTIONALLY BLANK

Contents

CEMP Appendix B2	1
Contents	i
Glossary/ Abbreviations	iii
Document control	5
1 Introduction	7
1.1 Context	7
1.2 Background and project description	7
1.3 Legislative framework	9
1.3.1 <i>Environmental Planning and Assessment Act 1979</i>	9
1.3.2 <i>Environment Protection and Biodiversity Conservation Act 1999</i>	9
1.3.3 EIS – Revised Environmental Management Measures	9
2 Purpose and objectives	10
2.1 Purpose	10
2.2 Objectives.....	10
2.3 Targets	10
3 Consultation	11
4 Existing environment	12
4.1 Terrestrial biodiversity.....	12
4.1.1 Flora	12
4.1.2 Fauna habitat	15
4.1.3 Threatened fauna	15
4.2 Marine biodiversity.....	16
4.2.1 Seagrass	17
4.2.2 Marine fauna	20
4.2.3 Matters of National Environmental Significance.....	23
5 Environmental impacts	25
5.1 Activities	25
5.2 Impacts.....	25
6 Environmental mitigation and management measures	27
6.1 Pre-Disturbance Survey – Terrestrial flora and fauna	27
6.2 Pre-Disturbance Survey – Marine flora & fauna	27
6.2.1 White’s Seahorse	27
6.2.2 Black Rockcod.....	28
6.2.2.1 Black Rockcod Dive Survey.....	28

6.2.2.2	Suitable Methods to Protect Black Rockcod	28
6.3	Seagrass monitoring and protection.....	29
6.4	Marine mammal monitoring	29
6.5	Marine mammal strike.....	30
6.6	Unexpected threatened species finds	31
6.7	Terrestrial fauna handling	31
6.8	Tree protection (Kurnell)	31
6.9	Control of weeds and pathogens	32
6.10	Marine pests	32
6.11	Biodiversity offsets.....	33
6.12	Noise and Lighting	35
6.13	Sediment	35
6.14	Environmental Work Method Statements	35
6.15	Summary of environmental control measures	37
7	Compliance management	53
7.1	Roles and responsibilities	53
7.2	Training	53
7.3	Monitoring and inspections	53
7.4	Auditing	53
7.5	Reporting.....	54
8	Review and improvement	55
8.1	Continuous improvement	55
8.2	BMP update and amendment	55
	Attachment A1 – Procedure for Terrestrial Vegetation Disturbance	56
	Attachment A2 – Procedure for Marine Vegetation Disturbance.....	64
	Attachment B – Unexpected threatened species finds procedure	67
	Attachment C – Terrestrial fauna handling procedure	69
	Attachment D – Syngnathid relocation plan	71
	Attachment E - Tree protection measures	81
	Attachment F – Terrestrial Weed and pathogen control procedure	87
	Attachment G – Marine mammal monitoring procedure	93
	Attachment H – Environmental Requirements.....	97
	Attachment I – Technical Advice – Protecting Black Rockcod (Epinephelus daemeli)	119
	Attachment J – Terrestrial Vegetation Map.....	130

Glossary/ Abbreviations

Abbreviations	Expanded text
BC Act	<i>Biodiversity Conservation Act 2016</i>
BMP	Biodiversity Management Plan
CEMP	Construction Environmental Management Plan
CEMS	Contractor's Environmental Management System
CMO	HESQ compliance database software
CMPNV	Construction Monitoring Program for Noise and Vibration
CMPT	Construction Monitoring Program for Turbidity
CoA	Conditions of Approval
Contractor	McConnell Dowell Contractors (Aust) Pty Ltd (MCD)
DPI	Department of Primary Industries
DPE	NSW Department of Planning and Environment
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
EPBC – CoA	<i>Environmental Protection and Biodiversity Conservation Act 1999</i> Conditions of Approval
EWMS	Environmental Work Method Statements
FM Act	<i>Fisheries Management Act 1994</i>
GDE	Groundwater dependent ecosystem
HSEQ	Health, Safety, Environment and Quality
JSEA	Job Safety and Environment Analysis
MBOS	Marine Biodiversity Offset Strategy
MCoA	Minister's Conditions of Approval for State Significant Infrastructure under the <i>Environmental Planning and Assessment Act 1979</i>
MCD	McConnell Dowell Contractors (Aust) Pty Ltd

Abbreviations	Expanded text
MMO	Marine Mammal Observer
MWMP	Marine Works Management Sub Plan
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NPWS	National Parks and Wildlife Service
NW Act	<i>Noxious Weeds Act 1993</i>
OEH	NSW Office of Environment and Heritage
REMM	Revised Environmental Management Measures
RMS - Roads and Maritime	Now Transport for NSW (TfNSW)
PCT	Plant Community Type
Site	Area defined by the construction boundary at La Perouse and Kurnell
TBOS	Terrestrial Biodiversity Offset Strategy
TEC	Threatened ecological community
TfNSW	Transport for New South Wales
TPZ	Tree Protection Zone

Document control

Revision	Date	Description	Approval
A	June 2021	Draft for Transport for NSW comment	N/A
B	July 2021	Draft for tender	N/A
C	Nov 2022	Draft for construction. Name changed from Flora and Fauna Management Sub Plan to Biodiversity Management Plan	N/A
D	Nov 2022	Updated to address MCD comments. Draft for TfNSW review.	N/A
E	Dec 2022	Updated to address TfNSW comments and update to Attachment H.	N/A
F	Feb 2023	Updated to address ER comments	N/A
G	Mar 2023	Updated to include EPBC Conditions and close out ER comments	N/A
H	Apr 2023	Updated following Consultation	N/A
I	May 2023	Updated to address DPE Comments	N/A
J	June 2023	Updated to address DPE Comments	N/A
K	June 2023	Updated to address DPE Comments	N/A

Distribution of controlled copies

This BMP as part of the CEMP is available to all personnel and sub-contractors via the Project document control management system. An electronic copy can be found on the Project website.

The document is uncontrolled when printed. One controlled hard copy of the BMP as part of the CEMP and supporting documentation will be maintained by the Quality Manager at the Project office [and on the project website].

Copy number	Issued to	Version

1 Introduction

1.1 Context

This Biodiversity Management Plan (BMP) forms part of the Construction Environmental Management Plan (CEMP) for the Kamay Ferry Wharves (the Project) as shown in Figure 1-1 and discussed in Section 1.3 of the CEMP.

This BMP has been prepared to address the requirements of the Minister’s Conditions of Approval under the *Environmental Planning and Assessment Act 1979* (MCoA) and *Environment Protection and Biodiversity Conservation Act 1999* Conditions of Approval (EPBC-CoA) and the Revised Environmental Management Measures (REMMs) listed in the Kamay Ferry Wharves Environmental Impact Statement (EIS).

Cardno now Stantec, on behalf of McConnell Dowell has prepared this BMP for the Project.

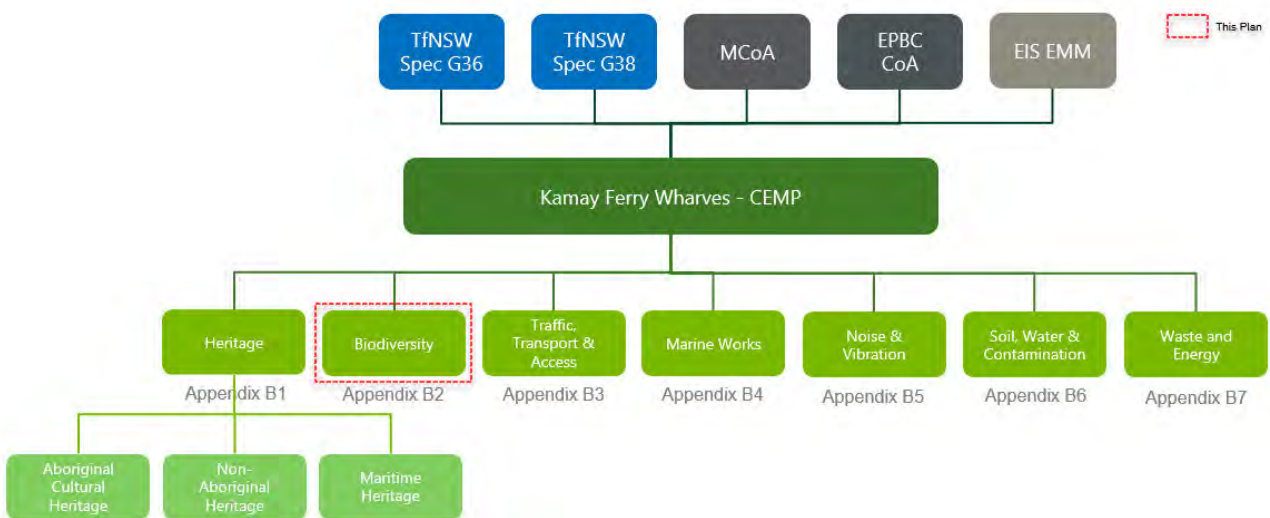


Figure 1-1 CEMP and Sub Plans

1.2 Background and project description

Transport for New South Wales (TfNSW) is constructing new ferry wharves at La Perouse (Figure 1-1) and Kurnell (Figure) in Botany Bay. This would allow for an alternative connection between northern and southern Botany Bay other than by road. The primary purpose of this infrastructure would be to operate a public ferry service. It would also provide supplementary temporary mooring for non-ferry commercial vessels (such as whale watching vessels) and recreational boating.



Figure 1-2 La Perouse project overview



Figure 1-3 Kurnell project overview

A detailed description of the Project is provided Chapter 5 of the EIS.

Chapter 10 and Chapter 11 of the Kamay Ferry Wharves EIS assessed impacts of construction and operation of the Project on marine and terrestrial biodiversity.

As part of the EIS development, detailed construction and operational assessments for marine and terrestrial biodiversity were prepared to address the Environmental Assessment Requirements issued by the Department of Planning, Industry and Environment (DPIE). The assessments were included in the EIS Appendix H Marine Biodiversity Assessment Report and Appendix I Biodiversity Development Assessment Report.

The EIS identified the potential for direct and indirect impacts on marine and terrestrial biodiversity.

1.3 Legislative framework

1.3.1 *Environmental Planning and Assessment Act 1979*

The Project was approved as State Significant Infrastructure (SSI) under the *Environmental Planning and Assessment Act 1979* on 21/7/2022 (SSI 10049). Conditions of SSI 10049 (MCoA) relevant to biodiversity management and where they are addressed in this plan are provided in Attachment H.

1.3.2 *Environment Protection and Biodiversity Conservation Act 1999*

The Project requires approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. EPBC 2020/8825 was lodged with the Commonwealth Minister for the Environment who determined the Project is a controlled action, however it was deemed appropriate that the Project be assessed under the assessment bilateral agreement with NSW.

Conditions of EPBC 2020/8825 relevant to biodiversity management and where they are addressed in this plan are provided in Attachment H.

1.3.3 *EIS – Revised Environmental Management Measures*

The EIS identified a range of environmental outcomes and Revised Environmental Management Measures (REMMs) that would be required to avoid or reduce the environmental impacts identified. REMMs were revised after consideration of the issues raised in the public submissions. REMMs relevant to biodiversity management and where they are addressed in this plan are provided in Attachment H.

2 Purpose and objectives

2.1 Purpose

The purpose of this BMP is to describe how the contractor McConnell Dowell proposes to manage and protect biodiversity during the construction of the Project and meet the requirements of the MCoA, EPBC-CoA and EIS REMMs.

2.2 Objectives

The objective of the BMP is to ensure that all avoidance, mitigation and management measures are implemented relevant to the protection of native biodiversity including threatened species and Endangered Ecological Communities (EECs) as referred to in:

- the Project EIS.
- the MCoA as granted to the Project on 21/7/2022 (SSI 10049).
- the EPBC-CoA as granted to the Project on 16/3/2023 (EPBC ref 2020/8825).
- relevant matters specified in the NSW DPI Fisheries Policy and guidelines for fish habitat conservation and management (NSW Department of Primary Industries, 2013).

2.3 Targets

The following targets have been established for the management of biodiversity impacts during the project using SMART principles (Specific, measurable, action, realistic, timebound):

- Ensure full compliance with the relevant legislative requirements: MCoA, EPBC-CoA and REMMs.
- All staff (including contractors) appropriately inducted.
- All pre-disturbance surveys (terrestrial and marine) conducted within the required timeframes to the appropriate procedure.
- All expected threatened species finds addressed in accordance with Section 6.6.
- Marine mammal monitoring in place during 100% of piling activities. Stop work process followed during any time marine mammals are observed in Zone 1 or 2.
- Vessel traffic obeying speed limits.
- All marine and terrestrial fauna handled by qualified persons in accordance with procedures outlined in Section 6.8.
- Trees at Kurnell are removed, retained and protected in accordance with Section 6.6.
- Weed management plan and weed site assessment conducted at La Perouse and Kurnell.
- No transfer of plant diseases or pathogens to/from the project work areas.
- Construction monitoring programs for Turbidity, and Noise and Vibration fully implemented.
- Sections of the MBOS and Marine Construction Management Plan relevant to protection of biodiversity fully implemented

3 Consultation

Several stakeholders were consulted in the development of this BMP in accordance with MCoA Condition C6.

Table 3-1 Biodiversity Management Plan consultation

Sub Plan	Relevant government agencies to be consulted
Biodiversity Management Plan (this plan)	NSW Department of Primary Industries Fisheries, NSW Environment and Heritage, Department of Planning, Industry and Environment – Water, National Parks and Wildlife Service, Randwick City Council and Sutherland Shire Council

The Biodiversity Plan has been updated to address the matters raised during consultation. Community feedback and complaints relating to biodiversity will be managed in accordance with the CEMP and Community Communications Strategy

4 Existing environment

The following sections summarise existing biodiversity within and adjacent to the Site including species, communities and habitats as described in the EIS.

The key reference documents are Chapter 10 and Chapter 11 of the EIS and the biodiversity assessments that were included in the EIS;

- Appendix H Marine Biodiversity Assessment Report and
- Appendix I Biodiversity Development Assessment Report.

4.1 Terrestrial biodiversity

4.1.1 Flora

Vegetation communities

At La Perouse, the Site is mostly characterised by maintained lawns and landscaped gardens with small isolated areas of native vegetation including two Plant Community Types (PCTs) (Figure 4-1).

Kurnell supports a range of native vegetation including six identified PCTs, although it is heavily disturbed. The Site is characterised by planted or regrown vegetation with large areas of wet sclerophyll forest (a type of vegetation community characterised by tall open tree canopies and an understorey of rainforest species) and a small patch of littoral rainforest further to the east. Within the Site, there are also large areas of cleared grasslands with several planted non-endemic pines fringing the foreshore (Figure 4-2).



Figure 4-1 Native vegetation at La Perouse



Figure 4-2 Native vegetation at Kurnell

Threatened ecological communities

The *Biodiversity Conservation Act 2016* (BC Act) lists threatened ecological communities (TECs) within NSW. Several NSW listed TECs are located within or near the Kurnell Site, their PCT, area and conservation status can be found in Table 4-1 and Figure 4-3. There are no NSW listed TECs at La Perouse.

The EPBC Act also lists TECs on the federal scale. There are no EPBC Act TECs listed at either La Perouse or Kurnell.

Table 4-1: TECs identified within or near the Kurnell Site

Threatened ecological community (TEC)	Plant community type (PCT)	Area in field survey extent (ha)	Conservation status	
			EPBC Act	BC Act
Kurnell Dune Forest in the Sutherland Shire and City of Rockdale	PCT 661	4.89	-	Endangered
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	PCT 1832	0.99	-	Endangered

Threatened ecological community (TEC)	Plant community type (PCT)	Area in field survey extent (ha)	Conservation status	
			EPBC Act	BC Act
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion	PCT 1232	0.11	-	Endangered



Figure 4-3 Threatened ecological communities at Kurnell

Threatened flora species

Two flora species listed as threatened under the BC and EPBC Acts have the potential to occur on or near the Kurnell Site. There are no threatened flora species at La Perouse.

Table 4-2: Potential threatened flora near Kurnell Site

Common name	Scientific name	EPBC Act	BC Act	Occurrence
Magenta Lilly Pilly	<i>Syzygium paniculatum</i>	Vulnerable	Endangered	70 individuals
Leafless Tongue-orchid	<i>Cryptostylis hunteriana</i>	Vulnerable	Vulnerable	Presence to be confirmed in flowering months

The location of these flora species in relation to the Project at Kurnell is shown on Figure 4-4 and the Sensitive Area Plans included at Appendix A8 of the CEMP.



Figure 4-4 Threatened flora at Kurnell

Groundwater dependent ecosystems

Groundwater dependent ecosystems (GDE) rely on a supply of groundwater to support species composition and their ecosystem structure and function. Whilst there is potential for GDEs to be located close to the Kurnell Site, there are unlikely to be any GDE’s within the Site. There is no potential for GDEs to occur at the La Perouse Site.

4.1.2 Fauna habitat

At La Perouse, there is a very small area of Coast Banksia Scrub (PCT 1778), which provides habitat for numerous bird species as well as tree and ground-dwelling mammals. Considering the small area of available habitat and level of local disturbance, it is likely only species tolerant of environmental disturbance would occur (e.g. Common Brushtail Possum).

At Kurnell, the more extensive and contiguous native vegetation provides foraging habitat for flying species (bats and birds) as well as arboreal and ground-dwelling mammals.

4.1.3 Threatened fauna

A total of six threatened fauna species were recorded during field surveys, one at La Perouse and five at Kurnell. Presence was also assumed at Kurnell for three additional fauna species that could not be discounted based on the survey methods used. These species are listed in Table 4-3.

No microbat or frog habitat was identified.

Table 4-3: Threatened fauna survey results for La Perouse and Kurnell

Species name	EPBC Act status*	BC Act status*	Survey observations
<i>Mammals</i>			
Little Bent-winged Bat	-	V	Calls detected at Kurnell
Large Bent-winged Bat	-	V	Calls detected at Kurnell
Eastern Coastal Free-tailed Bat	-	V	Calls detected at Kurnell
Grey-headed Flying Fox	V	V	Recorded flying over and foraging within Littoral Rainforest at Kurnell
Large-eared Pied Bat	V	V	Species not recorded and the site does not support breeding habitat. However, species presence for foraging cannot be discounted due to presence of potential breeding habitat within 2km.
Eastern Cave Bat	-	V	Species not recorded and the site does not support breeding habitat. However, species presence for foraging cannot be discounted due to presence of potential breeding habitat within 2km.
<i>Birds</i>			
Pied Oystercatcher	-	E	Species observed foraging along rocky shoreline at Kurnell
Sooty Oystercatcher	-	V	Species observed foraging along rocky shoreline at La Perouse
Gang-gang Cockatoo	-	V	Species not recorded but could not be discounted due to presence of Eucalypt tree hollows

* E: Endangered, V: Vulnerable

4.2 Marine biodiversity

The marine environments of each Site (La Perouse and Kurnell) within the study area (Figure 4-5) contain a range of habitats including intertidal and subtidal soft sediments, subtidal rock reef and extensive seagrass beds.



Figure 4-5 Marine study areas at La Perouse and Kurnell

The habitats found within in the study area can be classified according to the *Policy and Guidelines for Fish Habitat Conservation and Management*, and the ‘sensitivity classification scheme’ which requires consideration of the waterway ‘sensitivity’ or Type, which ranks the “importance of the habitat to the survival of fish and its robustness (ability to withstand disturbance)”. This ranking is used within the policy and guidelines to differentiate between permissible and prohibited activities or developments and for determining value in the event offsetting is required. Habitat classification is also linked to the marine vegetation present.

4.2.1 Seagrass

La Perouse

At La Perouse the distribution of seagrass is patch (Figure 4-6). *Halophila spp* (Halophila) is the main species being found throughout most of the soft sediment, particularly in the deeper areas. *Zostera capricorni* (Zostera) is mainly confined to the southern corner along Frenchmans Bay growing mixed with *Halophila spp*.

Small isolated patches of *Posidonia australis* (Posidonia) can be found growing amongst other seagrasses in the shallower areas closer to the shore. This seagrass is the only species considered as likely habitat for the White’s Seahorse or other Syngnathids. A single patch of Posidonia is found within the eastern corner of the construction boundary.

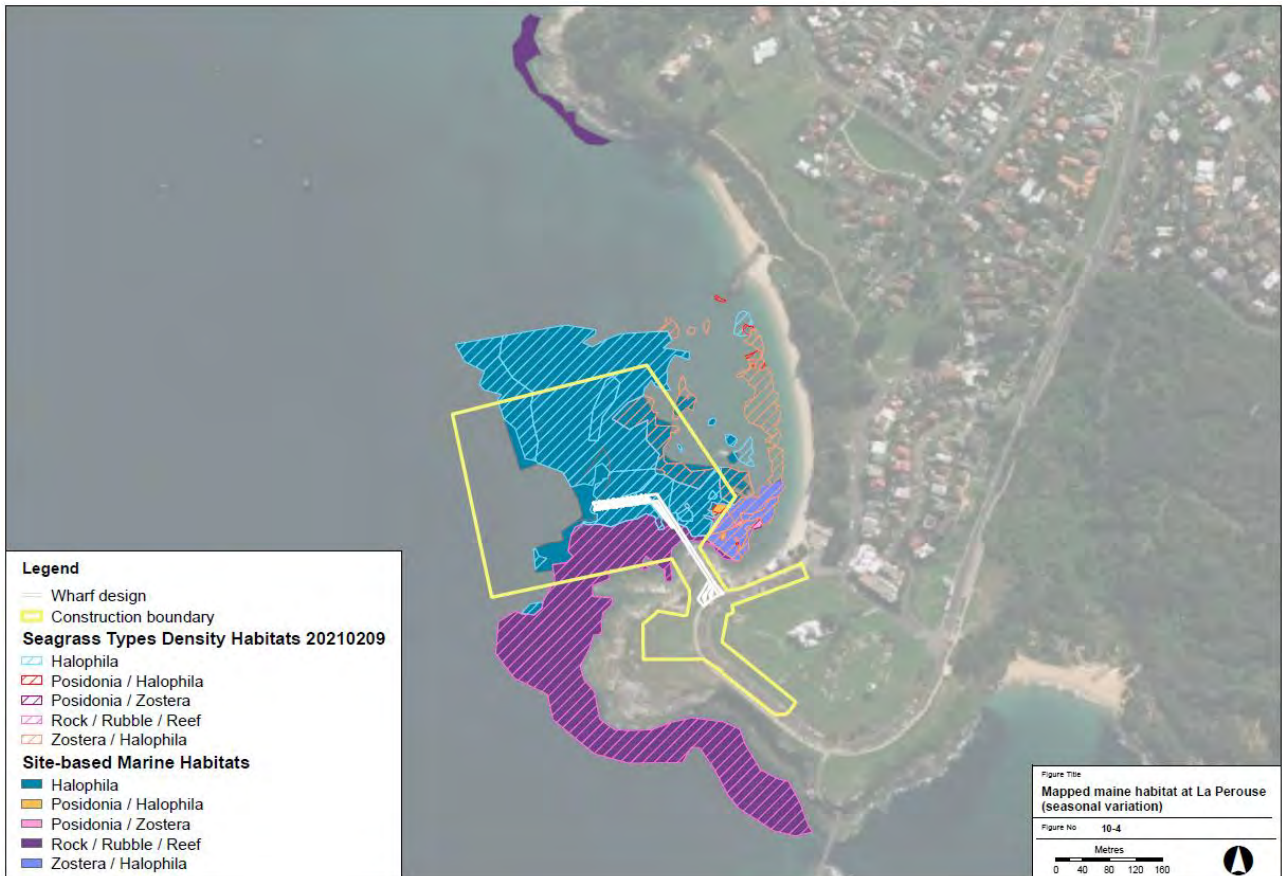


Figure 4-6 Marine habitats at La Perouse marine study area

Kurnell

Seagrass distribution is widespread throughout Kurnell both within the construction boundary and its surrounds and is typically found in a depth range between 1 – 5m. All three species of seagrass are represented at the Site, although Zostera and Halophila were also found in deeper waters towards the east of the Site. Zostera was also abundant in shallower waters close to the shoreline.

Posidonia at Kurnell is largely found as part of a large, dense, contiguous bed located on the western side of the proposed wharf (Figure 4-7). In shallow water (1 - 3.5m). This bed occurs within the western edge of the construction boundary. There are also smaller isolated patches of Posidonia mixed with other seagrass species in the shallow waters to the east of the proposed wharf within the construction boundary.

