

## **Alkimos Seawater Desalination Plant**

Alliance Management Plans

**Construction Marine Environmental Management Plan – Alkimos  
Desalination Plant EPBC 2019/8453**



**Alkimos SeaWater Alliance acknowledges the Whadjuk Noongar Nation, the Traditional Custodians of the lands upon which the Alkimos Seawater Desalination Plants stands.**

**We also acknowledge the Mooro people, the Traditional Custodians of this area.**

**We pay our respects to their Elders, past, present and emerging, and thank them for their continuing connection to Country, Culture and Community.**



## Document Control

The current document version number and date of revision are shown in the document footer. All changes made to the Engineering Summary Report (ESR) during the Alliance Development (AD) Stage and into detailed design will be recorded in these amendment tables.

## Document Approval

Revision	Date	Prepared by	Reviewed by	Approved by
A	24/01/2025	Rachel Champion	Rachel Champion	
B	23/02/2025	Rachel Champion	W. Carter	Peter Grant Smith
C	11/07/2025	William Carter	William Carter	Peter Grant Smith
D	09/09/2025	Ravish Ramessur/O2 Marine	William Carter	Peter Grant Smith
E	16/10/2025	O2 Marine / Peter Grant Smith / William Carter	William Carter	Peter Grant Smith
F	4/11/2025	Peter Grant Smith	William Carter	Peter Grant Smith
0	5/11/2025	Peter Grant Smith	William Carter	Peter Grant Smith
1	24/11/2025	William Carter	William Carter	Peter Grant Smith

## Revision history

Revision	Date	Prepared by	Description of Changes
A	24/01/2025	Rachel Champion	Draft Marine Construction Environmental Management Plan
B	23/02/2025	Rachel Champion / William Carter	Addressing Client Comments
C	11/07/2025	William Carter	Addressing DCCEEW comments
D	09/09/2025	Ravish Ramessur/O2 Marine	Addressing DCCEEW comments
E	16/10/2025	O2 Marine / Peter Grant Smith / William Carter	Addressing DCCEEW comments
F	4/11/2025	Peter Grant Smith	Addressing DCCEEW comments
0	5/11/2025	Peter Grant Smith/ William Carter	IFC
1	24/11/2025	William Carter	Correcting a contradiction in the plan



### 1. Cover page and declaration of accuracy

Requirement	Response
EPBC Number	2019/8543
Project name	Alkimos Desalination Plant, Alkimos WA
Person to whom the approval is grant (approval holder)	Water Corporation
ABN of approval holder	28 003 434 917
Approved action	To construct, operate and decommission: - a seawater desalination plant of about 100 gigalitre (GL) per annum capacity, and - a groundwater treatment plant of about 6 GL per annum capacity within the Alkimos Water Precinct, approximately 40 km northwest of Perth, - tunnels beneath the seabed containing a seawater intake pipeline about 2.46 km long and a separate brine outfall pipeline about 3.99 km long, both with vertical risers, and - a pipeline about 33 km long from the seawater desalination plant to the Wanneroo Reservoir and other distribution points along the pipe route. See EPBC Act referral 2019/8453 subject to the variation of the proposed Action accepted by the Minister under section 156B on 17 August 2023.
Location of the action	Alkimos, Western Australia
Date of preparation of the environmental management plan	October 21, 2025
Plan Prepared by	W. Carter – Post Grad Diploma Environmental Mgmt. & BSc Environmental Mgt & Sport Science – 18 yrs Construction experience in Australia, Ireland, UK and Qatar.
Person accepting responsibility for the environmental management plan – signed declaration (see below).	

#### Declaration of accuracy

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed

  
\_\_\_\_\_

Full name (please print)

Ryan Smith \_\_\_\_\_

Organisation (please print)

Water Corporation \_\_\_\_\_

Date

26/11/2025



## Terms, abbreviations, and acronyms

Term/abbreviation/acronym	Definition
AA	Alliance Agreement
AAa	Action Area as per the definition in the EPBC approval
AD Stage	Alliance Development Stage
AED	Acciona Engineering and Design
AIMS	Acciona Information Management System
ALT	Alliance Leadership Team
AMSA	Australian Maritime Safety Authority
AMT	Alliance Management Team
ASDP or Plant	Alkimos Seawater Desalination Plant
ASWA	Alkimos SeaWater Alliance ((Alliance delivering the Project comprising of Water Corporation (Owner Participant), Acciona (Non-Owner Participant) and Jacobs (Non-Owner Participant))
BCH	Benthic Communities and Habitats
BDC	Basis for Design and Construction
CEMP	Construction Environmental Management Plan
CIP	Clean in Place
CMEMP	Construction Marine Environment Management Plan
COMEMP	Commissioning and Operational Marine Environment Management Plan
Corporation	Water Corporation
D&C	Design and construction
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water Department
DPIRD	Department of Primary Industries and Regional Development
DWER	Department of Water and Environmental Regulation
EMS	Environmental Management System
EPA	Environmental Protection Authority
EPR	Environmental Performance Requirements
EPS	Environmental Protection Statement
Excessive Noise	Average noise in excess of 160dB over an 8-hour period
GIS	Geographic Information System
GPS	Global Positioning System
GWS	Eglinton Groundwater Scheme
HVAC	heating, ventilation and air conditioning
IMS	Integrated Management System
ISC	Infrastructure Sustainability Council
IWSS	Integrated Water Supply Scheme



Term/abbreviation/acronym	Definition
IWSS	Integrated Water Supply Scheme
CMEMP	Construction Marine Environmental Management Plan
Management Zone	The area required to be monitored, by observation, by MFOs (refer to C.1) for marine fauna. The Management Zone comprises of an observation zone and exclusion zone (restricted zone). In the event that marine fauna is observed within the Management zone, actions will be undertaken as outlined in this Plan (refer to C.3 & C.6).
MCOS	Minimum Conditions of Satisfaction
MFO	Marine Fauna Observer
MMM&MSP	Marine Mammal Management & Monitoring Sub plan
NCR	Non-conformance Report
NOP	Non-Owner Participants
Observation Area/zone	3km
O&M	operations and maintenance
OOH	Out of hours
OP	Owner Participant
PR	Proposal Requirement
Project	Alkimos Seawater Desalination Plant Project
Protected Matter	Protected matter/s means a matter protected under a controlling provision in Part 3 of the EPBC Act for which the EPBC approval has effect. Relevant protected matters are: i) Australian Sea Lion ii) Humpback Whale iii) Southern Right Whale.
RO	Reverse Osmosis
SCADA	supervisory control and data acquisition
SDP	Seawater Desalination Plant
SEP	Site Environmental Plan
Shut Down Area/Zone	500m
SWIPS	Seawater (Intake) Pump Station
SWRO	Seawater Reverse Osmosis
TBM	Tunnel Boring Machine
TSS	Total suspended solids
TTS	Temporary Threshold Shift
WHS	Work Health and Safety



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# Construction Marine Environmental Management Plan

## 2. Introduction

This Construction Marine Environmental Management Plan (CMEMP) has been developed for the Alkimos Seawater Desalination Plant (ASDP or Plant) Project (Project).

The Project is owned by the Water Corporation (WC) who is accountable for obtaining and complying to regulatory development applications and licenses. Water Corporation is in an Alliance for the construction, operation and maintenance of the ASDP. The Alliance, named the Alkimos SeaWater Alliance (ASWA), comprises of the Water Corporation (Owner Participant), Acciona (Non-Owner Participant) and Jacobs (Non-Owner Participant).

This CMEMP provides the processes and procedures for the control and management of marine environmental risks pertaining to the Project during the Design and Construction (D&C) Phase.

This Plan is developed in accordance with the:

- ASDP Alliance Agreement (AA)
- ASDP Basis for Design and Construction (BDC)
- The Corporation's Minimum Conditions of Satisfaction (MCOS)
- Department of Climate Change, Energy, the Environment and Water (DCCEE) Environmental Management Plan Guidelines.

This CMEMP is further supported by the detailed policies, procedures and records contained within the Alkimos SeaWater Alliance (ASWA) Integrated Management System (IMS). The scope of this Plan applies to all Alliance activities and ASWA personnel, suppliers, subcontractors, consultants and representatives.

This CMEMP outlines strategies and measures to manage and mitigate potential marine environmental impacts during the construction of the ASDP, to ensure that construction activities are carried out in an environmentally responsible manner, complying with relevant regulations, and minimising the project's negative effects on the marine environment.

Identifying and addressing potential environmental risks during the design phase has allowed for the implementation of measures to prevent or mitigate adverse effects during construction. Key examples of ASWA's design solutions in the marine environment which contribute to the protection of environmental values and impact mitigation are:

- Piles are required to support the intake and outfall structures without the need for dredging material with further impacts to the marine environment.
- Modularisation of the structures and simplification of support to ensure that the construction of the seawater inlets and outlet is limited to a single construction campaign over one summer and therefore limiting the disturbance of the existing benthic communities and habitats (BCH).

The *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* is Australia's main national environmental legislation that facilitates the protection and management of MNES including fauna, flora ecological communities and heritage places. The Southern humpback whales, Sea lions are listed as MNES under the EPBC Act.

The Alkimos Seawater Desalination Plan (the proposal) was approved, subject to conditions, under the EPBC Act on 8 November 2023 (EPBC ref 2019/8543) and amended on 1 July 2024, 24 March 2025 and 10 October 2025. The 10 October 2025 amendment related to a definition change of 'suitably qualified marine fauna observer' in condition 8b(vii) and a change to the marine development envelope. This version of the plan has been prepared with these changes.

Table 1 lists the approval conditions requirements with references to sections within this Plan that addresses the condition requirements, and a summary of the key commitments relating to each of the approval conditions.



The proposal was approved, subject to conditions, under the *Environmental Protection Act 1986 (EP Act)* in Ministerial Statement 1207 (MS1207) on 10 August 2023 and amended on the 17 April 2024, 21 January 2025 and 13 March 2025. The 13 March 2025 change approved changes to marine disturbance area in MS1207 condition B5. This version of the plan has been prepared with these changes.

Table 2 lists the approval conditions requirements with references to sections within this Plan that addresses the condition requirements.



### 3. Conditions of EPBC 2019/8453 Approval reference table

Table 1 - Conditions of EPBC 2019/8453 Approval Reference table

Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
1	6	To avoid and mitigate harm to protected matters, the approval holder must submit a Construction Marine Environmental Management Plan to the department for the Minister's approval. The approval holder must not commence the action within the marine environment unless the Minister has approved the Construction Marine Environmental Management Plan in writing. The approval holder must implement the Construction Marine Environmental Management Plan approved by the Minister in writing until the expiry date of this approval.	Appendix B	Construction is yet to commence
2	7.a	By implementing the Construction Marine Environmental Management Plan the approval holder must achieve the following environmental objectives:  Protect protected matters from adverse impacts of noise during construction of the tunnel and marine pipelines, including noise generated by vessels	Appendix B  Table 24: Marine Mammal Management & Monitoring Sub Plan  Table 25: Environmental Management Measures  Appendix C: Marine Fauna/ Mammal Protocol	This Plan identifies high acoustic impact construction activities that potentially could adversely affect protected matters. The noisy activities covered by this plan are: <ul style="list-style-type: none"> <li>Noise emission from vessels,</li> <li>Piling and drilling activities from the JUB for the construction of the intake and outtake risers, which form part of the marine pipeline.</li> </ul> For these noisy activities an analysis has been undertaken to determine management zones in which MFOs will look for the presence of marine fauna, so that actions can take place to cease noisy works prior to them coming within a harmful distance of the noise source. Noise management procedures are contained within the plan to address prestart, soft start, and shut down procedures in regard to those identified noisy activities. The plan identifies the requirements for suitable trained and experienced MFOs to meet the Conditions of Approval (i.e. at least 2 MFOs on duty, one of which has 2 years minimum experience, and they are suitably trained).

Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
				<p>An acoustic monitoring program will be undertaken to validate the assumptions made in the noise modelling undertaken and to reconfirm the marine fauna exclusions zone targeted to be maintained.</p> <p>This Plan also includes adaptive management measures based on triggers to respond to changes to expected conditions, so that controls can be adjusted to meet changing conditions.</p> <p>An assessment has been made on the construction of the tunnels and marine pipeline. The assessment based on cutter head noise, underground depth of the tunnelling and sandy nature of the material being cut, supported by noise monitoring to validate this assessment, has identified that the tunnelling does not generate noise to impact marine fauna, including protected matters.</p> <p>Further the construction of the marine pipeline inside the tunnel has been assessed, supported by noise monitoring to validate this assessment, as having no noise impact to marine fauna, including protected matters.</p> <p>Therefore, no additional controls are required to achieve the objective to protect protected matters from adverse impacts of noise during construction of the tunnel and marine pipelines.</p>
3	7.b	<p>By implementing the Construction Marine Environmental Management Plan the approval holder must achieve the following environmental objectives:</p> <p>Protect protected matters from injury or death from construction of the tunnel and marine pipelines, including vessel strike.</p>	<p>Table 24: Marine Mammal Management &amp; Monitoring Sub Plan</p> <p>Table 25: Environmental Management Measures</p> <p>Appendix C: Marine Fauna/ Mammal Protocols</p>	<p>This Plan identifies measures to protect protected matters from injury or death from construction of the tunnel and marine pipelines, including vessel strike. This includes the implementation of MFOs, Observation zones, and vessel management procedures.</p> <p>An acoustic monitoring program will be undertaken to validate the assumptions made in the noise modelling undertaken and to reconfirm the marine fauna exclusions zone targeted to be maintained.</p> <p>This Plan also includes adaptive management measures based on triggers to respond to changes to expected</p>

Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
				<p>conditions, so that controls can be adjusted to meet changing conditions.</p> <p>The plan addresses controls to prevent vessel strike with marine fauna, including protected matters, including:</p> <ul style="list-style-type: none"> <li>• Vessels contacting MFOs prior to entering into the action area and obtaining approval from the MFO to enter</li> <li>• MFOs maintaining observation for marine fauna, including protected matters, within the action area when vessels presence</li> <li>• Defined protocols to be implemented when protected matters and marine fauna are within spotted within management observation zones for vessels</li> <li>• Vessel masters undergo training, including marine mammal behaviour and actions, reporting requirements in the event of Marine Mammals and marine fauna injury or mortality.</li> <li>• Vessels being required not travel at speeds greater than 10 knots when transiting or undertaking activities within the Action Area</li> <li>• Application of Caution Zones and No Approach zones for vessels</li> </ul>
4	8.a	<p>The Construction Marine Environmental Management Plan must be consistent with the Environmental Management Plan Guidelines, and must include:</p> <p>Details of the relevant protected matters and a reference to EPBC Act approval conditions to which the plan refers. The relevant protected matters are:</p> <ul style="list-style-type: none"> <li>i) Australian Sea Lion</li> <li>ii) Humpback Whale</li> </ul>	Appendix B Appendix C Section 10.1.	Baseline data and background information relevant to the protected matters (Australian Sea Lion, Humpback Whale, and Southern Right Whale) is included within Marine Mammals the Marine Mammal Management and Monitoring Sub Plan (MMM&MSP) and Marine Fauna/Mammal Management Protocol and incorporated within Section 10.1.

Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
		iii) Southern Right Whale.		
5	8.b. i	Measures and commitments must consider: Avoid noise generated by construction in the marine environment during migration periods for the Australian Sea Lion, Humpback Whale and Southern Right Whale	Appendix B Appendix C.2	As per Condition 6 there will be <b>no</b> commencement of marine construction until the Minister approves the CMEMP in writing. The Project is committed to avoiding noise generated by construction in the marine environment during migration periods for the Australian Sea Lion, Humpback Whale and Southern Right Whale. To achieve this the construction methodology and schedule has been altered significantly from the initial construction methodology concept and construction program (baseline) to avoid the noisiest activities occurring during whale migration periods. All endeavours have been made to compress the overall construction timeframe to minimise exposure of construction to marine fauna. Refer to Appendix C2 and Table 29: Measures to avoid construction noise activities during Australian Sea Lion, Humpback Whale and Southern Right Whale migration
6	8.b. ii	Measures and commitments must consider: Avoid negative brine discharge impacts to the Australian Sea Lion, Humpback Whale and Southern Right Whale	Appendix B	Avoidance of negative brine discharge impacts to the Australian Sea Lion, Humpback Whale and Southern Right Whale is relevant to the commissioning and operation stages of the Project. No brine discharge will occur during the construction phase.
7	8.b.iii	Measures and commitments must consider: Avoid haul-out (resting) locations used by the Australian Sea Lion	Appendix B	Haul-out (resting) locations used by the Australian Sea Lion will be avoided prior to and during construction works. As per the project consultation with DBCA the nearest Australian Sea Lion haul-out location is 130 km to the north of the works.
8	8.b. iv	Measures and commitments must consider: Ensure that vessels do not travel at speeds greater than 10 knots when transiting or undertaking activities within the Action Area	Appendix B Appendix C.6 Vessel Management	Ensuring that vessels do not travel at speeds greater than 10 knots when transiting or undertaking activities within the Action Area is a management and mitigation action within the (MMM&MSP) and Marine Fauna/Mammal Management Protocol.

Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
9	8.b. v	Measures and commitments must consider: Ensure that vessels act consistently with Interacting with cetaceans and whale watching	Appendix B Appendix C.6 Vessel Management	Ensuring that vessels act consistently with Interacting with cetaceans and whale watching is a management and mitigation action within the (MMM&MSP) and Marine Fauna/Mammal Management Protocol. Our plan identifies vessel approach distance and speeds to be adhered when interacting with cetaceans and whale watching.
10	8.b.vi	Measures and commitments must consider: Implement observation and shut down zones consistent with the EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and Marine Mammals	Appendix B Appendix C	Implementation of observation and shut down zones consistent with the EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and Marine Mammals is a management and mitigation action within the (MMM&MSP).  Piling, drilling and vessel management zones will be consistent with Policy Statement 2.1. If noise monitoring indicates temporary threshold shift (TTS) is greater than modelled, the management zones will be expanded based on the collected data, in line with best practice marine piling measures.
11	8.b.vii	Measures and commitments must consider: Deploy at least two Marine Mammals observers whenever vessels are transiting or undertaking activities within the Action Area in order to maintain 360-degree observation of the observation zone and shut down zones at all times during hours of construction in the marine environment	Appendix B Appendix C.1.2 MFO Visibility & Operations	Deployment of at least two Marine Fauna observers whenever vessels are transiting or undertaking activities within the Action Area in order to maintain 360-degree observation of the observation zone and shut down zones at all times during hours of construction in the marine environment is a management and mitigation measure included within the (MMM&MSP) and Marine Fauna/Mammal Management Protocol.
12	8.b.viii	Measures and commitments must consider: Consult with, and implement the advice of, Australian Sea Lion experts at the Marine Science Program, Biodiversity and Conservation Science, DBCA	Appendix F	DBCA was consulted with on the 25 <sup>th</sup> of November 2024 regarding the advice of Australian Sea Lion experts at the Marine Science Program, Biodiversity and Conservation Science. Please refer to Appendix F.
13	8.b. ix	Measures and commitments must consider: Respond to any death or injury of a protected matter, by immediately halting the works or	Appendix A Appendix C.7	Responding to any death or injury of a protected matter, by immediately halting the works or machinery responsible, formally notifying the department within 5 business days of

Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
		machinery responsible, formally notifying the department within 5 business days of the incident and not resuming works until notified by the Minister in writing that these works may resume	Table 38: Reporting Requirements and contact details for injured marine fauna	the incident and not resuming works until notified by the Minister in writing that these works may resume, is addressed via the (MMM&MSP) and Marine Fauna/Mammal Management Protocol.
14	<b>8.c</b>	A table of commitments made in the plan to achieve the environmental objectives, and a reference to exactly where these commitments are detailed in the plan.	Conditions of EPBC 2019/8453 Approval reference table 1	This table identifies the commitments to achieve the environmental objectives and contains hyperlinks through to the location within this plan.
15	<b>8.d</b>	Reporting and review mechanisms to demonstrate compliance with the commitments made in the plan.	7 Reporting	Reporting and review mechanisms are detail in Section 7.
16	<b>8.e</b>	An assessment of risks relating to achieving the environmental objectives and risk management strategies and/or mitigation measures that will be applied to address identified risks.	Appendix B Appendix C	An assessment of risks relating to achieving the environmental objectives and risk management strategies and/or mitigation measures that will be applied to address identified risks are outlined in the (MMM&MSP) and Marine Fauna/Mammal Management Protocol.
17	<b>8.f</b>	Impact avoidance, mitigation and/or repair measures, and the timing of those measures.	Appendix A	Impact avoidance, mitigation and/or repair measures, and the timing of those measures are outlined in the (MMM&MSP).
18	<b>8.g. i</b>	A monitoring program which must include: measurable performance indicators	<b>Appendix B</b> <b>Appendix C</b> C.4 Underwater noise modelling validation and monitoring program	Noise modelling has been completed, based upon which our control measures have been created. A monitoring program detailed in C.4 Underwater noise modelling validation and monitoring program. Should those assumptions have been to liberal, the controls will be adjusted to achieve the desired acoustic goals and objective.
19	<b>8.g. ii</b>	A monitoring program which must include: Trigger values for corrective actions	<b>Appendix C 2</b> <b>Table 24 &amp; 35</b> C.4 Underwater noise modelling validation and monitoring program	Table 35 identifies the trigger values that must be met. A monitoring program detailed in C.4 Underwater noise modelling validation and monitoring program, will verified the modelling assumptions. Should those assumptions have been to liberal, the controls will be adjusted to achieve the desired acoustic goals and objective.

Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
				Adaptive management triggers have been identified in the Plan (see Table 35 Trigger values for corrective actions are outlined in the (MMM&MSP).
20	<b>8.g.iii</b>	A monitoring program which must include: The timing and frequency of monitoring, ensuring monitoring is capable of detecting trigger values and changes in the performance indicators, and	C.4 Underwater noise modelling validation and monitoring program <b>Table 24 &amp; 35</b>	The timing and frequency of monitoring, ensuring monitoring is capable of detecting trigger values and changes in the performance indicators are outlined in section C4
21	<b>8.g. iv</b>	A monitoring program which must include: proposed corrective actions if trigger values are reached.	C.4 Underwater noise modelling validation and monitoring program <b>Table 24 &amp; 35</b>	Proposed corrective actions if trigger values are reached are outlined in the (MMM&MSP).
22	<b>8h</b>	Links to other relevant plans or conditions of approval (including Western Australia Approval conditions). B6-1 The proponent shall implement the proposal to achieve the following environmental objectives: <ul style="list-style-type: none"> <li>• minimise the risk of physical injury or mortality from vessel strike on significant marine fauna;</li> <li>• minimise the risk of behavioural changes, health impacts, physical injury, or mortality from underwater noise emissions from construction to significant marine fauna (including temporary or permanent hearing loss).</li> </ul>	Table 2  Appendix C.6 Vessel Management Appendix C.4: Underwater noise management procedures Appendix C.1: Marine Fauna Observers  Appendix C.5: Adaptive Management	WA Approval B6 – MFO in place and supporting procedures. Two MFOs, one of which will be at least a Level1 MFO, will always be on duty when vessels are in transit to ensure caution, and no approach zones are adhered too. Caution zones and no approach zones are based on distances in the Australian National Guidelines for Whale and Dolphin Watching (DoEE 2017a) and the WA Biodiversity Regulations 2018 (WA Gov 2025). Vessel speeds restricted to 10 knots in the Project Action Area. Construction (piling & drilling) to schedule to occur first in the construction program to avoid whale migration (May to November). This Plan identifies noisy activities that may potentially cause the risk of behavioural changes, health impacts,

Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
				<p>physical injury, or mortality if not appropriately managed. The noisy activities are:</p> <ul style="list-style-type: none"> <li>• Noise emission from vessels,</li> <li>• Piling and drilling activities from the JUB for the construction of the intake and outtake risers, which form part of the marine pipeline.</li> </ul> <p>For these noisy activities an analysis has been undertaken to determine management zones in which MFOs will look for the presence of marine fauna, so that actions can take place to cease noisy works prior to them coming within a harmful distance of the noise source. Noise management procedures are contained within the plan to address prestart, soft start, and shut down procedures in regard to those identified noisy activities. The plan identifies the requirements for suitable trained and experienced MFOs to meet the Conditions of Approval (i.e. at least 2 MFOs on duty, one of which has 2 years minimum experience, and they are suitably trained).</p> <p>An acoustic monitoring program will be undertaken to validate the assumptions made in the noise modelling undertaken and to reconfirm the marine fauna exclusions zone targeted to be maintained.</p> <p>This Plan also includes adaptive management measures based on triggers to respond to changes to expected conditions, so that controls can be adjusted to meet changing conditions.</p> <p>An assessment has been made on the construction of the tunnels and marine pipeline. The assessment based on cutter head noise, underground depth of the tunnelling and sandy nature of the material being cut, supported by noise monitoring to validate this assessment, has identified that the tunnelling does not generate noise to impact marine fauna, including protected matters.</p> <p>Further the construction of the marine pipeline inside the tunnel has been assessed, supported by noise monitoring to</p>



Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
				<p>validate this assessment, as having no noise impact to marine fauna, including protected matters.</p> <p>Therefore, no controls are required to achieve the objective to protect protected matters from adverse impacts of noise during construction of the tunnel and marine pipelines.</p>
		<p>B6-2 During marine construction activities, the proponent shall:</p> <ul style="list-style-type: none"> <li>implement measures to avoid vessel strikes with significant marine fauna;</li> <li>implement a significant marine fauna observation zone consisting of a at least one (1) kilometre radius from each underwater drilling location whereby an observer must undertake significant marine fauna observation for a minimum of 30 minutes prior to the commencement of marine construction activities;</li> <li>implement an exclusion zone consisting of at least 500 metre radius from the underwater drilling location whereby:                             <ul style="list-style-type: none"> <li>(a) marine construction activities cannot commence should a significant marine fauna be within the exclusion zone; and</li> <li>(b) marine construction activities to cease should a significant marine fauna enter the exclusion zone during construction and are not to recommence until the significant marine fauna have moved outside the exclusion zone</li> </ul> </li> <li>(4) must engage a suitably trained and experienced marine fauna observer who has a demonstrated knowledge of significant marine fauna in the marine temperate region to undertake observations in the observation zone and exclusion zone;</li> <li>(5) implement noise management procedures to avoid temporary and permanent changes to</li> </ul>	<p>Appendix C.6 Vessel Management</p> <p>Appendix C.3: Underwater noise management procedures Table 33</p> <p>C.1.1. Training and Qualification and Table 26: MFO level</p>	<p>Appendix C.6 Vessel Management addresses measures to avoid vessel strikes with significant marine fauna.</p> <p>Appendix C.3: Underwater noise management procedures identify observation zones that is at least 1 km radius from the drilling location and exclusion zone at least 500 metre radius (Table 33) and prestart (C.3.2.2.) requiring marine observation 30 minutes prior to commencement of marine construction activities. Construction activities cannot commence if significant marine fauna within the exclusion zone; and marine construction activities to cease should a significant marine fauna enter the exclusion zone during construction and are not to recommence until the significant marine fauna have moved outside the exclusion zone.</p> <p>C.1.1. Training and Qualification and Table 23: MFO level definitions address this requirement identifying experience and knowledge.</p>

Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
		<p>hearing sensitivity in significant marine fauna and minimise behavioural responses</p> <p>(6) maintain a log of recorded sightings, locations and behaviours indicative of stress or disturbance of significant marine fauna and submit these to the National Cetacean Sighting Database; and</p> <p>(7) document and report to relevant regulators any incidents relating to significant marine fauna injury / mortality</p>	<p>definitions address this requirement.</p> <p>Appendix C.3: Underwater noise management procedures</p> <p>Appendix C.1.4 Field Logs</p> <p>Appendix C.7 Table 38: Reporting Requirements and contact details for injured marine fauna</p>	<p>Appendix C.2: Underwater noise management procedures detail specific controls to avoid temporary and permanent changes to hearing sensitivity in significant marine fauna and minimise behavioural responses.</p> <p>Appendix C.1.4 Field Logs – details requirements to be logged and submission to National Cetacean Sighting Database.</p> <p>Responding to any death or injury of a protected matter, by immediately halting the works or machinery responsible, formally notifying the department within 5 business days of the incident and not resuming works until notified by the Minister in writing that these works may resume, is addressed via the (MMM&amp;MSP) and Marine Fauna/Mammal Management Protocol</p>
22	16	The approval holder may, at any time, apply to the Minister for a variation to a plan approved by the Minister, or as subsequently revised in accordance with the following conditions, by submitting an application in accordance with the requirements of section 143A of the EPBC Act. If the Minister approves a revised plan then, from the date specified, the approval holder must implement the revised plan in place of the previous plan.	Section 13. Plan Revisions	The plan outlines the approach to be taken to submit a revised Management plan for review in accordance with the requirements of section 143A of the EPBC Act
23	17	The approval holder may choose to revise a plan approved by the Minister under conditions 4, 5 and 6, or as subsequently revised in accordance with these conditions, without submitting it for approval	Section 13. Plan Revisions	The plan outlines the approach to be taken to submit a revised Management plan for review in accordance with the requirements of section 143A of the EPBC Act

Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
		under section 143A of the EPBC Act, if the taking of the Action in accordance with the revised plan would not be likely to have a new or increased impact.		
24	18	<p>If the approval holder makes the choice under condition 17 to revise a plan without submitting it for approval, the approval holder must:</p> <p>a) Notify the department electronically that the approved plan has been revised and provide the department with:</p> <p>i) An electronic copy of the revised plan.</p> <p>ii) An electronic copy of the RAMP marked up with track changes to show the differences between the approved plan and the revised plan.</p> <p>iii) An explanation of the differences between the approved plan and the revised plan.</p> <p>iv) The reasons the approval holder considers that taking the Action in accordance with the revised plan would not be likely to have a new or increased impact.</p> <p>v) Written notice of the date on which the approval holder will implement the revised plan (revised plan implementation date), being at least 20 business days after the date of providing notice of the revision of the plan, or a date agreed to in writing with the department.</p> <p>b) Subject to condition 20, implement the revised plan from the revised plan implementation date</p> <p>b) Subject to condition 20, implement the revised plan from the revised plan implementation date.</p>	Section 13. Plan Revisions	The plan outlines the approach to be taken to submit a revised Management plan for review in accordance with the requirements of section 143A of the EPBC Act
25	19	The approval holder may revoke its choice to implement a revised plan under condition 17 at any time by giving written notice to the department. If	Section 13. Plan Revisions	The plan outlines the approach to be taken to submit a revised Management plan for review in accordance with the requirements of section 143A of the EPBC Act

Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
		the approval holder revokes the choice under condition 17, the approval holder must implement the plan in force immediately prior to the revision undertaken under condition 17.		
26	<b>20</b>	If the Minister notifies the approval holder that the Minister is satisfied that the taking of the Action in accordance with the revised plan would be likely to have a new or increased impact, then: a) Condition 17 does not apply, or ceases to apply, in relation to the revised plan. b) The approval holder must implement the plan specified by the Minister in the notice	Section 13. Plan Revisions	
27	<b>21</b>	At the time of giving the notice under condition 20, the Minister may also notify that for a specified period of time, condition 17 does not apply for one or more specified action management plans. Note: Conditions 17-21 are not intended to limit the operation of section 143A of the EPBC Act which allows the approval holder to submit a revised action management plan, at any time, to the Minister for approval.	Section 13. Plan Revisions	
28	<b>22</b>	The approval holder must submit all plans required by these conditions electronically to the department.	Section 13. Plan Revisions	All plans will be submitted electronically via email to DCCEEW.
29	<b>23</b>	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: of this approval, if the version of the plan to be implemented is specified in these conditions, or the plan is approved by the Minister in writing, if the plan requires the approval of the Minister, or	Section 13. Plan Revisions	All approved management plans will be published within the relevant timeframes on the Water Corporation Alkimos project website ( <a href="https://www.watercorporation.com.au/asdp">https://www.watercorporation.com.au/asdp</a> )

Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
		the plan is submitted to the department in accordance with a requirement of these conditions, if the plan does not require the approval of the Minister.		
	<b>24</b>	The approval holder must keep all plans required by these conditions published on the website until the expiry date of this approval.	Section 13.3. Plan Revisions	All approved management plans will be published on the Water Corporation Alkimos project website until the expiry of the approval ( <a href="https://www.watercorporation.com.au/asdp">https://www.watercorporation.com.au/asdp</a> )
	<b>25</b>	The approval holder is required to exclude or redact sensitive ecological data from plans published on the website or otherwise provided to a member of the public. 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.	Section 13.3. Plan Revisions	Any sensitive ecological data will be redacted prior to publishing online and DCCEEW will be notified via email what exclusions and redactions have been made in the version published on the website.
	<b>26</b>	The approval holder must notify the department electronically of the date of commencement of the Action, within 20 business days following commencement of the Action.	<b>Appendix F</b>	The department was notified of the commencement of the action via email on 27 November 2023.
	<b>27</b>	The approval holder must not Commence the Action later than 5 years after the date of this approval decision.	<b>N/A</b>	The action commenced on 20 November 2023 and the department was notified of the commencement of the action via email on 27 November 2023.
	<b>27a</b>	The approval holder must notify the department in writing of any proposed change to the conditions of the Western Australian approval that may relate to protected matters within 2 business days of formally proposing a change and within 5 business days of becoming aware of any proposed change.	<b>Section 14</b>	DCCEEW will be notified in writing via email of any proposed change to the conditions of the Western Australian approval that may relate to protected matters within 2 business days of formally proposing a change and within 5 business days of becoming aware of any proposed change.
	<b>27b</b>	The approval holder must notify the department in writing of any change to the Western Australian approval conditions that may relate to protected matters, within 10 business days of a change to	<b>Section 14</b>	DCCEEW will be notified in writing via email of any change to the Western Australian approval conditions that may relate to protected matters, within 10 business days of a change to conditions being finalised. The notification will include a copy



Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
		conditions being finalised. This notification must include a copy of the finalised changes to the Western Australian approval conditions.		of the finalised changes to the Western Australian approval conditions.
28	<b>28</b>	The approval holder must maintain accurate and complete compliance records.	<b>Section 7.2</b>	Environmental monitoring in accordance with Environmental Approval requirements will be carried out as per Project requirements and specifications. Monitoring Data will be saved on a SharePoint Folder for the purposes of audits and information request as / if required.
29	<b>29</b>	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.	<b>Section 7.2</b>	Environmental monitoring in accordance with Environmental Approval requirements will be carried out as per Project requirements and specifications. Monitoring Data will be saved on a SharePoint Folder for the purposes of audits and information request as / if required.
30	<b>30</b>	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.	<b>Section 7.2</b>	Environmental monitoring in accordance with Environmental Approval requirements will be carried out as per Project requirements and specifications. Monitoring Data will be saved on a SharePoint Folder for the purposes of audits and information request as / if required.
31	<b>31</b>	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.	<b>Section 7.2</b>	Environmental monitoring in accordance with Environmental Approval requirements will be carried out as per Project requirements and specifications. Monitoring Data will be saved on a SharePoint Folder for the purposes of audits and information request as / if required.
32	<b>32</b>	The approval holder must submit all monitoring data (including sensitive ecological data), surveys, maps, other spatial and metadata and all species	<b>Section 7.2</b>	Environmental monitoring in accordance with Environmental Approval requirements will be carried out as per Project requirements and specifications. Monitoring Data will be

Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
		occurrence record data (sightings and evidence of presence) electronically to the department within 60 business days or in accordance with the requirements of the Construction Environmental Management Plan and the Construction Marine Environmental Management Plan.		saved on a SharePoint Folder for the purposes of audits and information request as / if required.
	<b>33</b>	The approval holder must prepare a compliance report for each 12-month period following the date of this approval decision (or as otherwise agreed to in writing by the Minister).	<b>Section 7.2</b>	Compliance report to DCCEEW is due annually on the 26 March each year (commencing 2025).
	<b>34</b>	Each compliance report must be consistent with the Annual Compliance Report Guidelines, Commonwealth of Australia 2023.	<b>Section 7.2</b>	Each compliance report must be consistent with the Annual Compliance Report Guidelines, Commonwealth of Australia 2023. Each compliance report must include: Accurate and complete details of compliance and any non-compliance with the conditions and the plans, and any incidents. One or more shapefile showing all clearing of protected matters, and/or their habitat, undertaken within the 12-month period at the end of which that compliance report is prepared. A schedule of all plans in existence in relation to these conditions and accurate and complete details of how each plan is being implemented.
	<b>35</b>	Each compliance report must include Accurate and complete details of compliance and any non-compliance with the conditions and the plans, and any incidents. One or more shapefile showing all clearing of protected matters, and/or their habitat, undertaken within the 12-month period at the end of which that compliance report is prepared.	<b>Section 7.2</b>	Each compliance report must be consistent with the Annual Compliance Report Guidelines, Commonwealth of Australia 2023. Each compliance report must include: Accurate and complete details of compliance and any non-compliance with the conditions and the plans, and any incidents. One or more shapefile showing all clearing of protected matters, and/or their habitat, undertaken within the 12-month period at the end of which that compliance report is prepared.

Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
				<p>A schedule of all plans in existence in relation to these conditions and accurate and complete details of how each plan is being implemented.</p>
	<p><b>36</b></p>	<p>The approval holder must:</p> <p>Submit the compliance report to the department within 60 business days following the end of the 12 month calendar year period for which that compliance report is required.</p> <p>Publish each compliance report on the website within 90 business days following the end of the 12-month period for which that compliance report is required.</p> <p>Notify the department electronically, within 20 business days of the date of publication that a compliance report has been published on the website.</p> <p>Provide the weblink for the compliance report in the notification to the department.</p> <p>Keep all published compliance reports required by these conditions on the website until the expiry date of this approval.</p> <p>Exclude or redact sensitive ecological data from compliance reports published on the website or otherwise provided to a member of the public.</p> <p>If sensitive ecological data is excluded or redacted from the published version, submit the full compliance report to the department within 20 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>	<p><b>Section 7.2</b></p>	<p>Compliance report to DCCEEW is due annually on the 26 March each year (commencing 2025). Water Corporation will:</p> <p>Submit the compliance report to DCCEEW within 60 business days following the end of the 12-month calendar year period for which that compliance report is required.</p> <p>Submit the compliance report to DCCEEW within 60 business days following the end of the 12-month calendar year period for which that compliance report is required.</p> <p>Publish each compliance report on Water Corporation website within 90 business days following the end of the 12-month period for which that compliance report is required.</p> <p>Notify DCCEEW electronically, within 20 business days of the date of publication that a compliance report has been published on the website.</p> <p>Provide the weblink for the compliance report in the notification to DCCEEW.</p> <p>Keep all published compliance reports required by these conditions on the website until the expiry date of this approval.</p> <p>Exclude or redact sensitive ecological data from compliance reports published on the website or otherwise provided to a member of the public.</p> <p>If sensitive ecological data is excluded or redacted from the published version, submit the full compliance report to DCCEEW within 20 business days of its publication on the website and notify DCCEEW in writing what exclusions and redactions have been made in the version published on the website.</p>



Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
33	<b>37</b>	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 the conditions or commitments made in a plan.	<b>Section 7.2 &amp; 11.4.1</b>	Plan confirms Incidents shall be submitted to DEECCW in the nominated timeframes
34	<b>38</b>	The approval holder must specify in the notification: Any condition or commitment made in a plan which has been or may have been breached. A short description of the incident and/or potential non-compliance and/or actual non-compliance. The location (including co-ordinates), date and time of the incident and/or potential non-compliance and/or actual non-compliance.	<b>Section 7.2 &amp; 11.4.1</b>	Plan confirms Non-conformance shall be submitted to DEECCW in the nominated timeframes
35	<b>39</b>	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 the conditions or commitments made in a plan. The approval holder must specify: Any corrective action or investigation which the approval holder has already taken. The potential impacts of the incident and/or non-compliance. The method and timing of any corrective action that will be undertaken by the approval holder.	<b>Section 7.2 &amp; 11.4.1</b>	Plan confirms corrective actions / investigations and potential impacts shall be submitted to DEECCW in the nominated timeframes
36	<b>40</b>	The approval holder must ensure that an independent audit of compliance with the conditions is conducted for every five-year period following the commencement of the Action until this	<b>Section 12.1</b>	The Plan confirms that audits shall be conducted in the nominated timeframes as per the condition

Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
		approval expires (unless otherwise specified in writing by the Minister).		
37	41	<p>For each independent audit, the approval holder must:</p> <p>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.</p> <p>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.</p> <p>c) Submit the audit report to the department for approval within the timeframe specified and approved in writing by the department.</p> <p>d) Publish each audit report on the website within 15 business days of the date of the department's approval of the audit report.</p> <p>e) Keep every audit report published on the website until this approval expires.</p>	<b>Section 12.2</b>	The Plan confirms that audits shall be conducted in the nominated timeframes & competent personnel as per the condition
38	42	Each audit report must report for the five-year period preceding that audit report.	<b>Section 12.1</b>	The Plan confirms that audits shall be conducted in the nominated timeframes as per the condition
39	43	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.	<b>Section 12.1</b>	The Plan confirms that audits shall be conducted in the nominated timeframes & competent personnel as per the condition



Table 2: Conditions of MS1207 Approval Reference

Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
	B6-1	<p>The proponent shall implement the proposal to achieve the following environmental objectives:</p> <ul style="list-style-type: none"> <li>minimise the risk of physical injury or mortality from vessel strike on significant marine fauna;</li> <li>minimise the risk of behavioural changes, health impacts, physical injury, or mortality from underwater noise emissions from construction to significant marine fauna (including temporary or permanent hearing loss).</li> </ul>	Appendix C	<p>This Plan identifies measures to protect protected matters from injury or death from construction of the tunnel and marine pipelines, including vessel strike. This includes the implementation of MFOs, Observation zones, and vessel management procedures.</p> <p>An acoustic monitoring program will be undertaken to validate the assumptions made in the noise modelling undertaken and to reconfirm the marine fauna exclusions zone targeted to be maintained.</p> <p>This Plan also includes adaptive management measures based on triggers to respond to changes to expected conditions, so that controls can be adjusted to meet changing conditions.</p> <p>The plan addresses controls to prevent vessel strike with marine fauna, including protected matters, including:</p> <ul style="list-style-type: none"> <li>• Vessels contacting MFOs prior to entering into the action area and obtaining approval from the MFO to enter</li> <li>• MFOs maintaining observation for marine fauna, including protected matters, within the action area when vessels presence</li> <li>• Defined protocols to be implemented when protected matters and marine fauna are within spotted within management observation zones for vessels</li> <li>• Vessel masters undergo training, including marine mammal behaviour and actions, reporting requirements in the event of Marine Mammals and marine fauna injury or mortality.</li> </ul>



Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
				<ul style="list-style-type: none"> <li>Vessels being required not travel at speeds greater than 10 knots when transiting or undertaking activities within the Action Area</li> </ul> <p>Application of Caution Zones and No Approach zones for vessels</p>



Ref	Cond.	Condition Requirement	Plan reference	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
	B6-2	<p>During marine construction activities, the proponent shall:                      implement measures to avoid vessel strikes with significant marine fauna;                      implement a significant marine fauna observation zone consisting of a at least one (1) kilometre radius from each underwater drilling location whereby an observer must undertake significant marine fauna observation for a minimum of 30 minutes prior to the commencement of marine construction activities;                      "(3) implement an exclusion zone consisting of at least 500 metre radius from the underwater drilling location whereby:                      marine construction activities cannot commence should a significant marine fauna be within the exclusion zone; and                      marine construction activities to cease should a significant marine fauna enter the exclusion zone during construction and are not to recommence until the significant marine fauna have moved outside the exclusion zone"                      must engage a suitably trained and experienced marine fauna observer who has a demonstrated knowledge of significant marine fauna in the marine temperate region to undertake observations in the observation zone and exclusion zone;                      implement noise management procedures to avoid temporary and permanent changes to hearing sensitivity in significant marine fauna and minimise behavioural responses                      maintain a log of recorded sightings, locations and behaviours indicative of stress or disturbance of significant marine fauna and submit these to the National Cetacean Sighting Database; and                      document and report to relevant regulators any incidents relating to significant marine fauna injury / mortality</p>	<p>Appendix C.6 Vessel Management                       Appendix C.3: Underwater noise Table 33                       C.1.1. Training and Qualification and Table 26: MFO level definitions address this requirement.                      Appendix C.3: Underwater noise management procedures                      Appendix C.1.4 Field Logs                      Appendix C.7 Table 38: Reporting Requirements and contact</p>	<p>Appendix C.6 Vessel Management addresses measures to avoid vessel strikes with significant marine fauna.                      Appendix C.3: Underwater noise management procedures identify observation zones that is at least 1 km radius from the drilling location and exclusion zone at least 500 metre radius (Table 33) and prestart (C.3.2.2.) requiring marine observation 30 minutes prior to commencement of marine construction activities. Construction activities cannot commence if significant marine fauna within the exclusion zone; and marine construction activities to cease should a significant marine fauna enter the exclusion zone during construction and are not to recommence until the significant marine fauna have moved outside the exclusion zone.                      C.1.1. Training and Qualification and Table 26: MFO level definitions address this requirement identifying experience and knowledge.                      Appendix C.3: Underwater noise management procedures detail specific controls to avoid temporary and permanent changes to hearing sensitivity in significant marine fauna and minimise behavioural responses.                      Appendix C.1.4 Field Logs – details requirements to be logged and submission to National Cetacean Sighting Database.                      Responding to any death or injury of a protected matter, by immediately halting the works or machinery responsible, formally notifying the department within 5 business days of the incident and not resuming works until notified by the Minister in writing that these works may resume, is addressed via the (MMM&amp;MSP) and Marine Fauna/Mammal Management Protocol</p>

## 4. Project description

The Project will contribute significantly to the Government of Western Australia's vision for Perth as a liveable, waterwise city. Located in the high growth area of Alkimos to the north of Perth, the Project includes the design, construction, operation and maintenance of a new desalination plant equipped for 158ML/d (50GL p.a.) during Stage 1, and future proofing for an additional 158ML/d (50GL p.a.) during Stage 2. The scheme also includes the Eglinton Groundwater Scheme (GWS) which will provide an additional 6 GL p.a.

The ASDP will be designed for maximum energy efficiency and production flexibility, providing a cost-effective solution with minimised whole of life costs. Together, ASWA's D&C and O&M Alliances will deliver safe, compliant potable water via this vital component of Perth's Integrated Water Supply Scheme (IWSS).

### 4.1 Location

The ASDP is located within the Alkimos Water Precinct, between Marmion Avenue and the coast. The marine infrastructure location is shown in Appendix D.

### 4.2 Construction

ASWA has developed the following design solutions in the marine environment which contribute to the protection of environmental values and impact mitigation:

- Piles are required to support the intake and outfall structures without the need for dredging material with further impacts to the marine environment.
- Modularisation of the structures and simplification of support to ensure that the construction of the seawater inlets and outlet is limited to a single construction campaign over one summer and therefore limiting the disturbance of the existing benthic communities and habitats (BCH) and reduces risk of Marine Mammals interactions.

### 4.3 Schedule

Marine construction activities are expected to commence in November 2025 and continue through to May 2026.

The commencement of marine construction will not occur until the Minister approves the CMEMP in accordance with the below conditions (Conditions 6 and Condition 8bi).

- Condition 6 states there will be no commencement of marine construction until the minister approves the CMEMP in writing, and

*Condition 8bi the approval holder must: Avoid noise generated by construction in the marine environment during migration periods for the Australian sea lion, humpback whale and southern right whale (May -November; see key ecological windows).*



Table 3: Key marine mammal ecological windows and proposed construction timing (Water Corporation 2022) (dark blue represent- full duration of presence or activity. Light blue – represents timing of specific behaviours/specific construction activity) (diagonal shading – represents tails ends of the periods, with shading between representing peak period of activity)

Activity/species	2025												2026											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
<b>Schedule</b>																								
Construction schedule																								
Transit to site (intake)																								
Move jub into position																								
Intake caisson installation																								
Piling (intake)																								
Transit to site (outfall)																								
Move jub into position																								
Outfall caisson installation																								
Piling (outfall)																								
Demobilisation jub																								
<b>Species timings</b>																								
Humpback whale																								
-Northern migration																								
-Southern migration																								
-Southern migration calves																								
Southern right whale																								
-Seasonal migration*																								
-Calving																								

Note: Australian Sea Lion species are sedentary, staying near their colonies although they may move locally to respond to food sources and as the nearest “colony” is 150km north the Action area/ Project. Species revised migration BIA which overlaps with Project ~ April to October (DCCEEW 2024)



## 5. Objectives

This management plan outlines the key management and mitigation measures proposed by ASWA to meet the following objectives:

- Compliance with the relevant Statutory Approvals and supporting Management plan.
- Provide a strategic and systematic framework to enable construction of the Project with minimal impact due to effects on marine mammals.
- Ensure all construction activities are undertaken with the objective of preventing such impacts.

## 6. Roles and responsibilities

Table 4 indicates the environment team roles during construction, with each role responsible for different areas, activities and tasks to ensure a seamless process.