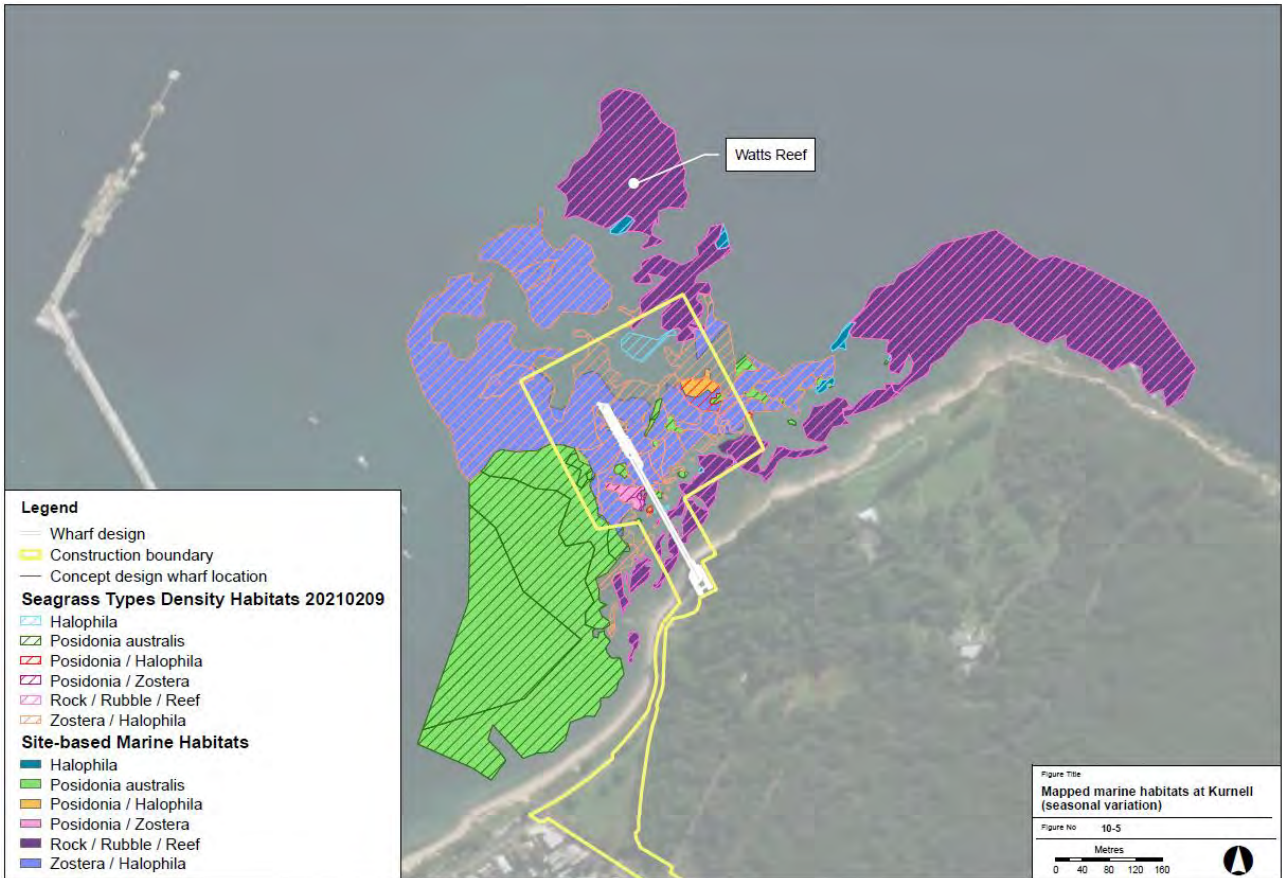


Figure 4-7 Marine habitats at Kurnell marine study area

Areas of seagrass types found within the marine study areas at La Perouse and Kurnell Sites are indicated in Table 4-4 below.

Table 4-4: Seagrass communities within the La Perouse and Kurnell marine study areas

Seagrass	Extent within marine study area (ha)
La Perouse	
<i>Halophila</i>	5.31
<i>Zostera/Halophila</i>	0.39
<i>Posidonia/Halophila</i>	0.03
<i>Posidonia/Zostera</i>	0.02
<i>Posidonia</i>	-
Open water (unmapped area within marine study area)	~7.20
Kurnell	
<i>Halophila</i>	0.14
<i>Zostera/Halophila</i>	6.45
<i>Posidonia/Halophila</i>	0.10
<i>Posidonia/Zostera</i>	0.09

Seagrass	Extent within marine study area (ha)
<i>Posidonia</i>	7.00
Open water (unmapped area within marine study area)	~39.20

Threatened ecological communities

Posidonia beds occurring in Port Hacking, Botany Bay, Sydney Harbour, Pittwater, Brisbane Waters and Lake Macquarie are listed as endangered populations under the *Fisheries Management Act 1994* (FM Act) and as a protected TEC under the Commonwealth EPBC Act (when certain criteria are met). *Posidonia* has seen a continued decline in distribution in the wider Sydney region over the last decade due to urbanisation and its associated impacts on water quality. As a slower growing seagrass species with long recovery times, *Posidonia* is particularly susceptible to disturbance and impacts.

4.2.2 Marine fauna

Within the marine study areas of La Perouse and Kurnell there are potentially 47 species listed and protected under the EPBC Act and 28 species listed and protected under the FM Act. These include 11 marine mammals, two turtles, one shark species, one fish, several Syngnathids (seahorses, pipefish and seadragons), one invertebrate, and 31 marine birds. Protected species of note include:

- the Southern Right Whale and the Humpback Whale which both migrate along the NSW coastline between May and November each year and have been recorded within Botany Bay on occasion.
- the Grey Nurse Shark which occasionally enters Botany Bay to breed but typically prefers rocky reef habitat located in deeper waters.
- several species of marine turtles, Syngnathids and other protected species which are associated with seagrass as foraging and nesting habitat. Seagrass also provides excellent habitat and refuge for juvenile fish.
- the endangered Black Rockcod associated with subtidal rocky reef habitat.
- various marine and shore birds that use the marine study area and its surrounds as foraging area.

A likelihood assessment was completed to determine the likelihood of occurrence of each species at the La Perouse and Kurnell Sites (Table 4-5).

Table 4-5: Marine fauna species possible or likely to occur at La Perouse and Kurnell

Name	EPBC Act Status	FM Act Status	Likelihood of occurrence
Marine mammals			
Australian Fur-Seal	Marine	Vulnerable, protected	Likely (transient)
Australian Sealion	-	Protected	Likely (transient)
Blue Whale	Endangered, migratory	-	Possible (transient offshore)
Bottlenose Dolphin	-	Protected	Likely
Common Dolphin	-	Protected	Likely

Name	EPBC Act Status	FM Act Status	Likelihood of occurrence
Dugong	Vulnerable, migratory	-	Possible (transient)
Dusky Dolphin	Migratory		Possible (transient)
False Killer Whale	-	Protected	Possible (transient)
Humpback Whale	Vulnerable, migratory	Vulnerable, protected	Likely (transient)
New Zealand Fur-Seal	Marine	Vulnerable, protected	Likely
Southern Right Whale	Endangered, migratory	-	Possible (transient)
Marine reptiles			
Loggerhead Turtle	Endangered, migratory	Endangered	Possible (transient)
Green Turtle	Vulnerable, migratory	Vulnerable	Possible (recorded)
Sharks			
Grey Nurse Shark	Critically endangered	Critically endangered	Possible
Fish			
Black Rockcod	Vulnerable	Vulnerable	Likely
White's Seahorse	Endangered	Endangered	Likely
Syngnathids	-	Protected	Likely
Marine birds			
Antipodean Albatross	Vulnerable, migratory	Vulnerable	Possible (transient)
Australian Pelican	-	Protected	Likely
Brown Booby	Protected under international agreement	Protected	Possible
Cape Petrel	-	Protected	Possible (transient offshore)
Caspian Tern	Protected under international agreement	Protected	Possible (transient)
Chatham Albatross	Endangered, migratory	-	Possible (transient)

Name	EPBC Act Status	FM Act Status	Likelihood of occurrence
Common Diving-petrel	-	Protected	Likely
Common Tern	Protected under international agreement	Protected	Possible (transient)
Fairy Prion	-	Protected	Likely (transient)
Fairy Tern	-	Protected	Possible (transient)
Fluttering Shearwater	-	Protected	Possible (transient)
Gibson's Albatross	Vulnerable	Vulnerable	Possible (transient) vagrant
Gould's Petrel	Endangered	Vulnerable	Possible (transient) vagrant
Great Cormorant	-	Protected	Likely
Gull-billed Tern	Protected under international agreement	Protected	Possible (transient)
Hutton's Shearwater	-	Protected	Possible (transient)
Kelp Gull	-	Protected	Likely
Little Penguin	-	Protected	Likely
Little Tern	Protected under international agreement	Endangered, protected	Possible (transient)
Northern Royal Albatross	Endangered, migratory, marine	-	Possible (transient)
Pacific Gull	-	Protected	Likely
Pied Oystercatcher	-	Endangered, protected	Likely
Salvin's Albatross	Vulnerable, migratory	-	Possible (transient)
Invertebrates			
Cauliflower Soft Coral	Endangered	Endangered, protected	Likely

4.2.3 Matters of National Environmental Significance

The project was declared a controlled action under the EPBC Act as it has the potential to significantly impact four nationally listed threatened species and ecological communities:

- *Posidonia australis*.
- Black Rockcod.
- Cauliflower Soft Coral.
- White's Seahorse.

Targeted surveys were carried out to confirm the presence of these species at La Perouse and Kurnell.

The presence of *Posidonia* was confirmed as outlined in Section 4.2.1

Targeted surveys did not confirm the presence of White's Seahorse or Black Rockcod in either of the Site areas.

White's Seahorse are highly cryptic and the Black Rockcod is mobile and transient so the absence of these species in the surveys does not preclude them from occurring in these areas. There is suitable White's Seahorse habitat within the construction boundary at both Sites (Figure 4-8, Figure 4-9), and there is good condition Black Rockcod habitat outside of the construction boundary but nearby within Botany Bay (Figure 4-8, Figure 4-9). It is assumed that these species could be present within the Site.

Targeted surveys did not identify the presence of Cauliflower Soft Coral in either Site. The rocky reef and seagrass habitats predominant in the area does not support Cauliflower Soft Coral and it was therefore determined that this species was not present within either Site.



Figure 4-8 Black Rock Cod and White's Seahorse habitat at La Perouse



Figure 4-9 Black Rock Cod and White's Seahorse habitat at Kurnell

5 Environmental impacts

5.1 Activities

Key activities of the Project that may directly and / or indirectly impact terrestrial and marine biodiversity during construction include:

- Construction and removal of the temporary causeway at Kurnell, and the temporary crane platform at La Perouse.
- Piling activities.
- Vessel traffic movements.
- Mooring and anchoring.
- Habitat clearing.
- Landside activities that include the disturbance of soils such as site establishment, hardscaping, utilities relocation and landscaping.

The potential for direct habitat loss, injury and death from construction plant and equipment, vessel strikes, propeller wash, entrapment, and entrainment.

There is also the potential for indirect impacts from noise (land based or underwater), light spill, turbidity, sediment disturbance, spills and vibration, disturbance from weeds and pathogens and impacts to tree protection and root zones.

5.2 Impacts

Potential direct and / or indirect impacts associated with project are discussed in Chapter 10 and Chapter 11 of the EIS. The following summarises the potential marine and terrestrial biodiversity impacts from construction at La Perouse and Kurnell.

Terrestrial biodiversity impacts:

- Impacts from removal of vegetation:
 - Clearing of 0.06ha of native vegetation
 - Clearing of 0.034ha of Kurnell Dune Forest TEC
 - Direct impacts to 0.05ha of potential breeding habitat for Gang-gang Cockatoo
 - Direct impacts to 0.05ha of potential foraging habitat for Large-eared Pied Bat
 - Direct impacts to 0.028ha of potential foraging habitat for Eastern Cave Bat
 - Loss of one African Olive tree and five juvenile trees (at Kurnell)
- Indirect habitat disturbance from changes in lighting and noise levels
- Risk of introduction of weeds and pathogens
- Impacts to habitat connectivity

Mitigation and management measures provided in Table 6-5 aim to minimise the above likely and/or potential impacts.

Marine biodiversity impacts:

- Direct loss of habitat including intertidal reefs, subtidal reefs and seagrass habitat from wharf construction. This includes loss of:
 - 0.480 ha of seagrass at La Perouse

- 0.138 ha of subtidal habitat (macroalgae) at La Perouse
- 0.691 ha of seagrass at Kurnell
- 0.148 ha of subtidal habitat (macroalgae) at Kurnell
- Indirect impact to benthic habitat from vessel activity and mooring (causing shading and scouring)
- Indirect impact to marine fauna (including White's Seahorse) due to loss of available habitat for foraging
- Underwater noise caused by piling and vessel movement
- Artificial light impacts on marine fauna and marine birds
- Potential impact to marine fauna from an increased risk of chemical spills and accidents
- Impacts to marine fauna from vessel strikes.
- Impacts to habitat and native biodiversity from the spread or introduction of marine pests

6 Environmental mitigation and management measures

A series of construction management measures will be implemented to avoid and mitigate impacts on marine and terrestrial biodiversity during construction. These management measures have been developed to meet the requirements of the MCoA, EPBC-CoA and EIS REMMs. Specific biodiversity management strategies are listed below in Sections 6.1 – 6.14. A summary of all environmental control measures are listed in Section 6.15.

6.1 Pre-Disturbance Survey – Terrestrial flora and fauna

A pre-disturbance process will be undertaken to provide a final check for any threatened terrestrial flora or fauna species that may have moved into the area since undertaking previous surveys and to minimise the impact of clearing on native flora and fauna. This is particularly important where the season or prevailing weather conditions influence whether a species is found in an area (NSW Transport Roads & Traffic Authority 2011).

A single pre-disturbance event will be conducted at La Perouse and Kurnell 24 hours prior to commencement of any terrestrial vegetation disturbance activity on the Site. This single event will provide for all future clearing activity unless the clearing and/or other construction activity that would disturb or exclude wildlife is paused for more than 2 weeks. In this circumstance an additional event should be carried out to further check for the presence of any fauna that may have reinhabited the site during the shutdown period.

The pre-disturbance survey will be conducted in accordance with the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 1: Pre-clearing)* included in Attachment A. Requirements include:

- Using qualified ecologists with experience in fauna handling to conduct flora and fauna searches
- Using a licensed wildlife carer or ecologist to carry out any fauna handling in accordance with the procedures outlined in Section 6.6.
- Conducting the fauna clearing component of the process in the 24-hour period immediately prior to clearing.

6.2 Pre-Disturbance Survey – Marine flora & fauna

A pre-disturbance survey will be undertaken by a suitably qualified ecologist to provide a final check for any threatened marine flora or fauna species that may be present in the area since undertaking previous surveys and to minimise the impact of vegetation disturbance on native marine flora and fauna.

Pre-disturbance surveys will be undertaken in the 24-hour period immediately prior to any work commencing which has the potential to impact marine fauna or flora.

Pre-disturbance events will be conducted at La Perouse and Kurnell prior to the commencement of marine side construction activities. The event is used to identify marine flora that will be impacted and relocate any Syngnathids that may be present and 'prepare' the area for construction activity. Where a single day is not sufficient to complete the pre-disturbance survey the event may run over multiple days if required.

6.2.1 White's Seahorse

White's Seahorse and other Syngnathids (seahorse, pipefishes and seadragons) were considered likely to occur within the construction Sites. A Syngnathid Relocation Plan has therefore been

prepared to mitigate impacts from the Project to these species at La Perouse and Kurnell (Attachment D).

Receiver sites are to be established and potentially protected from impacts in consultation with NSW DPI (Fisheries). Nearby patches of *Posidonia*, outside the construction boundary at both sites have been identified as likely receiver sites (Attachment D).

A Section 37 permit is required for any activity that involves taking or possessing fish or marine vegetation that would otherwise be unlawful under the *Fisheries Management Act 1994*. This includes handling of a threatened or protected species such as White's Seahorse or other Syngnathids. As such, Syngnathid relocation must be completed by a pre-qualified section 37 permit-holder. The relocation will be completed by a marine ecologist or biologist certified as a scientific diver or commercial diver with extensive experience in subtidal habitat surveys and animal handling.

6.2.2 Black Rockcod

Black Rockcod habitat has not been identified within the construction boundaries at La Perouse of Kurnell, however, suitable habitat has been identified in the wider study area where they are considered to have a high potential to occur. In particular, this includes the rocky reef south of the La Perouse Site and at locations to the north and west of the Kurnell Site (Watts Reef).

If present, any Black Rockcod in the study area are likely to be disturbed and indirectly affected by construction noise.

6.2.2.1 Black Rockcod Dive Survey

A targeted survey for Black Rockcod will be conducted at La Perouse and Kurnell in the leadup to any pile driving work (24 hours prior). A single survey is required at each site.

Likely habitat would be inspected using a combination of Ecologist divers and / or ROV deployed from a survey vessel, depending on which is most appropriate for the specific habitats and conditions surveyed at the time. All Ecologist divers are appropriately certified and experienced in accordance with the NSW Work Health and Safety Regulation 2017 whilst also being qualified and experienced ecologists (meeting Condition E9).

Dive surveys would utilise the roving diver count methodology as per Harasti (2013). Any sighted black Rockcod would be photographed, have their size recorded and their location identified in relation to the proposed works. Data would be recorded and provided to the appropriate agency in accordance with the Guidelines for biological survey and mapped data (Department of Environment and Energy, 2018) including data format and file specifications. Sighting would also be immediately reported to the client via phone and followed up by email.

It is anticipated that two to three dives would be required at each site to appropriately survey the quantity of available habitat.

A single pre-disturbance event will be conducted at La Perouse and Kurnell. With this single event used to confirm the absence of Black Rockcod and 'prepare' the area for construction activity.

6.2.2.2 Suitable Methods to Protect Black Rockcod

As outlined in MCoA E10, suitable methods to protect Black Rockcod habitat and individuals in accordance with the provisions of the MBOS, *Black Rockcod Recovery Plan 2012* and *DPI Fisheries' Priorities Action Statement — Actions for Black Rockcod* were further investigated by McConnell Dowell's Biodiversity consultant Stantec which has been included in Attachment I.

Stantec concluded that the EIS had considered the species to be likely to occur in the marine study area although targeted surveys did not identify any Black Rockcod individuals. There are sections of high-quality Black Rockcod habitat in proximity to the construction boundary at La Perouse and Kurnell but no likely habitat within the construction boundaries.

MCoA E10 requires the identification of suitable methods to protect Black Rockcod and its habitat in accordance with the Project's Marine Biodiversity Offset Strategy, the Black Rockcod Recovery Plan (2012) and DPI Fisheries' Priorities Action Statement — Actions for Black Rockcod. The Project poses several risks to Black Rockcod, although all have been assessed as minimal and easily managed with standard mitigation measures.

Water pollution risks were low with the EIS identifying that the Project would not cause additional turbidity that would affect marine fauna. A turbidity monitoring program with associated trigger values and a TARP are being implemented to monitor, confirm and manage (if required) this outcome. The Project was found to be highly unlikely to introduce non-indigenous fish and marine vegetation with a standard suite of vessel biofouling and ballast management procedures recommended.

The key risk the Project poses to Black Rockcod is from underwater noise generated from pile driving. The potential effects zone with increased risk of fatality for Black Rockcod is 300 m from any piling driving activity. This includes parts of likely Black Rockcod habitat at Watts Reef at Kurnell and a section of rocky reef habitat to the south of the construction boundary at La Perouse. Soft start piling procedures will be used to alert Black Rockcod of the upcoming activity and this would be expected to allow them the opportunity to move away. Targeted surveys would confirm the presence/absence of Black Rockcod at these locations before piling commences and whether additional mitigation measures need to be explored (as outlined in Section 9.3 of CEMP Appendix B5 – Construction Noise and Vibration Management Plan).

With the implementation of the recommended protection and mitigation measures Black Rockcod will be suitably protected from Project impacts in accordance with MCoA E10.

6.3 Seagrass monitoring and protection

Seagrass monitoring will be undertaken pre and post construction and will assess and report on the effectiveness of mitigation measures implemented as part of the project. Seagrass monitoring is detailed in and will be conducted in accordance with the Marine Biodiversity Offset Strategy prepared by Transport for NSW. Seagrass monitoring is not addressed further in this BMP.

Seagrass protection measures will be implemented in accordance with the MBOS and the Marine Work Management Plan. Key actions under these include:

- No anchoring zones identified in the Project Boundary Drawings are to be implemented to minimise impacts from anchor points within seagrass meadows of Posidonia.
- Avoid fixed location of barges at locations of seagrass meadows of Posidonia outside of the marine habitat impact area within the construction boundary to minimise shading impacts.
- Establish are no wash zones at:
 - La Perouse to minimise wash effects on the coastal subtidal and intertidal reef areas
 - Watts Reef near Kurnell to minimise wash effects on the subtidal habitat on the reef
- Establish suitable navigation channels to avoid areas of listed species habitat, including:
 - Large seagrass meadow of Posidonia at Kurnell
 - No access over patch of Posidonia to the east of the wharf at La Perouse.

6.4 Marine mammal monitoring

A suitably qualified marine mammal observer(s) is required when migratory, vulnerable or endangered marine mammals are likely to be present within the area surrounding the piling activity. Marine mammals are to be monitored for within the area of potential underwater sound impacts in accordance with the Marine mammal monitoring procedure (Attachment G). Key actions in this procedure include:

- Conduct monitoring 30 minutes before and during any pile hammering or any piling activities that would generate an area of potential acoustic effects that can harm marine mammals
- Use suitably qualified marine mammal observer(s)
- Soft start piling procedures to be used. This gradually increases the energy of piling over 30 minutes, alerting marine mammals of the piling activity and allowing them time to move away before more intense piling noise
- Stop or do not start work if a marine mammal is sighted in the monitoring area. Do not start work again until the marine mammal has moved out of the monitoring area
- Piling crew to be inducted into the marine mammal monitoring procedure
- Conduct pile hammering activities only during daylight hours when observers can visually monitor for marine mammals.

6.5 Marine mammal strike

Collisions with vessels are one of the primary threats to marine mammals, particularly large whales in Australia and around the world. To reduce the risk of Project vessels impacting marine mammals low speed operations (4 knots or less) will be observed within the construction boundary at La Perouse and Kurnell as per the Marine Works Management Plan.

Safe distances and caution zones for vessels identified in Section 2.3 and 2.5 of the *Biodiversity Conservation Regulation 2017* will also be followed as outlined below in Table 6-1.

Caution Zone

A caution zone for a whale, dolphin or dugong means an area around the whale, dolphin or dugong of a radius outlined below in Table 6-1.

Within the caution zone vessel operators must:

- operate the vessel at a constant slow speed and in a manner that consistently minimises noise,
- make sure that the vessel does not drift closer the caution zones outlined in Table 6-1,
- if the whale, dolphin or dugong shows signs of being disturbed—must immediately withdraw the vessel from the caution zone at a constant slow speed,
- make sure the vessel does not restrict the path of the whale, dolphin or dugong,
- report all interactions with marine mammals to the Environment & Sustainability Lead

Safe Approach Distance

Vessel operators must operate the vessel at a constant slow speed, in a manner that consistently minimises noise and must not approach a marine mammal any closer than the safe approach distances outlined in Table 6-1 as required under Section 2.3 and Section 2.5 of the *Biodiversity Conservation Regulation 2017*.

Table 6-1 Caution Zones and Safe Approach Distances for Marine Mammals

Marine Mammal	Caution Zone	Safe Approach Distance	Applicable Vessel	Reference
Whale	300m	100m	if the person is approaching a whale and is on, or using, a vessel other than a prohibited vessel,	Section 2.3 and Section 2.5 <i>Biodiversity Conservation Regulation 2017</i>

Dolphin or Dugong	150m	50m	if the person is approaching a dolphin or dugong and is on, or using, a vessel other than a prohibited vessel	Section 2.3 and Section 2.5 <i>Biodiversity Conservation Regulation 2017</i>
-------------------	------	-----	---	--

Vessel operators and crew will be trained and made aware of this risk through a project induction. Crews are required to observe for marine mammals during operation of construction related vessels. Any night-time vessel operations are to be briefed of the additional risk of marine mammal strike due to limited visibility.

6.6 Unexpected threatened species finds

If a threatened plant or animal species is unexpectedly encountered on site, a process must be followed as indicated in Attachment B. Work must be stopped until the sighting can be confirmed, and an ecologist conducts an assessment of significance. Where impacts are likely to occur, the appropriate agencies must be consulted and approval, licences or permits obtained as appropriate. Transport for NSW is also to be informed once the sighting is confirmed.

6.7 Terrestrial fauna handling

Handling fauna may be necessary when they are encountered and need to be relocated or, if injured, taken to a vet or wildlife carer. The careful handling of fauna is essential to minimise stress or further injury on the animal, to prevent the spread of diseases and to avoid injury to fauna handlers.

Handling of any terrestrial fauna is to be undertaken in accordance Attachment C.

6.8 Tree protection (Kurnell)

An Arboricultural assessment surveyed and numbered 88 trees at Kurnell within the grounds of Kamay National Park. Trees were categorised based on their retention value, identified for retention or removal, and assigned protection measures if retained (Table 6-2). Trees are to be removed, retained and protected in accordance with the Tree protection measures (Attachment E).