Table 4 : Roles and responsibilities

Role	Responsibilities/Lines of communication
Alliance Manager	<ul style="list-style-type: none"> <li>▪ Oversee, manage and lead the Alliance in planning, directing and controlling of all activities to ensure that the Project is completed to meet the Alliance Environmental Policy and objectives.</li> <li>▪ Demonstrate the importance of environmental outcomes for the Project through leadership, particularly within the Alliance Management Team (AMT) and wider Project team.</li> <li>▪ Responsible for compliance with the relevant environmental laws, approvals and requirements of the environmental management plans to maximise environmental project outcomes and support the Sustainability and Environmental Manager in the pursuit of compliance.</li> <li>▪ Maintain appropriate human resource strategies to facilitate the Alliance objectives</li> </ul>
Design Manager	<ul style="list-style-type: none"> <li>▪ Familiarise themselves with their responsibilities within this Plan and the EMS</li> <li>▪ Ensure the Project design is compliant with the requirements of the relevant environmental laws, approvals and requirements of the environmental management plans.</li> <li>▪ Ensure that environmental objectives and targets are being met.</li> <li>▪ Provide the required support to assist personnel under their control to implement all aspects of the ASWA Alliance Environmental Policy, procedures and guidelines utilised by the Project.</li> <li>▪ Uphold an active interest in workplace environmental issues</li> </ul>
Construction Manager	<ul style="list-style-type: none"> <li>▪ Familiarise themselves with their responsibilities within this Plan and the EMS</li> <li>▪ Ensure the Project construction is compliant with the requirements of the relevant environmental laws, approvals and requirements of the environmental management plans.</li> <li>▪ Ensure that environmental objectives and targets are being met.</li> <li>▪ Provide the required support to assist personnel under their control to implement all aspects of the ASWA Alliance Environmental Policy, procedures and guidelines utilised by the Project.</li> <li>▪ Monitor the effectiveness of the ASWA Alliance Environmental Policy and associated procedures, guidelines and work instructions used by the Project, and communicate changes as required.</li> <li>▪ Uphold an active interest in workplace environmental issues</li> <li>▪ Contacting the Alliance Manager and Water Corp Project Manager immediately when informed of reportable incidents</li> </ul>
Marine Area Manager	<ul style="list-style-type: none"> <li>▪ Familiarise themselves with their responsibilities within this Plan and the EMS</li> <li>▪ Ensure the Project construction is compliant with the requirements of the relevant environmental laws, approvals and requirements of the environmental management plans.</li> <li>▪ Ensure that environmental objectives and targets are being met.</li> </ul>



Role	Responsibilities/Lines of communication
	<ul style="list-style-type: none"> <li>▪ Provide the required support to assist personnel under their control to implement all aspects of the ASWA Alliance Environmental Policy, procedures and guidelines utilised by the Project.</li> <li>▪ Monitor the effectiveness of the ASWA Alliance Environmental Policy and associated procedures, guidelines and work instructions used by the Project, and communicate changes as required.</li> <li>▪ Uphold an active interest in workplace environmental issues</li> <li>▪ Contacting the Construction Manager immediately when informed of reportable incidents</li> </ul>
Sustainability and Environment Manager	<ul style="list-style-type: none"> <li>▪ Assume responsibility for overall facilitation of environmental management for the Project.</li> <li>▪ Provide leadership in the environment space, and report on such to the AMT.</li> <li>▪ Establish and oversee the review of the Project Environmental Management Plans and documentation.</li> <li>▪ Develop the environmental monitoring and reporting requirements for the Project.</li> <li>▪ Provide adequate environmental training to all staff, subcontractors and visitors to the site.</li> <li>▪ Ensure ASWA employees charged with workplace environmental responsibilities have the appropriate training to adequately perform their duties.</li> <li>▪ Coordinate and gain all environmental approvals, permits and licences for the construction of the Project.</li> <li>▪ Liaise with relevant government bodies and environmental consultants as required.</li> <li>▪ Liaise with the Alliance on remedial and corrective actions in response to non-conformance.</li> <li>▪ Monitor any legislative changes to government policies that could influence this Plan and amend it to include the list of legislation.</li> <li>▪ Establish systems for managing environmental aspects of the Project (such as ensuring procedures, guidelines, forms and checklists are readily accessible)</li> <li>▪ Establish a schedule of environmental inspections and ensure that all personnel complete the required inspections at the specified frequencies.</li> <li>▪ Participate in site inspections, audits and reviews.</li> <li>▪ Monitor the implementation of environmental procedures, use of guidelines, forms and checklists.</li> <li>▪ Coordinate and gain all environmental approvals, permits and licences for the construction of the Project.</li> <li>▪ Liaise with relevant government bodies and environmental consultants as required.</li> </ul> <p>Monitor any legislative changes to government policies that could influence this Plan and amend it to include the list of legislation.</p> <p>Coordinate technical studies and other inputs for environmental approval applications.</p> <ul style="list-style-type: none"> <li>▪ Liaise with design and construction personnel on approval timeframes and conditions.</li> <li>▪ Verify that fauna logs are being completed and recorded in accordance with this Plan</li> <li>▪ Notification of incidents in accordance to Table 32, and the escalation of reportable incident notifications to Water Corporation within 30 minutes of notification.</li> <li>▪ Oversee the implementation of preventive and corrective actions for non-conformances resulting from audits, investigations, incidents/accidents, hazards, injuries and near misses</li> </ul>



Role	Responsibilities/Lines of communication
Environment Team	<ul style="list-style-type: none"> <li>▪ Support the Sustainability and Environment Manager</li> <li>▪ Provide environmental information and support.</li> <li>▪ Conduct regular internal reviews of this Plan.</li> <li>▪ Implement monitoring and reporting requirements including regular site inspections and analytical monitoring to ensure all protection measures are in place and adequate.</li> <li>▪ Deliver adequate environmental training to all ASWA staff, subcontractors and visitors to the site.</li> <li>▪ Monitor the compliance with all environmental approvals, permits and licences for the construction of the project.</li> <li>▪ Liaise with relevant environmental consultants as required.</li> <li>▪ Liaise with construction personnel and subcontractors on remedial and corrective actions in response to non-conformance.</li> <li>▪ Maintain all current policies, forms and notices on noticeboards, in crib rooms, site office etc.</li> <li>▪ Distribute environmental alerts and circulars for industry related incidents concerning the environment.</li> <li>▪ Participate in site inspections, audits, and reviews.</li> <li>▪ Prepare and facilitate the implementation of environmental procedures, use of guidelines, forms and checklists.</li> <li>▪ Implement preventive and corrective actions for non-conformances resulting from audits, investigations, incidents/accidents, hazards, injuries and near misses</li> </ul>
Level 1 Marine Fauna Observers (MFOs)- Suitably Qualified MFO with a minimum of 2 years' experience	<p>In addition to responsibilities outline for MFOs below, Level 1 MFOs will be responsible for:</p> <p>Leading and coordinating MFOs in observation duties</p> <p>Liaising with the Marine Superintendent to ensure adequate MFO coverage and observation vantage points</p> <ul style="list-style-type: none"> <li>▪ Preparing and presenting toolboxes and prestarts on marine mammal's plan and procedures with focus on observations, interactions and exclusion zones.</li> <li>▪ Collecting and reviewing MFO Field Logs for completeness</li> <li>▪ Sending Field Logs to the Sustainability and Environment Manager for verification</li> <li>▪ Providing input into the collation and writing of technical reports required to be submitted to the National Cetacean Sighting Database or reports to regulators, including the Completion Report.</li> <li>▪ Assisting in the compilation of marine fauna related reporting e.g. incidents</li> </ul>



Role	Responsibilities/Lines of communication
MFOs	<ul style="list-style-type: none"> <li>▪ When rostered on duty MFOs will be solely dedicated to their duties as a MFO and will not perform any other role</li> <li>▪ Observation duties as outlined in this Plan for the purpose of protection of marine fauna</li> </ul> <p>Comply with site environmental rules &amp; relevant Approvals.</p> <ul style="list-style-type: none"> <li>▪ Work in conjunction with other duty MFOs to maintain 360 degree visibility of surroundings/ marine fauna observation zones</li> <li>▪ Maintain communication channels between on duty MFOs</li> <li>▪ Required to implement marine piling and drilling provisions (management zones, prestart procedures, soft start, normal operations, shut down, low-visibility procedures)</li> <li>▪ Required to maintain communication channels with Masters entering Action Area, observing vessel approach distances, speeds, caution zones, no approach zones, and providing information regarding observed marine fauna to the Master.</li> <li>▪ Undertaken management and mitigation measures for marine piling and drilling</li> <li>▪ Alert Marine Superintendent to stop work if the environment (including marine mammals) is placed at risk and discuss strategies to rectify environmental concerns immediately with the Marine Superintendent.</li> <li>▪ Provide environmental information and support, particularly in reference to marine mammals.</li> <li>▪ Implement monitoring and reporting requirements for marine mammal observation to ensure marine mammal protection measures are in place.</li> <li>▪ Notifying the Marine Superintendent when target marine fauna enter management zones</li> <li>▪ Raise any environmental issues or concerns immediately or during meetings with environment team, Marine Superintendent, or Marine Area Manager. This includes but is not limited to any potential sightings of marine mammals in close proximity to the works.</li> <li>▪ Provide Daily reports to the Sustainability and Environment Manager</li> <li>▪ Reporting breaches/ nonconformance in accordance to this Plan to the Marine Superintendent and Sustainability and Environment Manager</li> <li>▪ Maintain detailed daily field logs, recording of all sightings of marine mammals, marine reptiles (i.e. turtles) and other notable observations</li> </ul>
Vessel Master	<ul style="list-style-type: none"> <li>▪ Obtaining positive communications with the MFOs prior to entering the Action Area.</li> <li>▪ Reducing vessel speed to 6 knots when within the caution zone</li> <li>▪ Withdrawing away from a fauna's caution zone or manoeuvre in a way that increases the distance between the vessel and fauna</li> <li>▪ Not entering a "no approach" zone immediately in front and behind marine fauna</li> <li>▪ Reporting immediately to an MFO and Marine Superintendent any incident their vessel is involved in with marine fauna</li> </ul>
Marine Superintendent	<ul style="list-style-type: none"> <li>▪ Meeting at the commencement of each shift with the Level 1 MFO to determine adequate MFO availability and rostering to meet the obligations within this Plan.</li> <li>▪ Releasing persons from all other duties to perform MFO duties as required to meet the obligations within this Plan.</li> <li>▪ Adherence of the soft-start and shut down procedures within this Plan</li> <li>▪ Suspending activities within 2 minutes of notification by a MFO when a target marine fauna is sited in distress within the observation zone</li> <li>▪ Ceasing works if target marine fauna enters the exclusion zone</li> <li>▪ Reporting incidents to the Marine Area Manager and Sustainability and Environment Manager in accordance with this Plan.</li> <li>▪ Restricting piling to daylight hours, and commencement of a new pile within 1 hour of sunset.</li> <li>▪ Completion of visual inspections to monitor sediment plumes during construction are contained within Action Area.</li> <li>▪ Maintaining clean and tidy JUB and safe storage of chemicals</li> <li>▪ Contacting Marine Area Manager and Environmental &amp; Sustainability Manager immediately when a reportable incident occurs</li> </ul>
Discipline leads / Area Managers	<ul style="list-style-type: none"> <li>▪ Provide input into environmental impacts mitigation and outcomes. This includes both the leaders and managers for each discipline.</li> <li>▪ Manage environmental requirements as defined within their position descriptions</li> </ul>



Role	Responsibilities/Lines of communication
All ASWA team members	<ul style="list-style-type: none"> <li>Contribute to maximising the outcomes of the Project, specifically considering impacts to environmental aspects, both within and beyond the Project boundary</li> </ul>
Water Corp Environmental Team	<ul style="list-style-type: none"> <li>Notify DBCA, DCCEEW and DWER within required time frames reportable incidents</li> <li>Annual compliance reporting, auditing and Completion Report to DCCEEW</li> </ul>

## 7. Reporting

### 7.1 Internal reporting

Performance reporting will be applied to produce systematic, comprehensive and informative reports on the results of environmental monitoring and the construction activities of the Project. As part of the Alliance, the Corporation have representatives on both AMT and ALT and therefore will receive the monthly reports.

Monthly reports will be provided to the Alliance Manager, AMT and the ALT by the Sustainability and Environmental Manager and include information about:

- Fauna encounters or observed marine mammals within the project site.
- Monitoring outcomes
- Environmental incidents, non-compliance and corrective outcomes
- Approvals or licences granted.
- Completion of specific activities with environmental impacts
- Inspections carried out (internal and with regulatory bodies)
- Environmental complaints.

Copies of these reports will be provided to key Corporation stakeholders.

### 7.2 External reporting

ASWA will maintain accurate and complete records to produce external environmental reporting to communicate the Project's environmental performance, compliance and impacts to external stakeholders. This type of reporting includes:

- Non-compliance, with focus on incidents, preventive and corrective actions, will be reported to the Corporation and regulatory bodies, if required, as described in Section 11.4.1.
- Non-compliance with approvals conditions and / or commitments in this plan (as stipulated in condition 38), to be reported to the Corporation and regulatory bodies, as per specific timeline and contents indicated in the approvals, when a non-compliance is occurring.
- In accordance with condition 39, the approval holder will specify any corrective action or investigation which has already been taken and determine actual impacts and/or non-compliance.
- Environmental monitoring and compliance, to be reported to the Corporation and regulatory bodies, as per specific timeline and contents indicated in the approvals (EPA Annual Compliance Report –and EPBC Annual Compliance Report – Condition 33 of EPBC 2019/8453). In some instances, the Corporation will compile ASWA's report with other data and submit one overall report to the applicable environmental regulator.
- All monitoring data, surveys, maps and other data will be prepared in accordance with the *Guidelines for biological survey and mapped data*, Commonwealth of Australia 2018 and *Guide to providing maps and boundary data for EPBC Act projects*, Commonwealth of Australia 2021.
- The approval holder will notify DEECCW electronically, within 2 business days of becoming aware of any incident and/or potential non-compliance and/or actual non-compliance with the conditions or commitments made in a plan in accordance with EPBC Conditions 37 & 38.
- Compliance report to DCCEEW is due annually on the 26 March each year (commencing 2025). Water Corporation will submit the compliance report to DCCEEW within 60 business days following the end of the 12-month calendar year period for which that compliance report is required.



- The Approval holder will submit the compliance report to DCCEEW within 60 business days following the end of the 12-month calendar year period for which that compliance report is required.
- Each compliance report will be consistent with the *Annual Compliance Report Guidelines, Commonwealth of Australia 2023*
- If the department makes a request in writing, the approval holder will provide electronic copies of compliance records to the department within the timeframe specified in the request.
- Publish each compliance report on Water Corporation website within 90 business days following the end of the 12-month period for which that compliance report is required.
- Notify DCCEEW electronically, within 20 business days of the date of publication that a compliance report has been published on the website.
- Provide the weblink for the compliance report in the notification to DCCEEW.
- Keep all published compliance reports required by these conditions on the website until the expiry date of this approval.
- Exclude or redact sensitive ecological data from compliance reports published on the website or otherwise provided to a member of the public.
- If sensitive ecological data is excluded or redacted from the published version, submit the full compliance report to DCCEEW within 20 business days of its publication on the website and notify DCCEEW in writing what exclusions and redactions have been made in the version published on the website.

Report to the Corporation will be in accordance with Section 11.4.1, Table 14 of this plan. Marine fauna specific reporting requirements are presented in .

### 7.3 Completion reporting

On completion of all piling and drilling works (construction phase), a final marine fauna report will be submitted to the client, which will allow for compliance auditing. The completion report will include a summary of construction works and marine fauna mitigations (See Appendix . The completion report will be submitted to DCCEEW within two months following the completion of construction works.

## 8. Environmental training

All Project personnel, subcontractors, consultants and visitors will receive appropriate training to ensure they understand their responsibilities and are competent to undertake their work in an acceptable manner. Environmental requirements will be explained and discussed during this induction.

### 8.1 Environmental Inductions

The environmental induction will address:

- Operating statement (including environmental policy)
- General environmental duty/duty to notify.
- Legislation and permit/approval/licence/compliance obligations applicable to the Project
- Sensitive or protected environmental areas on and surrounding site.
- Environmental management plans and related documents
- Legal responsibilities for all personnel
- Incident reporting
- Emergency procedures and responses
- Regulatory requirements relevant to the Project and their obligations as a member of the Alliance team
- Potential consequences if procedures are not followed.

### 8.2 Marine Fauna Observers (MFOs)

The Project will engage a reputable industry-recognised Marine Fauna training provider to develop Project Specific training for personnel to undertake MFOs duties. This training will cover:



- Legal compliance including Project specific DCCEEW conditions of compliance
- MCEMP risk controls/ management strategies
- Species identification
- Marine mammal awareness in a marine temperate region including morphological and behavioural characteristics
- Observation technics – visual and distance determination
- Appropriate use and application of equipment in marine fauna observation
- Mitigation protocols (e.g. marine management observation zones)
- Documentation and Reporting (e.g. Field Logs, incident reporting)

## 9. Emergency contacts and procedures

A marine emergency plan and response plan has been developed for emergency situations which may impact upon the environment, in line with the CW03524-PM-0000-PLN-0023 Construction Emergency Response Plan.

Some of the environmental emergency situation and their emergency response plans are outlined in Table 5.

Table 5 : Examples of environmental emergency situations

Emergency incident	Potential impact	Contingency response measure	Key roles
Major oil or fuel spill or chemical spill	<ul style="list-style-type: none"> <li>▪ Contamination of marine environments</li> <li>▪ Risk to marine fauna</li> <li>▪ Prosecution</li> </ul>	<ul style="list-style-type: none"> <li>▪ All work to stop immediately in vicinity.</li> <li>▪ Marine spill response kits and equipment deployed.</li> <li>▪ Use all available resources to contain and clean up spill.</li> <li>▪ Contact additional consultants or subcontractors if required.</li> <li>▪ Notify relevant authorities (such as Marine Pollution Response on 08 9480 9924) within 24 hours.</li> <li>▪ Implement incident reporting procedures as per Section 11.4.1</li> <li>▪ Reporting to AMSA (Australian Maritime Safety Authority)</li> </ul>	<ul style="list-style-type: none"> <li>▪ First on the scene</li> <li>▪ Sustainability and Environmental Manager</li> <li>▪ Environment team</li> <li>▪ Area Project Manager</li> <li>▪ Project Engineer/Site Supervisor</li> <li>▪ Emergency Response Coordinator</li> </ul>
Major sediment discharge	<ul style="list-style-type: none"> <li>▪ Contamination of marine environments</li> <li>▪ Risk to marine fauna</li> <li>▪ Prosecution</li> </ul>	<ul style="list-style-type: none"> <li>▪ All work to stop immediately in vicinity.</li> <li>▪ Reinstate controls if required.</li> <li>▪ Install new controls if required.</li> <li>▪ Apply flocculants if required.</li> <li>▪ Commence clean-up activities.</li> <li>▪ Contact additional consultants or subcontractors if required.</li> <li>▪ Notify relevant authorities (such as the Marine</li> </ul>	<ul style="list-style-type: none"> <li>▪ First on the scene</li> <li>▪ Sustainability and Environmental Manager</li> <li>▪ Environment team</li> <li>▪ Area Project Manager</li> <li>▪ Project Engineer/Site Supervisor</li> <li>▪ Emergency Response Coordinator</li> </ul>



Emergency incident	Potential impact	Contingency response measure	Key roles
		Pollution Response) within 24 hours. <ul style="list-style-type: none"> <li>Implement incident reporting procedures as per Section 11.4.1</li> </ul>	
Injury or death of marine mammals and other conservation significant marine fauna.	<ul style="list-style-type: none"> <li>Death or harm to marine mammals</li> </ul>	<ul style="list-style-type: none"> <li>All work to stop immediately in vicinity.</li> <li>If marine mammal is injured, contact Wildcare Helpline on 08 9474 9055 for further assistance.</li> <li>In case of death, contact Wildcare Helpline immediately.</li> <li>Implement incident reporting procedures as per Section 11.4.1 and in Appendix C.</li> </ul>	<ul style="list-style-type: none"> <li>First on the scene</li> <li>Sustainability and Environmental Manager</li> <li>Environment team</li> <li>Area Project Manager</li> <li>Project Engineer/Site Supervisor</li> <li>Emergency Response Coordinator</li> </ul>

Timeframe and reporting for these environmental emergency situations are:

- Incident to be reported to Alliance Manager and Sustainability and Environmental Manager/environment team ASAP.
- Incident to be notified to the Corporation by the Sustainability and Environmental Manager within 30 Minutes
- Incident to be notified to relevant authorities by the Sustainability and Environmental Manager within 12 hours.
- Incident to be notified to the Corporation by the Sustainability and Environmental Manager, as per Section 11.4.1, Table 9.

Key emergency contacts responsible for managing environmental emergencies are detailed in Table 6 with external contacts shown in **Error! Reference source not found.**

Table 6 : Key internal emergency contact

Position	Name	Phone
Alliance Manager	Peter Scheiwe	0404 812 442
Sustainability and Environment Manager	William Carter	0424 192 170
Health, Safety, Sustainability, Environment and Quality Manager	Peter Grant Smith	0428 295 279
Construction Manager	Mario Buterin	0409 364 242
Marine Construction Lead	Anthony Michelle	0419 198 573
Water Corporation Project Delivery Manager	Ryan Smith	0400 244 918

Table 7 : Key external emergency contact

External Contact	Phone
Wildcare Helpline (sick or injured wildlife)	08 9474 9055
Department of Transport Marine Pollution Response	08 9480 9924
Fish deaths	1800 815 507
Invasive marine species	1800 815 507



## 10. Potential environmental impacts and risks

### 10.1 Threats to matters protected under the EPBC Act

The marine waters surrounding the ASDP Project support a variety of fauna, several of which are protected under State and Commonwealth legislation. These species were discussed and identified within the Project's Environmental Review Document (Water Corporation 2022). While no specific surveys for Marine Mammals have been undertaken, conservation significant Marine Mammals likely to be present in the marine waters of ASDP are summarised in Table 8



Table 8: Key marine fauna species summaries from Water Corporation (2022) and potential impacts during the Projects construction phase

Species	Summary and relevant policy and guidance	Project activities	Potential impacts
<p>Australian sea lion (<i>Neophoca cinerea</i>)  (EPBC Act listing Endangered, Marine)</p>	<p>While there is no breeding or haul out sites for Australian sea lions within the Project Action Area, individuals may be sighted in the Action area. Relevant EPBC Act documents are:</p> <ul style="list-style-type: none"> <li>Conservation Advice <i>Neophoca cinerea</i> Australian Sea Lion (TSSC 2020)</li> <li>Recovery Plan for the Australian Sea Lion (<i>Neophoca cinerea</i>) (DSEWPac 2013)</li> <li>Threat Abatement Plan for the Impacts of Marine Debris on the Vertebrate Wildlife of Australia's Coasts and Oceans (DoEE 2018)</li> <li>Marine bioregional plan for the South-west Marine Region (DSEWPac 2012).</li> </ul>	<p>Piling  Drilling  Vessel movements</p>	<p>Key threats:</p> <ul style="list-style-type: none"> <li>Direct impacts from underwater noise</li> <li>Direct injury from vessel strike</li> </ul> <p>Other minor impacts:</p> <ul style="list-style-type: none"> <li>Entanglement/ plastic ingestion from marine debris</li> <li>Hydrocarbon spill causing marine fauna injury and/ or impact on critical habitat</li> <li>Introduction of marine pest species from construction vessels</li> </ul>
<p>Southern right whale (<i>Eubalaena australis</i>)  (EPBC Act listing Endangered, Cetacean, Marine)</p>	<p>Southern right whales have been observed in Marmion Marine Park (~10 km south of Alkimos) during winter and spring months in association with their breeding and calving season (Water Corporation 2022). Southern right whale breeding is known to occur in the Alkimos region. Relevant EPBC Act documents are:</p> <ul style="list-style-type: none"> <li>National Recovery Plan for the Southern Right Whale <i>Eubalaena australis</i> (DCCEEW 2024a)</li> <li>Threat Abatement Plan for the Impacts of Marine Debris on the Vertebrate Wildlife of Australia's Coasts and Oceans (DoEE 2018)</li> <li>National Guidelines for the Survey of Cetaceans, Marine Turtles and the Dugong (DCCEEW 2024b)</li> <li>National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (DoEE 2017a)</li> <li>Australian National Guidelines for Whale and Dolphin Watching (DoEE 2017b)</li> <li>Industry Guidelines on the Interaction between offshore seismic exploration and whales (DEWHA 2008)</li> <li>Marine bioregional plan for the South-west Marine Region (DSEWPac 2012).</li> </ul>		
<p>Humpback whale (<i>Megaptera novaeangliae</i>)  (EPBC Act listing Migratory, Cetacean)</p>	<p>Humpback whales have been observed in Marmion Marine Park (~10 km south of Alkimos) during their annual migrations (DPAW 2012, DBCA 2017b). It is unlikely that humpback whales would remain for any length of time within the waters surrounding Alkimos, but likely to be travelling through the area during their annual migration. Relevant EPBC Act documents are:</p> <ul style="list-style-type: none"> <li>Listing Advice <i>Megaptera novaeangliae</i> Humpback Whale (TSSC 2022)</li> <li>Threat Abatement Plan for the Impacts of Marine Debris on the Vertebrate Wildlife of Australia's Coasts and Oceans (DoEE 2018)</li> <li>National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (DoEE 2017a)</li> <li>Australian National Guidelines for Whale and Dolphin Watching 2017 (DoEE 2017b)</li> <li>National Guidelines for the Survey of Cetaceans, Marine Turtles and the Dugong (DCCEEW 2024a)</li> </ul>		

Species	Summary and relevant policy and guidance	Project activities	Potential impacts
Indo-Pacific bottlenose dolphin ( <i>Tursiops aduncus</i> ) (EPBC Act listing Migratory, Cetacean)	<ul style="list-style-type: none"> <li>▪ Industry Guidelines on the Interaction between offshore seismic exploration and whales (DEWHA 2008)</li> <li>▪ Marine bioregional plan for the South-west Marine Region (DSEWPaC 2012a).</li> </ul> <p>Bottlenose dolphins have been sighted throughout the Marmion Marine Park, ~10 km south of Alkimos (Water Corporation 2022). It is likely that bottlenose dolphins may be encountered in the waters surrounding Alkimos. Relevant EPBC Act documents are:</p> <ul style="list-style-type: none"> <li>▪ Threat Abatement Plan for the Impacts of Marine Debris on the Vertebrate Wildlife of Australia's Coasts and Oceans (DoEE 2018)</li> <li>▪ National strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (DoEE 2017a)</li> <li>▪ Australian National Whale and Dolphin Watching Guidelines (DoEE 2017b)</li> <li>▪ National Guidelines for the Survey of Cetaceans, Marine Turtles and the Dugong (DCCEEW 2024a).</li> </ul>		



## 10.2 Potential impacts

Potential marine environmental aspects and potential impacts associated with the usage of plant and equipment for the specific ASDP construction activities are presented in Table 24.

As discussed in the Environmental Review Document (ERD) (Water Corporation 2022), the key risks associated with the construction phase of the Project are presented in Table 9 : Potential construction phase environmental impacts. A brief summary of potential impacts are presented in the table below.

Table 9 : Potential construction phase environmental impacts

Impact/risk	Driver
Direct removal of BCH	Drilling, placement of intake and outfall configuration, and pile installation
Underwater noise	Piling and drilling
Turbidity	Drilling and piling
Smothering	Turbidity, and sedimentation
Vessel strike	Construction vessels
Introduced marine species	Construction vessels and equipment (including jack up barges)
Hydrocarbon spills	Construction vessels and equipment.

### 10.2.1 Underwater noise

Underwater noise is categorised as either being impulsive (e.g. with a sudden onset, like piling) or continuous/non-impulsive (e.g. part of the ambient, or background soundscape like shipping and dredging).

The Projects construction phase contains a variety of noise sources, including impulsive noise generated by piling, and continuous/non-impulsive noise generated by drilling and vessel movements

Condition 7(b) requires the achievement of the environmental objective to protect protected matters from adverse impacts of noise during construction of the tunnel and marine pipelines, including noise generated by vessels.

#### 10.2.1.1 Tunnel and marine pipeline

The project involves the construction of two tunnels that are also marine pipelines (i.e. the tunnel and marine pipeline are one in the same). One tunnel/ marine pipeline, refer to as the intake pipeline is approximately 2.9 kilometres, and the other tunnel/ pipeline is referred to as the outfall pipeline is approximately 4.5 kilometres. The tunnel is constructed using a Tunnel Boring Machine (TBM), which has a cutting head that bores the tunnel pathway. As the tunnel bores the tunnelling crew installs and grouts the tunnel walls comprising of six precast panels.

Each TBM is boring and installing a tunnel approximately between 20 metres and 13 metres underground. The *Alkimos Seawater Desalination Plan, Environmental Review Document – Public Review, Assessment No. 2210 (WA); 2019/8453 (Commonwealth) Table 7-10 Sources of construction related underwater noise*, identified that tunnel is “not expected to generate audible noise.” *Table 14-2: Potential construction and operational impacts to marine fauna* identifies that “Tunnelling and drilling noise may be sufficient to cause behavioural responses in the form of avoidance but is not sufficient to cause TTS or injury to marine fauna.”

The acoustic output of the TBM was assessed during onshore works and there was no audible acoustic reference to the TBM operations.