Table 6-2 Trees impacted at Kurnell

Category	Description	Total	Removal		Retain	
			Within development	Irrespective of future development	Specific protection	Generic protection
A	High retention value	26			337, 338, 339, 458, 463, 464, 477, 524	335, 336, 341, 437, 448, 450, 451, 452, 454, 455, 456, 459, 471, 483, 490, 491, 493, 494
B	Moderate retention value	22	460		326, 466, 467, 469, 479, 481, 495, 496	327, 457, 482, 486, 488, 498, 500, 501, 502, 503, 504, 508, 509, 510, 511, 518, 519, 521, 522

Category	Description	Total	Removal		Retain	
			Within development	Irrespective of future development	Specific protection	Generic protection
C	Low retention value	27	513, 514, 515, 516	497	325, 480, 525	327, 457, 482, 486, 488, 498, 500, 501, 502, 503, 504, 508, 509, 510, 511, 518, 519, 521, 522
D	Trees to be removed irrespective*	13	517	340, 453, 465, 468, 470, 499, 523, 527		505, 506, 507, 512

* Trees that pose a risk to health and safety and may need to be removed irrespective of the development

6.9 Control of weeds and pathogens

Construction projects and maintenance works have the potential to introduce and promote the spread of weed species and/or pathogens. In NSW, all biosecurity risks including weeds are managed under the *Biosecurity Act 2015*, which imposes duties on any persons dealing with biosecurity matters. McConnell Dowell and Transport for NSW have responsibilities to ensure that biosecurity risks are prevented, eliminated, or minimised.

The Project EIS did not identify any pathogens on either site, however the introduction of Root Rot (*Phytophthora cinnamomic*) and Myrtle Rust (*Austropuccinia psidii*), may pose a risk to threatened flora within the site. Other native vegetation communities may also be impacted if appropriate hygiene measures are not implemented during construction.

Weed management and control practices to be implemented on the Kurnell and La Perouse Sites to minimise threats to any local remnant vegetation in accordance with the Weed and pathogen control procedures (Attachment F). Key actions include:

- development of a weed management plan for each site
- a site weed assessment to be undertaken by an ecologist as part of the Terrestrial Pre-Disturbance Survey – Terrestrial Flora and Fauna (Section 6.1) prior to any clearing or grubbing
- Inspection of machinery prior to mobilising to check for contaminants/weeds - machine to be confirmed clean prior to mobilisation

6.10 Marine pests

Maritime construction projects and maintenance works have the potential to introduce and promote the spread of marine pests, particularly *Caulerpa taxifolia* which occurs throughout Botany Bay.

Mitigation actions to reduce the risk of marine pests include:

- Marine vessel owners will undertake a Vessel Risk Assessment (VRA), which includes using the online Vessel-Check application and complete a Biofouling Record Book Form for each vessel prior to mobilisation of the vessel to Site. The history of the vessel is also to be provided including location of last port and previous antifouling applications.
- All vessels assessed in the VRA as uncertain or high risk for introduction of invasive marine species must undertake an Invasive Marine Species Inspection (IMS) Any construction

vessels mobilised from outside of Australia shall also be considered high risk and an IMS inspection must be carried out.

- The IMS inspection must be undertaken by an appropriately qualified practitioner with experience in biosecurity of marine vessels. The Contractor(s) is responsible for arranging the IMS inspection and attendance of DPI-Fisheries.
- The Contractor(s) must provide the completed IMS report to the Principal at least seven days prior to the vessel leaving the departure port.
- Where IMS inspections identify significant amounts of sediment and/or the presence of an invasive marine species (as deemed by the IMS inspector) the vessel must be dry docked and cleaned prior to entering the site. The Contractor(s) must then resubmit the VRA and if the vessel is classified as low risk, it shall be permitted to sail to site and begin operations.
- All work vessels must be cleaned before and after leaving site.
- Anchoring locations should be established with consideration for *Caulerpa*. Currently no *Caulerpa* has been identified onsite however it is known to occur in the locality.
- Ballast water management procedures would also apply to vessels operating on site in accordance with the Australian Ballast Water Management Requirements (Department of Agriculture, Water and the Environment 2020).
- Ensure moveable structures (semi-permanent or temporary infrastructure) are inspected to assess the level of biofouling present before being moved between locations, and clean if necessary:
 - if there is a high level of fouling/macroufouling (more than just an algal film/microfouling), the structure should be cleaned before it is moved, as this can present similar biofouling risks to vessel movements
 - cleaning should be done on land or in a location with suitable facilities to prevent waste from returning to the water
 - infrastructure that can be removed from the water, such as mooring buoys, should be pressure cleaned or scraped, scrubbed and air-dried for at least 48 hours, ideally exposed to sunshine, before being redeployed
 - if the infrastructure cannot be cleaned on land, it should be cleaned according to the *Anti-fouling and in-water cleaning guidelines*.

6.11 Biodiversity offsets

Biodiversity offsets are required by the MCoA (SSI 10049) and will be implemented by Transport for NSW.

McConnell Dowell will aim to minimise the loss of marine and terrestrial vegetation and habitat to ensure the conditioned offsets remain applicable to the Project impacts.

Terrestrial Biodiversity Offsets

Terrestrial biodiversity offsets are outlined in the Terrestrial Biodiversity Offset Strategy (TBOS), prepared by Transport for NSW, and will require biodiversity offset credits to be acquired to the level necessary to offset residual impacts of the Project. The estimated number of credits based on the EIS assessment is provided in Table 6-3.

Table 6-3 Ecosystem Credit Requirements (MCoA)

Credit class	PCT	Associated TEC	Direct impacts (ha)	Estimated number of credits
Ecosystem	1823 Coastal headland cliffline scrub	-	0.009	0
	661 Coastal sand littoral forest	Kurnell Dune Forest in the Sutherland Shire and City of Rockdale	0.034	4
	772 Coastal foredune wattle scrub	-	0.024	0

Table 6-4 Species Credit Requirements (MCoA)

Credit Class	Relevant Matter	Habitat Required	Direct Impacts (ha)	Number of Credits
Species	Large -eared Pied Bat	Potential foraging	0.07	6
	Eastern Cave Bat	Potential foraging	0.024	1
	Australian Pied Oystercatcher	Potential foraging/breeding	0.024	2
	Sooty Oystercatcher	Potential foraging/breeding	n/a	1
	Grey-headed Flying Fox	Potential foraging	0.03	0
	Green and Golden Bell Frog	Potential foraging/movement	0.03	0
	Leafless Tongue-orchid		0.05	0
	Magenta Lilly Pilly		0.05	0

Marine Biodiversity Offsets

Marine offsets are documented separately in the Marine Biodiversity Offset Strategy (MBOS). This will include seagrass monitoring before, during and after construction, transplanting of seagrass, water quality improvement actions, investment in research, and measures (such as artificial structures) to compensate for the loss of seahorse habitat and avoid the permanent displacement of these species.

6.12 Noise and Lighting

Construction activities have the potential to generate noise above ambient natural levels with potential impact on ecology. The Project will generate noise on land and in water. Underwater noise has the potential to impact the Black Rockcod and other noise sensitive species such as marine mammals.

A Construction Noise and Vibration Management Plan will be prepared that:

- Identifies potential significant noise and vibration generating activities
- Implements management conditions to ensure that noise does not adversely impact terrestrial or marine ecology
- Has taken into consideration management principles outlined in [National Light Pollution Guidelines for Wildlife \(dcceew.gov.au\)](https://www.dcceew.gov.au)

Light generating equipment is also to be positioned to avoid light spillage into terrestrial and marine environments.

6.13 Sediment

A Soil, Water & Contamination Management Sub Plan will be prepared that contains suitable methods to prevent sediment disturbance including erosion control. This Sub Plan shall be implemented prior to and during works.

A construction monitoring program for turbidity (CMPT) will be prepared in accordance with MCoA C14 and E61, EIS REMM CP2 and in consultation with NSW DPI (Fisheries). The CMPT will form part of the Soil, Water & Contamination Management Sub Plan (KFW02-MCD-ALL-EN-PLN-000004) and will outline the available baseline data, monitoring parameters, monitoring frequency and monitoring locations. It will also contain reporting and analysis requirements and the 'trigger' values used to implement additional mitigation measures. These trigger values will be used to maintain NSW Water Quality Objectives.

Mitigation actions under the CMPT may include:

- Use of silt curtains
- Changing timing of construction to coincide with high/low periods of turbidity
- Alteration of construction methodology e.g. use of an auger to extract spoil and place on barge

6.14 Environmental Work Method Statements

As outlined in Section 4.4.5 of the CEMP, Environmental work method statements (EWMS) will be prepared to manage and control all high-risk activities and others that have the potential to negatively impact on the environment.

These EWMS are prepared prior to the commencement of relevant construction activities and will be developed to:

- Provide a description of the work activity, including any plant and equipment to be used
- Include relevant mitigation measures and controls developed through SMART principles
- Outline of the sequence of tasks for the activity, including interfaces with other construction activities and identify any cumulative impacts
- Communicate requirements, actions, processes and controls to construction personnel using plans, diagrams and simply written instructions
- Identify any environmental and/or socially sensitive areas, sites or place

- Identify of potential environmental risks/impacts due to the work activity

The following EWMS will be developed throughout construction (prior to the respective activity commencing) and will include, where applicable, heritage aspects and controls.

- Site Embellishment
- Anchor handling & Placement
- Services Installation Works
- Demolition
- Refuelling
- Landside Civil Works
- Installation of Major Temporary Works (*including the installation and removal of the construction platform at La Perouse, temporary causeway at Kurnell and any other temporary structures*)
- Working within or near a sensitive area
- Heritage Storage Work
- Piling - Install of Piles, including Bored Rock Sockets
- Installation of In-situ Concrete Pile Plugs, Precast Concrete Headstocks and Deck Planks
- Installation of In-situ Concrete Deck
- Installation and grouting of Steel Headstocks
- Repair of Protective Coatings
- Terrestrial Vegetation Disturbance
- Marine Vegetation Disturbance
- Treatment of Acid Sulfate Soils

6.15 Summary of environmental control measures

A summary of specific environmental control measures to meet the objectives of this BMP and to address impacts on biodiversity are outlined in Table 6-5. These measures apply to both La Perouse and Kurnell, unless otherwise stated.

Table 6-5 Summary of biodiversity control measures

ID	Measure/Requirement	Responsibility	When to implement	Timing/frequency	Reference	Evidence
General						
BMP_01	A Construction Biodiversity Management Plan (BMP) must be prepared in accordance with the Biodiversity Assessment Method (NSW DPIE, 2020h).	McConnell Dowell Environment & Sustainability Lead	Construction	Prior to construction	REMM MB2 REMM B3	This Plan
BMP_02	Prepare and implement Site Environmental Plans that identify sensitive habitats, protection areas, no anchoring zones, and exclusion zones to protect seagrass and threatened species.	McConnell Dowell Environment & Sustainability Lead	Construction	Prior to construction	REMM MB2 REMM MB3 REMM B3	Site Environmental Plan - CEMP Appendix H (this plan addresses the requirements of a Sensitive Area Map).
BMP_03	Site inductions and training must be undertaken to ensure awareness of requirements of the BMP, sensitive areas and exclusion zones. Site-specific training will be given to personnel when working in the vicinity of areas of identified biodiversity value that are to be protected.	McConnell Dowell Environment & Sustainability Lead	Construction	During construction	REMM MB2 REMM B3	Staff inductions and training register

ID	Measure/Requirement	Responsibility	When to implement	Timing/frequency	Reference	Evidence
BMP_04	<p>Suitable methods to prevent and monitoring water pollution and sediment disturbance shall be implemented prior to and during works. These include:</p> <ul style="list-style-type: none"> • Development and implement Progressive Erosion and Sediment Control Plans • Development and implement a Turbidity Monitoring Program 	McConnell Dowell Environment & Sustainability Lead	Prior to and during Construction	Prior to and during Construction	MCoA MB2 MCoA C14	<p>Site Environmental Plans - CEMP Appendix H (this plan addresses the requirements of a Sensitive Area Map).</p> <p>Progressive Erosion and Sediment Control Plans</p> <p>CEMP Appendix B6 – Soil, Water and Contamination Management Plan</p>
BMP_05	Lighting equipment is to be positioned to avoid light spillage into terrestrial and marine environments.	McConnell Dowell Site Supervisors	Prior to and during Construction	Prior to and during Construction	Best practice	Site Inspection Report
BMP_06	Noise impacts for Out of Hours Work (OOHW) on terrestrial fauna will be taken into consideration when assessing noise impacts under the OOHW Protocol	McConnell Dowell Environment & Sustainability Lead	As required	As required	Best practice	<p>CEMP Appendix B5 Construction Noise and Vibration Management Plan</p> <p>Out of Hours Work Protocol</p>
Marine Biodiversity						
BMP_07	Seagrass monitoring will be carried out, prior to, during and after construction to determine the impacts from the Project on seagrass.	Transport for NSW	Prior to, during and after construction	Pre-construction, during construction and post-construction	REMM MB10	Marine Biodiversity Offset Strategy

ID	Measure/Requirement	Responsibility	When to implement	Timing/frequency	Reference	Evidence
BMP_08	A Marine Mammal Observation Procedure is to be prepared and implemented in accordance with the <i>Guidance for Developing a Marine Mammal Monitoring Plan</i> (NOAA, 2020) and <i>Underwater Piling Noise Guidelines</i> (Department of Planning, Transport and Infrastructure, 2012)	McConnell Dowell Environment & Sustainability Lead	Prior to and during underwater noise generating activities	Prior to construction	REMM UN3	Attachment G
BMP_09	Trained marine mammal observers, with demonstrated experience in the identification and management of marine mammals are to undertake the observation of marine mammals during piling and re-strike testing. The zone distances which are to be observed include: <ul style="list-style-type: none"> • Stop work Zone – 800m (Very High-Frequency Cetaceans) • Observation Zone – 1050m (Very High-Frequency Cetaceans) 	McConnell Dowell Construction Manager Supervisors	Prior to and during underwater noise generating activities	Prior to construction	REMM UN3	Marine Mammal Observation Procedure Marine Works Management Plan
BMP_10	Undertake the below Piling Operation Procedures as outlined in Attachment G – Marine Mammal Monitoring Procedure <ul style="list-style-type: none"> a) Pre-start Observation b) Soft-Start Procedure c) Stand by procedure d) Normal Piling Procedure 	McConnell Dowell Construction Manager Supervisors Piling Contractors	Prior to and during underwater noise generating activities	During construction	REMM UN3	Piling operation log Marine Works Management Plan

ID	Measure/Requirement	Responsibility	When to implement	Timing/frequency	Reference	Evidence
	e) Re-strike Testing f) Shut-Down Requirements					
BMP_11	A marine biodiversity pre-clearing procedure will be developed and implemented prior to construction. This would include measures to safely relocate species in the direct impact zone of the construction footprint.	McConnell Dowell Environment & Sustainability Lead	Construction	Prior to construction	REMM NB2	Attachment D
BMP_12	Develop and implement a Syngnathid Relocation Plan which identifies relocation methods and associated reporting required.	McConnell Dowell Environment & Sustainability Lead	Construction	During construction	REMM MB2 MCoA E8	Section 6.3 Section 6.4 Syngnathid Relocation Plan – Attachment D
BMP_13	Conduct an inspection 24 hours prior to the start of work that may impact potential habitat for White's Seahorse (<i>Hippocampus whiteo</i>) (seagrass, kelp, sargassum, and existing structures such as piles, jetties, wharf pylons) located in and within 100 metres of the construction footprint. Any seahorses that are detected in the construction footprint must be relocated to nearby suitable habitat in accordance with the Syngnathid Relocation Plan.	McConnell Dowell Environment & Sustainability Lead	Prior to work that may impact potential habitat for White's Seahorse	Prior to construction	MCoA E7	Section 6.4.1 Attachment D

ID	Measure/Requirement	Responsibility	When to implement	Timing/frequency	Reference	Evidence
BMP_14	Conduct an inspection when any construction methods have the potential to impact potential habitat for Black Rockcod (<i>Epinephelus daemelii</i>) (rocky reefs, caves, ledges, gutters and artificial structures such as wharves, piers and rock emplacements).	McConnell Dowell Environment & Sustainability Lead	Prior to work that may impact potential habitat for Black Rock Cod	Prior to construction	MCoA E9 MCoA E10	Section 6.4.2 Attachment D
BMP_15	Investigate suitable methods protect Black Rockcod habitat and individuals in the construction footprint at La Perouse and Kurnell sites in accordance with the provisions of the MBOS, <i>Black Rockcod Recovery Plan 2012</i> and <i>DPI Fisheries' Priorities Action Statement — Actions for Black Rockcod</i> .	McConnell Dowell Environment & Sustainability Lead	Prior to work that may impact potential habitat for Black Rock Cod	Prior to construction	MCoA E10	Section 6.4.2.1 Attachment I CEMP Appendix B5 – Construction Noise and Vibration Management Plan (Section 9.3)
BMP_16	Vessel Speed Limits: a) All vessels associated with construction must travel at a speed of 4 knots or less within the port limits	McConnell Dowell Supervisor	Construction	During construction	REMM MB2	Marine Works Management Plan
BMP_17	Avoid impact on known Key Fish Habitat as defined by Policy and guidelines for fish habitat conservation and management (DPI Fisheries, 2013) where possible.	McConnell Dowell Environment & Sustainability Lead	Construction	During construction	REMM MB2 REMM MB8	Site Environmental Plan - CEMP Appendix H (this plan addresses the requirements of a Sensitive Area Map).

ID	Measure/Requirement	Responsibility	When to implement	Timing/frequency	Reference	Evidence
						Site inspection report Marine Works Management Plan
BMP_18	Avoid vessel strike by maintaining safe distances and approaches as identified in Section 2.3 and 2.5 of the <i>Biodiversity Conservation Regulation 2017</i> and limiting speeds.	McConnell Dowell Construction Manager	Construction	During construction	REMM MB2	Site inspection report Marine Works Management Plan
BMP_19	No anchoring zones identified in the Project Boundary Drawings are to be implemented to minimise impacts from anchor points within seagrass meadows of <i>Posidonia australis</i> .	McConnell Dowell Construction Manager	Construction	Prior to construction	REMM MB2 REMM MB3	Project Boundary Drawings Site Environmental Plan - CEMP Appendix H (this plan addresses the requirements of a Sensitive Area Map). Marine Works Management Plan
BMP_20	Avoid fixed location of barges at locations of seagrass meadows of <i>Posidonia australis</i> outside of the marine habitat impact area within the construction boundary to minimise shading impacts.	McConnell Dowell Construction Manager	Construction	During construction	REMM MB4	Site inspection report Marine Works Management Plan

ID	Measure/Requirement	Responsibility	When to implement	Timing/frequency	Reference	Evidence
BMP_21	<p>Establish suitable navigation channels to avoid areas of listed species habitat, including:</p> <p>Kurnell</p> <ul style="list-style-type: none"> Watts reef (likely Black Rockcod habitat) Large TEC seagrass meadow of <i>Posidonia australis</i> <p>La Perouse</p> <ul style="list-style-type: none"> Avoid accessing near reef habitat No access over patch of <i>Posidonia australis</i> to the east of the wharf. 	McConnell Dowell Construction Manager	Construction	During construction	REMM MB6	<p>Site inspection report</p> <p>Marine Works Management Plan</p>
BMP_22	<p>Establish areas of no wash zones in consultation with Port Authority NSW, NSW DPI Fisheries and Transport for NSW at:</p> <ul style="list-style-type: none"> La Perouse to minimise wash effects on the coastal subtidal and intertidal reef areas Watts Reef near Kurnell to minimise wash effects on the subtidal habitat on the reef Near both wharves to minimise excess wash from the ferry and recreational vessel access. 	McConnell Dowell Construction Manager	Prior to marine construction	Prior to and during construction	REMM MB9	<p>Site inspection report</p> <p>Marine Works Management Plan</p>
Terrestrial Biodiversity						
BMP_23	Develop and implement a vegetation and habitat clearing	McConnell Dowell	Prior to construction	Prior to and during construction	Best practice REMM B3	Attachment A

ID	Measure/Requirement	Responsibility	When to implement	Timing/frequency	Reference	Evidence
	<p>procedure as specified in the <i>Biodiversity Guidelines - Protecting and managing biodiversity on RTA Projects (NSW Roads and Traffic Authority, 2011a)</i> including but not limited to:</p> <p>a) Pre-clearing, including the outcomes of final flora and fauna species checks, establishment of exclusion zones and on-ground identification of specific habitat features to be retained (such as hollow-bearing trees)</p>	Environment & Sustainability Lead				
BMP_24	Develop and implement an unexpected threatened species finds procedure as specified in the <i>Biodiversity Guidelines - Protecting and managing biodiversity on RTA Projects (NSW Roads and Traffic Authority, 2011a)</i>	McConnell Dowell Environment & Sustainability Lead	Prior to construction	Prior to and during construction	REMM B3	Attachment B – Unexpected threatened species finds procedure
BMP_25	Develop and implement a fauna handling procedure as specified in the <i>Biodiversity Guidelines - Protecting and managing biodiversity on RTA Projects (NSW Roads and Traffic Authority, 2011a)</i>	McConnell Dowell Environment & Sustainability Lead	Prior to construction	Prior to and during construction	REMM B3	Attachment C – Terrestrial fauna handling procedure
BMP_26	The Site must be rehabilitated and revegetated in accordance with Guide 3: <i>Biodiversity Guidelines - Protecting and managing</i>	McConnell Dowell Environment & Sustainability Lead	Prior to construction	Prior to and during construction	REMM B3	Site inspection report

ID	Measure/Requirement	Responsibility	When to implement	Timing/frequency	Reference	Evidence
	biodiversity on RTA Projects (NSW Roads and Traffic Authority, 2011a)					
Tree removal and protection						
BMP_27	<p>A consulting arborist is to carry out an assessment of all trees within the construction boundary that are proposed for retention</p> <p>The arborist is to provide a report with recommendations on the viable retention of all native trees within the construction boundary of the mapped PCTs, and include recommendations for amending design or using alternate construction methods to reduce any impacts on retained trees.</p>	McConnell Dowell Environment & Sustainability Lead	Prior to vegetation removal	Prior to Construction	REMM B4	Arborist Report
BMP_28	<p>There are several trees to be removed as part of the Project (including one African Olive tree and five juvenile species) at Kurnell.</p> <p>These will be removed in consultation with a suitably qualified arborist in consultation with National Parks and Wildlife Services.</p>	McConnell Dowell Environment & Sustainability Lead	During construction at Kurnell	During construction	REMM B4	Site inspection report
BMP_29	The clearing of native vegetation must not exceed the clearing footprint of the project.	McConnell Dowell	Prior to and during clearing of vegetation	During construction	MCoA E1 MCoA E2	MCD Clearing Permits

ID	Measure/Requirement	Responsibility	When to implement	Timing/frequency	Reference	Evidence
	All practicable measures to reduce the clearing of native vegetation within the clearing footprint must be undertaken, with the objective of reducing impacts to threatened ecological communities and threatened species habitat.	Environment & Sustainability Lead				
BMP_30	Tree protection measures must be implemented to ensure the protection of all trees planned to be retained on site. This includes measures such as restricting activities in the tree protection zones, fencing and signage requirements.	McConnell Dowell Environment & Sustainability Lead	Prior to landside construction	During construction	REMM B4	Attachment E Tree Protection Measures Site inspection report
Weeds						
BMP_31	Develop and implement a weed and pathogen control procedure	McConnell Dowell Environment & Sustainability Lead	Construction	During construction	REMM B2	Attachment F
BMP_32	Use chemical and mechanical weed control methods such as slashing or mowing, as well as a range of herbicides to avoid the development of herbicide resistance (eg glyphosate resistance).	McConnell Dowell Environment & Sustainability Lead	Construction	During construction	REMM B2	Attachment F Site inspection report
BMP_33	Mow/slash areas infested with weeds before they seed. This may	McConnell Dowell	Construction	During construction	REMM B2	Site inspection report

ID	Measure/Requirement	Responsibility	When to implement	Timing/frequency	Reference	Evidence
	reduce the propagation of new plants.	Environment & Sustainability Lead				
BMP_34	Should weed-contaminated soil be removed from site, it is to be and disposed of at an appropriate waste management facility.	McConnell Dowell Environment & Sustainability Lead	Construction	During construction	REMM B2	Site inspection report Waste and Energy Management Sub Plan
BMP_35	Separate stockpiles are to be maintained for native vegetation and weeds. Weed stockpiles are to be covered at all times to prevent the spread through seed or wind dispersal. Weeds are not to be used for, or incorporated into mulch.	McConnell Dowell Environment & Sustainability Lead	Construction	During construction	REMM B2	Site inspection report Progressive Erosion and Sediment Control Plans (PESCP)
BMP_36	Minimise soil disturbance and vehicle or machinery tracking within weed infested areas. Topsoil recovered from areas of low weed infestation can be re-used onsite with the appropriate chemical treatment Should stockpiling of soil known to contain weeds be necessary, it is to be stockpiled separately and managed for weeds as necessary.	McConnell Dowell Environment & Sustainability Lead	Construction	During construction	REMM B2	Site inspection report Progressive Erosion and Sediment Control Plans (PESCP)
Marine biosecurity						

ID	Measure/Requirement	Responsibility	When to implement	Timing/frequency	Reference	Evidence
BMP_37	<p>Ensure moveable structures (semi-permanent or temporary infrastructure) are inspected to assess the level of biofouling present before being moved between locations, and clean if necessary:</p> <ul style="list-style-type: none"> if there is a high level of fouling/macrofouling (more than just a slime layer/microfouling—see the <i>Anti-fouling and in-water cleaning guidelines (Department of Agriculture, 2015)</i> for images), the structure should be cleaned before it is moved, as this can present similar biofouling risks to vessel movements cleaning should be done on land or in a location with suitable facilities to prevent waste from returning to the water infrastructure that can be removed from the water, such as mooring buoys, should be pressure cleaned or scraped, scrubbed and air-dried for at least 48 hours, ideally exposed to sunshine, before being redeployed 	McConnell Dowell Environment & Sustainability Lead	Prior to marine construction	Contractor	REMM MB5 REMM B3	Site inspection report

ID	Measure/Requirement	Responsibility	When to implement	Timing/frequency	Reference	Evidence
	<ul style="list-style-type: none"> if the infrastructure cannot be cleaned on land, it should be cleaned according to the Anti-fouling and in-water cleaning guidelines. 					
BMP_38	<p>All Contractor must undertake a Vessel Risk Assessment (VRA), which could include using the online Vessel-Check application, and complete a Biofouling Record Book Form (BRBF) in accordance with Appendix 2 of the <i>Guidelines for the control and management of a ships' biofouling to minimise the transfer of invasive aquatic species</i> (IMO, 2011) for each vessel prior to mobilisation of the vessel to Site. The VRA may be completed by the vessel owner/operator. All vessels, floating plant and dredge equipment mobilised to site from any place inside or outside of Australia shall be subject to a VRA and BRBF. The VRA will determine if an Invasive Marine Species inspection (IMS) is required to be prepared in accordance with the <i>Invasive Marine Species Inspection Report Requirements</i> (Department of Primary Industries and Regional Development, 2017). The Contractor must provide the completed VRA and BRBF to the Principal at least four weeks prior to</p>	McConnell Dowell Environment & Sustainability Lead	During construction	Contractor	REMM MB5 REMM B3	Marine Works Management Plan

ID	Measure/Requirement	Responsibility	When to implement	Timing/frequency	Reference	Evidence
	the vessel leaving the departure port.					
BMP_39	<p>The Contractor must undertake an Invasive Marine Species (IMS) in accordance with the <i>Invasive Marine Species Inspection Report Requirements</i> (Department of Primary Industries and Regional Development, 2017) inspection of all vessels assessed in the VRA as uncertain or high risk for introduction of invasive marine species. Any construction vessels mobilised from outside of Australia shall be considered high risk and an IMS inspection must be carried out.</p> <p>The IMS inspection must be undertaken by an appropriately qualified practitioner with experience in biosecurity of marine vessels. The Contractor(s) is responsible for arranging the IMS inspection and attendance of DPI-Fisheries.</p> <p>The Contractor(s) must provide the completed IMS report to the Principal at least seven days prior to the vessel leaving the departure port.</p> <p>Where IMS inspections identify significant amounts of sediment</p>	McConnell Dowell Environment & Sustainability Lead	During construction	Contractor	REMM MB5 REMM B3	IMS inspection

ID	Measure/Requirement	Responsibility	When to implement	Timing/frequency	Reference	Evidence
	<p>and/or the presence of an invasive marine species (as deemed by the IMS inspector) the vessel must be dry docked and cleaned prior to entering the site. The Contractor(s) must then resubmit the VRA and if the vessel is classified as low risk it shall be permitted to sail to site and begin operations.</p>					
BMP_40	<p>Ballast water management:</p> <ul style="list-style-type: none"> • Potable water will be used for marine barges during piling activities as ballast water. If the ballast water needs to be discharged, the activity will be controlled by a MCD Discharge Permit issued from the Environment & Sustainability Lead (refer to Attachment F – Dewatering Procedure of the Soil, Water and Contamination Management Plan). • Domestic vessels should manage ballast water in accordance with the Australian Ballast Water Management Requirements (Department of Agriculture, Water and the Environment 2020). • Any ballast water exchange from international vessels must be undertaken in accordance 	<p>McConnell Dowell Environment & Sustainability Lead</p>	<p>During construction</p>	<p>Contractor</p>	<p>REMM MB5 REMM B3</p>	<p>Marine Works Management Plan Attachment F – Dewatering Procedure of the Soil, Water and Contamination Management Plan</p>

ID	Measure/Requirement	Responsibility	When to implement	Timing/frequency	Reference	Evidence
	<p>with the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM) (IMO 2016) – i.e. “whenever possible, conduct ballast water exchange at least 200 nautical miles from the nearest land and in water at least 200 m in depth, taking into account Guidelines developed by IMO” and “in cases where the ship is unable to conduct ballast water exchange as above, this should be as far from the nearest land as possible, and in all cases at least 50 nautical miles from the nearest land and in water at least 200 m in depth”.</p>					

7 Compliance management

7.1 Roles and responsibilities

The McConnell Dowell organisational structure and roles and responsibilities are outlined in Section 4.4 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Section 6 of this BMP.

7.2 Training

All employees, contractors and utility staff working on site will undergo site induction training relating to biodiversity management issues. The induction training will address elements related to biodiversity management including:

- Existence and requirements of this BMP
- Relevant legislation
- Roles and responsibilities for biodiversity management
- Specific species likely to be affected by the construction works and how these species can be recognised
- Process if an unexpected threatened species is found
- Tree protection measures (Kurnell only)
- Marine mammal processes including slow start (for piling operators)
- Marine mammal strike mitigations (vessel operators)
- Marine and terrestrial fauna handling procedures
- Weed and pathogen control measures
- General biodiversity management measures
- Marine biosecurity requirements (for vessel operators only)

Further details regarding staff induction and training are outlined in Section 6.3 of the CEMP.

7.3 Monitoring and inspections

Inspections of sensitive areas and activities with the potential to impact biodiversity will occur for the duration of the Project, these include:

- Pre-Disturbance surveys are required under Sections 6.1 and 6.2 of the BMP.
- Monitoring required under Sections 6.3, 6.4 and 6.15 of the BMP
- General Environment & Sustainability Inspections required under Section 8.1 of the CEMP.

Requirements and responsibilities in relation to monitoring and inspections are documented in Section 8.1 of the CEMP.

7.4 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this BMP, MCoA, EPBC – CoA and other relevant approvals, licenses and guidelines.

Audit requirements are detailed in Section 3.9.3 of the CEMP.

7.5 Reporting

Reporting requirements and responsibilities are documented in Section 8.2 of the CEMP. There are specific reporting requirements associated with additional survey work and monitoring including:

- Results of pre-clearing surveys (Section 6.3 and 6.4)
- Results of monitoring programs
- Results of any unexpected threatened species finds or marine and terrestrial fauna handling. (Attachment B)
- Results of vessel biosecurity inspections (Section 6.1).

8 Review and improvement

8.1 Continuous improvement

Continuous improvement of this BMP will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance
- Determine the cause or causes of non-conformances and deficiencies
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies
- Verify the effectiveness of the corrective and preventative actions
- Document any changes in procedures resulting from process improvement
- Make comparisons with objectives and targets.

8.2 BMP update and amendment

The processes described in Section 3.1 of the CEMP may result in the need to update or revise this BMP. This will occur as needed.

McConnell Dowell will review and update the BMP where required prior to significant changes in construction methodology that alter the risk rating identified in the Aspect and Impacts Register or after significant environmental incidents.

If the works are anticipated to extend beyond 18 months, the BMP would be reviewed and updated where required within 12 months of approval.

Only the Environment & Sustainability Lead, or delegate has the authority to change any of the environmental management documentation.

Where significant changes to the BMP have occurred, a copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure – refer to 6.8 of the CEMP.

Attachment A1 – Procedure for Terrestrial Vegetation Disturbance

Purpose

This clearing procedure explains the process and measures to be implemented prior to, during and after terrestrial vegetation clearing for construction activities and identifies the person(s) responsible for their implementation.

Scope

This procedure is applicable to all native and introduced terrestrial vegetation required to be cleared or impacted.

Induction/training

All personnel undertaking clearing or directly involved with works will be trained in this procedure through Toolbox Talks or Pre-Start meetings.

Preparation

Prior to terrestrial vegetation clearing the Environment & Sustainability Lead will ensure:

1. The limit of clearing, 'no-go' areas and boundary flagging has been established on site.
2. The Project Ecologist has undertaken a Pre-disturbance survey prior to clearing, and has completed the following tasks:
 - a. Identified the species and location of any weeds growing within the area to be cleared and grubbed
 - b. Identified and fenced the location of threatened flora species, EECs, threatened species habitat and trees adjacent to creeks and waterways which have been marked or otherwise identified for preservation
 - c. Identified any trees outside the limits of clearing which are unsound and likely to fall upon the roadway or onto private land. These trees may need to be cleared or pruned in accordance with AS 4373 following the approval of the Environment & Sustainability Lead;
 - d. Clearly mark and record all habitat trees within the clearing zone and ensure no previously unidentified threatened species are present;
 - e. Completed the *Terrestrial Vegetation Disturbance Permit – Section A – Pre-Disturbance Survey* below and provide to the Environmental Representative.
3. Where required, the Contractor is to liaise with the National Parks and Wildlife Service ascertain if any special precautions are required.
4. A Terrestrial Vegetation Disturbance Environmental Work Method Statement (EWMS) is to be prepared by McConnell Dowell and outline:
 - a. the species of weeds present
 - b. the location of any unsound trees
 - c. a written notice of the limits of clearing
 - d. areas of weed infestation
 - e. proposed management measures for the control of area of weed infestation and identified weed species.

The Terrestrial Vegetation Disturbance Environment Work Method Statement (EWMS) are to be submitted to the Transport for NSW as a **Hold Point** at least ten (10) days before starting any clearing.

Site setup and training

Prior to vegetation clearing the Environment & Sustainability Lead will ensure:

1. All subcontractors and employees involved in the clearing are trained via Toolbox Talks or Pre-Start meetings on the environmental risks and aspects to be considered during clearing and grubbing
2. Limits of terrestrial clearing will be fenced off with clearly visible flagging to identify the boundary. Habitat Trees are to be marked with spray tape and flagging tape. Environmentally sensitive areas like heritage items, threatened species, tree protection zones etc. are to be fenced with para webbing and signposted. See flagging guide below for examples.



Orange Flagging

Clearing Limits / Exclusion Zone.
No Clearing outside this flagging.



Red and White Tape

Habitat Tree, Sprayed circle and H written in white.



Double Blue Flagging – Vegetation Areas

NO ENTRY – ENVIRONMENTAL PROTECTION AREA
To be used for heritage and biodiversity protection zones.
No access without written permit from the Environment & Sustainability Lead



Barrier Mesh – Tree Protection Zones

NO ENTRY – ENVIRONMENTAL PROTECTION AREA
To be used Tree Protection Zones (TPZ) (refer to Attachment E) in consultation with the project Arborist.

3. Clearing boundaries are to be established and clearly marked from creeks, watercourses and drainage lines to indicate where to stop clearing. Clearing of these areas cannot take place until immediately before construction commences in that area
4. Areas of contaminated soil and weed infestation zones have been identified and marked on site.
5. Where required, weed eradication has been carried out and with weed-infected areas confirmed to be appropriately treated and under control.

6. Sediment controls are in place where possible, as described in the *Soil, Water and Contamination Management Plan* and relevant *Progressive Erosion and Sediment Control Plan (PESCP)*
7. The Terrestrial Vegetation Disturbance Environment Work Method Statement has been approved by Transport for NSW

Clearing and Grubbing

The Environment & Sustainability Lead shall ensure that the 2-stage clearing procedure is followed as below:

Stage 1: During terrestrial vegetation clearing

1. The Environment & Sustainability Lead and Site Supervisor are to monitor the clearing operations daily to ensure proper management and compliance with this procedure and relevant EWMS.
2. Prior to the removal of vegetation, a pre-disturbance survey must be undertaken by the Project Ecologist.
3. The Terrestrial Vegetation Disturbance Permit is to be completed prior to clearing
4. A wildlife carer and/or ecologist will be present during all clearing of fauna habitat. Wildlife carers are to be advised of habitat clearing for the possibility of taking injured wildlife
5. Non-habitat trees are to be cleared first.
6. Habitat trees will be left for 24 hours after felling of the non-habitat trees nearby to allow any potential fauna the opportunity to move from the habitat trees.
7. Where possible, habitat trees are to be knocked with an excavator bucket or other machinery used for clearing to create only enough disturbance for fauna to move from the tree (this may not be possible for some large dead trees due to safety risks to plant operator). Excessive knocking of the tree must not take place. The tree is to be left for 1 hour before being felled as gently as possible
8. Habitat trees are to be removed strictly under the guidance of the licensed wildlife carer and/or ecologist and in accordance with *RMS Biodiversity Guideline, Guide 4*. Habitat trees are to be felled so as to keep as much of the integrity of the tree material around the hollow intact.
9. Felled habitat trees will be immediately inspected by the licensed wildlife carer and/or ecologist for fauna and the Hollow Inspection Checklist below is to be completed. If fauna is found, the Unexpected threatened species finds procedure (Attachment B) is to be followed. Habitat trees will be removed once the licensed wildlife carer and/or ecologist has confirmed no fauna is present in the tree.
10. Grasses and small understorey species are to be retained adjacent to rivers, creeks and watercourses wherever possible.
11. Techniques to minimise impacts on bank stability are to be implemented where relevant.
12. Holes left during removal of trees and stumps will be promptly backfilled with sound material and, where required, revegetated
13. If required, grubbing should be carried out to a depth of 0.5m below natural ground and 1.5m below top of Select Material Zone.
14. All trees, stud and logs of the sizes listed below which are outside the area to be cleared for the formation but considered by the Environment & Sustainability Lead to be a potential traffic hazard must be trimmed or removed within a minimum disturbance to adjacent trees and vegetation.

Stage 2: After terrestrial vegetation clearing

Holes remaining after trees and stumps have been grubbed and redundant drainage, utilities and other structures removed must be backfilled promptly with sound material to prevent the infiltration and ponding of water. The backfilling material must be compacted to at least the relative compaction of the material existing in the adjacent ground.

Native trees that are removed during clearing and grubbing will be used either in conjunction with soil erosion and sediment control measures or converted to mulch and stockpiled for use in landscape planting.

All materials cleared, pruned and grubbed will be removed from the site for recycling or disposal. Disposal will be in accordance with the Waste and Energy Management Sub Plan.

Terrestrial Vegetation Disturbance Permit

Prior to clearing

A Terrestrial Vegetation Disturbance Permit, including a Pre-Disturbance Survey must be submitted to the Environment & Sustainability Lead prior to impacts to terrestrial vegetation commencing.

Permit and any other relevant information are to be submitted to Transport for NSW for approval as a Hold Point. Works must not commence in any part of the area until this Terrestrial Vegetation Disturbance Permit has been approved.

Below is an example of the content that will be included in the Terrestrial Vegetation Disturbance Permit

Terrestrial Vegetation Disturbance Permit

Permit Details

Project	
Permit Start Date	Permit End Date
Location of Vegetation <i>(Attach drawings / sketches / maps if required)</i>	
Site Environmental Plan <i>(include SEP No. and revision)</i>	
Environmental Work Method Statement <i>(include EMWS No. Title and revision)</i>	

Section A – Pre-Disturbance Survey

To be completed by Project Ecologist

Survey Date	
Ecologist Conducting Survey	
Pre-Disturbance Survey Report <i>(to be attached to this Permit)</i>	

#	Control Measure	Y/N/NA	Ecologist Comments
1	Have EECs been identified and marked in the field? If yes, provide details of location and EEC on plan.		
2	Have all habitat trees been identified and clearly marked on site?		
3	Trees are to be spray painted with an individual number/ID (i.e. H01) on two sides of the tree. Provide a map and details of identified habitat trees (i.e. ID, species, DBH, height, no/size/type of hollows).		
4	Have built structures (culverts, bridges, etc) been checked prior to their demolition for potential roosting habitat for microbats.		
5	Were any threatened fauna species identified during the survey? If yes, mark clearly on site (i.e. flagging tape) and follow the Unexpected Threatened Species Find Procedure outlined in Attachment B of the BMP.		
6	Were any threatened flora species identified during the survey? If yes, clearly mark on site (i.e. flagging tape) and follow the Unexpected Threatened Species Find Procedure outlined in Attachment B of the BMP.		
7	Have any trees outside the clearing limit been deemed unsound? If yes, clearly mark on site.		

Comments

Ecologist Sign Off

Name	Signature	Date
------	-----------	------

I have inspected the disturbance area and consider that provided all actions are undertaken, that all measures have been implemented as required.

Section B – Pre-Work Inspection

To be completed by Project Environment & Sustainability Lead

Survey Date			
E&S Lead Conducting Inspection			
MCD Supervisor Overseeing Works			
#	Control Measure	Y/N/NA	Ecologist Comments

1	Have the clearing limits been established by the Survey Team?		
2	Has the limit of clearing been clearly fenced off?		
3	Is protective flagging and environmental no-go zones been installed around EECs and heritage items?		
4	Have areas of weed infected topsoil been identified?		
5	Have habitat trees and/or trees to be preserved been identified and marked?		
6	Have built structures (culverts, bridges, etc) been checked prior to their demolition for potential roosting habitat for microbats.		
7	Has Hold Point detailing relevant information been submitted at least ten (10) days prior to commencement of vegetation disturbance?		
8	Have boundary limits been established and clearly marked from rivers, creeks, watercourses and drainage lines to indicate to the clearing contractors where to stop clearing?		
9	If near a creek or waterway crossing, ensure riparian zone is managed in accordance with BMP - Management and Mitigation Measures		
10	Have sediment control measures been installed before vegetation disturbance as required by the Progressive Erosion and Sediment Control Plan (PESCP)?		
11	Has the Project Ecologist been notified and scheduled to supervise vegetation disturbance work?		
12	Has the Project Ecologist identified potential fauna release sites?		
13	Have all relevant personnel signed onto the EWMS for this work?		

Section C – Permit Sign Off

Works cannot commence unless permit has been signed off by all parties

Project Environment & Sustainability Lead Sign Off

I have reviewed the "Vegetation Disturbance Permit" checklist and all measures have been implemented as required. The clearing at the above mentioned location may proceed in accordance with this procedure.

Name

Date	
Signature	
Supervisor Sign Off <i>I have reviewed "Vegetation Disturbance Permit" checklist, all measures have been implemented as required and all relevant personnel have been trained in and signed onto the Environmental Work Method Statement.</i>	
Name	
Date	
Signature	
Clearing Contractor Sign Off <i>I have reviewed "Vegetation Disturbance Permit" checklist, all measures have been implemented as required and all relevant personnel have been trained in and signed onto the Environmental Work Method Statement.</i>	
Name	
Date	
Signature	

Clearing Data Sheet

Record details of all fauna observed/caught during clearing operations.

Species	Details of how the animal was injured/found	Location	Action Undertaken i.e. captured/released, self-escape, taken to vet etc.
Ecologist / Fauna Handler			

Toolbox

The objective of this toolbox is to ensure that all personnel and subcontractors involved with clearing operations are aware of their responsibilities and the environmental procedure/work method.

- Pre-Disturbance Surveys must be undertaken prior to vegetation disturbance commencing
- All personnel undertaking vegetation clearing are to be training in and sign onto the Vegetation Disturbance (Terrestrial) Environmental Work Method Statement
- All environmental controls are to be in place and maintained
- All personnel are aware of relevant marking of habitat trees, environmentally sensitive areas, weeds, unsound trees and trees to be retained
- All personnel are aware of the 2 stage clearing method
- Know the procedures to be undertaken without the appropriate signoffs
- If any fauna is detected during clearing, immediately notify the Environment & Sustainability Lead.

Attachment A2 – Procedure for Marine Vegetation Disturbance

Purpose

This procedure explains the process and measures to be implemented any disturbance to marine vegetation caused by construction and identifies the person(s) responsible for their implementation.

Scope

This procedure is applicable to all marine vegetation that will be directly impacted by construction.

Induction/training

All personnel undertaking activities that will directly impact marine vegetation will be trained in this procedure through Toolbox Talks or Pre-Start meetings.

Preparation

Prior to impacting on marine vegetation the Environment & Sustainability Lead will ensure:

1. The Project Ecologist has undertaken a Pre-Disturbance Survey, and has completed the following tasks:
 - a. Identified the species and location marine vegetation growing within the area that will be impacted by construction.
 - b. Identified and relocate any Syngnathids in accordance with the Syngnathid Relocation Plan (BMP Attachment D)
 - c. Completed the Vegetation Disturbance Permit (Marine) – Part A and provide to the Environment & Sustainability Lead.
2. A Vegetation Disturbance (Marine) Environmental Work Method Statement (EWMS) is to be prepared by McConnell Dowell and outline:
 - a. the species and location of marine vegetation present
 - b. process of the Pre-Disturbance Survey to be undertaken by the project ecologist
 - c. proposed management measures to reduce impacts to marine vegetation

The Vegetation Disturbance (Marine) Environment Work Method Statement (EWMS) are to be submitted to the Transport for NSW as a **Hold Point** at least ten (10) days before impacting marine vegetation.

Marine Vegetation Disturbance Permit

Permit Details

Project			
Permit Start Date		Permit End Date	
Location of Works <i>(Attach drawings / sketches / maps if required)</i>			
Site Environmental Plan <i>(include SEP No. and revision)</i>			
Environmental Work Method Statement <i>(include EMWS No. Title and revision)</i>			

Section A – Pre-Disturbance Survey

To be completed by Project Ecologist

Survey Date			
Ecologist Conducting Survey			
Pre-Disturbance Survey Report <i>(to be attached to this Permit)</i>			
#	Control Measure	Y/N/NA	Ecologist Comments
1	Has all marine vegetation within the survey area been identified and documented		
2	Has all marine vegetation within the survey area been checked for marine fauna		
3	Have all encountered Syngnathid's been relocated in accordance with the BMP – Syngnathid relocation plan?		
4	Is there any identified Black Rockcod within the survey area?		
Comments			
Ecologist Sign Off			
Name		Signature	Date
I have inspected the disturbance area and consider that provided all actions are undertaken, that all measures have been implemented as required.			

Section B – Pre-Work Inspection

To be completed by Project Environment & Sustainability Lead

Survey Date			
E&S Lead Conducting Inspection			
MCD Supervisor Overseeing Works			
#	Control Measure	Y/N/NA	Ecologist Comments
1	Have all relevant employees signed onto the EWMS?		
2	Has Hold Point detailing relevant information been submitted at least ten (10) days prior to commencement of vegetation disturbance?		
10	Have sediment control measures been installed before vegetation disturbance as required by the Progressive Erosion and Sediment Control Plan (PESCP)?		

Section C – Permit Sign Off

Works cannot commence unless permit has been signed off by all parties

Project Environment & Sustainability Lead Sign Off <i>I have reviewed the "Vegetation Disturbance Permit" checklist and all measures have been implemented as required. The clearing at the above-mentioned location may proceed in accordance with this procedure.</i>	
Name	
Date	
Signature	
Supervisor Sign Off <i>I have reviewed "Vegetation Disturbance Permit" checklist, all measures have been implemented as required and all relevant personnel have been trained in and signed onto the Environmental Work Method Statement.</i>	
Name	
Date	
Signature	

Attachment B – Unexpected threatened species finds procedure

Purpose

This procedure details the actions to be taken when a threatened species is unexpectedly encountered on site.

Induction/training

Where required, personnel will be inducted on the identification of potential threatened species occurring on site and the relevant actions for them with regards to this procedure during the Project Induction, Site Inductions and regular Toolbox Talks.

Scope

This procedure is applicable to all activities conducted by personnel that have the potential to come into contact with threatened flora species. Where threatened fauna is unexpectedly encountered, refer to the Fauna Handling Procedure (Attachment C of the BMP).

Procedure

1. Threatened Species unexpectedly encountered on site

- a. STOP ALL WORK in the vicinity of the find or that is likely to impact on the species
- b. Immediately notify the Environment & Sustainability Lead
- c. Environment & Sustainability Lead to confirm the identity of the species in consultation with the project ecologist
- d. Once confirmed, notify Transport for NSW, the Planning Secretary and NSW Environment and Heritage.

Agencies will be informed of any unplanned event of death or injury to any threatened species, expected or unexpected on site.

2. Assessment of Impact

An assessment is to be undertaken by the Environment & Sustainability Lead and the Project Ecologist to determine the likely impact to the threatened species and develop appropriate management options. If a significant impact is determined to be likely to occur to a species not been previously identified during the project, then Transport for NSW will be consulted immediately.