As the TBM will continue to tunnel through consistent horizons and geotechnical conditions i.e. soft limestone and the deeper we go it will be more sand related and act as a further acoustic attenuation.

Therefore, based on the acoustic assessment in the below table and as per monitoring results in Appendix G ASWA deems this aspect of the works as a low risk and highly unlikely to have any impact on Marine Fauna.

The graphs in Appendix G, is flatlined demonstrating there was little to no external acoustic influences on the monitoring periods and reflective of ambient acoustic levels.

Table 10 : Onshore TBM Acoustic Assessment

Monitoring	Monitoring	LAeq (dB)	TTS Trigger (dB)
Location 1	Stage 1	45.2	171
Location 1	Stage 2	44.5	171
Location 1	Stage 3	45.1	171

As a result of the monitoring completed for the onshore TBM works, It is concluded that the operation of the TBMs will not create noise that will cause behavioural responses, TTS or AUD INJ to marine fauna.

Therefore, the TBM design and construction methodology meet the objectives of condition 7(b) objective to protect protected matters from adverse impacts of noise during construction of the tunnel and further controls, and monitoring is deemed necessary.

**10.2.1.2 Piling**

Piling is required to support the installation of the infall and outfall risers of the marine pipeline (saltwater intake and brine outtake pipeline).

Piling is considered the most significant noise source for the Project and has the greatest risk of leading to auditory injury of marine fauna species. Underwater noise modelling has been completed to for the different piling scenarios at the intake and outfall locations (Talis Consulting 2025). The modelling results identified that the whales (southern right whale and humpback whales) were the most sensitive species, having the largest Auditory Injury (AUD INJ) (formerly referred to as Permanent threshold shift- PTS) and temporary threshold shift distances (TTS).

The outfall casing (caisson piling) scenarios represent the activity with the greatest potential to cause AUD INJ, TTS, and behavioural responses in whales, with a modelled AUD INJ and TTS zones extend to approximately 7,750 m and 1,000 m (See Appendix C.3.1). Given the large modelled INJ and TTS zones for whales piling activities have been scheduled to avoid the avoid sensitive migration ecological windows for the southern right whale and humpback whale migration (especially the southern migration for humpback whales),

The caisson piling of the intake represents the piling scenario which has the largest TTS and AUD INJ for the Australian sea lion, with a modelled exceedance distance of 1,100 m and 100, respectively. Australian sea lions may be present throughout the year, however there is no clear ecological window defined for the species, and they are not known to breed near the Project area. While individuals may occasionally forage in the waters near the Project, their use of the area is not critical. With appropriate management, including the establishment of an Exclusion Zone to prevent AUD INJ and TTS (See Appendix C.3.1) impacts are expected to be limited to short-term behavioural disturbance, such as temporary avoidance of noise- affected areas.

The caisson piling of the intake represents the piling scenario which has the largest TTS and AUD INJ for the Indo-Pacific bottlenose dolphin with a modelled exceedance distance of 100 m and <50 m. With appropriate management , including an Exclusion Zone designed to avoid AUD INJ and TTS (See Appendix C.3.1), impacts are expected to be limited to temporary behavioural disturbance(avoidance of area) if individuals are present in the vicinity of piling avoidance of the area is likely to only be short-term.

The potential for underwater noise impacts to marine fauna from piling will be managed using strategies outlined within this plan. The implementation of these strategies, including the restriction of construction to periods outside of critical whale migration windows, is expected to result in outcomes that achieve the EPA’s objective for



marine fauna. These strategies, together with the short-term nature of the piling phase, it is unlikely to significantly impact marine fauna in the Project area.

**10.2.1.3 Drilling**

Drilling is required to core out the pile casing so that concrete can be poured. Drilling produces non-impulsive/continuous noise, which has a low source level and low vibrations. Drilling is not likely to lead to auditory to marine fauna, but rather potential behavioural response or masking. The noise modelling within the ERD (Water Corporation 2022), found that the impact zones for PTS (now known as AUD INJ) onset for marine mammals were <50 m for low frequency (LF) cetaceans (e.g. baleen whales) and less than 10 m for very high frequency (VHF) cetaceans (e.g. dolphins). Under the same operating condition and exposure period, the impact zones for TTS onset are less than 500 m for LF cetaceans and less than 200 m for VHF cetaceans. For Other marine carnivores in water (OCW) (Australian sea lion) for both scenarios PTS was <20 m and TTS of <40 m. The implementation of appropriate management strategies, including avoidance of construction activities outside of the whale’s migration, is unlikely to significantly impact marine fauna in the Project Action area.

**10.2.1.4 Vessels**

Vessels generate continuous (non-impulsive) underwater noise, which is unlikely to cause temporary threshold shift (TTS) or auditory injury (AUD INJ) given the comparatively lower source levels associated with non-impulsive sound.

However, prolonged or repeated exposure may lead to behavioural responses in marine fauna. In coastal areas where recreational boating is common, many coastal-dwelling marine mammals are known to rapidly habituate to such noise sources (Southall et al. 2021; Erbe et al. 2025).

A Jack-Up Barge (JUB) serves as a stationary platform from which construction activities will be undertaken. As the JUB is not self-propelled, it will require the support of marine vessels for its operation, including towing to site, deploying and retrieving anchors, transferring crew, and delivering supplies.

A tug will be required to tow the JUB to its location and to perform anchor handling duties (running the JUB’s anchors to where they will be dropped) to secure the JUB into its position within the Action Area. Towing and anchor-handling operations undertaken by the tug vessel will generate underwater noise that may cause disturbance to marine fauna. A Tug will be required to tow dumb barges for the supply of materials to the JUB. Control measures will be implemented to minimise potential disturbance impacts associated with tug-generated noise on marine fauna.

Crew transfer vessels, typically 12–15 m in length, will be used to transport personnel and small supplies to and from the JUB. Although the underwater noise generated by these vessels is expected to be lower than that produced by tugs, control measures will also be implemented to minimise potential disturbance on marine fauna.

Utility vessels, which are generally intermediate in size between tugs and crew transfer vessels, may be used as an alternative, depending on operational requirements. Similar control measures will be applied to manage and reduce potential underwater noise impacts on marine fauna.

Underwater noise modelling was completed by GHD (2022) as part of the Alkimos Seawater Desalination Plant Project approval (WA EPA MS 1207, EPBC 2019/8453). A summary of the modelled vessel noise, anchor handling supply tug, is presented in Table 11. (Note: the modelled vessel is significantly larger and noisier than the tugs that will be used on the Project.) The assessment of potential impacts in relation to underwater noise generated by vessels was assessed within the ERD and determined with the development of a CMEMP that significant residual impacts are not expected (Water Corporation 2022).

*Table 11: Marine mammal PTS/TTS cumulative impact zones from non-impulsive noise during tug transit (Scenario 4: pull/push to relocate jack-up from shore to intake/outfall diffuser) — 1-hour exposure. Adapted from GHD (2022). Table 11: Marine mammal PTS/TTS cumul*

Marine mammal hearing group	PTS onset - Weighted SEL24hr	PTS onset - Distance (m)	TTS onset - Weighted SEL24hr (dB re 1 µPa <sup>2</sup> -s)	TTS onset - Distance (m)
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	(dB re 1 $\mu\text{Pa}^2\cdot\text{s}$ )			
Low frequency cetaceans (LF)	199	40	179	485
High frequency cetaceans (HF) - Dolphins	198	10	178	100
Other marine carnivores in water (OCW) – Sea lions	219	-	199	20

The potential impacts of underwater noise from marine support vessels on marine fauna will be managed using strategies outlined within this plan.

Australian sea lions and Indo-Pacific bottlenose dolphins are expected to occur infrequently within waters immediately around the Project footprint, primarily when transiting or opportunistically foraging, and are not restricted to the area (Water Corporation 2022). In contrast, both species are routinely recorded using adjacent coastal habitats, particularly Cockburn Sound and the Kwinana Shelf, where recreational and commercial vessel traffic is substantial and year-round (Chabanne 2024; Chabanne et al. 2017; Salgado Kent et al. 2024). Male Australian sea lions undertake short, mobile trips between haul-out sites and shallow coastal foraging grounds across the Perth nearshore (e.g., Carnac/Seal Islands to Rottnest and southwards), inherently moving into and out of vessel acoustic footprints over short timeframes (Salgado Kent et al. 2024). Likewise, resident dolphin communities use key areas within Cockburn Sound that overlap busy boating corridors (Chabanne 2024; Chabanne et al. 2017). Indo-Pacific bottlenose dolphins have also been recorded within Marmion Marine Park (~10 km south of the Project), indicating occasional movements through the broader coastal mosaic (Water Corporation 2022).

Given this mobile behaviour and the higher baseline vessel activity documented in adjacent areas compared with the waters off Alkimos, the probability that an individual sea lion or dolphin would experience a continuous close proximity exposure to elevated boat noise at the Project site is low. This is further reduced by operational patterns: tugs produce their highest levels while transiting but operate at lower power (and lower source levels) during on-site support. Whales (e.g. humpback) are present mainly during seasonal migrations and typically transit past the area; there are no recognised calving, nursery, or resting habitats within the immediate footprint. Overall, the evidence supports that sea lions and dolphins use the Project area infrequently, while adjacent coastal zones already expose these species to substantial, routine vessel activity, consistent with the conclusion that prolonged harmful exposure from Project-related vessel noise is unlikely.

### 10.2.2 Turbidity

Suspended sediments, and sedimentation, have the potential to significantly impact upon marine fauna through multiple pathways, these include:

- reduction of light levels by increased turbidity
- clogging of fauna feeding and respiratory structures by sediments
- mobilisation of nutrients and/or contaminants in dredged sediments.

Additionally, suspended sediment plumes may reduce biological functioning by clogging feeding mechanisms or by smothering foraging habitats. Plumes of suspended sediments can impact marine fauna by reducing light penetration through the water column impairing visibility during foraging and potentially leading to reduced growth or to death of light-dependent benthic habitats on which they feed on. Unusually high concentrations of total suspended solids (TSS) may lead to direct and indirect impacts to marine fauna, if they persist for long periods. Direct effects may result due to abrasion or the clogging of filtration mechanisms. Indirect effects may stem from increased turbidity leading to altered light regimes and resultant changes in feeding efficiency and behaviour (Water Corporation 2022).

The potential for impacts to the marine environment following an increase in turbidity was investigated through a desktop assessment (Water Corporation 2022). During the drilling period, the mobilisation of drill cuttings can result in increase may cause a temporary increase in turbidity and increased TSS, near the drilling sites. Piling works are expected to result in temporary, localised increase in turbidity, generally within 10 m from the pile location.



Given the scale of the Project, localised nature and the implementation of appropriate management the impacts are expected to be negligible, and it is unlikely to represent a significant impact to marine environmental quality, BCH or marine fauna.

### 10.2.3 Smothering

The risk of smothering during construction from drilling was assessed within the ERD (Water Corporation 2022). The placement of material on the seabed will be completed by a transfer hose and placement will be controlled by a diver to ensure material placement is relatively level and does not create unnecessary materials mounds potentially generating water quality concerns in the short term. Further, the Project has been designed to avoid construction and placement of material away from seagrasses and macroalgal communities as reasonably practicable.

### 10.2.4 Vessel strike

Vessel strike is a known threat to marine fauna, identified in the south-west marine bioregional plan (DSEWPaC 2012) as a threat of potential concern for the southern right whale and a threat of least concern for the Australian sea lion and humpback whale. However, vessel strike is also known to effect Australian sea lions, bottlenose dolphins and shark species. The speed that the vessel is travelling has an influence on the extent of the injury to fauna. Laist (2001) found significant increase in the risk of vessel collision between marine megafauna and vessels at speeds >10 knots. Speeds >14 knots significantly increase the chance of lethal injury from a vessel collision.

As identified in the ERD (Water Corporation 2022) the risks are considered low due to the low occurrence of marine mammals in the area, together with the nature of the construction vessels, which will be stationary or slow-moving (<10 knots) during the construction phase. The potential for injury to marine mammals will be managed by limiting the construction activities to periods outside the critical marine mammal migration windows.

Due to the distance below the seabed and the **slow-moving** cutting face of the TBM, it is not expected to have a detrimental impact of migratory species

It is acknowledged that there is a potential impact on Migratory species particularly with the transition of the barge into position during migratory season as this is the most likely time of an actual encounter with Marine Mammal species. However, with the appropriate mitigation measures, including as per EPBC 2019/8453 MFOs must be in an elevated position to maintain 360 degrees of vision around the operation, it is expected that potential impacts can be effectively managed and is unlikely to significantly impact marine fauna in the Project Action area.

### 10.2.5 Introduced marine species

The potential for the introduction of invasive marine species (IMS) was assessed during the referral stage through a desktop assessment. The primary mechanism for IMS incursion is through biofouling of vessel hulls and equipment entering the construction area from international or interstate waters. Introduction of IMS has been identified as a potential risk given the number of vessel movements during the construction phase. The risk of IMS incursion mitigated through ballast water risk assessment, compliance with National biofouling management guidelines for non-trading vessels (Marine Pest Sectoral Committee 2018), the Australian Ballast Water Management Requirements (DAWE 2020), and appropriate monitoring and reporting procedures. It is expected that potential impacts can be effectively managed and is unlikely to significantly impact marine fauna in the Project Action area.

### 10.2.6 Hydrocarbon spills

The potential for significant hydrocarbon spills is considered low (Water Corporation 2022). Any spills, if they occur at all, are expected to be limited to small volumes of oil, lubricants or diesel fuel. Hydrocarbon use will be managed carefully under the International Maritime Organisation's (IMO) International Convention for the Prevention of Pollution from Ships (MARPOL). All refuelling is to be via fully closed line connections from the source of the fuel to the plant operating. In the unlikely event of a spill, there are hydrocarbon booms on board the barge to contain the spill.



### 10.2.7 Marine debris

The injury and fatality to vertebrate marine life caused by ingestion of, or entanglement in, harmful marine debris is listed as a key threatening process under the EPBC Act, and as such the Threat Abatement Plan for the Impacts of Marine Debris on the Vertebrate Wildlife of Australia's Coasts and Oceans (DoEE 2018). Marine debris has been identified as a threat of concern to Australian sea lions, and threat of potential the humpback whale, and southern right whale (DSEWPaC 2012).

General waste is expected with any construction activity and sources of marine debris from the Project activities include direct disposal into the marine environment or wind-borne litter from vessels or landside infrastructure. Marine fauna can be impacted by debris entering the marine environment potentially leading to injury or mortality, through entanglement or plastic ingestion. With all waste and debris being appropriately disposed of, store and managed the likelihood of waste and debris entering the marine environment can be prevented.

### 10.3 Risk assessment

Environmental risk assessment will be carried out throughout the Project delivery in accordance with CW03524-PM-0000-PLN-0010 Risk Management Plan. The risk assessment is presented in Appendix A. Risk identification will be facilitated through meetings (e.g. risk and opportunity meetings, toolbox talks, pre-work briefings and site inspections) and via the usage of specific tools (including the Project Risk and Opportunity Register, safe work method statements (SWMS), hazard observations and environmental checklist). Table 11 below presents the overarching marine risk assessment.

During the construction all Project staff are responsible for identifying environmental risks, assessing and managing them in consultation with relevant Project and environment teams.

The review of specific Project environmental risks may be triggered by a change in the construction methodologies, changes in materials used, legislation requirements or unexpected risks which may come to light at a later stage. Upon identification of additional potential impacts, each relevant management and monitoring sub plan that is part of this CMEMP will be updated accordingly to include and manage the identified risk.

Given the Project now involves piling, which is likely to be a significant noise source and potential risk to marine mammals. To ensure risk are appropriately considered and mitigated for underwater noise modelling has been undertaken

Table 12 : Marine Risk Assessment summary (see Appendix A)

Potential impacts	Context	Inherent Risk	Residual Risk
Impacts to marine fauna from underwater noise from piling activities that form part of the marine pipeline	Impacts include: Auditory Injury (AUD INJ) (formerly referred to as Permanent threshold shift- PTS): Permanent damage to inner ear or tissue, TTS, and behavioural changes (e.g.) temporary behavioural avoidance.	High	Low
Impacts to marine fauna from underwater noise from underwater drilling activities that form part of the marine pipeline	Drilling produces continuous underwater noise. It involves cutting or boring into the seabed with a rotating drill or auger, rather than hammering. It could cause, communication masking and behavioural changes (e.g., area avoidance which could impact foraging opportunities, or physiological responses associated with stress and increased energy expenditure)  Is less likely to result in Auditory Injury (AUD INJ) (formerly PTS) and TTS).	Low	Low



Potential impacts	Context	Inherent Risk	Residual Risk
Impacts to marine fauna from underwater noise from vessel noise activities	Vessel types include job, barge, tug, workboats and crew transfer vessels. Vessels produce continuous underwater noise, and could cause communication masking and behavioural changes (e.g., area avoidance which could impact foraging opportunities, or physiological responses associated with stress and increased energy expenditure)  Is less likely to result in Auditory Injury (AUD INJ) (formerly PTS) and TTS).	Low	Low
Injury/mortality of Marine Mammals from vessel strike/collisions (collision/entanglement)	The presence of vessels and machinery during construction activities may interact with Marine Mammals and potentially result in Marine Mammals collision. Construction also has the potential to contribute waste and building materials in the construction zone thereby increasing the possibility of Marine Mammals entanglement.	Low	Low
Impacts to marine fauna from underwater noise generated from tunnelling and beneath seabed marine pipeline construction	Tunnelling boring machine drilling between 15-20 meters under ground beneath seabed, and installation of six precast tunnel segments to form the pipeline. Noise generated from these activities will not be sufficient to permeate through the underground horizon to have any negative effect on marine fauna.	Low	Low
Reduced light and smothering/stressor effects (elevated TSS)	There is potential for periodic and/or short-term elevations in turbidity in close proximity to the work zone which may lead to indirect impacts to marine fauna and BCH.	High	Low
Loss of local biodiversity (introduction of IMS)	Construction has the potential to allow the settlement of Introduced Marine Species (IMS) via construction vessels, machinery and equipment.	Medium	Low
Toxicity effects on Marine Mammals (introduction of toxicants)	The potential release of toxicants (e.g. grouting materials, chemicals) during construction / commissioning has the potential to adversely impact marine fauna.	Low	Low
Injury/mortality of Marine Mammals from marine debris (entanglement)	Potential ingestion or entanglement of marine debris has the potential to adversely impact marine fauna.	Low	Low



## 10.4 Risk management process

ASWA’s risk management approach is to embed risk management into everything we do to achieve a best for Project outcome for every issue, risk and opportunity. All plans, procedures, processes, behaviour and governance are tailored with responsive, collaborative and coordinated risk-based methods, creating and implementing a robust risk management system to identify, assess, control, escalate, report and monitor specific Project risks.

As part of this approach, environmental risks will be identified, assessed and managed throughout Project delivery. A risk register which covers all stages of the Project will be maintained and updated throughout the D&C Phase by the ASWA Alliance, as highlighted in CW03524-PM-0000-PLN-0010 Risk Management Plan.

Potential impacts identified through risk identification processes for each of the key environmental factors and environmental risk aspects are addressed within each management and monitoring sub plan (see **Appendix B**).

## 10.5 Communication

### 10.5.1 Internal communication

Regular project management and coordination meetings will be held to monitor progress, discuss issues and plan upcoming construction activities. Environmental management will be a mandatory agenda item at such meetings.

#### 10.5.1.1 Meetings

Meeting where environmental topics and issues will be identified and discussed are the ones included in Table 13.

Table 13 : Environmental meetings

Type of meeting	Frequency	Leader and participants	Environmental topics discussed	Meeting actions
Pre-work briefing	Daily	<ul style="list-style-type: none"> <li>▪ Led by site supervisors or engineers with authority and responsibility for overseeing the project activities.</li> <li>▪ All construction personnel to attend</li> </ul>	<ul style="list-style-type: none"> <li>▪ Current and ongoing activities across the Project</li> <li>▪ Activities with the potential to impact the environment.</li> <li>▪ Discussion of environmental incidents/non-conformance and associated works</li> <li>▪ Identification of potential environmental risks connected to site activities.</li> <li>▪ Measures to avoid and mitigate environmental impacts to be implemented on site.</li> <li>▪ Roles and responsibilities</li> <li>▪ Review emergency response plans for potential environmental incidents and accidents.</li> <li>▪ Updates of management plans or</li> </ul>	<p>Feedback from the meeting translate in actions which need to be implemented by different Project personnel. Examples of actions from the meeting are:</p> <ul style="list-style-type: none"> <li>▪ Review work methodology or environmental procedures.</li> <li>▪ Review Site Environment Plans</li> <li>▪ Implement mitigation measures.</li> <li>▪ Undertake monitoring</li> </ul>



Type of meeting	Frequency	Leader and participants	Environmental topics discussed	Meeting actions
			environmental procedures	
Toolbox talk	Weekly or fortnightly	<ul style="list-style-type: none"> <li>▪ Led by site supervisor, safety officer, or a designated safety representative.</li> <li>▪ All construction personnel to attend</li> </ul>	<p>Various topics related to environmental protection and sustainability are discussed as the objective is to raise awareness among workers about the potential environmental impacts of their activities and to promote environmentally responsible practices. Below some examples of discussion topics:</p> <ul style="list-style-type: none"> <li>▪ Waste management</li> <li>▪ Spill prevention and recent incidents.</li> <li>▪ Erosion and sediment controls</li> </ul>	<p>Feedback from the meeting translate in actions which need to be implemented by different Project personnel. Examples of actions from the meeting are:</p> <ul style="list-style-type: none"> <li>▪ Review work methodology or environmental procedures.</li> <li>▪ Review Site Environment Plans</li> <li>▪ Implement mitigation measures.</li> <li>▪ Undertake monitoring.</li> </ul>
Project management meetings	Weekly	<ul style="list-style-type: none"> <li>▪ Led by Construction Manager</li> <li>▪ Key construction and management personnel to attend</li> </ul>	<p>Various topics related to environmental protection, sustainability, and regulatory compliance are discussed as the objective is to ensure that the Project is conducted in an environmentally responsible manner, minimising its impact on the natural surroundings and complying with relevant environmental regulations. Below some examples of discussion topics:</p> <ul style="list-style-type: none"> <li>▪ Environmental performance</li> <li>▪ Compliance with Environmental Regulations</li> <li>▪ Upcoming activities with the potential to impact the environment and mitigation measures to implement</li> </ul>	<p>Feedback from the meeting translate in actions which need to be implemented by different Project personnel. Examples of actions from the meeting are:</p> <ul style="list-style-type: none"> <li>▪ Review work methodology or environmental procedures.</li> <li>▪ Review Site Environment Plans</li> <li>▪ Implement mitigation measures.</li> <li>▪ Undertake monitoring</li> </ul>



Type of meeting	Frequency	Leader and participants	Environmental topics discussed	Meeting actions
Subcontractor coordination meetings	Weekly or fortnightly	<ul style="list-style-type: none"> <li>Led by Senior Project Engineer in charge for the subcontractor activities.</li> <li>Key construction personnel and subcontractors to attend</li> </ul>	<ul style="list-style-type: none"> <li>Upcoming activities with the potential to impact the environment and mitigation measures to implement.</li> <li>Identification of potential environmental risks connected to site activities.</li> <li>Review emergency response plans for potential environmental incidents and accidents.</li> <li>Updates of management plans or environmental procedures</li> </ul>	<p>Feedback from the meeting translate in actions which need to be implemented by different Project personnel. Examples of actions from the meeting are:</p> <ul style="list-style-type: none"> <li>Review work methodology or environmental procedures.</li> <li>Review Site Environment Plans</li> <li>Implement mitigation measures.</li> <li>Undertake monitoring</li> </ul>

## 11. Environmental management measures

### 11.1 Environmental management activities, controls and performance targets

ASWA’s environmental risk assessment conducted on the Project has identified key marine environmental factors and environmental risk aspects, including:

- Marine environmental quality (MEQ)
- Benthic communities and habitats (BCH)
- Marine fauna (Marine mammals).

Environmental controls required to mitigate or manage the marine environmental risks are outlined in the management and monitoring sub plan provided in **Appendix B**, along with background information, objectives and compliance requirements. Environmental management activities, controls and performance targets are outlined in **Appendix C** and detailed marine mammals management measures (management and monitoring sub plan) are provided in **Appendix B** and **Appendix C**. No brine shall be discharged during construction.