3. Approvals

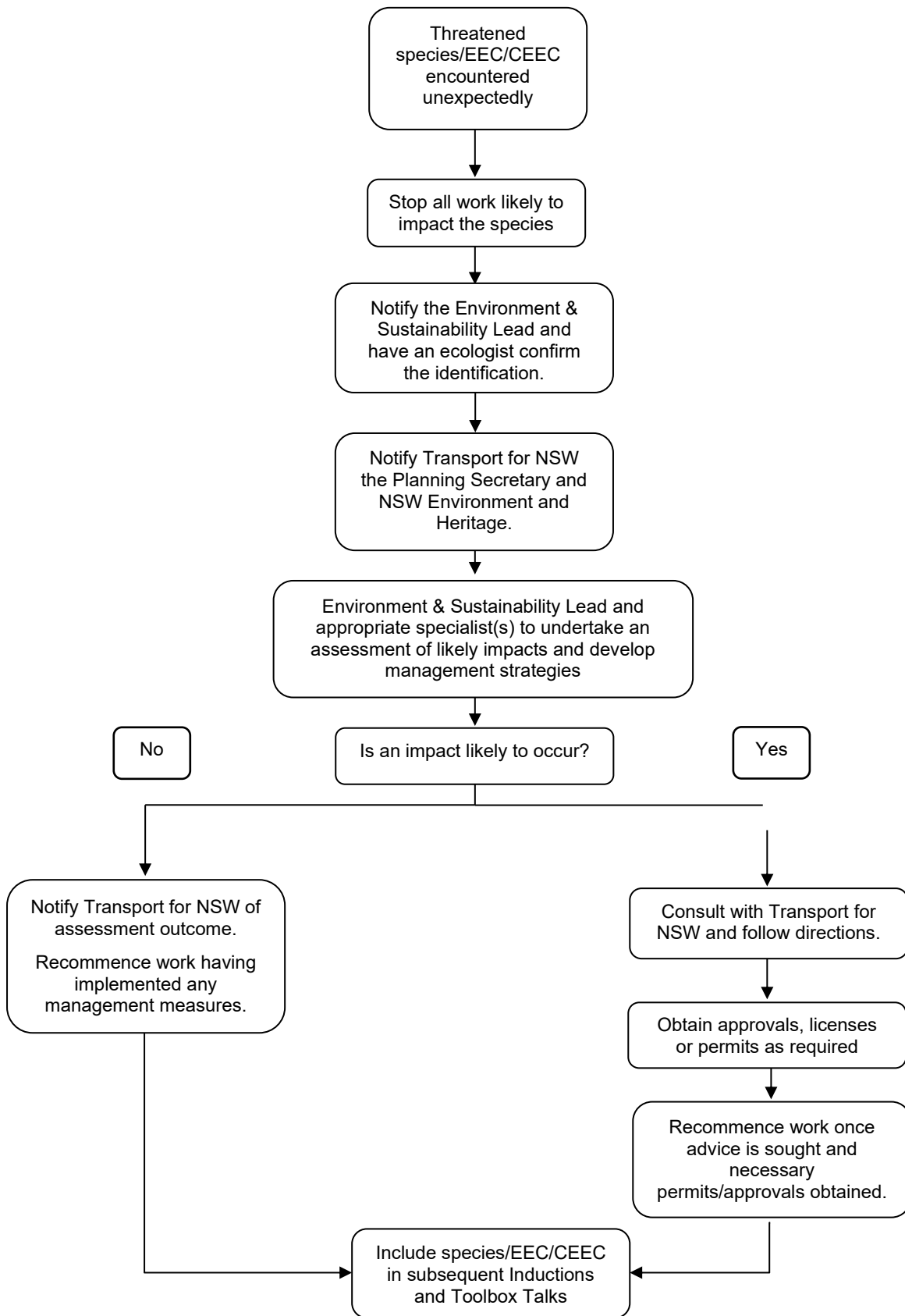
If the species is likely to be significantly impacted then McConnell Dowell will obtain any licences, permits or approvals required.

4. Recommencement of Works

Works is not to recommence until necessary advice has been sought and any licences, permits or approvals obtained (if required). If any licences, permits or approvals are not required, works can recommence after advice from the Project Ecologist, Transport for NSW and relevant agencies confirms it is appropriate to do so.

Briefing on any new threatened species is to be included in subsequent Project Inductions and Toolbox Talks.

Figure B1: Unexpected Threatened Species Find Procedure Flow Chart



Attachment C – Terrestrial fauna handling procedure

Purpose

This procedure explains the actions to be taken if an injured, shocked, juvenile animal or eggs are discovered on the project site that require handling, relocating or rescue.

Scope

This procedure is applicable to all native and introduced species found on the project Site.

Induction/Training

All site personnel will attend a project induction, which will include a section on fauna and fauna handling. The induction will clearly outline staff responsibilities for fauna handling.

Procedure

1. Wildlife encountered on site that requires handling, relocating or rescue

STOP ALL WORKS in the vicinity of the fauna or that is likely to impact the fauna, and immediately notify the Site Supervisor and Environment & Sustainability Lead.

2. Assess risk of fauna to workers

If the animal cannot be handled and/or poses a risk to workers on site (e.g. venomous reptiles):

- Exclude all personnel from the vicinity
- Record the exact location of the animal and provide to the Environment & Sustainability Lead and/or the appropriate rescue agency

3. Minimise stress (low risk)

To minimise stress to native fauna and remove the risk of further injury, the Environment & Sustainability Lead or their nominee shall:

- Cover large animals with a towel or blanket and place in a large cardboard box and/or hessian bag;
- Place smaller animals in a cotton bag, tied at the top; and
- Keep the animal in a quiet, warm, ventilated and dark place away from noisy construction activities

Note: Some animals require particular handling (e.g. venomous reptiles, raptors) and should only be handled by appropriately qualified person i.e. WIRES representative/licensed fauna ecologist).

4. Seek help Call the Environment & Sustainability Lead or Wildlife Carer (details below) immediately and follow any advice provided. The Ecologist may nominate to contact rescue agency (e.g. WIRES) to assist. Any decisions regarding the care of the animal will be made by the Ecologist, with advice from the rescue agency where applicable.

Agency/Business	Phone Number
<i>Environment & Sustainability Lead</i>	<i>Mitch Jones 0411 076 046</i>
<i>WIRES Wildlife Rescue</i>	<i>1300 094 737</i>

In the event the rescue service and/or local veterinary service cannot be contacted, the injured animal will be delivered to the relevant agency as soon as practically possible. The injured animal should be recorded on the Fauna Rescue and Relocation Register.

5. Threatened species

If the fauna species is identified as a threatened species not identified in the Biodiversity Management Plan, the unexpected threatened species finding procedure must also be followed (Attachment B).

6. Relocation

Relocation of fauna will be undertaken by the Ecologist or the Environment & Sustainability Lead and will be recorded on the Fauna Rescue and Relocation Register. If the animal is not injured or stressed, it may be released nearby in an area that is not to be disturbed by the construction, in accordance with the following procedures:

- Sites to be identified as suitable release points by the Project Ecologist or WIRES rescuer
- Release will be into similar habitat as close to the original area as possible
- Nocturnal species to be released at dusk
- Release generally not undertaken during periods of heavy rainfall

Attachment D – Syngnathid relocation plan

The methodology and relocation specifics presented in this section apply to all locations. The methodology is focused on the salvage and relocation of White's Seahorse however, it is also applicable to all other species of Syngnathids.

Note – It is not appropriate to relocate mobile Syngnathids such as Weedy Seadragons (Phyllopteryx taeniolatus) who are able to move to nearby suitable habitat outside of the construction boundary.

Receiver sites

Receiver sites are to be established in consultation with DPI Fisheries. Nearby patches of Posidonia, outside the construction boundary at both sites have been identified as likely receiver sites (Figure D1, D2).

If receiver sites are within the construction boundary then exclusion areas are to be established to demarcate all receiver sites that Syngnathids have been relocated to (e.g. marked by buoys or mapped on sensitive area plans) prior to commencement of water-based construction activities.



Figure D 1 White's Seahorse habitat and potential receiver sites (red) at La Perouse

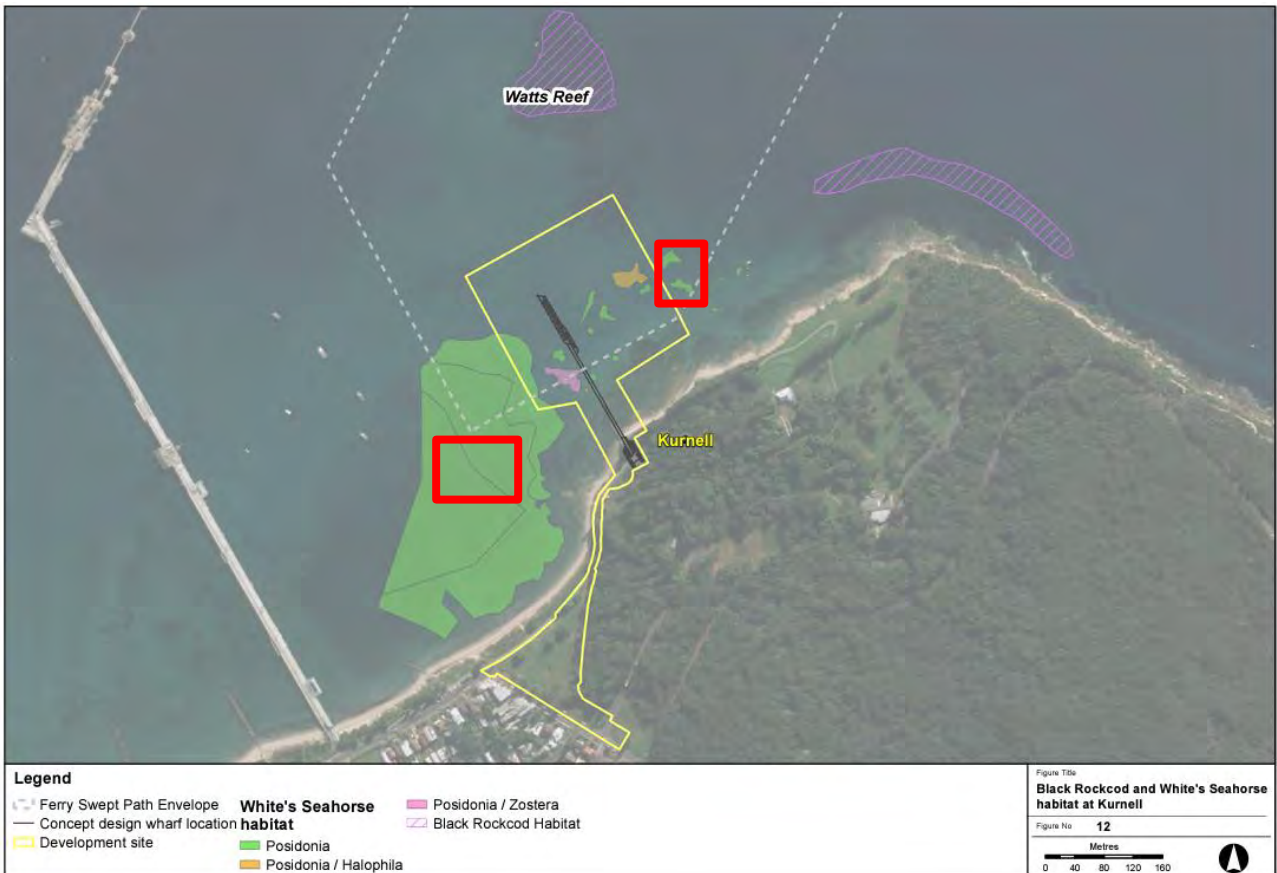


Figure D 2 White's Seahorse habitat and potential receiver sites (red) at Kurnell

Relocation methods

Table E-1 presents the two Syngnathid relocation methods in order of preference.

Table E-8-1 - Relocation methods for Syngnathids

Relocation method	Prepare	Salvage	Release
In-situ	<ul style="list-style-type: none"> • Zip-lock bags 20x19cm or larger for storing individuals of pairs of Syngnathids. • Catch bags for storing zip-lock bags. • Waterproof paper/tags to label size of individuals and location/habitat where they were salvaged from. • Underwater pencil and slate. 	<ul style="list-style-type: none"> • Two divers search all potential Syngnathid habitat identified as source sites. Divers are to wear gloves when salvaging Syngnathids. • Syngnathids located will be captured by hand and placed in an extended catch bag or similar so that individuals are not injured from crushing or abrasion (e.g. storing individuals in zip lock bags filled with water and then placed in the catch bag). • Pairs or nearby groups of individuals are not to be separated and are to be placed in the same bag. 	<ul style="list-style-type: none"> • Salvage divers are to take note of habitat and habitat condition where Syngnathids are found so that individuals can be relocated to like-for-like habitat at receiver sites. • Individuals must be carefully placed in the receiving habitat as close to the seafloor or structure as possible and observed to be responsive to stimulus or have attached to benthic habitat features.
Alternative Relocation Method (for when Syngnathids cannot be safely relocated underwater by divers)	<ul style="list-style-type: none"> • Zip-lock bags 20x19cm or larger for storing individuals of pairs of Syngnathids. • Catch bags for storing zip-lock bags. • Waterproof paper/tags to label size of individuals and location/habitat where they were salvaged from. 	<ul style="list-style-type: none"> • Two divers search all potential Syngnathid habitat identified as source sites. Divers are to wear gloves when salvaging Syngnathids. 	<ul style="list-style-type: none"> • Salvage divers are to take note of habitat and habitat condition where Syngnathids are found so that individuals can be relocated to like-for-like habitat at receiver sites.

Relocation method	Prepare	Salvage	Release
	<ul style="list-style-type: none"> • Underwater pencil and slate. • Large buckets (≥20 litres; receiving tanks) filled with water and macroalgae from the source site will be prepared in anticipation of salvaged Syngnathids. • The amount of macroalgae in the receiving tanks should occupy about 25% of the volume of the tank. • Receiving tanks should be aerated and fitted with a digital thermometer. The aerator should not create turbulence in the water. • A dive supervisor on land/onboard will monitor the tanks and complete a water change (from the source location) if water temperatures fluctuate more than 1°C. 	<ul style="list-style-type: none"> • Syngnathids located will be captured by hand and placed in an extended catch bag or similar so that individuals are not injured from crushing or abrasion (e.g. storing individuals in zip lock bags filled with water and then placed in the catch bag). • Pairs or nearby groups of individuals are not to be separated and are to be placed in the same bag. • At the end of each dive, salvaged Syngnathids are to be transferred to receiving tanks, taking care to keep them inundated at all times and handled as less as possible. • The maximum density of one receiving tank is 10 individuals. • If multiple dives are required to salvage Syngnathids, then a second dive team should be deployed to relocate individuals where possible. This is aimed to reduce stress on 	<ul style="list-style-type: none"> • Individuals must be carefully placed in the receiving habitat as close to the seafloor or structure as possible and observed to be responsive to stimulus or have attached to benthic habitat features. • If salvaged Syngnathids need to be transported by a vessel or vehicle to the receiver site, this should be done as soon as practicable (e.g. deploy a second dive team to release individuals). Care must also be taken during transit to create as little disturbance to the receiving tanks as possible. Receiving tanks are to be covered by perforated lids during transit and remain aerated.

Relocation method	Prepare	Salvage	Release
		<p>individuals in the receiving tanks.</p> <ul style="list-style-type: none"> The dive supervisor onshore will monitor the captured Syngnathids for signs of stress and complete a water change if stress is detected or water temperatures fluctuate more than one degree Celsius. Water changes should be done with care and not disturb captured Syngnathids. 	

Equipment and personnel

Syngnathid relocation must be completed by a qualified marine ecologist or biologist certified as scientific divers or as commercial divers with extensive experience in subtidal habitat surveys and animal handling.

The equipment requirements for Syngnathid relocation include:

- Buckets (≥20 litres)
- Aerators
- Digital thermometers
- SCUBA dive equipment
- Sanitised dive gloves
- Catch bags and zip lock bags
- Underwater slate and pencil
- Relocation records
- Dive camera (optional)
- Vessel/vehicle (if required).

Timing

Inspection dives to salvage Syngnathids are to be completed within 24 hours of the commencement of water-based construction activities unless more than one day of dives are required. The timing of construction activities will be discussed with NSW DPI Fisheries.

Adaptive management

Syngnathid relocation is best carried out during clear skies and calm seas. It is not recommended to complete relocation during inclement weather, upon which relocation activities should be delayed until more suitable conditions arise.

All Syngnathid injury or mortality must be reported to NSW DPI Fisheries. Any injured Syngnathids should be taken to SEA LIFE Sydney Aquarium. It is recommended to alert the staff at SEA LIFE Sydney Aquarium of the arrival of injured Syngnathids to avoid delays in treating injuries. Injured individuals should be handled and transported as per the methods above.

Occupational health and safety requirements

Only serviced and fully-operational SCUBA equipment is to be used. All other equipment required by this scope of works are to be cleaned and sanitised before each relocation event (ie at each wharf). Cleaning agents used must be aquarium-grade and safe to use for Syngnathids.

All field work would be undertaken under an appropriate Safe Work Method Statement in accordance with Transport for NSW's health, safety and environment requirements.

Relocation record proforma

Wharf location	La Perouse / Kurnell
Salvage sites	Name: Easting: Northing: Description:
	Name: Easting: Northing: Description:

	<p>Name:</p> <p>Easting:</p> <p>Northing:</p> <p>Description:</p>
Receiver sites	<p>Name:</p> <p>Easting:</p> <p>Northing:</p> <p>Description:</p>
	<p>Name:</p> <p>Easting:</p> <p>Northing:</p> <p>Description:</p>

	<p>Name:</p> <p>Easting:</p> <p>Northing:</p> <p>Description:</p>
<p>Salvage and release team</p>	<p>Diver 1:</p> <p>Diver 2:</p> <p>Diver 3:</p> <p>Diver 4:</p>
<p>Date</p>	
<p>Weather and sea conditions</p>	
<p>Syngnathid records</p>	<p>Identifier:</p> <p>Species:</p> <p>Salvage area name:</p> <p># of individuals:</p> <p>Release area name:</p> <p>Notes:</p>

Identifier:

Species:

Salvage area name:

of individuals:

Release area name:

Notes:

Identifier:

Species:

Salvage area name:

of individuals:

Release area name:

Notes:

Identifier:

Species:

Salvage area name:

of individuals:

Release area name:

Notes:

	Identifier:
	Species:
	Salvage area name:
	# of individuals:
	Release area name:
	Notes:
	Identifier:
	Species:
	Salvage area name:
	# of individuals:
	Release area name:
	Notes:

Reporting

Each Syngnathid relocation event must be recorded and reported to NSW DPI Fisheries within two weeks of relocation, including:

- The location of the works
- The date of the relocation activity
- The number of Syngnathids collected and relocated
- The species of Syngnathid, if known
- Where the Syngnathids were moved to, including coordinates
- The type and condition of the habitat at the relocation site.
- A reporting proforma template has been included below.

Records of the threatened White's Seahorse must also be registered in the NSW DPI Fisheries 'Report a threatened species' database (<https://www.dpi.nsw.gov.au/fishing/threatened-species/report-it>) within the same timeframe as the above reporting requirements.

Attachment E - Tree protection measures

The Aboricultural Impact Assessment (Appendix J of the EIS) surveyed the existing trees at Kurnell. Each tree is given a number, which should be referred to when implementing the measures below.

In accordance with REMM B4, prior to construction, an Arborist Report will be completed by an Arborist for all trees within the construction boundary that are proposed for retention in accordance with Australian Standard 4970: Protection of Trees on Development Sites.

The Arborist Report will include recommendations on the viable retention of all native trees within the construction boundary by further refining the specific protection measures outlined in the Aboricultural Impact Assessment (Appendix J of the EIS).

Project arborist

An official "Project Arborist" must be commissioned to oversee the tree protection, any works within the TPZ's and complete regular monitoring compliance certification.

The Project Arborist must suitable qualified with relevant demonstrated experience in tree management on construction sites.

Inspections are to be conducted by the Project Arborist at several key points during the construction in order to ensure that protection measures are being adhered to during construction stages and decline in tree health or additional remediation measures can be identified.

Specific protection measures

The below trees will have proposed excavation or construction activity >10% within their Tree Protection Zone (TPZ) and will therefore require supervision as outlined below.

- Category A Trees 337, 458
- Category B Trees 495, 496

The remaining trees below will have considerable construction activity >10% within their TPZ requiring specific protection measures.

- Category A Trees 338, 339, 463, 464, 477, 524;
- Category B Trees 326, 466, 467, 469, 479, 481;
- Category C Trees 325, 480, 525

Excavation Protection Measures

Excavation is to be carried out only under arborist supervision. No excavation should occur within the Structural Root Zone (SRZ) of these trees unless completely unavoidable. An adaptive management process will be followed if there is a need to work within the SRZ and TPZ. This would be in consultation with the Project Arborist, and with the approval of Transport for NSW.

It is recommended that the proposed excavation commence at the outer extent of the TPZ and move inwards to minimise root damage to the trees.

Works should be undertaken using techniques that are sensitive to tree roots to avoid unnecessary damage. Such techniques include:

- Excavation using a high-pressure water jet and vacuum truck.

- Excavation using an Air Spade with vacuum truck.
- Excavation by hand.

Machine excavation is prohibited within the TPZs of retained trees unless undertaken at the direct consent of the Project Arborist.

Roots discovered are to be treated with care and minor roots (<40mm diameter) pruned with a sharp, sterile saw or secateurs. All significant roots (>40mm diameter) are to be recorded, photographed, and reported to the project arborist for comment.

Other proposed surfacing within the TPZ is to be installed above the existing grade and be of a permeable nature to allow the passage of air and moisture. If the surfacing is to be load bearing, then it is suggested that a geogrid/web or similar is incorporated to ensure the rooting area below does not become compacted with the installation of the load bearing structure placed on top. Comment from the Project Arborist is sought before the installation of such systems to ensure any adverse impacts to trees and root systems are suitably mitigated.

Generic protection and reporting measures

All retained trees require generic protection measure. These are:

- Category A Trees 335, 336, 341, 437, 448, 450, 451, 452, 454, 455, 456, 459, 471, 483, 490, 491, 493, 494;
- Category B Trees 449, 472, 473, 474, 475, 478, 484, 485, 487, 489, 492, 526;
- Category C Trees 327, 457, 482, 486, 488, 498, 500, 501, 502, 503, 504, 508, 509, 510, 511; and
- Category U Trees 505, 506, 507, 512.

Refer to Section 7.5–7.7 of the Aboricultural Impact Assessment (Appendix J of the EIS) for further detail.

Tree protection measures include:

- Activities restricted within the TPZ
- Protective fencing / flagging
- Trunk and ground protection
- Tree protection signage
- Involvement from the Project Arborist
- Project milestones
- Compliance reporting

Activities prohibited within the TPZ:

- Machine excavation including trenching
- Storage
- Preparation of chemicals, including cement products
- Parking of vehicles and plant
- Refuelling
- Dumping of waste
- Wash down and cleaning of equipment
- Placement of fill

- Lighting of fires
- Soil level changes
- Temporary or permanent installation of utilities and signs
- Physical damage to the tree.

Demarcating of Tree Protection Zones

Prior to machinery or materials are brought to Site and before commencement of works (including demolition) the Tree Protection Zone (TPZ) of each applicable tree is to be establishing in consultation with the project Arborist. Examples of controls to be placed along the Tree Protection Zones are outlined below in Figure E-1.

Tree Protection Zone demarcation will:

- be secured, signposted and clearly visible to restrict access
- be installed as far as practicable from the trunk of any retained trees in consultation with the project Arborist
- remain intact throughout all proposed construction works and must only be dismantled after all construction is completed
- not be removed or altered without consulting the Project Arborist.
- trees themselves must also not to be used as a billboard to support advertising material.
- Ensure that affixing nails or screws into the trunks of trees to display signs of any type is prohibited.



Figure E-1 Tree Protection Zone materials (example)

Trunk and root protection

Given that proposed works are often within the TPZs of retained trees, standard protective measures may not always be a viable method of protection. In these areas trunk protection and root protection should be installed prior to the commencement of works and remain in place until after construction works have been completed.

Where construction access into the TPZ of retained trees cannot be avoided, the root zone of each tree must be protected using either plates or rumble board strapped over mulch/aggregate in consultation with the Project Arborist until such a time as permanent above ground surfacing (cellular confinement system or similar) is to be installed.

Trunk and root protection (Figure E-2) should be undertaken in line with the Australian Standard AS 4790–2009: Protection of Trees on Development Sites as per the image below.

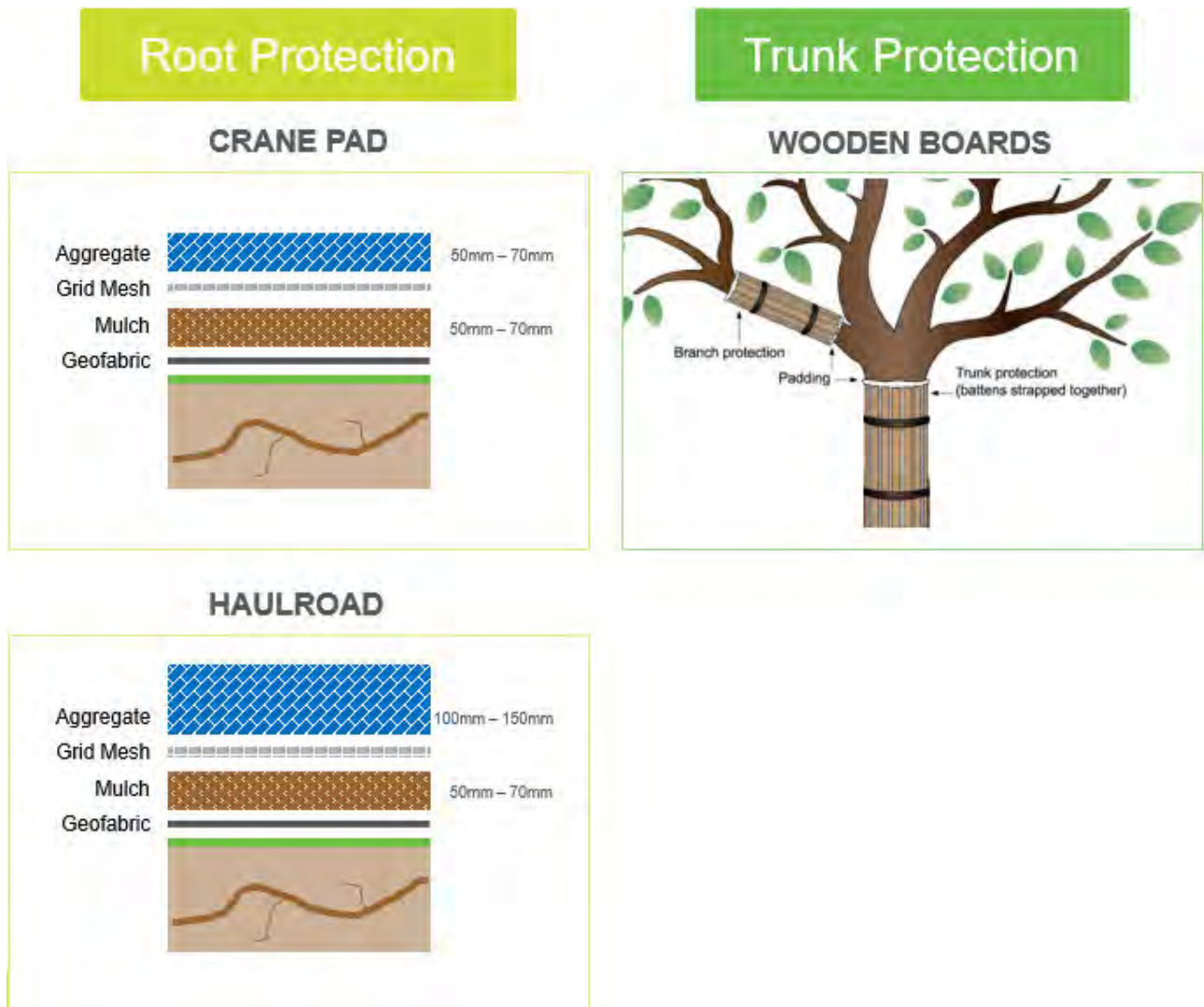


Figure E-2 Trunk and root protection techniques

Additional excavation/trenching within TPZs

In the event additional excavation is required within the TPZs, arborist involvement will be required to ensure works are undertaken in accordance with the Australian Standard AS 4970–2009: Protection of Trees on Development Sites.

Where excavation or trenching is required to facilitate installation of underground services within the TPZs of any site trees arborist supervision is required. Works should be undertaken using techniques that are sensitive to tree roots to avoid unnecessary damage. Such techniques include:

- Excavation by hand
- Excavation using a high-pressure water jet and vacuum truck
- Excavation using an Air Spade with vacuum truck.

Machine excavation should be prohibited within the TPZs of retained trees unless undertaken at the direct consent from the project arborist and/or the responsible authority.

Inspections

The following visits and milestones are recommended as to when on-site tree inspection by the Project Arborist is required:

Table E1 Project milestones

Purpose of visit	Timing	Purpose
Pre-Construction Walkthrough	Prior to construction	Discuss proposed tree protection measures and walkthrough of site in development of the Arborist Report (REMM B4)
Supervision of works in TPZ's including all regarding and excavations	Whenever there is work planned to be performed within the TPZ's.	Ensure that works are conducted in accordance with this plan and the Arborist Report
Regular site inspections	Frequency to be determined in consultation with Project Arborist and reflective of works onsite.	Inspection to be completed by the Project Arborist to ensure tree protection measures are installed and maintained as required.
Final sign off	Following completion of works	Practical completion of works and prior to tree protection removal.

Compliance reporting

Following each inspection, the Project Arborist shall prepare a report detailing the condition of the trees. These reports should certify whether or not the works have been completed in compliance with the consent relating to tree protection.

These reports should contain photographic evidence where required to demonstrate that the work has been carried out as specified.

Matters to be monitored and included in these reports should include tree condition, tree protection measures and impact of site works which may arise from changes to the approved plans.

The reports and compliance statements shall be submitted to the Environmental Representative following each inspection.

The reports and any non-compliance statements shall be submitted to McConnell Dowell if tree protection conditions have been breached. Reports should contain clear remedial action specifications to minimise any adverse impact on any subject tree.

Attachment F – Terrestrial Weed and pathogen control procedure

Purpose

This procedure details weed and pathogen management and control practices to be implemented on the Kurnell and La Perouse Sites to minimise threats to any local remnant vegetation. The aims of weed and pathogen management are to:

- suppress and destroy existing noxious and environmental weed infestations within the Project Sites
- prevent or minimise the spread of noxious and environmental weed species both within and outside the Project Sites
- ensure that McConnell Dowell satisfies its obligations to control weeds under the *Biosecurity Act 2015, Guide 6: Weed management* and *Guide 7: Pathogen management, Biodiversity Guidelines* (RTA, 2011) and the *Greater Sydney Regional Strategic Weed Management Plan 2017 - 2022*.
- prevent the import and spread of pathogens.

This weed and pathogen management procedure has been developed for weed control activities and pathogen management associated with terrestrial vegetation disturbance and weed suppression during the construction period.

Scope

In NSW all plants are regulated, with a general biosecurity duty imposed under the *Biosecurity Act 2015*, on any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, to prevent, eliminate or minimise any biosecurity risk they may pose, so far as is reasonably practicable.

Weed management and control will be conducted on all weeds identified on site with attention to areas of vegetation and those weeds declared noxious within the Randwick City Council and Sutherland Shire Local Government Areas. The full list of priority and other weed species, their classification and management measures is available at the *Greater Sydney Regional Strategic Weed Management Plan 2017 - 2022*. Priority weeds and other weeds of regional concern are also attached to this procedure.

Pathogen management and control will be conducted onsite in accordance with this procedure to prevent the import and spread of weeds.

Induction and training

All personnel on Site are to be inducted on the existence of noxious weeds during the Project induction and as required in toolbox talks, and the controls they are required to implement to minimise weed spread.

Weed control

The Environment & Sustainability Lead must ensure the following best practice methods for weed management are undertaken:

- Mow/slash areas infested with weeds before they seed. This may reduce the propagation of new plants.

- Program works from least to most weed infested areas.
- Clean machinery, vehicles, and footwear before moving to a new location.
- Securely cover loads of weed-contaminated material to prevent weed plant material falling or blowing off vehicles.
- Dispose of weed-contaminated soil at an appropriate waste management facility.
- Remove weeds immediately onto suitable trucks and dispose of without stockpiling.
- Separate weeds from native vegetation where native vegetation is to be used for mulch. Dispose of weeds to an appropriate waste management facility. Do not use weeds for mulch.

Programmed weed control procedure

To control weed infestations the Environment Representative will ensure the following procedure is implemented:

1. Machinery to be inspected prior to mobilising to site. Check for contaminants/weeds with machine to be confirmed as clean prior to mobilisation
2. The Environment & Sustainability Lead shall arrange for an Ecologist to undertake a site weed assessment at each site prior to commencing vegetation disturbance as part of the Terrestrial Pre-Disturbance Inspection. This assessment will detail:
 - the weed species on site,
 - their locations
 - recommended methods of control
 - where any Weeds of National Significance, National Environmental Alert Weeds or noxious weeds are found the weeds officer at the relevant local council will be consulted
 - This site weed assessment will remain current for any future terrestrial vegetation disturbance unless periodic inspections identify new areas of weed infestation (see Step 7 below)
3. Weed control methods will be explored based on consultation with the Project Ecologist and NPWS if at the Kurnell site, it is predicted that primary control will be mechanical removal and segregation of weed contaminated materials during clearing
4. Areas infested with weeds are mapped and marked as an exclusion zone with fencing and signage to limit access by personnel and vehicles
5. Where pesticides are to be used the Environment & Sustainability Lead will ensure that pesticide application is conducted and documented
6. If required, the Environment & Sustainability Lead shall ensure that a follow-up inspection is undertaken of identified weed infestation sites to ensure treatment was successful. If treatment was unsuccessful, re-treat the area until it is successful
7. Any weeds physically removed are to be separated from native vegetation and disposed of appropriately at a suitable vegetation waste facility
8. The Environment & Sustainability will conduct periodic inspections throughout the construction period. Any new areas of weed infestation identified on site will be appropriately controlled depending on species, location, and density.

Pesticide use

Use of pesticides must be in accordance with the *Pesticides Act 1999 (NSW)*, other relevant legislation, label directions and any relevant industry codes of practice.

Complete a Records Sheet within 24 hours of applying the pesticide and submit a copy to the Environmental Representative. For guidance when preparing pesticide application records, you may use the “Sample Pesticides Application Records Sheet” (refer to Table G1).

You are exempt from completing the Records Sheet when all the following are satisfied:

- The pesticide is, or is part of a product that is widely available to the public
- The pesticide is only applied by hand or by using hand-held equipment
- If applied outdoors on any single occasion, in quantities of no more than 5 litres/5 kilograms of concentrated product or 20 L/20kg of ready-to-use product; or if applied indoors, in quantities of no more than 1 litre/1 kilogram of concentrated product or 5 litres/5 kilograms of the ready-to-use product.

All personnel managing and using pesticides must receive appropriate training and hold appropriate licence(s) prior to commencing work. Only pesticides registered for use near water may be used near water.

Public notification of pesticide use will be conducted as required Table . Implement the following measures whenever pesticides are to be used adjacent to, or across the road from, a “sensitive place”. (

- Use of mechanical means of pest control (such as mowing or slashing) where feasible; or
- Use of hand-held application of pesticides where mechanical means of pest control are not feasible.

Avoid applying pesticides:

- on hot days when plants are stressed
- after the seed has set
- within 24 hours of rain or when rain is imminent
- when winds will cause drift of pesticides into non-target areas.

Table G1 Pesticides Application Records Sheet

	Information to be Recorded	Brief Description	Enter Data Here
1.	Date and time	Start Date and Time: Finish Date and Time:	
2.	Who applied the pesticide	Full operator name: Operator contact address: Operator contact phone:	
3.	Who owns/occupies the land	Full owner/occupier’s name: Owner/occupier’s contact address: Owner/occupier’s contact phone:	

	Information to be Recorded	Brief Description	Enter Data Here
4.	Boundaries of treated area and order of treatment	List treated areas and order of treatment, preferably with reference to a map: List order of treatment:	
5.	Problem treated	Identify the pest or problem treated (e.g. controlling of spot weed infestation):	
6.	Product used	Record either the full name, or a product code if a list of full product names of pesticides you use is kept at the front of your logbook:	
7.	Equipment used	Describe the equipment used (e.g. boom-spray, hand-held backpack sprayer etc):	
8.	Quantity applied and dilution	Total amount of pesticide product mix used: Write down whether the mix was concentrated product or a diluted mixture (note down rate of dilution):	
9.	Area covered by application	Area of application (in square metres or hectares):	
10.	Wind speed and direction	Estimate of wind speed and direction (only if the pesticide is applied through the air): Write down any changes in weather during application:	
11.	Other weather details	Record any weather details such as temperature, humidity and/or rainfall where the pesticide product label requires you to assess these:	

Table G2 Public notification of pesticide use

Public places # where pesticides will be applied on behalf of Transport for NSW	Minimum Notification Methods
<p>Urban and rural roadsides, including:</p> <ul style="list-style-type: none"> • Median strips • Road shoulders • Kerb and guttering • Roundabouts • Traffic islands • Roadside cycleways/footpaths • Traffic management devices • Stockpile sites <p>Freeways and controlled access roads</p>	<p>Signs on vehicle concurrent with spraying activity.</p> <p>Internet-based notification as required</p>
<p>Road construction sites</p>	<p>Signs on vehicle concurrent with spraying activity.</p>
<p>Roadside rest areas, including facilities such as:</p> <ul style="list-style-type: none"> • Picnic/BBQ areas • Toilets • Playgrounds <p>Weigh stations and heavy vehicle inspection stations</p> <p>Vacant lands owned by Transport for NSW, including pesticide applications around built property (excluding lands that are leased for private occupation and without public access).</p> <p>Motor registries, including:</p> <ul style="list-style-type: none"> • Buildings and surrounds • Carparks • Lawn/landscaping <p>Administration sites, including regional and district offices.</p> <p>Depots</p> <p>Rider/driver training schools</p> <p>Public places over which persons or organisations hold an existing lease on Transport for NSW land</p>	<p>Signs on vehicle concurrent with spraying activity.</p> <p>Portable signs will be erected at locations where most likely to be seen immediately prior to use and remain until operation is completed, unless label requires a longer period. Reasonable efforts must be made to replace signs removed or vandalised.</p>
<p>Ferry wharves</p>	

Public places # where pesticides will be applied on behalf of Transport for NSW	Minimum Notification Methods
Bridges, vehicular ferries and associated infrastructure.	Portable signs will be erected at locations where most likely to be seen immediately prior to use and remain until operation is completed, unless label requires a longer period. Reasonable efforts must be made to replace signs removed or vandalised.

Notes:

- Pesticide uses on land where Transport for NSW shares maintenance responsibilities with others is also captured by the above notification requirements.
- Pesticide uses are also captured by the above notification requirements if:
 - the pesticides are applied on land that is not under Transport for NSW control or ownership; and
 - the land is immediately adjacent to land that is under Transport for NSW control or ownership; and
 - there are no physical boundaries (such as fences) between the two pieces of land; and
 - the application of pesticides on the land not under Transport for NSW control or ownership is incidental to pesticide application activities being undertaken on the land owned or controlled by Transport for NSW. e.g. roadside pesticide applications where Transport for NSW and councils may own/control adjacent areas of land without any physical boundaries such as fences.

Pathogens

The Project EIS did not identify any pathogens on either site. Target pathogens identified under the legislation include:

- Phytophthora (*Phytophthora cinnamomi*)
- Chytrid fungus (*Batrachomyces dendrobatidis*)
- Myrtle rust (*Uredo rangelli*)
- Fusarium wilt/Panama disease (*Fusarium oxysporum*).

Whilst absent from Site, the introduction of Root Rot and Myrtle Rust may pose a considerable risk to threatened flora within the site. Other native vegetation communities may also be if pathogens are introduced during construction.

Site hygiene measures are to be implemented to minimise any potential for pathogen introduction to the site. Actions to include:

- Environment & Sustainability Lead to conduct periodic monitoring to ensure Sites are pathogen free
- regular communication to staff and contractors (e.g. during inductions and toolbox talks) on the risk of spreading pathogens and the mitigation measures required on site
- ensure vehicles and footwear are cleaned and free of soil before entering or exiting the site
- restrict vehicles to designated tracks, trails and parking areas.

Attachment G – Marine mammal monitoring procedure

Objectives

The objective is to monitor for marine mammals in the defined area of potential sound impacts and enable protective management actions such as stopping work. Work is to be stopped or the start of work delayed if a marine mammal (whale, dolphin, seal, dugong etc.) is sighted in the monitoring area. Work cannot commence until the marine mammal has moved out of the monitoring area on its own accord.

Qualifications

To be suitably qualified a marine mammal observer (MMO) must have:

- qualifications in ecology, zoology or environmental sciences and demonstrated experience with the identification and management of dolphins or whales, or;
- equivalent Aboriginal traditional knowledge and demonstrated experience with the identification and management of dolphins or whales, or;
- Individuals suitably qualified through third party training organisations with specialist experience in marine environmental management

All MMO's should be experienced in marine mammal identification and behaviour and distance estimation, assist other trained crew members, and provide advice should marine mammals enter the observation zone.

Monitoring procedure

Shore based monitoring is appropriate at the La Perouse and Kurnell Sites. The following measures should be implemented during pile hammering to help prevent acoustic effects on marine mammals:

1. A map is to be prepared outlining the marine mammal safety zones at each Site including zones, distances from shore and proposed pile locations (Table H-1 & Figure H-1). This defines the marine mammal monitoring area (study area).

Table H - 1 Safety Zones for Marine Mammals

Functional Hearing Group	Shut-Down Zone	Observation Zone
Upper Zone	800m	1050m
Low-Frequency Cetaceans	550 m	800 m
High-Frequency Cetaceans	15 m	265 m
Very High-Frequency Cetaceans	800 m	1050 m
Otariid Pinnipeds	25 m	275 m
Sirenians	50 m	300 m

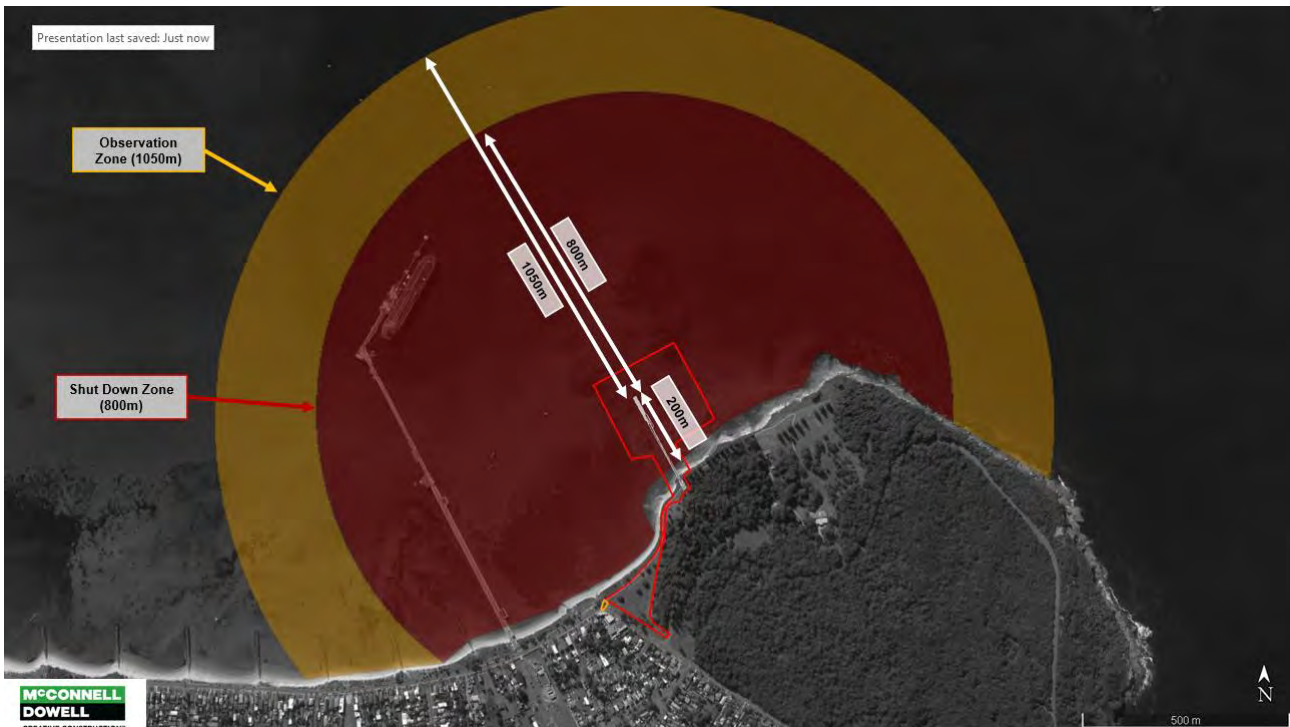


Figure H-8-1 Map of Safety Zones for Marine Mammals – Kurnell



Figure H-8-2 Map of Safety Zones for Marine Mammals – La Perouse

2. Piling crew to be inducted into the marine mammal monitoring procedure
3. MMO to check in with the Environment & Sustainability Lead at the beginning of the day
4. MMO to monitor the study area for marine mammals from 30 minutes before any piling activity commences
5. MMO to monitor the Observation Zone at each site for marine mammals during pile hammering or any piling activities that would generate the area of potential acoustic effect outlined in Table H -1. For full observer coverage at La Perouse the MMO will be positioned along the escarpment adjacent to Anzac Parade. At Kurnell the shoreline between Captain Cook's Landing Place and Sir Joseph Banks' Memorial is appropriate.
6. Use a hand-held GPS device or rangefinder to verify the study area and required monitoring distance from known locations.
7. Scan the waters within the study area using binoculars (10X42 or similar) or spotting scopes (20-60 zoom or equivalent), and by making visual observations.
8. If weather or sea conditions restrict the observer's ability to observe for marine mammal species cease pile installation until conditions allow for monitoring to resume.
9. Piling to use a soft start procedure alerting marine mammals of the piling activity and allowing them to move away. An example of a soft start procedure is the gradual increase of the hammer energy from 10% to 100% of the final energy level over 30 minutes.
10. Implement the following work procedure before pile hammering or any piling activities that would generate the area of potential acoustic effect outlined in Table H -1 commences:
 - a) **Pre-start procedure** – The presence of marine mammals (and other relevant marine fauna where able to be observed) shall be visually monitored by a person suitably experienced in identifying marine fauna for at least 30 minutes before the commencement of the soft start procedure. Particular focus shall be put on the shut-down zone but the observation zone shall be inspected as well, for the full extent where visibility allows. Observations should be made from a high vantage point, ideally >6 m above sea level, if where practicable.
 - b) **Soft start procedure** – If marine mammals have not been sighted within or are likely to enter the shut-down zone during the pre-start procedure, the soft start procedure may commence in which the piling impact energy is gradually increased over a 10-minute period. The soft start procedure shall also be used after long breaks of more than 30 minutes in piling activity. Visual observations of marine mammals within the safety zones shall be maintained by the marine mammal observer (MMO) throughout soft starts. The soft start procedure is an added precaution and may alert marine fauna to the presence of the piling rig and enable animals to move away to distances where injury is unlikely.
 - c) **Normal operation procedure** – If marine mammals have not been sighted within or are not likely to enter the shut-down or observation zone during the soft start procedure, piling may start at full impact energy. The MMO shall continuously undertake visual observations during piling activities. After long breaks in piling activity or when visual observations ceased or were hampered by poor visibility, the pre-start procedure shall be re-initiated. Piling activities at night-time or during low visibility operations may proceed, provided that there were no target marine mammal sightings during the preceding 24 hour period.
 - d) **Stand-by operations procedure** – If a marine mammal is sighted within the observation zone during the soft start or normal operation procedures, the operator of the piling rig shall be placed on stand-by to shut-down the piling rig (should the mammal enter the shut-down zone). The MMO shall continuously monitor the marine mammal in sight.

e) **Shut-down procedure** – If a marine mammal is sighted within or about to enter the shut-down zone, the piling activity shall be stopped immediately. If a shut-down procedure occurred and marine mammals have been observed to move outside the shut-down zone, or 30 minutes have lapsed since the last marine mammal sighting, then piling activities shall recommence using the soft start procedure. If marine mammals are detected in the shut-down zone during poor visibility, operations shall stop until visibility improves.

11. Species, date, and time of any marine mammal sightings to be recorded along with any periods work is halted. Marine mammal behaviour and any communication between the observer and the Environment & Sustainability Lead are also to be recorded.
12. MMO to sign out with the Environment & Sustainability Lead at the end of piling activities
13. Conduct pile hammering activities only during appropriate lighting conditions when observers can visually monitor for marine mammals

If the MMO observes any distressed or dead marine mammals in the study area or beyond, regardless of known cause:

- Record the species type (if known), date, time, and location of the observation.
- Take a photograph of the specimen.
- Immediately notify the Environmental Representative who will inform the Department of Primary Industries - Fisheries.