Table 14: Environmental Management Measures

Management target	Management actions	Trigger value	Responsible party	Monitoring	Reporting and evidence	Frequency/timing	Contingency
No impacts to marine fauna from piling	Two MFOs to be on duty at all times during piling operations, at least one of which will be a Level 1 MFO (See Appendix C.1). Piling scheduled to occur first in the construction program to avoid whale migration (May to November). Implement procedures outlined in Appendix B and , including: 30-min pre-start, 30-min soft-start, shut-down and low visibility procedures.	Sighting of marine fauna in Exclusion zone. Marine fauna in Management Zone (see Appendix B and ) Delays in piling into whale season or more than anticipated whale sightings.	Marine Superintendent ASWA MFOs	Two Level 1 MFOs to maintain continuous watch of Management Zones during all marine piling works (Refer to Appendix B and )	Marine fauna observations to be recorded in daily MFOs logs (Refer to Appendix B and C.1) Report incidents as outlined in Appendix 0	Two MFOs to be on duty at all times during piling operations, at least one of which will be at Level 1 MFO continuously monitor management zones during piling operations. Throughout piling activities (Refer to Appendix )	Adaptive management (C.5) will be implemented if higher than anticipated marine fauna sightings (e.g. whales present), which will require construction works to be halted until additional management measures can be implemented, these included but are not limited to: Additional MFOs Increased management zones Piling at energy levels below 90%.
	Piling restricted to daylight hours only. New pile installation cannot	Pile installation is not completed 30 min prior to sunset.	Marine Superintendent ASWA	Review of sunrise and sunset times at toolbox meeting.	MFO logs Piling logs	Throughout piling activities.	If pile installation not completed within 30 mins of sunset, contractor to contact Client to

Management target	Management actions	Trigger value	Responsible party	Monitoring	Reporting and evidence	Frequency/timing	Contingency
	occur within 1 hour of sunset.						evaluate situation. If pile installation was started prior to sunset is not completed prior to sunset, pile installation can be continued until completed for safety reasons.
	During soft-start procedures piling energy remain below 90%`	Piling logs indicate levels are exceeding 90% energy during soft-start.	Marine Superintendent ASWA	Piling logs	Daily piling logs to be provided to the Client.	For each pile and following stop work period >15 minutes	If piling logs indicate that soft-start is exceeding 90% energy then piling methods to be investigated, and engineering constraints to be investigated. Three days exceeding 90% then additional MFO's will be required to support the two Level 1 MFOs.
	Piling to be undertaken as efficiently as possible and	Damaged or faulty equipment.	Marine Superintendent ASWA	Daily inspections	Inspection reports	Daily	If equipment is found to be faulty or damaged is not used until



Management target	Management actions	Trigger value	Responsible party	Monitoring	Reporting and evidence	Frequency/timing	Contingency
	ensure equipment is maintained						repaired or is replaced.
Avoidance of injuries or deaths of marine mammals during construction activities (drilling)	Two MFOs to be on duty at all times during piling operations, at least one of which will be a Level 1 MFO (See Appendix ). Implement drilling procedures outlined in Appendix C.3.2., including: 30-min pre-start, 30-min soft-start, shut-down and low visibility procedures.	Sighting of marine fauna in Exclusion zone (see Appendix C.3.2.)	Marine Superintendent ASWA MFOs	Two MFOs to be on duty at all times during piling operations, at least one of which will be at Level 1 MFO to maintain continuous watch of Management Zones during marine Drilling (Refer to Appendix C . Drilling logs	Refer to Appendix C.3.2. Report incidents as outlined in Appendix 0	Daily throughout marine construction works	As provided in Appendix C.3.2. and Appendix C.6.
	During soft-start procedures drilling energy remain below 90%.	Drilling logs indicate levels are exceeding 90% energy during soft-start.	Marine Superintendent ASWA	Drilling logs	Weekly drilling logs provided to the client.	During all marine drilling works	In the event of noise generation proves unsatisfactory (exceeding 90% during soft-start), operations will cease, and adequate measures will be employed to modify or substitute work

Management target	Management actions	Trigger value	Responsible party	Monitoring	Reporting and evidence	Frequency/timing	Contingency
							processes to mitigate impacts.
	Drilling to be undertaken as efficiently as possible and ensure equipment is maintained	Damaged or faulty equipment.	Contractor	Daily inspections	Inspection reports	Daily	If equipment is found to be faulty or damaged is not be used until repaired or is replaced.
No incidences of marine fauna injury or death because of vessel strike/ noise.	<p>at least one of which will be a Level 1 MFO will be on duty at all times during vessel transit within the Action Area.</p> <p>All vessels are to adhere to standard set in the National Whale Watching Guidelines (DoEE 2017b) and the BC Regulations.</p> <p>Implement procedures outlined in Appendix C.6.</p> <p>Apply vessel approach distances (Appendix C.6.)</p> <p>The no approach zone is the area</p>	Marine fauna sighted within the Exclusion zone (500 m) (Refer to Appendix C.6)	Vessel Master MFOs	MFOs on duty anytime vessel is in transit within action area for the duration of the Project. Refer to Appendix C.6.	Daily MFO logs (Refer to Appendix .) Report incidents as outlined in Appendix 0	Daily throughout marine construction works (Refer to Appendix C.6.) Continuous MFO observations while vessel is in motion.	<p>Should a travelling dolphin enter the No Approach Zone, including bow riding, the vessel shall either maintain its course and speed, or maintain its course and gradually slow down.</p> <p>If higher than anticipated marine fauna sightings in the Project Action area then), which will require construction works to be halted until additional management measures can be</p>



Management target	Management actions	Trigger value	Responsible party	Monitoring	Reporting and evidence	Frequency/timing	Contingency
	<p>directly in front and behind fauna where boats should not enter (cut in front of fauna or follow fauna) and are a zone of total vessel exclusion (species specific distances presented in )</p> <p>The caution zone is the area surrounding fauna in all directions where vessel speeds are limited to no more than 6 knots</p> <p>No more than three vessels in caution zone</p>						<p>implemented, these included but are not limited to:</p> <p>Increase in the number and/or level of MFOs present while vessels are transiting</p> <p>Further reduction in vessel speeds</p>
	<p>Maximum speed of 10 knots for all Project vessels within the Project Action Area.</p>	<p>Vessel speed &gt;10 knots</p>	<p>Vessel master Contractor</p>	<p>All vessels operating within the Project Action Area to be fitted with an Automatic Identification System (AIS)</p>	<p>Vessel logs (weekly vessel logs to be provided)</p>	<p>At all times when operational in the Project Action Area</p>	<p>If marine fauna are present vessel speeds to be further reduced to 6 knots (see Appendix C.6.)</p> <p>Vessels exceeding speed limits are to be</p>

Management target	Management actions	Trigger value	Responsible party	Monitoring	Reporting and evidence	Frequency/timing	Contingency
							investigated and to continue operations must provide daily logs and have a client representative present to ensure vessel speed adherence.
	Vessels to remain within defined routes within action areas	Vessel movement outside of route.	Vessel master	All vessels operating within the Project Action Area to be fitted with an AIS.	Vessel logs (weekly vessel logs to be provided)	At all times when operational in the Project Action Area	Independent verification of barge GPS location.
TTS Threshold Levels (dB) for species hearing groups not to exceed at the piling Exclusion Zone boundary.	<p>) Undertake underwater noise validation during initial piling for each site and pile type.</p> <p>Take audio recordings in the dominant propagation sector; the direction of greatest predicted travel of piling noise, at three zones:</p>	Measured level at the TTS boundary for any hearing group exceeds the applicable TTS threshold.	ASWA Contractor Environmental Consultant/ noise expert	<p>Monitoring location based on the modelling outputs to ensure worst-case location.</p> <p>Minimum measurement of first pile installs at each location (intake and outfall) and worst-case scenario</p>	<p>Preliminary noise results validation memo produced following noise validation monitoring.</p> <p>Final report: summarising validated zones and any model updates.</p>	Minimum first pile installs (each type) at each location and worst-case scenario (deepest pile)	If any hearing group's TTS threshold is exceeded beyond the boundary, pause piling, expand the exclusion zone, brief crews/MFOs, and resume only after re-validation confirms compliance; continue underwater noise monitoring

Management target	Management actions	Trigger value	Responsible party	Monitoring	Reporting and evidence	Frequency/timing	Contingency
	Near-field (100-200 m) to characterise the source.			(deepest pile at HAT)			
No complaints related to marine mammals from the local community Control measures to be used to minimise excessive noise and vibration impacts on the environment.	Community informed of the works 1 week minimum of piling works commencing inclusive of periods of works & duration Construction contractor specifications will require that all construction work will be carried out in accordance with control of noise practices set out in Section 4 of Australian Standard 2436 "Guide to Noise Control on Construction, Maintenance and Demolition Sites Implement procedures outlined in	Public complaint	ASWA	Physical inspections during works with the potential to generate noise impacts, e.g. heavy equipment operation.	Noise monitoring may be undertaken if ongoing complaints are received. Weekly Inspection Checklist. Equipment Maintenance Register. Complaints to be investigate within 7-days.	1 week prior to commencing works Duration of construction works (daily or weekly)	If continuous complaints, works to be investigated by the Client.

Management target	Management actions	Trigger value	Responsible party	Monitoring	Reporting and evidence	Frequency/timing	Contingency
	Appendix B and C.1						
No loss of BCH outside of Project DE	Direct removal of BCH (including 'bare sand') shall be restricted to within a 10 m radius of the proposed drilling sites.	Construction outside of the localised Project Action Area.	ASWA Marine Superintendent	All construction vessels to be fitted with AIS Ongoing checks of GPS locations	Daily construction logs Vessel logs GPS logs	Daily during construction	Work to be stopped, locations and plans to be reviewed and the Minister to be contacted.
	Visual inspections of sediment plumes during construction (drilling, vessel movements and piling)	Significant visual plume outside of the localised Project Action Area.	ASWA Marine Superintendent	Ongoing checks of GPS locations Ongoing visual checks for turbidity within the marine construction area	Contractor vessel logs	Daily during construction	If a visible plume is identified during piling, then considerations will be made for mitigation options such as implementation of a silt curtain around the piling activity.  If silt curtain is not possible due to the nature of the work or environmental conditions (e.g. water depth), piling or drilling energies to be reduced to a

Management target	Management actions	Trigger value	Responsible party	Monitoring	Reporting and evidence	Frequency/timing	Contingency
							level where plume is localised in the Project Action Area.
Minimise plume from drilling and piling to reduce total suspended solids (TSS)	Visual inspections of sediment plumes during construction (e.g. drilling, vessel movements) and piling	Significant visual plume outside of the localised Project Action Area.	Marine Superintendent	Ongoing visual checks for turbidity within the marine construction area	Contractor vessel logs to report on visible plumes, use of silt curtains	Daily during construction	Reduce piling and drilling intensity if significant plume observed outside of the development envelope.  If a visible plume is identified during piling, then a silt curtain around the piling activity may be implemented if water depth allows it.
No introduction and/or spread of IMPs	Document the inspection carried out on construction vessels for DPIRD approval	Identification of IMP	Marine Superintendent	Prior to the commencement of the construction activities, the contractor shall prepare a Project Execution Plan, documenting the approach to inspection,	Submit the IMS section of the Project Execution Plan to DPIRD for approval.	Prior to commencement of construction	If IMP are identified they are to be reported as to DPIRD and response to be informed by appropriate experts (See Appendix 0)

Management target	Management actions	Trigger value	Responsible party	Monitoring	Reporting and evidence	Frequency/timing	Contingency
				for DPIRD for approval.			
	All vessels to comply with relevant ballast water management requirements	Ballast water management not appropriate. Discharge of ballast water. Identification of IMS	Vessel master	Vessel logs Vessels ballast water management	Vessel logs and management plans.	Prior to arrival to Project Action Area During of construction works	Vessel not to enter Project Action Area
	All vessel shall comply with the National Biofouling Management Guidelines for Non-Trading Vessels (Marine Pest Sectoral Committee 2018).	Biofouling management not appropriate. Identification of IMS	Vessel master	Vessel's biofouling management plan.	Vessel's biofouling record book.	Prior to arrival to Project Action Area During of construction works	Where delays in construction activities and vessels are spending prolonged periods in the action area, then underwater inspection of hull to be completed.
	Construction vessels to be obtained from WA waters.	Last port of call outside WA.	Vessel master	Vessel's biofouling and ballast water management	Vessels logs and AIS data.	Prior to arriving in WA waters.	Where vessels sourced from waters outside of WA, vessel to complete the verification on arrival in the pre-arrival report in line with DPIRDs requirements.  If vessel from outside of Australian waters, must

Management target	Management actions	Trigger value	Responsible party	Monitoring	Reporting and evidence	Frequency/timing	Contingency
							complete and submit a submit a non-commercial vessel pre-arrival report to DPIRD.
No hydrocarbons or waste spills or no release of toxicants.	Ensure all activities comply with the International Maritime Organisation International Convention for Prevention of Pollution from ships. Prior to the commencement of the construction activities, the contractor shall prepare a Project Execution Plan, documenting the agreed responses / management actions in the event of a spill.	In the event of a spill Visible plume, or algal bloom.	ASWA	Spill plume or leak	Review Construction method and ensure plant and equipment is operating and being operated competent operators Daily logs and toolbox	Daily during construction	In the event of a spill, the contractor shall document the spatial extent of the hydrocarbon spill using visual cues and GPS.  In the event of visible plume or algal bloom construction works to be halted and ASWA to contact DWER.
	In the event of an unplanned spill, implement an appropriate management response to		ASWA Marine Superintendent Vessel Master Client	Reactive monitoring	Contact	Immediately.	

Management target	Management actions	Trigger value	Responsible party	Monitoring	Reporting and evidence	Frequency/timing	Contingency
	minimise impacts to the marine environment						
	Implement procedures to maintain clean and tidy work areas, including the safe storage of all potentially hazardous substances.	Unsafe storage of hazardous substances.	ASWA Marine Superintendent Vessel Master	Daily toolbox meetings	Onsite inductions Weekly inspections	All crew to complete induction prior to arrival to site. Daily meetings Weekly inspections	Daily toolbox meetings to flag any issues and equipment to be updated. If work areas found to be unsatisfactory inspections to be increased to daily for at least 2 weeks.
	Ensure contractors have access to and know how to use hydrocarbon spill kits; and maintain access to all necessary materials for mitigation of accidental spill events.	In the event of a spill.	ASWA Marine Superintendent	Daily toolbox meetings	Onsite inductions Weekly inspections	All crew to complete induction prior to arrival to site. Daily meetings Weekly inspections	
No reported negative impacts on marine fauna attributable to marine debris.	MFOs will indirectly assist in the identifying and reporting hazardous marine debris during construction.	Marine debris sighted in the Project Action area.	MFOs	Daily logs	Incident report	Daily during construction works	If marine fauna identified entangled or injured in marine debris incidents to be reported to DBCA and

Management target	Management actions	Trigger value	Responsible party	Monitoring	Reporting and evidence	Frequency/timing	Contingency
	Implement standard waste minimisation and reduction strategies, including providing facilities for waste disposal.		Marine Superintendent Marine Area Manager Sustainability and Environment Manger	Daily toolbox meetings	Onsite inductions Weekly inspections	All crew to complete induction prior to arrival to site. Daily meetings Weekly inspections	DCCEEW as soon as possible/within 24hours



## 11.2 Environmental management maps and diagrams

### 11.2.1 Site environment plans (SEP)

Specific SEPs will be developed and shared with all construction personnel. Each SEP will include:

- Map of the site with environmental features highlighted.
- Description of measures and mitigation actions to address potential impacts on site
- List of relevant responsible personnel (such as the Alliance Manager and engineers, Environmental Representative, Safety Representative and Stakeholder Representative)
- List of relevant management and monitoring sub plans applicable for the site.

SEPs will be revised at least quarterly or as conditions change substantially to reflect site changes and therefore implementation measures and controls.

An example of a SEP is included in Appendix E.

## 11.3 Environmental monitoring

During construction, practices will be implemented to ensure efficiency of mitigation of the environmental impacts associated with plants and equipment:

- Plants and equipment will undergo daily plant prestart inspection and serviced as per manufacturer's recommendations to ensure integrity and good working order.
- Regular inspection of vessels
- Noise generating sources maintained to ensure they are not generating excess noise.
- Equipment operating within the standard or approved working hours.
- Removal of the equipment from site, if found to be **not** suitable for ongoing use due to excessive noise or vibration.

Plant and equipment will need to comply with all the relevant regulations and standards to ensure high safety performances, as highlighted in the CW03524-PM-0000-PLN-0016 WHS-PLN Health & Safety Management Plan.

Environmental monitoring in accordance with Environmental Approval requirements will be carried out as per Project requirements and specifications (Table 14). Monitoring requirements are outlined in the management and monitoring sub plan provided in Appendix B and Appendix C.

The environmental monitoring program will be the responsibility of the environment team, and include:

- Sufficient training of personnel
- Underwater acoustic monitoring to be completed for the duration of high impact construction works (based on acoustic modelling currently being undertaken).
- Arranging of specialist consultants when required
- Coordination of monitoring equipment and materials
- Coordination of sample collection, documentation and delivery
- Ensuring frequency and methodology is in accordance with all licences, permits, approvals, Australian Standards and guidelines and any other industry standards.
- Data management and representation of results
- Reporting non-conformances and implementing corrective actions.
- 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 as per EPBC condition 30.

Where monitoring finds that management measures have not been implemented, remedial actions will be undertaken as per the specified contingencies (Table 14).

Field data will be recorded electronically where possible and transferred into monitoring results spreadsheets. In addition to measured parameter readings, date, time, sampling point/location and name of the samples will be recorded.



### 11.3.1 Site inspections

Environment site inspections will be carried out though the duration of the Project and by various Project personnel:

- Environment team will conduct routine weekly inspections, to assess the environmental compliance on site and identify potential issues and controls to be implemented. Issues arising from the inspection will be addressed through corrective actions with specific addressed person and timeframe. Ad-hoc inspections will be carried out during activities deemed to be critical and post environmental incidents.
- Site supervisory staff will conduct routine daily and weekly inspections to assess the environmental compliance in the area of their supervision and identify potential issues and controls to be implemented.
- Site supervisory staff and the environment team will conduct ad-hoc inspections when requested by the Corporation or other regulatory body, to assess the environmental compliance on site and identify potential issues and controls to be implemented.
- Any ASWA member or subcontractor may raise environmental issues and request corrective actions or controls be implemented, by attending specific meetings (as per section 10.5.1.1), using hazard observations or environmental checklists or directly contacting the Environment team.

An electronic checklist will be completed during the site inspections, offering the advantages of real-time data collection, ease of sharing and collaboration, and the ability to track and analyse inspection results over time.

The digital nature of the checklist allows also for streamlined data management and promotes transparency and accountability in the inspection and corrective action processes.

## 11.4 Corrective actions

### 11.4.1 Environmental incidents

Environmental incidents are defined as events that cause or potentially cause harm to the environment, with the level of significance assigned according to definitions in Table 15.

Table 15: ASWA’s Environmental incident severity classifications

Class	Description
Class 1 (Low)	Insignificant or no environmental impact, non-adherence to procedure <ul style="list-style-type: none"> <li>▪ Negligible or very low environmental impact</li> <li>▪ Short-term material loss from site however no evidence of environmental harm, no protected habitat or species affected.</li> <li>▪ Impact confined to small area within Project Boundary</li> <li>▪ Procedural or administrative breach</li> </ul> – Notification to Water Corp within 24Hrs
Class 2 (Minor)	<ul style="list-style-type: none"> <li>▪ Minor environmental impact, within site boundaries, and easily cleaned up.</li> <li>▪ No protected habitat or species affected.</li> </ul> – Pollution or degradation, which has short-term and reversible effects on the environment and/or community. <ul style="list-style-type: none"> <li>– Minor discharge of sediment that does not impact on aquatic habitat.</li> <li>– Minor spill of hydrocarbons/chemicals that is cleaned and rectified.</li> <li>– Minor loss or impact on native flora/fauna that is not threatened/angered.</li> </ul> – These types of incidents are generally less environmentally or legislatively serious but must be identified and reported to track potential trends that may lead to more serious incidents (Class 3, 4 and 5) <ul style="list-style-type: none"> <li>– Notification to Water Corp within 24Hrs</li> </ul>
Class 3 (Serious)	Significant environmental impact, medium term effect, can be rectified to pre-existing conditions. Environmental incident involving protected species or habitat. <ul style="list-style-type: none"> <li>▪ Contaminate entering a water body that has a potential to cause or has caused environmental harm that is not material environmental harm.</li> <li>▪ Environmental incident involving protected species or habitat.</li> <li>▪ Chemical/fuel/bitumen spill to water</li> </ul>



Class	Description
	<ul style="list-style-type: none"> <li>▪ Incorrect disposal of controlled waste</li> <li>▪ Inadequate erosion/sediment controls causing off-site impacts.</li> <li>– Notification to Water Corp within 30 mins</li> </ul>
Class 4 (Major)	<ul style="list-style-type: none"> <li>▪ Major environmental consequences</li> <li>▪ Long term effect or damage to protected species or habitat.</li> <li>▪ Damage to heritage item or structure</li> <li>– Major spill (land or water)</li> <li>– Exposure of acid sulphate soils resulting in fish kill.</li> <li>– Pollution event that is persistent but reversible effects on the environment. Has the potential to or has resulted in material harm.</li> <li>– Notification to Water Corp within 30 mins</li> </ul>
Class 5 (Catastrophic)	<ul style="list-style-type: none"> <li>▪ Permanent damage to the environment, extreme breach of procedure or failures of process that result in actual offsite environmental harm, or residual onsite environmental harm.</li> <li>▪ Endangered species and habitat destroyed.</li> <li>– Major and persistent discharge of pollutant off-site/to land or water.</li> <li>– Major long-term impact on a sensitive environment</li> <li>– Major loss or impact to protected flora or fauna.</li> <li>– Destruction of heritage item of Significance</li> <li>– Incident resulting in prosecution.</li> <li>– Notification to Water Corp within 30 mins</li> </ul>

Incidents occurring in the terrestrial component of the project (for instance, pollutant discharge or chemical run-off) have the potential to cause harm to the marine environment and therefore are managed accordingly.

All incidents, no matter how insignificant, must be reported verbally to the Sustainability and Environment Manager, by the supervisory personnel of the area where the incident occurred, and in writing by the environmental personnel involved in the investigation as shown in Figure 1. Environmental incidents will be recorded in the Lucidity software. Corrective and preventative actions are also raised and tracked in Lucidity. An incident cannot be closed out until all associated corrective and preventative actions raised have been closed.

Incident investigation will take place as soon as possible after the incident has occurred and focus on identifying the causes of the incident so that appropriate remedial and preventative control measures can be identified and implemented.

Incidents shall be reported to the Corporation’s Project Delivery Manager, Ryan Smith (0400 244 918) within the time frames stipulated in Table 15.

Notify DEECCW electronically, within 2 business days of becoming aware of any incident and/or potential non-compliance and/or actual non-compliance with the conditions or commitments made in a plan in accordance with EPBC Conditions 37 & 38.

The depth of the investigation, the composition of the investigation team (which will include as a minimum an environment team member) and the reporting requirements will vary subject to an assessment of the actual and potential consequences, and therefore incident classification as per Table 16.

*Table 16 : Incident investigation according to Incident classification*

Classification	Incident investigation
Class 1 (Low) and Class 2 (Minor)	<ul style="list-style-type: none"> <li>▪ Generally, an in-depth investigation is not required for these types of incidents and a general analysis will take place to determine the root causes of the hazard or incident.</li> <li>▪ Corrective actions will generally be able to be implemented immediately, and the report closed out</li> </ul>
Class 3 (Serious)	<ul style="list-style-type: none"> <li>▪ Dependent upon the preliminary assessment of the incident, it is the responsibility of the Project Manager in consultation with the Environmental Manager to determine whether a more thorough investigation is required (such as ICAM or similar). The</li> </ul>



Classification	Incident investigation
	degree of investigation for Class 3 incidents is dependent upon severity of injury/damage/impact
Class 4 (Major) and Class 5 (Catastrophic)	<ul style="list-style-type: none"> <li>▪ A formal and thorough investigation (ICAM or similar) must be undertaken for all Class 4 and 5 incidents. Investigations must only be conducted by personnel who are formally trained and competent in investigations. Specialists and or subject matter experts may be required to assist in the investigation process</li> </ul>

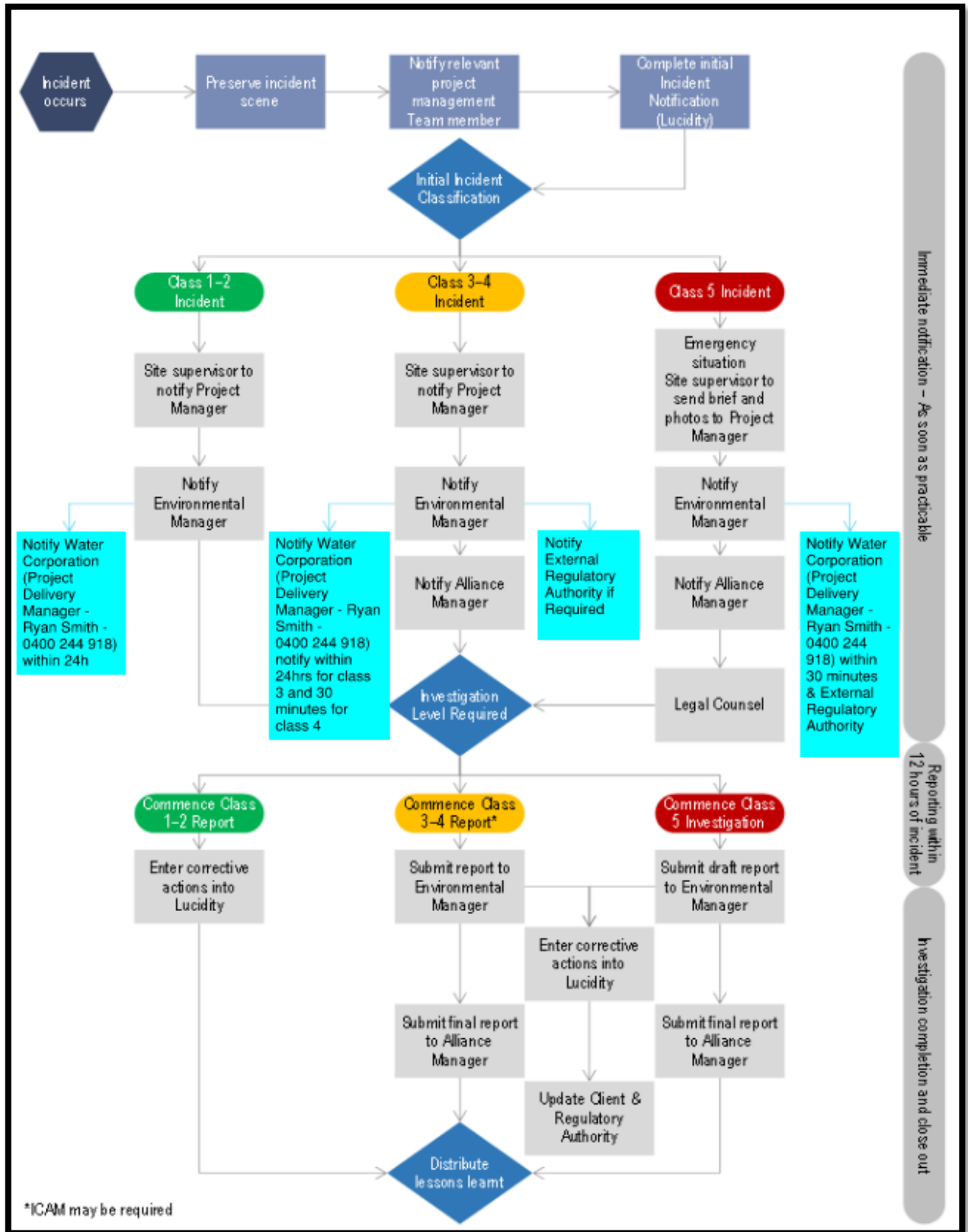
Upon completion of the investigation, the findings and recommendations will:

- Be entered into the Lucidity software along with the corrective actions implemented or to be implemented.
- Be distributed to the relevant site staff for discussion at pre-start or toolbox meetings (distribute lessons learnt)
- Inform the update of relevant document or procedures, to avoid recurrence of the incident.