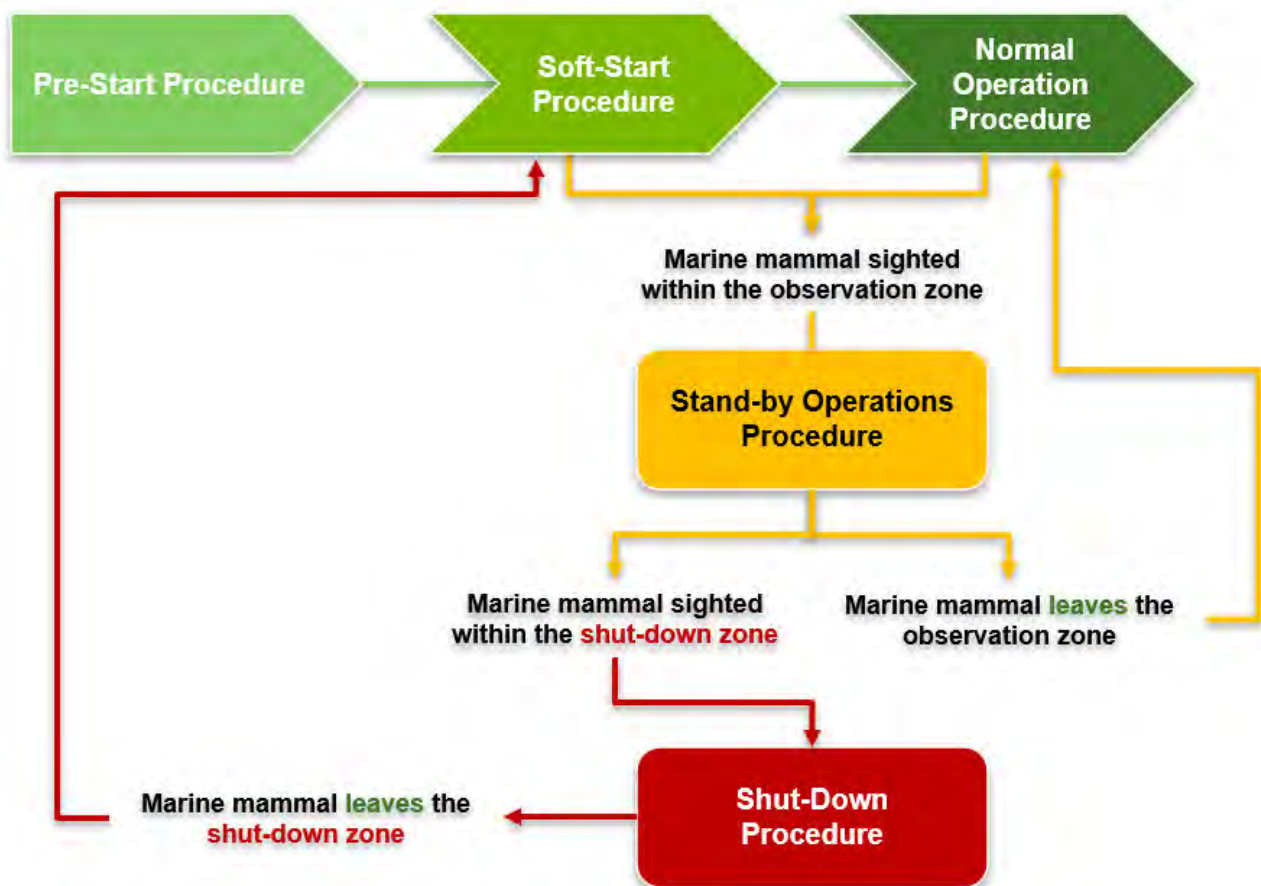


Figure H-8-3 - Overview of the standard operating procedures for piling works

Attachment H – Environmental Requirements

Relevant legislation and guidelines

Legislation

All legislation relevant to this BMP is included in Appendix C of the CEMP.

Additional approvals, licences, permits and requirements

Refer to Appendix C of the CEMP.

Guidelines

- Guidance for Developing a Marine Mammal Monitoring Plan (NOAA, 2020) and Underwater Piling Noise Guidelines
- Policy and Guidelines for Fish Habitat Conservation and Management
- Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Guide 1: Pre-clearing)
- NSW DPI Fisheries Policy and guidelines for fish habitat conservation and management (NSW Department of Primary Industries, 2013).
- Anti-fouling and in-water cleaning guidelines (Department of Agriculture, 2015)
- Biodiversity Guidelines - Protecting and managing biodiversity on RTA Projects (NSW Roads and Traffic Authority, 2011a)
- Guidelines for the control and management of a ships' biofouling to minimise the transfer of invasive aquatic species (IMO, 2011)
- RMS Biodiversity Guideline, Guide 4.
- Biosecurity Act 2015, Guide 6: Weed management and Guide 7: Pathogen management, Biodiversity Guidelines (RTA, 2011)
- Greater Sydney Regional Strategic Weed Management Plan 2017 - 2022.

Ministers Conditions of Approval

The MCoA relevant to this Plan are listed in the tables below. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table H-1 Minister's Conditions of Approval relevant to the BMP

CoA No.	Condition Requirements	Document Reference
C6	<p>Except as provided by Condition A15, the following CEMP Sub-plans must be prepared in consultation with the relevant government agencies identified for each CEMP Sub-plan. Details of all information requested by agency during consultation must be provided to the Planning Secretary as part of any submission of the relevant CEMP Sub-plan, including copies of all correspondence from those agencies as required by Condition A14.</p> <p>(c) Terrestrial and marine biodiversity – DPI Fisheries, DPIE Water, EHG, NPWS and relevant council(s)</p>	This Plan
C7	<p>The CEMP Sub-plans must state how:</p> <p>a) The environmental performance outcomes identified in the documents listed in Condition A1 will be achieved;</p>	Section 2.3
	<p>b) The mitigation measures identified in the documents listed in Condition A1 will be implemented;</p>	Section 6
	<p>c) The relevant terms of the approval will be complied with; and</p>	Attachment H of this plan
	<p>d) Issues requiring management during construction (including cumulative impacts), as identified through ongoing environmental risk analysis, will be managed through SMART principles.</p>	Section 6.14 Section 6.15

CoA No.	Condition Requirements	Document Reference
E1	The clearing of native vegetation must not exceed the clearing footprint identified in the documents listed in Condition A1. All practicable measures to reduce the clearing of native vegetation within the clearing footprint must be undertaken, with the objective of reducing impacts to threatened ecological communities and threatened species habitat.	Attachment A
E2	Impacts to plant community types must not exceed those identified in the documents listed in Table 1. The Proponent must minimise impacts to plant community types and not exceed the total areas impacted as listed in Table 1.	Section 6.8
E3	Impacts to threatened or endangered fauna and flora species exceeding those as impacted in the documents listed in Condition A1 or Table 2 must not occur. On the discovery of potential or actual impacts to any species not listed in the documents listed in Condition A1 or Table 2, all work in the associated location must stop to prevent further impact and the Planning Secretary and EHG notified. Work is not to recommence until appropriate approvals have been issued.	Section 6.1, 6.6, 6.6, 6.8, 6.9 Attachment B Attachment C
E6	The location of areas of seagrass (<i>Posidonia australis</i>) and other seagrass beds (Type 1 Key Fish Habitat (KFH)) and macroalgae (Type 2 KFH) that have been identified for removal and disturbance at Kurnell and La Perouse must be confirmed and recorded by surveying and mapping prior to the commencement of clearing in consultation with DPI Fisheries and DAWE.	TfNSW MBOS Section 6.3
E7	An inspection must be undertaken by an appropriately qualified and experienced ecologist (and diver) in the 24 hour period prior to the start of work that may impact potential habitat for White's Seahorse (<i>Hippocampus white</i> ,) (seagrass, kelp, sargassum, and existing structures such as piles, jetties, wharf pylons) located in and within 100 metres of the construction footprint.	Section 6.2 Attachment D

CoA No.	Condition Requirements	Document Reference
E8	Any seahorses that are detected in the construction footprint must be relocated to nearby suitable habitat in consultation with an appropriately qualified and experienced ecologist and consistent with location and design criteria provided in section 5.2 Creation of artificial habitat - seahorse hotels of the MBOS. Seahorse relocations must be performed by a suitably qualified and experienced ecologist with consultation from DPI Fisheries and as outlined in the Biodiversity Management Plan.	Section 6.2 Attachment D
E9	An inspection must be undertaken by an appropriately qualified and experienced ecologist (and diver) when any construction methods have the potential to impact potential habitat for Black Rockcod (<i>Epinephelus daemeli</i>) (rocky reefs, caves, ledges, gutters and artificial structures such as wharves, piers and rock emplacements).	Section 6.2.2.1
E10	Suitable methods must be used to protect Black Rockcod habitat and individuals in the construction footprint at La Perouse and Kurnell sites in accordance with the provisions of the MBOS, Black Rockcod Recovery Plan 2012 and DPI Fisheries' Priorities Action Statement - Actions for Black Rockcod.	Section 6.2.2 Attachment I
E13	The Proponent must allow for an additional winter and summer season in which to monitor marine biodiversity within the construction footprint prior to commencement of construction.	N/A – Addressed in the MBOS
E115	The Project must be designed, constructed and operated so as to maintain the NSW Water Quality Objectives where they are being achieved as at the date of this approval, and contribute towards achievement of the NSW Water Quality Objectives over time where they are not being achieved as at the date of this approval, unless an EPL in force in respect of the SSI contains different requirements in relation to the NSW Water Quality Objectives, in which case those requirements must be complied with.	Section 0 Soil, Water & Contamination Management Plan

EPBC Conditions of Approval

The EPBC relevant to this Plan are listed in the tables below. A cross reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table H-2 EPBC Conditions of Approval relevant to the BMP

Ref	Description	Owner	Evidence
1)	The approval holder must not clear outside of the project area.	All	CEMP Appendix B2 – Biodiversity Management Sub Plan
National Heritage Places			
2)	The approval holder must comply with NSW Approval conditions E21 – E37 and E49 to minimise impacts on the Indigenous, Non-Indigenous, and Natural heritage values of Kurnell Peninsula Headland.	All	CEMP Appendix B1 – Heritage Management Sub Plan
Listed Threatened Species and Ecological Communities			
3)	Within the project area, the approval holder must not clear more than: a) 0.0683 hectares of seagrass meadows b) 0.0683 hectares of White’s Seahorse habitat.	All	CEMP Appendix B2 – Biodiversity Management Sub Plan
4)	The approval holder must comply with NSW Approval conditions E6 – E8 and E11 related to preconstruction surveying and protection measures.	All	CEMP Appendix B2 – Biodiversity Management Sub Plan
5)	The approval holder must comply with NSW Approval conditions E62 – E65, E67 – E68, and E70 related to the prevention and management of contamination on protected matters.	All	CEMP Appendix B6 – Soil, Water & Contamination Management Sub Plan

Ref	Description	Owner	Evidence
Construction Environmental Management Plan			
6)	The approval holder must comply with NSW Approval conditions C1 – C13 related to the preparation and implementation of a Construction Environmental Management Plan (CEMP) to avoid, mitigate and manage impacts on protected matters during construction.	All	Construction Environmental Management Plan (this plan)
7)	The CEMP required by the NSW Approval must include environmental management measures to manage impacts to protected matters and be informed by the contamination documentation.	MCD	CEMP Appendix B6 – Soil, Water & Contamination Management Sub Plan
Marine Biodiversity Offset Strategy			
10)	The approval holder must comply with NSW Approval conditions E12 – E20 related to the requirements of the Marine Biodiversity Offset Strategy (MBOS) to compensate for the clearing of 0.0683 hectares of seagrass meadows and White’s Seahorse habitat.	TfNSW	TfNSW

Ref	Description	Owner	Evidence
11)	<p>To monitor the outcomes of the MBOS for seagrass meadows and White’s Seahorse habitat, the approval holder must include a Marine Biodiversity Offset Report as part of the compliance report until at least the 10th anniversary of the commencement of the action, unless otherwise agreed to in writing by the Minister. Each Marine Biodiversity Offset Report must include:</p> <ul style="list-style-type: none"> a. a progress report on the implementation of the MBOS; b. a list of success metrics; c. details of the monitoring methodology(ies) implemented and the locations of reference sites; d. monitoring results including a comparison against reference sites; e. a summary of any adaptive management steps taken to improve implementation and/or monitoring methodology(ies); and f. a conclusion as to whether the outcomes, as measured against the success metrics, have been achieved, are likely to be met or are unlikely to be met, as determined by a suitably qualified person. 	TfNSW	TfNSW

Ref	Description	Owner	Evidence
12)	<p>To assess the ongoing success of the MBOS, the approval holder must submit a Rehabilitation Monitoring Review to the department within 6 years of the date of this approval and every 5 years thereafter, unless otherwise agreed to in writing by the Minister. Each Rehabilitation Monitoring Review must include:</p> <ul style="list-style-type: none"> a. a review of the monitoring methodology by a suitably qualified person; b. a conclusion based on the success metrics as to whether the environmental offsets for seagrass meadows and White’s Seahorse habitat have been achieved, are likely to be met or are unlikely to be met, as determined by a suitably qualified person; and c. if environmental offsets for seagrass meadows and White’s Seahorse habitat have not been achieved based on the success metrics: <ul style="list-style-type: none"> i. a list measurable and time-bound remediation measures which will be undertaken to ensure the success metrics are achieved; and ii. justification for how the remediation measures will provide full compensation for the impacts to seagrass meadows and White’s Seahorse habitat. 	TfNSW	TfNSW
Submission and Publication of Plans			
13)	The approval holder must submit all plans required by these conditions electronically to the department.	TfNSW	TfNSW
14)	If the approval holder submits a revised version of a plan for the Planning Secretary’s approval, the approval holder must provide the revised plan to the department within 5 business days and an explanation of the differences between the approved plan and the revised plan.	TfNSW	TfNSW
15)	If a revised version of a plan is approved by the Planning Secretary, the approval holder must provide the revised plan to the department within 10 business days of the Planning Secretary’s approval.	TfNSW	TfNSW

Ref	Description	Owner	Evidence
16)	Unless otherwise agreed to in writing by the Minister, the approval holder must publish each plan on the website within 15 business days of the date: <ul style="list-style-type: none"> a. the plan is approved by the Planning Secretary; or b. a revised version of the plan is approved by the Planning Secretary. 	TfNSW	TfNSW
17)	The approval holder must keep all published plans required by these conditions on the website until the expiry date of this approval.	TfNSW	TfNSW
18)	The approval holder must exclude or redact sensitive ecological data from plans published on the website or otherwise provided to a member of the public.	TfNSW	TfNSW
19)	If sensitive ecological data is excluded or redacted from a plan, the approval holder must notify the department in writing what exclusions and redactions have been made in the version published on the website	TfNSW	TfNSW
Notification of Date of Commencement of the Action			
20)	The approval holder must notify the department electronically of the date of commencement of the action, within 5 business days of the commencement of the action.	TfNSW	TfNSW
21)	If the commencement of the action does not occur within 5 years from the date of this approval, then the approval holder must not commence the action without the prior written agreement of the Minister.	TfNSW	TfNSW
Compliance Records			
22)	The approval holder must maintain accurate and complete compliance records.	All	CEMP Section 8.4
23)	If the department makes a request in writing, the approval holder must provide electronic copies of compliance records to the department within the timeframe specified in the request.		

Ref	Description	Owner	Evidence
24)	Note: Compliance records may be subject to audit by the department, or by an independent auditor in accordance with section 458 of the EPBC Act, and/or be used to verify compliance with the conditions. Summaries of the results of an audit may be published on the department's website or through the general media.	TfNSW	TfNSW
25)	The approval holder must ensure that any monitoring data (including sensitive ecological data), surveys, maps and other spatial and metadata required under the conditions of this approval are prepared in accordance with the Guidelines for biological survey and mapped data (Commonwealth of Australia 2018), or as otherwise specified by the Minister in writing.	All	CEMP Section 8.1.2
26)	The approval holder must ensure that any monitoring data (including sensitive ecological data), surveys, maps and other spatial and metadata required under the conditions of this approval are prepared in accordance with the Guide to providing maps and boundary data for EPBC Act projects (Commonwealth of Australia 2021), or as otherwise specified by the Minister in writing.	All	CEMP Section 8.1.2
Annual Compliance Reporting			
27)	The approval holder must prepare a compliance report for each 12-month period following the date of this approval, or as otherwise agreed to in writing by the Minister.	TfNSW	TfNSW
28)	Each compliance report must be consistent with the Annual Compliance Report Guidelines (Commonwealth of Australia 2014).	TfNSW	TfNSW
29)	Each compliance report must include: <ul style="list-style-type: none"> a. Accurate and complete details of compliance and any non-compliance with the conditions and the plans, and any incidents. b. One or more shapefile showing all clearing of any protected matters, and/or their habitat, undertaken within the 12-month period at the end of which that compliance report is prepared. c. A schedule of all plans in existence in relation to these conditions and accurate and complete details of how each plan is being implemented. 	TfNSW	TfNSW

Ref	Description	Owner	Evidence
30)	<p>The approval holder must:</p> <ul style="list-style-type: none"> a) Publish each compliance report on the website within 60 business days following the end of the 12-month period for which that compliance report is required. b) Notify the department electronically, within 5 business days of the date of publication, that a compliance report has been published on the website. c) Provide the weblink for the compliance report in the notification to the department. d) Keep all published compliance reports required by these conditions on the website until the expiry date of this approval. e) Exclude or redact sensitive ecological data from compliance reports published on the website or otherwise provided to a member of the public. f) If sensitive ecological data is excluded or redacted from the published version, submit the full compliance report to the department within 5 business days of its publication on the website and notify the department in writing what exclusions and redactions have been made in the version published on the website. <p>Note: Compliance reports may be published on the department's website</p>	TfNSW	TfNSW
Reporting Non-Compliance			
31)	The approval holder must notify the department electronically, within 2 business days of becoming aware of any incident and/or potential non-compliance and/or actual non-compliance with these conditions or commitments made in a plan.	TfNSW	TfNSW

Ref	Description	Owner	Evidence
32)	<p>The approval holder must specify in the notification:</p> <ul style="list-style-type: none"> a) Any condition or commitment made in a plan which has been or may have been breached. b) A short description of the incident and/or potential non-compliance and/or actual non-compliance. c) The location (including co-ordinates), date, and time of the incident and/or potential non-compliance and/or actual non-compliance. <p>Note: If the exact information cannot be provided, the approval holder must provide the best information available.</p>	TfNSW	TfNSW
33)	<p>The approval holder must provide to the department in writing, within 12 business days of becoming aware of any incident and/or potential non-compliance and/or actual non-compliance, the details of that incident and/or potential non-compliance and/or actual non-compliance with these conditions or commitments made in a plan. The approval holder must specify:</p> <ul style="list-style-type: none"> a) Any corrective action or investigation which the approval holder has already taken. b) The potential impacts of the incident and/or non-compliance and/or non-compliance. c) The method and timing of any corrective action that will be undertaken by the approval holder. 	TfNSW	TfNSW
Independent Audit			
34)	<p>The approval holder must ensure that an independent audit of compliance with these conditions is conducted for every five-year period following the commencement of the action until this approval expires, unless otherwise specified in writing by the Minister.</p>	TfNSW	TfNSW

Ref	Description	Owner	Evidence
35)	<p>For each independent audit, the approval holder must:</p> <ul style="list-style-type: none"> a) Provide the name and qualifications of the nominated independent auditor, the draft audit criteria, and proposed timeframe for submitting the audit report to the department prior to commencing the independent audit. b) Only commence the independent audit once the nominated independent auditor, audit criteria and timeframe for submitting the audit report have been approved in writing by the department. c) Submit the audit report to the department for approval within the timeframe specified and approved in writing by the department. d) Publish each audit report on the website within 15 business days of the date of the department's approval of the audit report. e) Keep every audit report published on the website until this approval expires. 	TfNSW	TfNSW
36)	Each audit report must report for the five-year period preceding that audit report.	TfNSW	TfNSW
37)	Each audit report must be completed to the satisfaction of the Minister and be consistent with the Environment Protection and Biodiversity Conservation Act 1999 Independent Audit and Audit Report Guidelines (Commonwealth of Australia 2019).	TfNSW	TfNSW
Completion of the Action			
38)	The approval holder must notify the department electronically 60 business days prior to the expiry date of this approval, that the approval is due to expire.	TfNSW	TfNSW
39)	Within 20 business days after the completion of the action, and, in any event, before this approval expires, the approval holder must notify the department electronically of the date of completion of the action and provide completion data.	TfNSW	TfNSW
Changes to State Conditions			

Ref	Description	Owner	Evidence
40)	The approval holder must inform the department in writing within 2 business days of requesting any change to the NSW Approval conditions that may relate to protected matters.	TfNSW	TfNSW
41)	The approval holder must inform the department in writing within 5 business days of any approved changes made to the NSW Approval conditions that may relate to protected matters.	TfNSW	TfNSW

Revised Environmental Management Measures

Relevant REMMs are listed below. This includes reference to required outcomes, the timing of when the commitment applies, relevant documents or sections of the environmental assessment influencing the outcome and implementation.

Table H-3 Environmental management measures relevant to this BMP

Outcome	REMM Ref #	Commitment	Responsibility	Timing	BMP Reference
Marine biodiversity impacts	MB2	<p>A Construction Biodiversity Management Plan (BMP) will be prepared in accordance with the Biodiversity Assessment Method (NSW DPIE, 2020h). It will be implemented under the CEMP. The BMP will detail the measures and procedures to minimise and manage construction impacts on marine biodiversity. The BMP will include:</p> <ul style="list-style-type: none"> • Sensitive area maps that identify sensitive habitats, protection areas, no anchoring zones, and exclusion zones to protect seagrass and threatened species • Define procedures addressing relevant matters specified in the NSW DPI Fisheries Policy and guidelines for fish habitat conservation and management (NSW Department of Primary Industries, 2013). • Include measures to prevent and monitor: <ul style="list-style-type: none"> – Water pollution – Sediment disturbance during construction – Construction vessel/barge movements, anchoring, and shading – Impact on known Black Rockcod habitat where possible – Biosecurity risks – Vessel strike by maintaining safe distances and approaches as identified in Section 2.3 and 2.5 of the Biodiversity Conservation Regulation 2017 and limiting speeds. 	Contractor	Pre-construction and construction	<p>Site Environmental Plan - CEMP Appendix H (this plan addresses the requirements of a Sensitive Area Map).</p> <p>Water pollution (as turbidity) – Section 0</p> <p>Sediment disturbance – Soil, Water and Contamination Management Plan</p> <p>Vessel impacts – Marine Works Management Plan</p> <p>Black Rockcod – Section 6.2.2, Attachment I</p> <p>Biosecurity – 6.9, 6.10 & Attachment F</p> <p>Vessel Strike – Section 6.5</p> <p>Marine ecology induction – Site induction and training register Section 7.2</p>

Outcome	REMM Ref #	Commitment	Responsibility	Timing	BMP Reference
		<ul style="list-style-type: none"> Define and implement marine ecology induction to all workers during site inductions Consultation with DPI Fisheries, NSW Environment, Energy and Science Group, Randwick City Council, Sutherland Shire Council, National Parks and Wildlife Service for the preparation of the BMP.			Consultation – Section 3
Impacts to seagrass	MB3	Establish no anchoring zones to minimise impacts from anchor points within seagrass meadows of <i>Posidonia australis</i> at Kurnell and La Perouse.	Contractor	Pre-construction and construction	Site Environmental Plan - CEMP Appendix H (this plan addresses the requirements of a Sensitive Area Map). Marine Works Management Plan
Impacts to seagrass	MB4	Avoid fixed location of barges at locations of <i>Posidonia australis</i> outside of the marine habitat impact area within the construction boundary to minimise shading impacts.	Contractor	Construction	Site Environmental Plan - CEMP Appendix H (this plan addresses the requirements of a Sensitive Area Map). Marine Works Management Plan
Impacts from pest species	MB5	Implement biosecurity management measures applicable and relevant to the project in accordance with relevant NSW DPI Fisheries policies and procedures and National biofouling management guidelines for marinas, slipways, boat maintenance and recreational boating facilities (DAWE, 2021).	Contractor	Construction	Section 6.10 Attachment F
Impacts to marine habitats	MB6	Establish suitable navigation channels to avoid areas of listed species habitat, including:	Contractor	Pre-construction and construction	Section 6.3

Outcome	REMM Ref #	Commitment	Responsibility	Timing	BMP Reference
		<p>Kurnell</p> <ul style="list-style-type: none"> Watts reef (likely Black Rockcod habitat) Large TEC seagrass meadow of <i>Posidonia australis</i> La Perouse Avoid accessing near reef habitat No access over patch of <i>Posidonia australis</i> to the east of the wharf. 			<p>Site Environmental Plan - CEMP Appendix H (this plan addresses the requirements of a Sensitive Area Map).</p> <p>Marine Works Management Plan</p>
Impacts to marine fauna	MB7	Vessels are to maintain safe distances and approaches as identified in Section 2.3 and 2.5 of the Biodiversity Conservation Regulation 2017.	Contractor	Construction	<p>Section 6.5</p> <p>Marine Works Management Plan</p>
Impacts to Black Rockcod habitat	MB8	Where possible, areas of known Black Rockcod habitat will be identified in detailed design and avoided during construction and within the ferry swept path during operation.	Contractor	Construction	Marine Works Management Plan
Impacts to marine habitat	MB9	<p>Establish areas of no wash zones in consultation with Port Authority NSW, NSW DPI Fisheries and Transport for NSW at:</p> <ul style="list-style-type: none"> La Perouse to minimise wash effects on the coastal subtidal and intertidal reef areas Watts Reef near Kurnell to minimise wash effects on the subtidal habitat on the reef Near both wharves to minimise excess wash from the ferry and recreational vessel access. 	Transport for NSW and Contractor	Construction	<p>Section 6.5</p> <p>Site Environmental Plan - CEMP Appendix H (this plan addresses the requirements of a Sensitive Area Map).</p> <p>Marine Works Management Plan</p>
Seagrass habitat loss	MB10	A Marine Biodiversity Offset Strategy (MBOS) will be prepared in consultation with NSW DPI Fisheries. As a minimum the MBOS will include:	Transport for NSW	Pre-construction	MBOS

Outcome	REMM Ref #	Commitment	Responsibility	Timing	BMP Reference
		<ul style="list-style-type: none"> Pre and post construction seagrass monitoring program to validate construction impacts A seagrass translocation and rehabilitation plan Investigation of other offset opportunities which may include artificial marine fauna habitat such as seahorse habitat structures, environmentally friendly moorings or research trials on environmentally friendly moorings.		Construction Operation	
Impacts to terrestrial biodiversity	B1	Measures to further avoid and minimise the construction footprint, native vegetation or habitat removal will be considered during the detailed design stage and implemented where practicable and feasible. Measures to avoid and minimise impacts should be prioritised in the following order: <ul style="list-style-type: none"> Critical habitat Threatened species, endangered ecological communities or their habitat Native vegetation and habitat supporting connectivity and/or that supports other environmental objectives such as protecting water quality, hydrology or erosion and sediment controls Native vegetation of higher quality condition Other native vegetation. 	Transport for NSW	Detailed design	Site Environmental Plan - CEMP Appendix H (this plan addresses the requirements of a Sensitive Area Map). Section 6.1, 6.6, 6.8
Impacts to terrestrial biodiversity	B3	Terrestrial biodiversity management measures will be included as part of the Construction Biodiversity Management Plan (BMP). As a minimum the BMP will include: <ul style="list-style-type: none"> Sensitive area maps that identify native vegetation, habitat types, threatened species and endangered ecological communities Maps showing areas to be cleared and areas to be protected, including exclusion zones, protected 	Contractor	Pre-construction and construction	Site Environmental Plan - CEMP Appendix H (this plan addresses the requirements of a Sensitive Area Map). Site induction and training register Section 6.1, 6.6, 6.8, 6.9

Outcome	REMM Ref #	Commitment	Responsibility	Timing	BMP Reference
		<p>habitat features (eg hollow-bearing trees), and areas for rehabilitation or re-establishment of native vegetation</p> <ul style="list-style-type: none"> • Site inductions and training to ensure awareness of requirements of the BMP and relevant statutory responsibilities. Site-specific training will be given to personnel when working in the vicinity of areas of identified biodiversity value that are to be protected. • Requirements set out in the Roads and Traffic Authority (RTA) Landscape Guideline • Procedures addressing relevant matters specified in the Biodiversity Guidelines - Protecting and managing biodiversity on RTA Projects (NSW Roads and Traffic Authority, 2011a) including but not limited to: <ul style="list-style-type: none"> • Pre-clearing, including the outcomes of final species checks, establishment of exclusion zones and on-ground identification of specific habitat features to be retained (such as hollow-bearing trees) • Vegetation clearing and bushrock removal, including staged habitat removal and any specified seasonal limits on clearing activities • Fauna handling and unexpected threatened species finds • Rehabilitation, revegetation, re-use of soils, woody debris and bushrock, and other habitat management actions • Weed and pathogen management • Unexpected finds procedure. • Monitoring during construction and post-construction • Adaptive management measures to be applied if monitoring indicates unexpected adverse impacts. 			