Internal; Incident response flow chart is detailed in Figure 1. Compliance with conditions 37-39 shall be adhered to.



Figure 1: Environmental incident notification flow chart.



ASWA will report all actual and potential environmental incidents to the Corporation:

- Incidents involving wastewater or injury to marine mammals, as soon as practical, not exceeding 30 minutes.
- All other incidents, as soon as practical, not exceeding 24 hours.

#### 11.4.1.1 Environmental near misses

Environmental near miss events involve situations or activities that could have resulted in negative environmental impacts, such as pollution, contamination, or damage to ecosystems, but were narrowly avoided due to timely intervention or chance. Examples of near misses include if a container with hazardous substances almost tipped over or leaked but was secured in time to prevent a spill; or hazardous materials were temporarily stored incorrectly or in an insecure manner, but the issue was identified and rectified promptly.

Environmental near misses are essential to identify and learn from, as they provide valuable opportunities for improving environmental management practices and preventing future incidents that could cause actual harm to the environment.

Near misses will be identified through site inspections and audits, environmental monitoring, learnings from other projects and trending analyses.

Environmental near misses will be investigated to understand the root causes and contributing factors. The investigation (which will include as a minimum an environment team member) will take place as soon as possible after the occurrence and focus on identifying the causes of the near miss so that appropriate remedial and preventative control measures can be identified and implemented.

All near misses must be reported verbally and in writing. Near misses will be recorded in the Lucidity software.

#### 11.4.2 Non-conformance, preventative and corrective actions

A non-conformance is identified as a clear breach of a requirement of a Project environmental requirement, approval condition, project management plan, or key work procedure. The non-conformance can range in severity from a minor or major non-conformance depending on the potential for environmental harm or other Project implications of the breach. A minor non-conformance may only be procedural in nature.

Project personnel such as site engineers, project engineers, quality team, and environment team may raise environmental non-conformances when they are detected. The Sustainability and Environmental Manager will ensure that non-conformances that have been identified are correctly recorded and reported, with corrective and preventative actions raised with appropriate personnel. The Sustainability and Environmental Manager will also ensure that corrective and preventative actions are closed in a timely manner.

Corrective and preventative actions are determined when raising a Non-conformance Report (NCR), which are essential in ensuring the non-conformance is not repeated. Corrective and preventative actions should address the root cause of the non-conformance, and a hierarchy of control measures should be implemented:

- Can the issue be eliminated to ensure the non-conformance will not be repeated? (e.g. remove an item of plant from site that is leaking)
- Can engineering controls be utilised to ensure the non-conformance will not be repeated?
- Can administrative control measures be used such as training, changes to procedures, etc. to prevent non-conformance from being repeated? (e.g., re-train construction workforce using toolbox talk).

The occurrence of an NCR does not necessarily result in an environmental impact. Corrective actions issued will be recorded and actioned in accordance with the Quality Management Plan (refer to CW03524-PM-0000-PLN-0021) and the internal control of non-conformances corrective and preventative actions procedure. Those that pose a serious risk or breach any statutory requirements will be rectified immediately.

In the event of a non-conformance:

- The nature of the event will be investigated by the environment team.
- Advice may be sought from the construction teams and relevant specialist/s and regulators or agencies, if required
- Monitoring may be undertaken.
- The effectiveness or need for new or additional controls are reviewed.



- Appropriate preventative and corrective actions are implemented.
- Strategies are identified to prevent reoccurrence.
- Environmental documentation is reviewed and potentially revised.

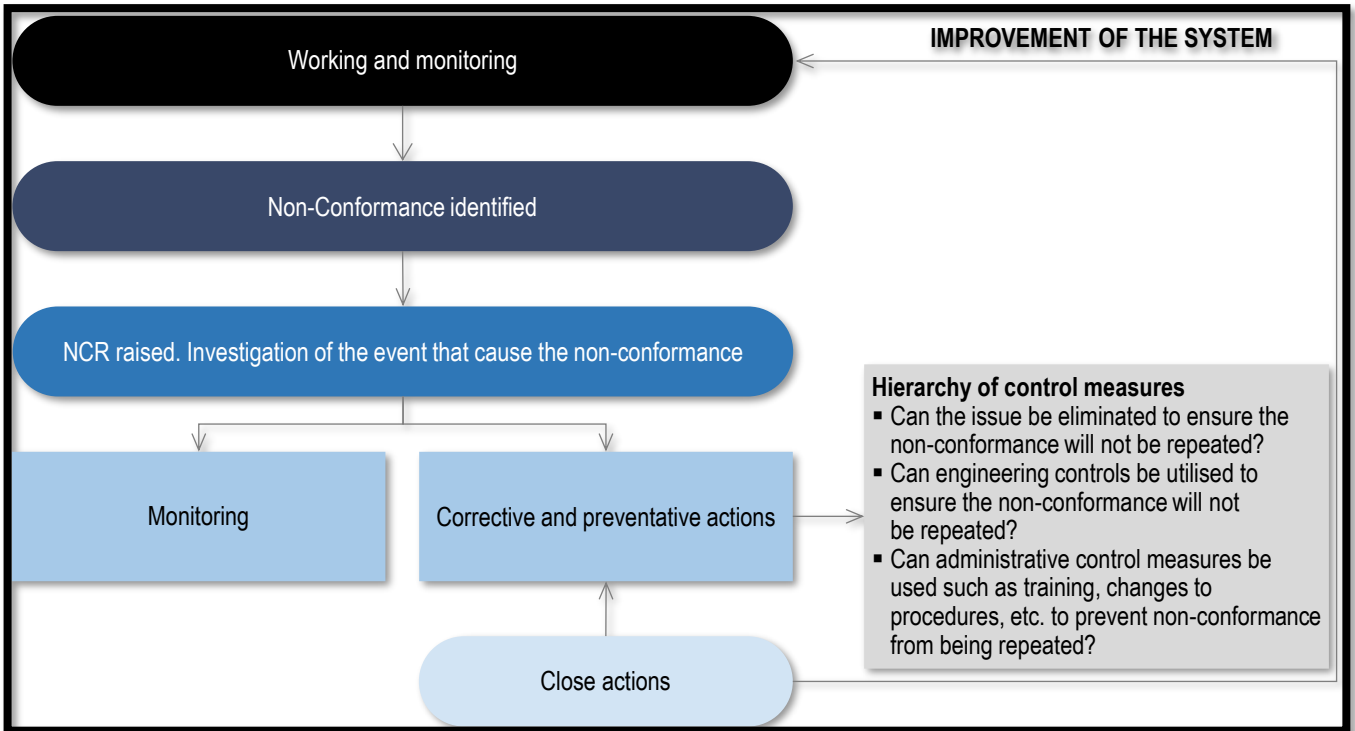


Figure 2: Non-conformance, preventive and corrective actions process.

If a subcontractor is in breach of one of their obligations, they may be in breach of their contract or agreement and may be requested to comply in accordance with conditions of their contract or agreement.

NCRs and corrective or implementation actions will be recorded in Lucidity.

**11.4.2.1 Marine response framework**

A contingency action-based framework has been developed for the construction works (Appendix B and Appendix C). The primary framework covers the marine mammal management process should one be spotted as part of the Marine Fauna Observations. The full risk assessment is presented in Appendix A which has informed a risk-based approach to the level of Marine Fauna Observer (MFO) for each construction activity which is presented in Table 17. The marine response framework for piling is presented in Figure 3 and is further described in Appendix C.



Table 17: Marine Fauna Observer (MFO) for each construction activity based on risk-based approach

Action Area Activities	Assessed Hazard				Key Mitigation	Day	Night
	Underwater Noise		Vessel Movement / Strike				
	Inherent risk	Residual risk	Inherent risk	Residual risk			
Major Vessel Movements including JUB, Barge, Tug, etc	Low	Low	Low	Low	Avoid: <ul style="list-style-type: none"> <li>High impact / noise construction works to occur outside of whale migration period (May to November)</li> </ul> Minimise: <ul style="list-style-type: none"> <li>Maximum speed of 10 knots within Project Action Area</li> </ul> Adhere to vessel caution and approach zones (Appendix C.6; <b>Error! Reference source not found.</b> ) <ul style="list-style-type: none"> <li>Scheduled to ensure infrequent trips/low traffic</li> <li>Vessels to remain within defined routes within action areas</li> </ul>	2 MFO, one at least a Level 1 MFO	2 MFO, one at least a Level 1 MFO
Minor Vessel Movements including Crew Transfer Vessels, work boats, etc	Low	Low	Low	Low	Avoid: <ul style="list-style-type: none"> <li>High impact / noise construction works to occur outside of whale migration period (May to November)</li> <li>Accommodate crew on board JUB to reduce frequency of crew transfers</li> </ul> Minimise: <ul style="list-style-type: none"> <li>Maximum speed of 10 knots within Project Action Area</li> <li>Adhere to vessel observation and exclusion zones (Appendix C.6; <b>Error! Reference source not found.</b>)</li> <li>Works to completed by small vessels</li> <li>Limit night movements</li> </ul>	2 MFO, one at least a Level 1 MFO	2 MFO, one at least a Level 1 MFO

Action Area Activities	Assessed Hazard				Key Mitigation	Day	Night
	Underwater Noise		Vessel Movement / Strike				
	Inherent risk	Residual risk	Inherent risk	Residual risk			
Vessel Anchor Movements	Low	Low		Low	Avoid: <ul style="list-style-type: none"> <li>High impact / noise construction works to occur outside of whale migration period (May to November)</li> <li>Sequence of works has been modified in satisfaction of 8b.i to consider the avoidance of noise generated by construction activities during the whale migration periods for the specified Australian sea lion, humpback whale and southern right whale by sequencing the activities in order to do those works with the highest potential noise generating impacts to occur during the non-migration periods.</li> <li>Vessel anchor movements restricted to daylight hours only.</li> </ul> Minimise: <ul style="list-style-type: none"> <li>Maximum speed of 10 knots within Project Action Area</li> <li>Scheduled to ensure infrequent trips/low traffic</li> <li>Vessels to remain within defined routes within action areas</li> <li>Use of support vessels to supply JUB, therefore not requiring the JUB to return to Port, thus reducing frequency of its anchors to be moved.</li> <li>Tugs used for anchor handling instead of Large Support Vessels</li> </ul>	2 MFO, one at least a Level 1 MFO	N/A
Diving Operations	Low	Low	Nil	Nil	Avoid: <ul style="list-style-type: none"> <li>High impact / noise construction works to occur outside of whale migration period (May to November)</li> </ul>	2 MFO, one at least a Level 1 MFO	2 MFO, one at least a Level 1 MFO

Action Area Activities	Assessed Hazard				Key Mitigation	Day	Night
	Underwater Noise		Vessel Movement / Strike				
	Inherent risk	Residual risk	Inherent risk	Residual risk			
					<ul style="list-style-type: none"> <li>Sequence of works has been modified in satisfaction of 8b.i to consider the avoidance of noise generated by construction activities during the whale migration periods for the specified Australian sea lion, humpback whale and southern right whale by sequencing the activities in order to do those works with the highest potential noise generating impacts to occur during the non-migration periods.</li> </ul> <p>Minimise:</p> <ul style="list-style-type: none"> <li>Diving Ops conducted from JUB Deck</li> <li>Manual installation works at Seabed</li> </ul>	2 MFO, one at least a Level 1 MFO	2 MFO, one at least a Level 1 MFO
Pile Driving Operations	High <sup>1</sup>	Low	Ni	Nil	<p>Avoid:</p> <ul style="list-style-type: none"> <li>Piling scheduled to occur first in the construction program to avoid whale migration (May to November).</li> <li>Piling restricted to daylight hours only.</li> </ul> <p>Minimise:</p> <ul style="list-style-type: none"> <li>Underwater noise modelling results informing Exclusion Zone (based of TTS exceedance distance)</li> <li>Implement 30-minute pre-start, 30-minute soft-start, shut-down and low-visibility conditions.</li> </ul>	2 MFO, one at least a Level 1 MFO	*N/A
						2 MFO, one at least a Level 1 MFO	*N/A

<sup>1</sup> Based on the inherent risk rating with the highest inherent risk rating (see Appendix A).

Action Area Activities	Assessed Hazard				Key Mitigation	Day	Night
	Underwater Noise		Vessel Movement / Strike				
	Inherent risk	Residual risk	Inherent risk	Residual risk			
Drilling Operations	Low	Low	Nil	Nil	Avoid: <ul style="list-style-type: none"> <li>Drilling is scheduled to follow piling in the construction program to avoid whale migration (May to November).</li> </ul> Minimise: <ul style="list-style-type: none"> <li>Implement 30-minute pre-start, 30-minute soft-start, shut-down and low-visibility conditions</li> <li>500m Exclusion Zone and 1000 m Observation Zone.</li> </ul>	2 MFO, one at least a Level 1 MFO	2 MFO, one at least a Level 1 MFO
JUB construction Deck / Lifting Operations	Nil	Nil	Nil	Nil	Avoid: <ul style="list-style-type: none"> <li>High impact / noise construction works to occur outside of whale migration period (May to November)</li> <li>Work not occurring in the marine environment but on the deck of the barges and vessels.</li> </ul>	2 MFO, one at least a Level 1 MFO	2 MFO, one at least a Level 1 MFO

\*Note N/A Operations not conducted at night

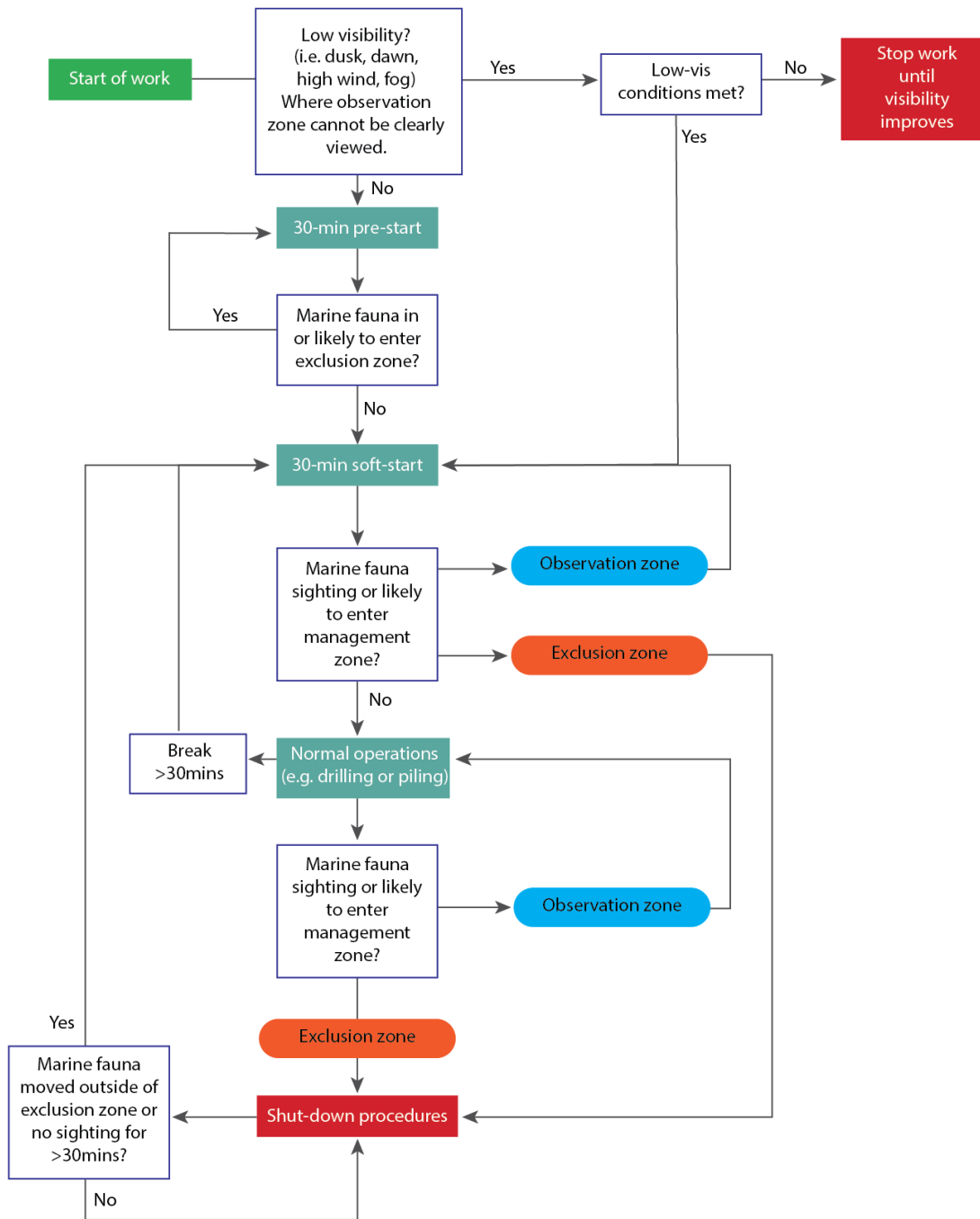


Figure 3: Preliminary action flowchart for marine mammal monitoring and actions for piling.



### 11.4.3 Environmental complaints

All environmental complaints will be managed through the Corporation's Community and Stakeholder Manager in accordance with the CW03524-PM-0000-PLN-0021 Community and Stakeholder Interface Plan.

To reduce formal complaints through to the Corporation, members of the Alliance will be required to directly manage construction and environmental-related complaints with the community in the first instance. Relevant Alliance members will undergo community engagement training through the Corporation and have key messages available to them.

Where the complaint can't be closed in the first instance, it will be referred through to Corporation. All complaints will be recorded in the complaints management system and reported through to the Corporation in the monthly report.

## 12. Audit and review.

### 12.1 Environmental auditing

The Sustainability and Environmental Manager will be responsible for confirming an audit schedule for the Project and inclusive of this CMEMP, and construction activities inclusive of subcontractor works depending on the magnitude and risk profile of construction activities taking place.

Additionally, ad-hoc audits may be undertaken by the Corporation. These ad-hoc audits will be coordinated by the Sustainability and Environmental Manager in conjunction with the Corporation or relevant regulatory body who has requested them as per EPBC conditions 40-43.

External audits will be conducted by qualified and experienced environmental auditors that are otherwise not involved in the Project. ASWA is committed to ensure an independent audit of the conditions is conducted following the commencement of the action until the expiry of the approval for every five-year period unless otherwise specified in writing by the Minister and each audit report must report for the five-year period preceding that audit report in accordance with conditions 40 & 42 stated in table 1 of this plan.

Environmental audit findings will be communicated to all staff and management. The results of these audits will provide input into ASWA's Management Review, together with proposed and implemented actions for any confirmed opportunities for improvement, observations, or non-conformances.

Each audit report will 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.

### 12.2 Independent Audits

The Sustainability and Environmental Manager will be responsible for confirming an audit schedule for the Project and inclusive of this CMEMP, and construction activities inclusive of subcontractor works depending on the magnitude and risk profile of construction activities taking place.

The audit schedule shall include independent audits as scheduled by the Corporation.

For each independent audit, the approval holder must:

- 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.
- 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.
- Submit the audit report to the department for approval within the timeframe specified and approved in writing by the department.



- Publish each audit report on the website within 15 business days of the date of the department's approval of the audit report.
- The approval holder must ensure that an **independent audit** of compliance with the 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**).
- Keep every audit report published on the website until this approval expires.

### 12.3 Environmental management plan review

Continual improvement of this CMEMP will be achieved by the continual evaluation of environmental management performance against environmental policies, objectives, and targets for identifying opportunities for improvement and submit to DCCEEW in accordance with conditions 16-21 in Table 1.

The continual improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management which leads to improved environmental performance.
- Determine the root cause or causes of non-conformances and deficiencies.
- Develop and implement a plan of corrective and preventative action to address 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.

Other triggers for review the plan may include:

- Corrective actions raised through the reporting process/inspections.
- Changes to relative legislative, regulatory or compliance obligations
- Significant changes to any constituent of project construction
- Request by the Corporation or any regulatory authority
- Significant changes to the environment
- Identification of new environmental risks.

Any changes to this plan, including minor ones, will trigger resubmission to DCCEEW.

The Sustainability and Environmental Manager will be responsible for review and amendment of this CMEMP with the assistance of the environment team. The updated and revised copy with tracked changes will be submitted to the Corporation and DCCEEW for assessment under EPBC conditions 17-19.

## 13. Plan Revisions

Changes to this plan that do not have a new or increased impact on the environmental matters contained therein, may be made without requiring approval under section 143A of the EPBC Act. In this case the department will be notified electronically that the approved plan has been revised and provide the department with:

- i) An electronic copy of the revised plan.
- ii) An electronic copy of the RAMP marked up with track changes to show the differences between the approved plan and the revised plan.
- iii) An explanation of the differences between the approved plan and the revised plan.
- iv) The reasons the approval holder considers that taking the Action in accordance with the revised plan would not be likely to have a new or increased impact.
- v) Written notice of the date on which the approval holder will implement the revised plan (revised plan implementation date), being at least 20 business days after the date of providing notice of the revision of the plan, or a date agreed to in writing with the department.



Otherwise, variations to this Plan must be approved by the Minister, by submitting an application in accordance with the requirements of section 143A of the EPBC Act. If the Minister approves the revised Plan then, from the date specified, the revised plan will come into effect.

Water Corporation will publish this Plan on their website until the expiry date of this approval. Water Corporation will exclude or redact sensitive ecological data from this Plan on the website or otherwise provided to a member of the public. If sensitive ecological data is excluded or redacted from this Plan, the Water Corporation will notify the department in writing what exclusions and redactions have been made in the version published on the website.

## 14. Notification to DCCEEW of Western Australian Conditions

DCCEEW will be notified in writing via email of any proposed change to the conditions of the Western Australian approval that may related to protected matters within 2 business days of formally proposing a change and within 5 business days of becoming aware of any proposed change.

DCCEEW will be notified in writing via email of any change to the Western Australian approval conditions that may relate to protected matters, within 10 business days of a change to conditions being finalised. The notification will include a copy of the finalised changes to the Western Australian approval conditions.

## 15. References

- Chabanne D (2024) *Fine-scale understanding of Indo-Pacific bottlenose dolphin use of the Kwinana Shelf within Cockburn Sound and identification of key areas within the Shelf*. Prepared for the WAMSI Westport Marine Science Program. Western Australian Marine Science Institution, Perth, Western Australia. 58 pp.
- Chabanne DB, H Finn and L Bejder (2017) Identifying the Relevant Local Population for Environmental Impact Assessments of Mobile Marine Fauna, *Frontiers in Marine Science*, 4(148):1-17. doi: 10.3389/fmars.2017.00148
- DCCEEW (2024a) National Recovery Plan for the Southern Right Whale – *Eubalaena australis*. Department of Climate Change, Energy, the Environment and Water, Canberra. Available from: [national-recovery-plan-southern-right-whale.pdf](#)
- DCCEEW (2024b) [National Guidelines for the Survey of Cetaceans, Marine Turtles and the Dugong - DCCEEW](#), accessed 17 April 2025.
- DEWHA (Department of the Environment, Water, Heritage and the Arts) (2008a) *EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales*, Australian Government Department of the Environment, Water, Heritage and the Arts
- DIT SA (Department for Infrastructure and Transport South Australia) (2023) Underwater Piling and
- DoEE (Department of the Environment and Energy) (2017a) National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna. <https://www.dcceew.gov.au/sites/default/files/documents/vessel-strike-strategy.pdf>. Accessed September 2024
- DoEE (2017b) Australian National Guidelines for Whale and Dolphin Watching 2017. <https://www.agriculture.gov.au/sites/default/files/documents/aust-national-guidelines-whale-dolphin-watching-2017.pdf>. Accessed September 2024
- DoEE (2018) Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans. <https://www.dcceew.gov.au/sites/default/files/documents/tap-marine-debris-2018.pdf>. Accessed September 2024.



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<https://www.dcceew.gov.au/sites/default/files/env/pages/a73fb726-8572-4d64-9e33-1d320dd6109c/files/south-west-marine-plan.pdf>. Accessed September 2024.

DSEWPaC (2013) Recovery plan for the Australian Sea Lion (*Neophoca cinerea*).

<https://www.dcceew.gov.au/sites/default/files/documents/neophoca-cinerea-recovery-plan.pdf>. Accessed September 2024.

EPA (2016) Environmental Factor Guideline Marine Fauna. Accessed from: [Guideline-Marine-Fauna-131216\\_2.pdf](#).

GHD (2022) *Alkimos Seawater Desalination Plan – Marine Noise Study*. Report Prepared for Water Corporation. Available from: [Appendix C - Alkimos Seawater Desalination Plant Marine Noise Study.pdf](#)

Salgado Kent C, K Waples, S Parsons, H Raudino, A Sequeira, S Vitali, B Gardner and J Edwards (2024) Australian sea lion abundance and movement in the Perth metropolitan area, Western Australia - Final Report. Prepared for the WAMSI Westport Marine Science Program. Western Australian Marine Science Institution, Perth, Western Australia. 61 pp.

Southall BL, DP Nowacek, AE Bowles, V Senigaglia, L Bejder and PL Tyack (2021) Marine Mammal Noise Exposure Criteria: Assessing the Severity of Marine Mammal Behavioural Response to Human Noise, *Aquatic Mammals* 2021, 47(5):421-464. doi: 10.1578/AM.47.5.2021.421

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<http://www.environment.gov.au/biodiversity/threatened/species/pubs/22-conservation-advice-23122020.pdf>. In effect under the EPBC Act from 23-Dec-2020.