Outcome	REMM Ref #	Commitment	Responsibility	Timing	BMP Reference
Impacts to trees within construction boundary	B4	A consulting arborist is to carry out an assessment of all trees within the construction boundary that are proposed for retention in accordance with Australian Standard 4970: Protection of Trees on Development Sites. The arborist is to provide a report with recommendations on the viable retention of all native trees within the construction boundary of the mapped PCTs, and include recommendations for amending design or using alternate construction methods to reduce any impacts on retained trees.	Contractor	Pre-construction	Section 6.1, 6.8 Attachment E
Terrestrial biodiversity offsets	B5	A Terrestrial Biodiversity Offset Strategy will be prepared in accordance with the NSW Biodiversity Offset Scheme (NSW Department of Planning, Industry and Environment (DPIE), 2020i). Biodiversity credits are required to be obtained for the following PCTs and fauna species: <ul style="list-style-type: none"> • PCT 1823 – Coastal headland cliffline scrub • PCT 661 – Coastal sand littoral forest (Kurnell Dune Forest in the Sutherland Shire and City of Rockdale) • PCT 772 - Coastal foredune wattle scrub • Potential foraging habitat for Large-eared Pied Bat • Potential foraging habitat for Eastern Cave Bat • Potential foraging habitat for Pied Oystercatcher • Potential foraging habitat for Sooty Oystercatcher 	Transport for NSW	Pre-construction, construction and operation.	Section 6.11 Terrestrial Biodiversity Offset Strategy
Underwater noise management	UN1	Underwater noise management measures will be included as part of a Construction Noise and Vibration Management Plan (CNVMP). The CNVMP will include: <ol style="list-style-type: none"> a. Identification of potential significant underwater noise and vibration generating activities 	Contractor	Pre-construction and construction	Section 6.4 CNVMP

Outcome	REMM Ref #	Commitment	Responsibility	Timing	BMP Reference
		<p>b. Management measures that will be guided by section 5 of the SA Underwater Piling Noise Guidelines (Government of South Australia, 2012).</p> <p>This will include:</p> <ul style="list-style-type: none"> • Investigating the use bubble curtains to reduce the severity of the energy of the sounds caused by the driving of the piles. • Carrying out observations for 30 minutes before starting work in all zones. • A slow-start process for the piling works that would last for 10 minutes. • Implement a stand-by and shut down process. • Prepare and maintain a compliance and siting report while piling takes place. • Notify the recreational user groups in the area and post notices at the key beaches warning people of the ongoing piling works so that can expect potential underwater noise. • Aim to avoid piling on weekends and during public holidays 			
Underwater noise impacts on marine fauna	UN3	<p>Underwater noise monitoring may be carried out before the main construction works starts. This will be used to define three zones in accordance with section 5.2 of the Underwater Piling Noise Guidelines (Government of South Australia, 2012):</p> <p>a. Zone 1: stop work</p> <p>b. Zone 2: introduce work restrictions</p>	Contractor	Pre-construction and construction	Section 6.4

Outcome	REMM Ref #	Commitment	Responsibility	Timing	BMP Reference
		<p>c. Zone 3: use marine spotters.</p> <p>A specialist marine spotter will be responsible for observing and implementing the three zones during piling activities.</p>			

Attachment I – Technical Advice – Protecting Black Rockcod (Epinephelus daemeli)

Under MCoA E10, McConnell Dowell's Biodiversity Consultant Stantec has undertaken the below investigation into potential protection measures for Black Rock Cod (Section 6.4.2.1).

Technical Advice – Protecting Black Rockcod (*Epinephelus daemeli*) During Construction of the Kamay Ferry Wharves

1 Project Background

Transport for New South Wales (TfNSW) is constructing new ferry wharves at La Perouse (Figure 1-1) and Kurnell (Figure 1-2) in Botany Bay (the Project). This would allow for an alternative connection between northern and southern Botany Bay other than by road. The primary purpose of this infrastructure would be to return the public ferry service that operated between La Perouse and Kurnell for 75 years until the wharves were damaged in 1974 by a storm. It would also provide supplementary temporary mooring for non-ferry commercial vessels (such as whale watching vessels) and recreational boating.

Key features of the project include:

- Demolition of the existing viewing platform at Kurnell
- Construction of temporary ancillary works including access roads, compound areas, stockpiles, fencing and temporary building platforms (including a temporary causeway at Kurnell and temporary crane platform at La Perouse)
- Relocation of swing moorings at La Perouse
- Construction of two wharves on piles, one at La Perouse and one at Kurnell that would include:
 - A berth for passenger ferries (to cater for ferries between 15 m to 40 m in length)
 - A multi-user berth for commercial and recreational vessels (to cater for vessels between 2 m and 20 m long)
 - Sheltered waiting areas and associated furniture located on the wharves
 - Signage and lighting
 - Landside paving and landscaping at the entrance to the wharves

An Environmental Impact Statement (EIS) was prepared for the Project with Chapter 10 assessing impacts of construction and operation of the Project on marine biodiversity.

The Project was approved as State Significant Infrastructure (SSI) under the *Environmental Planning and Assessment Act 1979* on 21/7/2022 (SSI 10049).



Figure 1-1 La Perouse project overview



Figure 1-2 Kurnell project overview

2 Purpose

SSI 10049 contains several conditions relevant to biodiversity management including those related to the vulnerable Black Rockcod (*Epinephelus daemeli*) (Table 2-1). This paper of technical advice provides for the requirements of SSI Condition E10, identifying suitable methods to protect Black Rockcod and its habitat in accordance with the Project's Marine Biodiversity Offset Strategy, the NSW Black Rockcod Recovery Plan (2012) and NSW Department of Primary Industries (DPI) Fisheries' Priorities Action Statement — Actions for Black Rockcod.

Table 2-1 SSI 10049 conditions relating to Black Rockcod

Condition no.	Condition
E9	An inspection must be undertaken by an appropriately qualified and experienced ecologist (and diver) when any construction methods have the potential to impact potential habitat for Black Rockcod (<i>Epinephelus daemeli</i>) (rocky reefs, caves, ledges, gutters and artificial structures such as wharves, piers and rock emplacements).
E10	Suitable methods must be used to protect Black Rockcod habitat and individuals in the construction footprint at La Perouse and Kurnell sites in accordance with the provisions of the MBOS, Black Rockcod Recovery Plan 2012 and DPI Fisheries' Priorities Action Statement — Actions for Black Rockcod.

3 Background – Black rockcod

The Black Rockcod is a large grouper, listed as vulnerable under the NSW *Fisheries Management Act 1994* (FM Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This species is known to occur in warm temperate to subtropical waters of the south-western Pacific Ocean (Aquaculture, Conservation and Marine Parks Unit, Port Stephens Fisheries Institute, 2012). It has been recorded along the east coast of Australia from southern Queensland to Kangaroo Island off South Australia and around Lord Howe and Norfolk Islands.

Black Rockcod distribution is centred around the NSW coast and adults are usually found in caves, gutters and beneath bommies on rocky reefs up to 50 metres (m) in depth. Juveniles of this species prefer coastal rock pools while larger juveniles prefer rocky reefs in estuaries. This species has high site fidelity and is territorial. Significant habitat for the species has been identified, of which the intertidal rocky shore within the coastal depth zone between 0 and 20 m of the Hawkesbury Shelf is considered as significant.

Black Rockcod was considered in the EIS to be likely to occur in the marine study area, which extended 100-200 m outside the construction boundary. Targeted surveys undertaken as part of the EIS did not identify Black Rockcod in the study area, but the species are known in the region and there is habitat outside of the construction boundary but within the study area (Figure 3-1, Figure 3-2), which is in good condition that could support these species. There is no high-quality Black Rockcod habitat within the construction boundary and it is highly unlikely that Black Rockcod would utilise this area.



Figure 3-1 Black Rockcod habitat at La Perouse



Figure 3-2 Black Rockcod habitat at Kurnell

3.1 Black Rockcod Recovery Plan

NSW DPI Fisheries develop and implement recovery and threat abatement plans to assist in the recovery of threatened species, populations, ecological communities, and mitigate key threatening process listed under the FM Act. Recovery plans summarise the current state of knowledge of the species, community etc and use a risk assessment framework to identify and rank threats. The plans also identify and prioritise recovery actions.

The Black Rockcod Recovery Plan (2012) identified and prioritised nine risks to Black Rockcod (**Table 3-1**). Six of those nine risks, including the only high risk, are related to fishing or collecting and hence would not be influenced by the Project. Climate change would also not be influenced by the Project. The only identified risks to Black Rockcod that have the potential to be influenced by the Project are water pollution and the introduction of non-indigenous fish and marine vegetation. These are addressed in detail in Section 4.

Table 3-1 Black Rockcod Recovery Plan – Identified risks and priority

Threat	Risk/Priority
Hook and line fishing (bottom-set baited) – setlining, trotlining, handlining	High
Hook and line fishing (soft plastic lures and droplining)	Moderate
Climate change	Moderate
Water pollution	Moderate
Spearfishing	Low
Mesh netting (estuarine) and fish trapping	Low
Hook and line fishing (non-baited, surface-set baited) – lure, fly, jig, poling, driftlining, trolling	Low
Aquarium collecting	Low
Introduction of non-indigenous fish and marine vegetation	Low

3.2 Priorities Action Statement – Actions for Black Rockcod

NSW DPI Fisheries Priorities Action Statements are non-regulatory documents that provide a list of strategies and recovery actions that will assist in down-grading risks to each threatened species, population, ecological community, and from key threatening process listed under the FM Act.

Recovery actions for the Black Rockcod relevant to the Project are limited. This is due to the Project not influencing many of the key identified Black Rockcod risks (eg fishing, climate change). Recovery actions for the Black Rockcod relevant to the Project include:

- Ensure that councils, government agencies and other relevant organisations are aware of the location of important areas for Black Rockcod, for example, by providing maps of known and potential habitat and the location of significant populations
- Implement the NSW Diffuse Source Water Pollution Strategy to coordinate efforts to reduce diffuse source water pollution impacting on Black Rockcod habitat

4 Project Risks to Black Rockcod

The EIS considered that the Project poses several risks to Black Rockcod and its habitat and these are further addressed below. Water pollution and the introduction of non-indigenous fish and marine vegetation were identified as key risk in the Black Rockcod Recovery Plan (2012).

4.1 Water Pollution

Activities at Kurnell and La Perouse including piling have the potential to impact water quality, particularly turbidity within the construction boundaries of each site. Turbidity and sediment deposition have the potential to impact on the quality of adjoining Black Rockcod habitats, both through smothering as well as reducing the absorption of light for photosynthesis of marine vegetation. Mobilisation of finer debris could also result in the resuspension of sediments of an unknown quality. This could reduce forage material or the quality of shelter. This may, however, only be a temporary disturbance to habitat depending on the volume and the size of fine debris, along with the potential for wave, tide and current to disperse suspended or settled sediment.

Fish, including Black Rockcod could experience behavioural changes, given species may avoid affected areas of impact. Fish can also experience physiological changes from increased turbidity. While the precise impacts of water pollution on Black Rockcod are unknown, it is likely to have a negative impact on the species long-term viability in local areas.

Given the location of the study area at the mouth of the Georges River, periodic changes in turbidity and suspended sediments are normal with high levels of local natural variability. The project EIS indicates that water quality impacts from piling are low and restricted to within proximity to the piling activities. Sediment generated from piling is predicted to mainly suspend and disperse near the seafloor over 80 m from piling at Kurnell and 40 m from piling at La Perouse. On the surface sediment is expected to disperse more rapidly, being fully dispersed more than 20 m from any piling activities.

Most mobile marine fauna (including fish) would also temporarily seek out alternative unaffected habitat within the estuary. Less mobile fauna or those with strong site fidelity, such as the Black Rockcod could be temporarily affected by local changes in water quality however given the known variability in turbidity at the location of the study area it is more likely that local populations are adapted to such conditions.

Given the Project would not be expected to cause additional turbidity that would affect the fauna in Botany Bay and that local fauna is expected to be adapted to, and can tolerate, occasional high turbidity's that occur naturally due to rainfall and river flow events, and other activities, Black Rockcod are not expected to be at risk. Notwithstanding, monitoring measures to ensure that turbidity remains with a target range are included in Section 5.1.

4.2 Introduction of Non-indigenous Fish and Marine Vegetation

The Black Rockcod Recovery Plan indicated that the introduction of non-indigenous fish and marine vegetation to the coastal waters of NSW is unlikely to directly affect Black Rockcod as none of the known introduced species are reported to interact with Black Rockcod. However, it was acknowledged that there may be some unknown indirect impacts on the prey resources and/or habitat of Black Rockcod. For example, the invasive alga *Caulerpa taxifolia* has been reported to support fewer species, higher abundances of gobies, and few or no seahorses and leatherjacket species than adjacent, native seagrass beds.

Maritime construction projects and maintenance works have the potential to introduce and promote the spread of non-indigenous fish and marine vegetation, particularly *Caulerpa* which occurs throughout Botany Bay. No *Caulerpa* was found within the study area and the over water activities of the proposal are highly unlikely to introduce marine pests if the appropriate protection and mitigation measures are implemented as per Section 5.

4.3 Habitat Loss

The EIS indicated that there is no habitat for Black Rockcod within the construction boundary that would be directly impacted or lost due to Project activities. This risk has not been considered further or had protection and mitigation measures recommended.

4.4 Underwater Noise

Underwater noise can impact marine mammals (whales, dolphins, porpoise, seals, and dugong), fish, sharks, rays, sea turtles, other marine reptiles, birds, invertebrates, squid, and crustaceans, causing permanent or temporary hearing loss and injury. It can also affect divers and other recreational users. Tolerance to changes in noise, vibration and water quality may vary among species, but the response is generally similar to these types of activities in a busy harbour (ie movement away from unfavourable conditions).

There would be two underwater noise sources associated with the construction of the Project. During construction there is the need to pile the wharf foundations. This would generate impulsive noise for approximately eight months at Kurnell and La Perouse. The other noise source occurs from construction vessels operating in the area (approximately 13 months).

The Project Construction Noise and Vibration Sub-Plan indicates that the potential effects zone with increased risk of fatality for fish with swim bladders (Black Rockcod) is 300 m from piling. Construction vessel operation is not expected to cause injury at distances of more than 1 m and does not require any mitigation actions.

The 300 m potential effects zone for piling include parts of Watts Reef at Kurnell and a section of rocky reef habitat to the south of the construction boundary at La Perouse. Measures to protect Black Rockcod from underwater noise impacts are recommended in Sections 5.3 and 5.4.

4.5 Vessel Strike

A temporary increase in vessel and barge activity during Project construction will increase the risk of vessel strikes. This risk is largely relevant to turtles, marine mammals, and other species that regular access the surface, rather than Black Rockcod given its preference for bottom habitat such as caves, or gutters within rocky reef. This risk is further limited by there being no Black Rockcod habitat within the construction boundary at La Perouse or Kurnell. Vessel activity during travel to and from the construction site would be far less regular than at the Construction site. As such, the Project would not pose additional risk to Black Rockcod via vessel strike.

Vessel strike mitigation measures are being implemented for marine mammals as per Section 5.3. These would also provide protection for Black Rockcod.

5 Protection and Mitigation Measures

Several protection and mitigation measures are recommended to reduce risks to Black Rockcod from Project activities.

5.1 Turbidity Monitoring Program

A turbidity monitoring program and associated Trigger Action Response Plan (TARP) were developed for the Project in accordance with conditions of SSI 10049 and the Revised Environment Management Measures (REMMs) identified by the EIS.

The program includes a turbidity threshold of 2.2 NTU. The level was set with consideration for Botany Bay's classification as a high conservation value system under ANZECC guidelines, ecological values and community preferences. This threshold is consistent with the Sydney Metropolitan Catchment Management Authority water quality objectives under the Botany Bay and Catchment Water Quality Improvement Plan (2011).

If the threshold is exceeded, fortnightly turbidity readings are to be compared between control and impact sites. Where an exceedance is confirmed to have resulted from construction and not from a natural event any work with the potential to impact water quality will be stopped until further sampling confirms reading have dropped below the threshold. Increased monitoring frequency is recommended in the period immediately following any exceedance.

The turbidity monitoring program was developed in accordance with ANZECC guidelines and the NSW Diffuse Source Water Pollution Strategy.

5.2 Introduction of Non-indigenous Fish and Marine Vegetation

Mitigation actions to reduce the risk of Project activities introducing non-indigenous fish and marine vegetation are listed in the Kamay Ferry Wharves Biodiversity Management Plan and include:

- All Contractors must undertake a Vessel Risk Assessment (VRA), which includes using the online Vessel-Check application and complete a Biofouling Record Book Form for each vessel prior to mobilisation of the vessel to Site. The history of the vessel is also to be provided including location of last port and previous antifouling applications.
- All vessels assessed in the VRA as uncertain or high risk for introduction of invasive marine species must undertake an Invasive Marine Species Inspection (IMS) Any construction vessels mobilised from outside of Australia shall also be considered high risk and an IMS inspection must be carried out.
- The IMS inspection must be undertaken by an appropriately qualified practitioner with experience in biosecurity of marine vessels. The Contractor(s) is responsible for arranging the IMS inspection and attendance of DPI-Fisheries.
- The Contractor(s) must provide the completed IMS report to the Principal at least seven days prior to the vessel leaving the departure port.
- Where IMS inspections identify significant amounts of sediment and/or the presence of an invasive marine species (as deemed by the IMS inspector) the vessel must be dry docked and cleaned prior to entering the site. The Contractor(s) must then resubmit the VRA and if the vessel is classified as low risk, it shall be permitted to sail to site and begin operations.
- All work vessels must be cleaned before and after leaving site.
- Anchoring locations should be established with consideration for *Caulerpa*. Currently no *Caulerpa* has been identified onsite however it is known to occur in the locality.
- Ballast water management procedures would also apply to vessels operating on site in accordance with the Australian Ballast Water Management Requirements (Department of Agriculture, Water and the Environment 2020).
- Ensure moveable structures (semi-permanent or temporary infrastructure) are inspected to assess the level of biofouling present before being moved between locations, and clean if necessary:
 - if there is a high level of fouling/macrofouling (more than just an algal film/microfouling), the structure should be cleaned before it is moved, as this can present similar biofouling risks to vessel movements
 - cleaning should be done on land or in a location with suitable facilities to prevent waste from returning to the water
 - infrastructure that can be removed from the water, such as mooring buoys, should be pressure cleaned or scraped, scrubbed and air-dried for at least 48 hours, ideally exposed to sunshine, before being redeployed
 - if the infrastructure cannot be cleaned on land, it should be cleaned according to the *Anti-fouling and in-water cleaning guidelines*.

5.3 Targeted Surveys

Black Rockcod habitat has not been identified within the construction boundary of either site (La Perouse or Kurnell). Black Rockcod have been identified to potentially occur at the rocky reef south of the La Perouse construction boundary (**Figure 3-1**), and at locations to the north (Watts Reef) and west of Kurnell (**Figure 3-2**). Some of this habitat is within the 300 m potential effects zone for piling underwater noise.

A targeted survey for Black Rockcod will be conducted at La Perouse and Kurnell in the leadup to any pile driving work (24 hours prior). A single survey is required at each site. Likely habitat would be inspected using a combination of divers and / or ROV deployed from a survey vessel, depending on which is most appropriate for the specific habitats and conditions surveyed at the time. Surveys would utilise the roving count methodology as per Harasti (2013) focusing on habitat within the 300 m potential effects zone. This meets the requirements of SSI 10049 Condition E9.

Any sighted Black Rockcod would be photographed, have their size recorded and their location identified in relation to the proposed works. Sighting would be immediately reported to the client via phone and followed up by email.

If Black Rockcod are observed within the 300 m potential effects zone, then due to their high site fidelity additional underwater noise mitigation measures such as bubble curtains and underwater noise monitoring may be required. Further Black Rockcod monitoring may also be required to support these additional measures. It is recommended that the DPI Fisheries Threatened Species Unit is consulted in this circumstance.

5.4 Piling Procedures

All pile driving is to use a soft start procedure which would alerts Black Rockcod of the upcoming activity, allowing them the opportunity to move away. An example of a soft start procedure is the gradual increases of the hammer energy from 10% to 100% of the final energy level of piling over 30 minutes.

5.5 Vessel Management

To reduce the risk of vessel strike due to increased vessel traffic during Project construction low speed operations (>4 knots) will be observed within the construction boundary at La Perouse and Kurnell. Safe distances and approaches as identified in Section 2.3 and 2.5 of the *Biodiversity Conservation Regulation 2017* will also be followed.

Vessel operators and crew will be trained and made aware of vessel strike risk through a project induction.

6 Summary

The Black Rockcod is a large grouper, listed as vulnerable under the FM Act and EPBC Act. Its distribution is centred around the NSW coast with adults usually found in caves, gutters and beneath bommies on rocky reefs. This species has high site fidelity and is territorial.

The EIS considered the species to be likely to occur in the marine study area although targeted surveys did not identify any Black Rockcod individuals. There are sections of high-quality Black Rockcod habitat in proximity to the construction boundary at La Perouse and Kurnell but no likely habitat within the construction boundaries.

SSI 10049 Condition E10 requires the identification of suitable methods to protect Black Rockcod and its habitat in accordance with the Project's Marine Biodiversity Offset Strategy, the Black Rockcod Recovery Plan (2012) and DPI Fisheries' Priorities Action Statement — Actions for Black Rockcod. The Project poses several risks to Black Rockcod, although all have been assessed as minimal and easily managed with standard mitigation measures.

Water pollution risks were low with the EIS identifying that the Project would not cause additional turbidity that would affect marine fauna. A turbidity monitoring program with associated trigger values and a TARP are being implemented to monitor, confirm, and manage (if required) this outcome. The Project was found to be highly unlikely to introduce non-indigenous fish and marine vegetation with a standard suite of vessel biofouling and ballast management procedures recommended.

The key risk the Project poses to Black Rockcod is from underwater noise generated from pile driving. The potential effects zone with increased risk of fatality for Black Rockcod is 300 m from any piling driving activity. This includes parts of likely Black Rockcod habitat at Watts Reef at Kurnell and a section of rocky reef habitat to the south of the construction boundary at La Perouse. Soft start piling procedures will be used to alert Black Rockcod of the upcoming activity and this would be expected to allow them the opportunity to move away. Targeted surveys would confirm the presence/absence of Black Rockcod at these locations before piling commences and whether additional mitigation measures need to be explored.

With the implementation of the recommended protection and mitigation measures Black Rockcod will be suitably protected from Project impacts in accordance with SSI 10049 Condition E10.

Attachment J – Terrestrial Vegetation Map

The following maps identified areas of terrestrial vegetation disturbance that will occur during construction, areas of protected vegetation and indicative areas of rehabilitation.



Figure J-1 Kurnell Vegetation Map



Figure J-2 La Perouse Vegetation Map