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[https://www.epa.wa.gov.au/sites/default/files/PER\\_documentation2/Alkimos%20SDP%20-%20Public%20Environmental%20Review%20Document\\_Rev%206\\_19%20September.pdf](https://www.epa.wa.gov.au/sites/default/files/PER_documentation2/Alkimos%20SDP%20-%20Public%20Environmental%20Review%20Document_Rev%206_19%20September.pdf)

Wei C and C Erbe (2024) Hearing in Australian sea lions Prepared for the WAMSI Westport Marine Science Program Western Australian Marine Science Institution, Perth, Western Australia 28 pp



## Appendix A. Risk assessment marine mammals

### A.1. Potential impacts

Table 18: Summary of marine mammals that could be present in the waters around the Project, their sensitive, known threats and potential impact

Species	Listing	Relevance to the Project Action Area	Sensitivity and potential impacts
Australian sea lion <i>(Neophoca cinerea)</i>	<b>EPBC Act</b> Endangered Marine <b>BC Act</b> Endangered <b>IUCN (non-statutory)</b> Endangered	Australian sea lions are generally found from Houtman Abrolhos, WA, to Kangaroo Island, South Australia. Rottnest and Garden Island have historically supported breeding populations, but now the areas are just considered haul-out locations. Breeding colonies are located in the Jurien Bay Marine Park (Salgado Kent et al. 2024). Haul out sites in the Perth area include Penguin, Sea, Carnac, Dyer, Little Islands and Burns Rock (Orsini et al. 2006). Burns Rock and Little Island are closest to Alkimos at around 12 km and 21 km south respectively (Water Corporation 2022).  The Project area does not support any haul-out or breeding colonies, however a known haul-out is located ~12 km away. Male Australian sea lions may be present infrequently in the waters around the Project, likely to be present either foraging or travelling in the waters but are not restricted to the area (Water Corporation 2022).	<p>Known threats (DSEWPaC 2012):</p> <ul style="list-style-type: none"> <li>▪ Human presences</li> <li>▪ Changes in oceanography</li> <li>▪ Chemical spills,</li> <li>▪ Marine debris</li> <li>▪ Noise pollution (underwater and airborne noise)</li> <li>▪ Entanglement</li> <li>▪ Climate change.</li> </ul> <p>Underwater noise is a known threat identified within the South-west Marine Bioregional Plan (DSEWPaC 2012). The bioregional plan has identified underwater noise as a threat of potential concern, and it is likely given the status of the species that noise activities near or within Australian sea lion habitat could negatively impact the species.</p> <p>The Australian sea lion appears to have similar in-air and underwater audiograms to the California sea lion. Research has shown the species has a broad spectrum of sound frequencies, between 100 Hz and 20 kHz in air and 100 Hz and 40 kHz underwater (Wei and Erbe 2024). Therefore, it is likely that the species is sensitive to frequencies of common anthropogenic noise sources both underwater and in-air. Underwater noise sources include ship traffic, pile driving, and airgun signals, and could experience behavioural, masking, permanent threshold shift (PTS) and temporary threshold shift (TTS) from these sources. In-air sources include traffic noise from card and aircraft, and construction noises (Wei and Erbe 2024).</p>

Species	Listing	Relevance to the Project Action Area	Sensitivity and potential impacts
Southern right whale <i>(Eubalaena australis)</i>	<b>EPBC Act</b> Endangered Migratory Cetacean <b>BC Act</b> Vulnerable <b>IUCN</b> Least Concern	Southern right whales are known to occur within the Marion Marine Park (~10 km south of Alkimos). The species migration Biologically Important Area (BIA) overlaps the with the Project Action Area, and the species breeding BIA is located further south as does not overlap. Southern right whales are known to occur in the Perth metropolitan region during their northern migration from May to August, and during their southern migration from September to November (Cannell 2004). Southern right whales in Australian waters predominantly occur in aggregations in coastal water reproductive areas where they calve and nurse their young generally from May to October (could be as early as April and as late as November), primarily occupying shallow waters (< 10 m depth) within 1 km of the coastline (DCCEEW 2024a). Southern right whales along the WA coastline appear to be reoccupying historical calving and migration ranges and as the population continues to recover, it is likely that more southern right whales will be present along the WA coastline, including the waters adjacent to the Project. Therefore, it is possible that the species could be present in the waters around the Proposal, likely using the area during its migration period (Water Corporation 2022).	<p>Known threats (DSEWPac 2012; DCCEEW 2024a):</p> <ul style="list-style-type: none"> <li>▪ Changes in oceanography</li> <li>▪ Marine debris</li> <li>▪ Underwater noise</li> <li>▪ Habitat modification</li> <li>▪ Hydrocarbon spill</li> <li>▪ Vessel strike</li> <li>▪ Entanglement.</li> </ul> <p>Southern right whales are known to be sensitive to underwater noise and vessel strike given the species preference for shallow coastal waters. Underwater noise is a known threat to the southern right whale and is identified as a threat of potential concern within the South-west Marine Bioregional Plan (DSEWPac 2012) (DSEWPac 2012). In the southern right whales recovery plan, underwater noise has been identified as a minor risk to the western population of southern right whales (DCCEEW 2024). However, underwater noise is considered to be more of a concern within or close to areas which support reproduction (habitat critical to the survival or the species/reproduction BIA), as this is an area where pregnant and nursing females and calves are resident for prolonged periods of time (e.g. weeks to months).</p> <p>Whale hearing sensitivity are known to overlap with the noise levels of piling and vessels (Figure 4), and therefore could be impacted by the Project.</p> <p>Given the species high conservation listing and the ability of underwater noise to propagate the species should be considered within noise modelling to ensure noise propagation is appropriately considered.</p>
Humpback whale	<b>EPBC Act</b> Migratory Cetacean	Humpback whales off the WA coastline are Breeding Stock D, from May to November. Breeding Stock D use the WA coastline as a migratory corridor, moving from their southern feeding ground to northern breeding grounds and back over each season/year. When completing their northern	Underwater noise has been identified as a threat of potential concern in the South-west Marine Bioregional Plan (DSEWPac 2012). The southern migration of humpback whales represents the most



Species	Listing	Relevance to the Project Action Area	Sensitivity and potential impacts
<i>(Megaptera novaeangliae)</i>	<b>BC Act</b> Conservation Dependent <b>IUCN</b> Least Concern	<p>migration, humpback whale densities are generally higher further offshore, up to 250 nautical miles from the coast. Humpback whales travelling between Bunbury to Jurien Bay are generally sighted within 20 nm of the coastline (Jenner et al. 2001). During their southern migration, humpback whales are generally found closer to shore (Jenner et al. 2010). The strength of the Leeuwin current appears to influence humpback whales' migration along the WA coastline, with tagging results indicating that during their northern migration they migrate inshore of the current and utilise the southern flow of the current on their southern migration. Further, during years where the flow is stronger, it is likely to force northern migrating whales closer inshore (How et al. 2020)</p> <p>The Project Action Area overlaps with the species migration BIA, and it possible that the species would be present in the water of and around the Project during the migration period, with sightings known to occur within 10 km of the Project (Water Corporation 2022). Therefore, it is likely that humpback whales will be present in the waters around the Project using the area to travel, and potentially resting/milling during the southern migration (Water Corporation 2022).</p>	<p>sensitive period, as cow-calf pairs are frequently sighted resting along the migration corridor. This is a particularly vulnerable life stage, with calves susceptible to predation and females expending considerable energy on lactation.</p> <p>The southern migration represents the most sensitive period as this is when mother-calf pairs are common and sighted resting along their migration corridor. Neonate calves are particularly vulnerable to vessel strikes, as they have limited swimming and diving abilities and low breath-hold capacity (Irvine and Salgado Kent 2019). This is a sensitive life phase as they are prone to predation and females expend much energy on lactation.</p> <p>Known threats (DSEWPaC 2012; TSSC 2022):</p> <ul style="list-style-type: none"> <li>▪ Underwater noise</li> <li>▪ Change in oceanography</li> <li>▪ Marine debris</li> <li>▪ Hydrocarbon spills.</li> </ul> <p>The greatest threats to Breeding Stock D humpback whales are from human-made anthropogenic threats, such as underwater noise, vessel strike, entanglement in lobster pot lines, and marine debris (TSSC 2022). Underwater noise can lead to hearing impairment, organ damage, communication interference, masking, evaluated stress levels and/or avoidance of important habitats.</p>
Indo-Pacific bottlenose dolphin <i>(Tursiops aduncus)</i>	<b>EPBC Act</b> Migratory Cetacean <b>BC Act</b> Migratory <b>IUCN (non-statutory)</b>	<p>Indo-Pacific bottlenose dolphins are typically found close to shore (within 1 km from the coastline), or in water depths less than 30 m (Reeves et al. 2003). Resident populations are known to occur in resident population further south of the Project (Gage Roads, Swan Canning River Park, and Cockburn Sound) (Chabanne 2023). However, Indo-pacific bottlenose dolphins have been sighted in the waters of the Marimion Marine Park (~10 km) south of the Project (Water Corporation 2022). Therefore, it is possible that the species may be infrequently present travelling and foraging in the waters around the Project (Water Corporation 2022).</p>	<p>The species is not identified as conservation value in the South-west marine bioregional plan.</p> <p>Underwater noise has the potential to cause direct harm, or affect hearing through masking and hindering communication, which is important for maintaining social structure and natural behaviours. Underwater noise has the potential to cause direct harm from Auditory Injury (AUD INJ) (formerly referred to as</p>



Species	Listing	Relevance to the Project Action Area	Sensitivity and potential impacts
	Near Threatened		<p>Permanent threshold shift- PTS) and TTS, or affect hearing through masking and hindering communication, which is important for maintaining social structure and natural behaviours. Bottlenose dolphins inhabit the coastal environment, and therefore they overlap with human activities and coastal development, which exposes them to repeated and cumulative stressors that could disrupt or displace individuals (Bejder et al. 2006; Smith et al. 2016). The life history traits of low reproductive rate and high calf mortality make the bottlenose dolphin population recovery slow (DCCEEW 2025).</p>



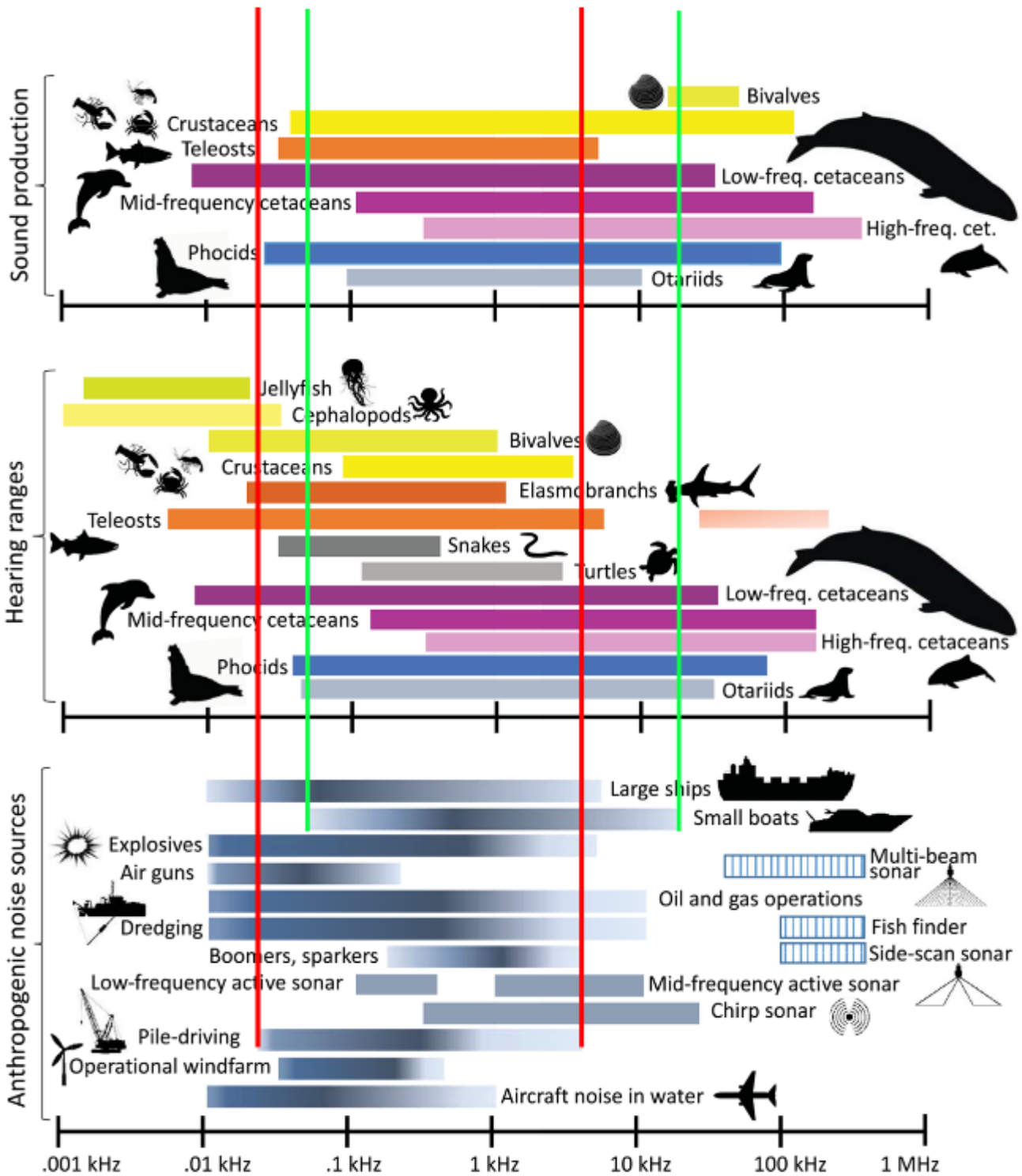


Figure 4: Approximate sound production and hearing ranges of marine taxa and frequency ranges of selected anthropogenic sound sources (adapted from Duarte et al. 2021)



## A.2. Risk Assessment Methodology

### Evaluating risk

The following section sets out a qualitative risk assessment methodology that can be applied to the environmental risks associated with a wide range of projects. It follows the provided as an example of one approach to risk assessment and the Department does not require that this particular approach be used when preparing an environmental management plan. Further guidance on evaluating and managing risk can be found in AS ISO 31000:2018 Risk management – Guidelines (Standards Australia 2018).

### Likelihood and consequence

Each environmental risk has been assessed in terms of likelihood and consequence criteria outlined in Table 16 and Table 19 below. These ratings are then combined using the risk rating matrix (Table 20) to generate a risk rating of low, medium, high or severe.

Table 19: Likelihood

Qualitative measure of likelihood	How likely is it that this event/issue will occur after control strategies have been put in place
Highly likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the Project
Possible	Might occur during the life of the Project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances

Table 20: Consequence Definitions

Qualitative measure of consequences	What will be the consequence/result if this issue does occur rating
Minor	Minor incident of environmental damage that can be reversed
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts
High	Substantial instances of environmental damage that could be reversed with intensive efforts
Major	Major loss of environmental amenity and real danger of continuing
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage

### Risk rating

You should give each of your risks a likelihood rating and a consequence rating. Using the rating table below you can determine whether your risk is low, medium, high or severe.

The risk rating generated using the above table can be used as a guide to the amount of time and resources that will be required to manage each risk. Risks with 'low' risk ratings will usually require significantly less management than 'medium', 'high' and 'severe' risks.



This is usually reflected in the environmental management plan where issues with higher risk ratings require more detailed information regarding:

- The description of the risk
- The measures and commitments to minimise and manage the risk
- The performance objectives and monitoring programs
- Trigger values for additional action, review and reporting.

Table 21: Risk Rating Matrix Table

Likelihood	Consequence				
	Minor	Moderate	High	Major	Critical
Highly Likely	Medium	High	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possible	Low	Medium	Medium	High	Severe
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High



### A.3. Risk Assessment Outcomes

Table 22: Key risks to marine mammals

Activity and potential impact pathway	Species	Species sensitivities	Consequence	Likelihood	Inherent Risk	Controls and Management measures	Consequence	Likelihood	Residual Risk	Conclusion
<p><b>Underwater noise</b></p> <p>Underwater noise is categorised as either being impulsive (e.g. with a sudden onset, like piling) or continuous/non-impulsive (e.g. part of the ambient, or background soundscape like shipping and dredging). The Projects construction phase contains a variety of noise sources, including impulsive noise generated by piling, and continuous/non-impulsive noise generated by drilling and vessel movements. Piling is considered the most significant noise source for the Project and has the greatest risk of leading to auditory injury of marine fauna species.</p>										
<p><b>Construction piling - Underwater Noise</b></p> <p>Hammer strikes generating impulsive underwater noise that propagates through the water column, resulting in:</p> <ul style="list-style-type: none"> <li>Auditory Injury (AUD INJ) (formerly referred to as Permanent threshold shift- PTS)</li> <li>Temporary auditory damage (temporary threshold shift (TTS))</li> <li>Communication masking</li> <li>Behavioural changes (e.g., area avoidance which could impact foraging opportunities, or physiological responses associated with stress and increased energy expenditure)</li> </ul> <p>This is the Project's noisiest activity that will occur.</p>	<p>Australian sea lion (<i>Neophoca cinerea</i>)</p>	<p>ASL is an Endangered species with a decreasing population. Individuals exhibit high site fidelity. No haul-out areas are present in the Project area but foraging may occur in coastal waters.</p> <p>Piling noise is detectable but outside their peak sensitivity range. As such, vulnerability level to piling noise is lower than that for baleen whales.</p> <p>With a worst-case TTS exceedance distance of 1,950 m which is expected for the intake caisson piling (Talis Consulting 2025).</p>	Moderate	Likely	Medium	<p>Avoid:</p> <ul style="list-style-type: none"> <li>Piling restricted to daylight hours only</li> </ul> <p>Minimise:</p> <ul style="list-style-type: none"> <li>Two Marine Fauna Observers (MFOs) on duty at all times, with at least one being a Level 1 MFO</li> <li>Implement industry standards 30-min pre-start, 30-min soft-start, shutdown and low-visibility conditions</li> <li>Complete underwater noise monitoring for the duration of the Project</li> <li>Observation and Exclusion Zones to mitigate against TTS (i.e. piling exclusion zone to be at least as large as the modelled TTS distance) Refer to Appendix C tables 31 &amp; 32</li> </ul>	Moderate	Unlikely	Low	<p>Piling will follow standardised underwater noise management protocol including the use of suitable MFOs, management zones informed by underwater noise modelling with in-field validation. The potential impact to ASL from piling noise will therefore be <b>Low</b>.</p>
	<p>Southern right whale (<i>Eubalaena australis</i>)</p>	<p>Whales are the most sensitive hearing group to underwater noise, as piling noise directly overlaps with their primary communication and sensory band. Whales were the most sensitive group for all piling scenarios, with the outfall caisson piling having the largest TTS range 7,750 m.</p> <p>The Project area does not overlap with the southern right whales calving</p>	Major	Likely	High	<p>Avoid:</p> <ul style="list-style-type: none"> <li>No piling during whale migration period (May to November)</li> <li>Piling restricted to daylight hours only</li> </ul> <p>Minimise:</p> <ul style="list-style-type: none"> <li>Two Marine Fauna Observers (MFOs) on duty at all times, with at least one being a Level 1 MFO</li> <li>Implement industry standards 30-min pre-start, 30-min soft-start,</li> </ul>	Minor	Unlikely	Low	<p>It is unlikely that the whales will be present during piling as piling will avoid the whale migration season.</p> <p>In addition, piling will follow standardised underwater noise management protocol including the use of suitable MFOs, management zones informed by underwater noise modelling with in-field validation. The potential impact to whales from piling noise will therefore be <b>Low</b>.</p>



Activity and potential impact pathway	Species	Species sensitivities	Consequence	Likelihood	Inherent Risk	Controls and Management measures	Consequence	Likelihood	Residual Risk	Conclusion
		Biologically Important Area (BIA). The inherent risk ranking is based on the activity occurring during the whale migration period (May to November). The residual risk ranking is based on the activity occurring outside of this period.				shutdown and low-visibility conditions <ul style="list-style-type: none"> <li>Complete underwater noise monitoring for the duration of the Project</li> <li>Observation and Exclusion Zone to mitigate against TTS (i.e. piling exclusion zone to be at least as large as the modelled TTS distance) Refer to Appendix C tables 31 &amp; 32</li> </ul>				
	Humpback whale ( <i>Megaptera novaeangliae</i> )	Whales are the most sensitive hearing group to underwater noise, as piling noise directly overlaps with their primary communication and sensory band. Whales were the most sensitive group for all piling scenarios, with the outfall caisson piling having the largest TTS range 7,750 m.  The Project area does overlap with the humpback whale migration BIA.  The inherent risk ranking is based on the activity occurring during the whale migration period (May to November). The residual risk ranking is based on the activity occurring outside of this period.	Major	Likely	High	Given the known sensitivity of whales to underwater noise, if whale migration appears to be occurring later or earlier and whales are sighted – adaptive management inline with EPBC Act Policy Statement 2.1 will be implemented.	Minor	Unlikely	Low	It is unlikely that the whales will be present during piling as piling will avoid the whale migration season.  In addition, piling will follow standardised underwater noise management protocol including the use of suitable MFOs, management zones informed by underwater noise modelling with in-field validation. The potential impact to whales from piling noise will therefore be <b>Low</b> .
	Indo-Pacific bottlenose dolphin ( <i>Tursiops aduncus</i> ) (EPBC Act listing Migratory, Cetacean)	Indo-pacific bottlenose dolphins may be present at some time, but not restricted to the Project area. Piling noise is likely to induce a startle response, although hearing damage could be caused at close proximity to the source. The noise modelling results indicate that piling is low risk with an AUD	Moderate	Unlikely	Low	Avoid: <ul style="list-style-type: none"> <li>Piling restricted to daylight hours only</li> </ul> Minimise: <ul style="list-style-type: none"> <li>Two Marine Fauna Observers (MFOs) on duty at all times, with at least one being a Level 1 MFO</li> <li>Implement industry standards 30-min pre-start, 30-min soft-start,</li> </ul>	Minor	Unlikely	Low	Piling will follow standardised underwater noise management protocol including the use of suitable MFOs, management zones informed by underwater noise modelling with in-field validation.  The potential impact to dolphins from piling noise will therefore be <b>Low</b> .



Activity and potential impact pathway	Species	Species sensitivities	Consequence	Likelihood	Inherent Risk	Controls and Management measures	Consequence	Likelihood	Residual Risk	Conclusion
		<p>INJ distance of 50 m for all piling scenarios, and the largest TTS distance of 100 m for intake casing piling.</p> <p>Piling noise is outside their peak sensitivity range. As such, vulnerability level to piling noise is lower than that for baleen whales.</p>				<p>shutdown and low-visibility conditions</p> <ul style="list-style-type: none"> <li>Complete underwater noise monitoring for the duration of the Project</li> <li>Observation and Exclusion Zone to mitigate against TTS (i.e. piling exclusion zone to be at least as large as the modelled TTS distance) Refer to Appendix C tables 31 &amp; 32</li> </ul>				
<p><b>Drilling (Rotary and Tunnelling)- Underwater noise</b></p> <p>Drilling produces continuous underwater noise. It involves cutting or boring into the seabed with a rotating drill or auger, rather than hammering. It could cause:</p> <ul style="list-style-type: none"> <li>Communication masking</li> <li>Behavioural changes (e.g., area avoidance which could impact foraging opportunities, or physiological responses associated with stress and increased energy expenditure)</li> </ul> <p>Is less likely to result in:</p> <ul style="list-style-type: none"> <li>Auditory Injury (AUD INJ) (formerly referred to as Permanent threshold shift- PTS)</li> <li>Temporary auditory damage (temporary threshold shift (TTS))</li> </ul>	Australian sea lion ( <i>Neophoca cinerea</i> )	<p>ASL is an Endangered species with a decreasing population. Individuals exhibit high site fidelity. No haul-out areas are present in the Project area but foraging may occur in coastal waters.</p> <p>Drilling noise lower is detectable but outside their peak sensitivity range. As such, vulnerability level to piling noise is lower than that for baleen whales.</p>	Moderate	Unlikely	Low	<p>Drilling will be monitored by suitable MFOs, being trained crew. Adaptive management will include replacing MFOs with Level 1 MFOs if animal sightings are relatively high.</p> <ul style="list-style-type: none"> <li>Implement industry standards 30-min pre-start, 30-min soft-start, shutdown and low-visibility conditions</li> <li>Complete underwater noise monitoring for the duration of the Project</li> <li>Management zones: 1km observation, 500m exclusion.</li> </ul>	Minor	Unlikely	Low	<p>Drilling generates lower-intensity, higher-frequency continuous noise than impact driving, posing less risk of auditory injury but still capable of causing disturbance. Drilling will be monitored during daylight hours by suitable MFOs.</p> <p>The potential impact to ASL from drilling noise will therefore be <b>Low</b>.</p>
	Southern right whale ( <i>Eubalaena australis</i> )	<p>Drilling noise is mostly above their most sensitive low-frequency band, but potential disturbance or masking could occur.</p> <p>The Project area does not overlap with the southern right whale Biologically Important Area (BIA).</p> <p>The inherent risk ranking is based on the activity occurring during the whale migration period (May to November).</p>	Moderate	Unlikely	Low	<ul style="list-style-type: none"> <li>Drilling will be monitored by Two Marine Fauna Observers (MFOs) on duty at all times, with at least one being a Level 1 MFO during times vessel transit within Action Area</li> <li>Implement industry standards 30-min pre-start, 30-min soft-start, shutdown and low-visibility conditions</li> <li>Complete underwater noise monitoring for the</li> </ul>	Minor	Unlikely	Low	<p>Drilling generates lower-intensity, higher-frequency continuous noise than impact driving, posing less risk of auditory injury but still capable of causing disturbance. Drilling will be monitored during daylight hours by suitable MFOs.</p> <p>It is unlikely that the whales will be present during drilling as drilling activities will avoid the whale migration season.</p> <p>The potential impact to whales from piling noise will therefore be <b>Low</b>.</p>



Activity and potential impact pathway	Species	Species sensitivities	Consequence	Likelihood	Inherent Risk	Controls and Management measures	Consequence	Likelihood	Residual Risk	Conclusion
		The residual risk ranking is based on the activity mostly occurring outside of this period.				<ul style="list-style-type: none"> <li>duration of the Project</li> <li>Management zones: 1km observation, 500m exclusion.</li> </ul>				
	Humpback whale ( <i>Megaptera novaeangliae</i> )	<p>Drilling noise is mostly above their most sensitive low-frequency band, but potential disturbance or masking could occur.</p> <p>The Project area does overlap with the humpback whale migration Biologically Important Area (BIA).</p> <p>The inherent risk ranking is based on the activity occurring during the whale migration period (May to November). The residual risk ranking is based on the activity mostly occurring outside of this period.</p>	Moderate	Unlikely	Low	<ul style="list-style-type: none"> <li>Drilling will be monitored by Two Marine Fauna Observers (MFOs) on duty at all times, with at least one being a Level 1 MFO during times vessel transit within Action Area</li> <li>Implement industry standards 30-min pre-start, 30-min soft-start, shutdown and low-visibility conditions</li> <li>Complete underwater noise monitoring for the duration of the Project</li> <li>Management zones: 1km observation, 500m exclusion.</li> </ul>	Minor	Unlikely	Low	<p>Drilling generates lower-intensity, higher-frequency continuous noise than impact driving, posing less risk of auditory injury but still capable of causing disturbance. Drilling will be monitored during daylight hours by suitable MFOs..</p> <p>It is unlikely that the whales will be present during drilling as drilling activities will avoid the whale migration season.</p> <p>The potential impact to whales from piling noise will therefore be <b>Low</b>.</p>
	Indo-Pacific bottlenose dolphin ( <i>Tursiops aduncus</i> ) (EPBC Act listing Migratory, Cetacean)	<p>Drilling noise overlaps partly with their mid-frequency sensitivity; risk is mostly behavioural (avoidance, distraction).</p> <p>Indo-Pacific bottlenose dolphins may be present at some time, but not restricted to the Project area.</p>	Moderate	Unlikely	Low	<ul style="list-style-type: none"> <li>Drilling will be monitored by Two Marine Fauna Observers (MFOs) on duty at all times, with at least one being a Level 1 MFO during times vessel transit within Action Area</li> <li>Implement industry standards 30-min pre-start, 30-min soft-start, shutdown and low-visibility conditions</li> <li>Complete underwater noise monitoring for the duration of the Project</li> <li>Management zones: 1km observation, 500m exclusion.</li> </ul>	Minor	Unlikely	Low	<p>Drilling generates lower-intensity, higher-frequency continuous noise than impact driving, posing less risk of auditory injury but still capable of causing disturbance.</p> <p>Drilling will be monitored during daylight hours by suitable MFOs.</p> <p>The potential impact to dolphins from piling noise will therefore be <b>Low</b>.</p>



Activity and potential impact pathway	Species	Species sensitivities	Consequence	Likelihood	Inherent Risk	Controls and Management measures	Consequence	Likelihood	Residual Risk	Conclusion
<p><b>Vessel - Underwater noise</b></p> <p>Noise related vessel types include tug, workboats and crew transfer vessels. Vessels produce continuous underwater noise, and could cause:</p> <ul style="list-style-type: none"> <li>Communication masking</li> <li>Behavioural changes (e.g., area avoidance which could impact foraging opportunities, or physiological responses associated with stress and increased energy expenditure)</li> </ul> <p>Is less likely to result in:</p> <ul style="list-style-type: none"> <li>Auditory Injury (AUD INJ) (formerly referred to as Permanent threshold shift- PTS)</li> <li>Temporary auditory damage (temporary threshold shift (TTS))</li> </ul>	<p>Australian sea lion (<i>Neophoca cinerea</i>)</p>	<p>ASL is an Endangered species with a decreasing population. Individuals exhibit high site fidelity. No haul-out areas are present in the Project area but foraging may occur in coastal waters.</p> <p>Low frequency and continuous noise, with behavioural effects on sea lions in water and at haul-outs.</p>	Moderate	Unlikely	Low	<p>Minimise:</p> <ul style="list-style-type: none"> <li>Two Marine Fauna Observers (MFOs) on duty at all times, with at least one being a Level 1 MFO during times vessel transit within Action Area</li> <li>Vessel movements confined to designated routes</li> <li>Vessel speed restriction (&lt;10 knots)</li> <li>Adhere to the Australian National Guidelines for Whale and Dolphin Watching (DoEE 2017), and the BC Regulations (WA Gov 2025) cation and no approach distances.</li> </ul> <p>Implementation of observation zone (no approach) and Exclusions Zone (Caution Zone) Table 23: Vessel fauna management zones for marine support vessels to protect marine mammals from vessel noise</p>	Minor	Unlikely	Low	<p>Vessels generate lower-intensity, higher-frequency continuous noise, posing less risk of auditory injury but still capable of causing disturbance. MFOs will be onboard every vessel. Adaptive management will include having Level 1 MFOs onboard vessels if animal sightings are relatively high.</p> <p>Vessel speeds will be restricted (&lt;10 knots), reducing potential noise propagation.</p> <p>The potential impact to ASL from vessel will therefore be <b>Low</b>.</p>
	<p>Southern right whale (<i>Eubalaena australis</i>)</p>	<p>Noise from vessels is low-frequency and continuous, with the highest risk to baleen whales through masking and disturbance.</p> <p>The Project area does not overlap with the southern right whale Biologically Important Area (BIA).</p> <p>The inherent risk ranking is based on the activity occurring during the whale migration period (May to November). The residual risk ranking is based on</p>	Moderate	Unlikely	Low	<p>Avoid:</p> <ul style="list-style-type: none"> <li>Limit vessel crew transfers by accommodating crew on board</li> <li>Utilise tugs and workboats instead of Large Handling Vessels</li> </ul> <p>Minimise:</p> <ul style="list-style-type: none"> <li>Two Marine Fauna Observers (MFOs) on duty at all times, with at least one being a Level 1 MFO during times vessel transit within Action Area</li> </ul>	Minor	Unlikely	Low	<p>Vessels generate lower-intensity, higher-frequency continuous noise, posing less risk of auditory injury but still capable of causing disturbance. MFOs will be onboard every vessel. Adaptive management will include having Level 1 MFOs onboard vessels if animal sightings are relatively high.</p> <p>Vessel speeds will be restricted (&lt;10 knots), reducing potential noise propagation.</p> <p>It is unlikely that whales will be present during construction as the Project will avoid the majority of whale migration season.</p>



Activity and potential impact pathway	Species	Species sensitivities	Consequence	Likelihood	Inherent Risk	Controls and Management measures	Consequence	Likelihood	Residual Risk	Conclusion
		the activity occurring mostly outside of this period.				<ul style="list-style-type: none"> <li>Vessel movements confined to designated routes</li> <li>Vessel speed restriction (&lt;10 knots)</li> <li>Adhere to the Australian National Guidelines for Whale and Dolphin Watching (DoEE 2017), and the BC Regulations (WA Gov 2025) cation and no approach distances.</li> <li>Implementation of observation zone (no approach) and Exclusions Zone (Caution Zone) Table 24: Vessel fauna management zones for marine support vessels to protect marine mammals from vessel noise</li> </ul>				<p>The Project has scheduled its noisiest construction activities to be completed first – piling and then drilling to avoid whale migration season.</p> <p>The potential impact to whales from vessel will therefore be <b>Low</b>.</p>
	Humpback whale ( <i>Megaptera novaeangliae</i> )	<p>Noise from vessels is low-frequency and continuous, with the highest risk to baleen whales through masking and disturbance.</p> <p>The Project area does overlap with the humpback whale migration Biologically Important Area (BIA).</p> <p>The inherent risk ranking is based on the activity occurring during the whale migration period (May to November). The residual risk ranking is based on the activity occurring outside of this period.</p>	Moderate	Unlikely	Low	<p>Avoid:</p> <ul style="list-style-type: none"> <li>Limit vessel crew transfers by accommodating crew on board</li> <li>Utilise tugs and workboats instead of Large Handling Vessels</li> <li>Scheduling noisiest construction activities first to avoid occurring during whale migration season</li> </ul> <p>Minimise:</p> <ul style="list-style-type: none"> <li>Two Marine Fauna Observers (MFOs) on duty at all times, with at least one being a Level 1 MFO during times vessel transit within Action Area</li> <li>Vessel movements confined to designated routes</li> </ul>	Minor	Unlikely	Low	<p>Vessels generate lower-intensity, higher-frequency continuous noise, posing less risk of auditory injury but still capable of causing disturbance. MFOs will be onboard every vessel. Adaptive management will include having Level 1 MFOs onboard vessels if animal sightings are relatively high.</p> <p>Vessel speeds will be restricted (&lt;10 knots), reducing potential noise propagation.</p> <p>It is unlikely that the whales will be present during construction as the Project will avoid the majority whale migration season.</p> <p>The Project has scheduled its noisiest construction activities to be completed first – piling and then drilling to avoid whale migration season.</p>



Activity and potential impact pathway	Species	Species sensitivities	Consequence	Likelihood	Inherent Risk	Controls and Management measures	Consequence	Likelihood	Residual Risk	Conclusion
						<ul style="list-style-type: none"> <li>Vessel speed restriction (&lt;10 knots)</li> <li>Adhere to the Australian National Guidelines for Whale and Dolphin Watching (DoEE 2017), and the BC Regulations (WA Gov 2025) caution and no approach distances.</li> </ul> Implementation of observation zone (no approach) and Exclusions Zone (Caution Zone) Table 25: Vessel fauna management zones for marine support vessels to protect marine mammals from vessel noise				The potential impact to whales from vessel noise will therefore be <b>Low</b> .
	Indo-Pacific bottlenose dolphin ( <i>Tursiops aduncus</i> ) (EPBC Act listing Migratory, Cetacean)	Vessel noise overlaps partly with their mid-frequency sensitivity; risk is mostly behavioural (avoidance, distraction).  Indo-Pacific bottlenose dolphins may be present at some time, but not restricted to the Project area.	Moderate	Unlikely	Low	Minimise: <ul style="list-style-type: none"> <li>Two Marine Fauna Observers (MFOs) on duty at all times, with at least one being a Level 1 MFO during times vessel transit within Action Area</li> <li>Vessel movements confined to designated routes</li> <li>Vessel speed restriction (&lt;10 knots)</li> <li>Adhere to the Australian National Guidelines for Whale and Dolphin Watching (DoEE 2017), and the BC Regulations (WA Gov 2025) caution and no approach distances.</li> </ul> Implementation of observation zone (no approach) and Exclusions Zone (Caution Zone) Table 26: Vessel fauna	Minor	Unlikely	Low	Vessels generate lower-intensity, higher-frequency continuous noise, posing less risk of auditory injury but still capable of causing disturbance MFOs will be onboard every vessel. Adaptive management will include having Level 1 MFOs onboard vessels if animal sightings are relatively high.  Vessel speeds will be restricted (<10 knots), reducing potential noise propagation.  The potential impact to dolphins from vessel noise will therefore be <b>Low</b> .



Activity and potential impact pathway	Species	Species sensitivities	Consequence	Likelihood	Inherent Risk	Controls and Management measures	Consequence	Likelihood	Residual Risk	Conclusion
						management zones for marine support vessels to protect marine mammals from vessel noise				
<p><b>Vessel strike</b>                      Marine fauna may be impacted by vessel strike during construction, potentially resulting in injury or death. Marine mammals and turtles are susceptible to vessel strike as they are air breathers and known to spend prolonged periods at the surface.</p>										
Vessel types include JUB (when under tow), barge, tug, workboats and crew transfer vessels  Major Vessel Movements including Jub, Barge, Tug, etc, resulting in vessel strike: <ul style="list-style-type: none"> <li>Injury</li> <li>Death</li> <li>Reduced fitness</li> </ul> Minor Vessel Movements including Crew Transfer Vessels, work boats, etc <ul style="list-style-type: none"> <li>Injury</li> <li>Death</li> <li>Reduced fitness</li> </ul>	Australian sea lion ( <i>Neophoca cinerea</i> )	ASL is an Endangered species with a decreasing population. Individuals exhibit high site fidelity. No haul-out areas are present in the Project area but foraging may occur in coastal waters.  Australian sea lions surface to breathe and could potentially be at risk of vessel strike.	Moderate	Unlikely	Low	Minimise: <ul style="list-style-type: none"> <li>Two Marine Fauna Observers (MFOs) on duty at all times, with at least one being a Level 1 MFO during times vessel transit within Action Area</li> <li>Vessel movements confined to designated routes</li> <li>Vessel speed restriction (&lt;10 knots)</li> <li>Adhere to the Australian National Guidelines for Whale and Dolphin Watching (DoEE 2017), and the BC Regulations (WA Gov 2025) cation and no approach distances.</li> </ul>	Minor	Unlikely	Low	MFOs will be onboard every vessel. Adaptive management will include having Level 1 MFOs onboard vessels if animal sightings are relatively high.  Vessel crew transfer frequency reduced Vessel speeds will be restricted (<10 knots), reducing potential noise propagation.  The potential impact to ASL from vessel strike will therefore be <b>Low</b> .
	Southern right whale ( <i>Eubalaena australis</i> )	Southern right whales are known to be sensitive vessel strike given the species preference for shallow coastal waters.  The residual risk ranking is based on the activity occurring outside of this period.	Moderate	Unlikely	Low	Avoid: <ul style="list-style-type: none"> <li>Limit vessel crew transfers by accommodating crew on board</li> <li>Utilise tugs and workboats instead of Large Handling Vessels</li> </ul> Minimise: <ul style="list-style-type: none"> <li>Two Marine Fauna Observers (MFOs) on duty at all times, with at least one being a Level 1 MFO during times vessel transit within Action Area</li> <li>Vessel movements confined to designated routes</li> <li>Vessel speed restriction (&lt;10 knots)</li> </ul>	Minor	Unlikely	Low	MFOs will be onboard every vessel. Adaptive management will include having Level 1 MFOs onboard vessels if animal sightings are relatively high.  Vessel crew transfer frequency reduced Vessel speeds will be restricted (<10 knots), reducing potential noise propagation.  The potential impact to whales from vessel strike will therefore be <b>Low</b> .



Activity and potential impact pathway	Species	Species sensitivities	Consequence	Likelihood	Inherent Risk	Controls and Management measures	Consequence	Likelihood	Residual Risk	Conclusion
						<ul style="list-style-type: none"> <li>Adhere to the Australian National Guidelines for Whale and Dolphin Watching (DoEE 2017), and the BC Regulations (WA Gov 2025) cation and no approach distances.</li> </ul>				
	Humpback whale ( <i>Megaptera novaeangliae</i> )	<p>The southern migration represents the most sensitive period as this is when mother-calf pairs are common and sighted resting along their migration corridor. Neonate calves are particularly vulnerable to vessel strikes, as they have limited swimming and diving abilities and low breath-hold capacity (Irvine and Salgado Kent 2019).</p> <p>The residual risk ranking is based on the activity occurring outside of this period.</p>	Moderate	Unlikely	Low	<p>Avoid:</p> <ul style="list-style-type: none"> <li>Limit vessel crew transfers by accommodating crew on board</li> <li>Utilise tugs and workboats instead of Large Handling Vessels</li> </ul> <p>Minimise:</p> <ul style="list-style-type: none"> <li>Marine Fauna Observers (MFOs) on duty at all times vessel transit</li> <li>Vessel movements confined to designated routes</li> <li>Vessel speed restriction (&lt;10 knots)</li> <li>Adhere to the Australian National Guidelines for Whale and Dolphin Watching (DoEE 2017), and the BC Regulations (WA Gov 2025) cation and no approach distances.</li> </ul>	Minor	Unlikely	Low	<p>MFOs will be onboard every vessel. Adaptive management will include having Level 1 MFOs onboard vessels if animal sightings are relatively high.</p> <p>Vessel crew transfer frequency reduced</p> <p>Vessel speeds will be restricted (&lt;10 knots), reducing potential noise propagation.</p> <p>The potential impact to whales from vessel strike will therefore be <b>Low</b>.</p>
	Indo-Pacific bottlenose dolphin ( <i>Tursiops aduncus</i> ) ( <i>EPBC Act listing Migratory, Cetacean</i> )	<p>Indo-Pacific bottlenose dolphins may be present at some time, but not restricted to the Project area.</p> <p>Bottlenose dolphins are generally able to avoid vessels due to their speed and agility, but are at greater risk from small boats and when resting or foraging.</p>	Moderate	Unlikely	Low	<p>Minimise:</p> <ul style="list-style-type: none"> <li>Marine Fauna Observers (MFOs) on duty at all times vessel transit</li> <li>Vessel movements confined to designated routes</li> <li>Vessel speed restriction (&lt;10 knots)</li> <li>Adhere to the Australian National Guidelines for Whale and Dolphin Watching (DoEE 2017), and the BC Regulations (WA Gov 2025) cation</li> </ul>	Minor	Rare	Low	<p>MFOs will be onboard every vessel. Adaptive management will include having Level 1 MFOs onboard vessels if animal sightings are relatively high.</p> <p>Vessel crew transfer frequency reduced</p> <p>Vessel speeds will be restricted (&lt;10 knots), reducing potential noise propagation.</p> <p>The potential impact to dolphins from vessel strike will therefore be <b>Low</b>.</p>



Activity and potential impact pathway	Species	Species sensitivities	Consequence	Likelihood	Inherent Risk	Controls and Management measures	Consequence	Likelihood	Residual Risk	Conclusion
						and no approach distances.				

Table 27: Other risk (minor) to marine mammals

Activity and potential impact pathway	Species group	Consequence	Likelihood	Inherent Risk	Controls and Management measures	Consequence	Likelihood	Residual Risk Conclusion
<b>Other construction activities (minor potential impacts)</b>								
Reduced light and smothering/stressor effects (elevated TSS) There is potential for periodic and/or short-term elevations in turbidity generated through excavation of foundations, which may lead to a range of direct and indirect impacts to marine fauna.	Marine mammals	Moderate	Highly likely	High	Minimise: <ul style="list-style-type: none"> <li>Visual inspections of sediment plumes during construction (e.g. drilling, vessel movements) and piling</li> </ul>	Minor	Unlikely	Low
Loss of local biodiversity (introduction of IMS) Construction has the potential to allow the settlement of Introduced Marine Species (IMS) via construction vessels, machinery and equipment.	Marine mammals	Moderate	Possible	Medium	Minimise: <ul style="list-style-type: none"> <li>Document the inspection carried out on construction vessels for DPIRD approval</li> <li>All vessels to comply with relevant ballast water management requirements</li> <li>All vessel shall comply with the National Biofouling Management Guidelines for Non-Trading Vessels (Marine Pest Sectoral Committee 2018).</li> <li>Construction vessels to be obtained from WA waters.</li> </ul>	Moderate	Unlikely	Low
Toxicity effects on Marine Mammals (introduction of toxicants) Construction has the potential to allow the settlement of Introduced Marine Species (IMS) via construction vessels, machinery and equipment.	Marine mammals	Minor	Possible	Low	Minimise: <ul style="list-style-type: none"> <li>Ensure all activities comply with the International Maritime Organisation International Convention for Prevention of Pollution from ships.</li> <li>Implement standard spill response procedures</li> </ul>	Moderate	Unlikely	Low
Injury/mortality of Marine Mammals from marine debris (entanglement)	Marine mammals	Minor	Possible	Low	Minimise: <ul style="list-style-type: none"> <li>MFOs will indirectly assist in the identifying and reporting hazardous marine debris during construction.</li> <li>Implement standard waste minimisation and reduction strategies, including providing facilities for waste disposal.</li> </ul>	Unlikely	Minor	Low



## Appendix B. Marine Mammal Management & Monitoring Sub plan

Table 28: Marine Mammal Management & Monitoring Sub plan

Marine Mammal Management & Monitoring Sub Plan Scope	
This management and monitoring plan has been developed to manage the Project's construction activities with respect to marine mammals on the Project	
Objectives	
<p>Provide a strategic and systematic framework to enable construction of the Project with minimal impact due to effects on marine mammals.</p> <ul style="list-style-type: none"> <li>Ensure all construction activities are undertaken with the objective of preventing such impacts</li> </ul>	
Performance indicators	
<ul style="list-style-type: none"> <li>Avoid physical and behavioural impacts of noise on listed threatened and migratory southern right whales (<i>Eubalaena australis</i>), humpback whales (<i>Megaptera novaeangliae</i>) and Australian Sea Lion (<i>Neophoca cinerea</i>)</li> <li>Control measures to be used to minimise excessive noise and vibration impacts on the environment.</li> <li>No complaints related to marine mammals from the local community</li> <li>No incidences of marine fauna injury or death because of vessel strike.</li> <li>No impacts to marine fauna from piling (e.g. injury, or death)</li> <li>Acoustic Output not to exceed TTS distance at [Hold distance to be informed by piling noise modelling] distance from pile.</li> </ul>	
Legislation, Standards and Guidelines	
<ul style="list-style-type: none"> <li>Environmental Protection Act 1986</li> <li>Environmental Protection Regulations 1987</li> <li>Environmental Protection (Unauthorised Discharges) Regulations 2004</li> <li>Environmental Protection and Biodiversity Conservation Act 1999</li> <li>Biodiversity Conservation Act 2016</li> </ul>	<ul style="list-style-type: none"> <li>Biodiversity Conservation Regulations 2018</li> <li>Rights in Water Irrigation Act 1914</li> <li>Technical guidance – Protecting the quality of Western Australia's marine environment (EPA 2016)</li> <li>EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and Marine Mammals</li> <li>National Guidelines for Whale and Dolphin watching (DoEE 2017).</li> </ul>
Baseline data and background	
<p>The marine waters surrounding the ASDP Project support a variety of fauna, several of which are protected under State and Commonwealth legislation. While no specific surveys for Marine Mammals have been undertaken, conservation significant Marine Mammals present in the marine waters of ASDP Project include:</p> <ul style="list-style-type: none"> <li>Australian sea-lion (<i>Neophoca cinerea</i>)</li> <li>Southern right whale (<i>Eubalaena australis</i>)</li> <li>Humpback whale (<i>Megaptera novaeangliae</i>)</li> </ul> <p>The migration periods of the key mammals are:</p> <ul style="list-style-type: none"> <li><i>Eubalaena australis</i> (southern right whale) – Likelihood of encounter between May–November</li> <li><i>Megaptera novaeangliae</i> (humpback whale) – Likelihood of encounter between May–November</li> </ul> <p>The key potential impacts to Marine Mammals associated with the Project are:</p> <ul style="list-style-type: none"> <li>Underwater noise from construction vessels &amp; activities</li> <li>Vessel movement and strike</li> </ul> <p>Other potential impacts associated with the Project include:</p> <ul style="list-style-type: none"> <li>There is potential for periodic and/or short-term elevations in turbidity generated through excavation of foundations, which may lead to a range of direct and indirect impacts to marine fauna.</li> <li>Loss of local biodiversity (introduction of IMS)</li> <li>Toxicity effects on Marine Mammals (introduction of toxicants)</li> <li>Injury/mortality of Marine Mammals from marine debris (entanglement)</li> </ul>	



Table 29: Environmental Management Measures

Management target	Management Action	Trigger value	Responsible party	Reporting and evidence	Frequency/timing	Contingency
No impacts to marine fauna from piling	<p>Two MFOs, one of which will be a Level 1 MFO, to be on duty at all times during piling operations (See Appendix C.1).</p> <p>Piling is scheduled to be completed first to avoid whale migration period (May to November)</p> <p>Implement procedures outlined in Appendix B C.1, C.3., tables 31 &amp; 32 including:</p> <p>30-min pre-start, 30-min soft-start, shut-down and low visibility procedures.</p>	<p>Sighting of marine fauna in Exclusion zone, refer to tables 31 &amp; 32</p> <p>Marine fauna in Management Zone (see Appendix B and C.1)</p> <p>Delays in piling into whale season or more than anticipated whale sightings.</p>	ASWA MFOs	<p>Marine fauna observations to be recorded in daily MFOs logs (Refer to Appendix B and C.1)</p> <p>Report incidents as outlined in Appendix 0</p>	<p>MFOs, continuously monitor management zones during piling operations.</p> <p>Throughout piling activities (Refer to Appendix )</p>	<p>Adaptive management (C.5) will be implemented if higher than anticipated marine fauna sightings (e.g. whales present), which will require construction works to be halted until additional management measures can be implemented, these included but are not limited to:</p> <ul style="list-style-type: none"> <li>▪ Additional MFO support</li> <li>▪ Increased management zones</li> </ul> <p>Piling at energy levels below 90%.</p>
	<p>Piling restricted to daylight hours only.</p> <p>New pile installation cannot occur within 1 hour of sunset.</p>	<p>Pile installation is not completed 30 min prior to sunset.</p>	ASWA	<p>MFO logs</p> <p>Piling logs</p>	<p>Throughout piling activities.</p>	<p>If pile installation not completed within 30 mins of sunset, contractor to contact Client to evaluate situation.</p> <p>If pile installation was started prior to sunset is not completed prior to sunset, pile</p>

Management target	Management Action	Trigger value	Responsible party	Reporting and evidence	Frequency/timing	Contingency
						installation can be continued until completed for safety reasons.
	During soft-start procedures piling energy remain below 90%	Piling logs indicate levels are exceeding 90% energy during soft-start.	ASWA	Daily piling logs to be provided to the Client.	For each pile and following stop work period >15 minutes	If piling logs indicate that soft-start is exceeding 90% energy then piling methods to be investigated, and engineering constraints to be investigated.  Three days exceeding 90% then additional Level 1 MFO will be required.
	Piling to be undertaken as efficiently as possible and ensure equipment is maintained	Damaged or faulty equipment.	ASWA	Inspection reports	Daily	If equipment is found to be faulty or damaged is not used until repaired or is replaced.
Avoidance of injuries or deaths of marine mammals during construction activities (drilling)	Two MFOs, one of which will be a Level 1 MFO, will be on at all times during marine drilling activities (See Appendix C.1).  Implement drilling procedures outlined in Appendix C.3.2., including:  30-min pre-start, 30-min soft-start, shut-down and low visibility procedures.	Sighting of marine fauna in Exclusion zone (see Appendix C.3.2. & Table 33)	ASWA MFOs	Refer to Appendix C.3.2.  Report incidents as outlined in Appendix 0	Daily throughout marine construction works	As provided in Appendix C.3.2. and Appendix C.6.

Management target	Management Action	Trigger value	Responsible party	Reporting and evidence	Frequency/timing	Contingency
	During soft-start procedures drilling energy remain below 90%.	Drilling logs indicate levels are exceeding 90% energy during soft-start.	ASWA	Weekly drilling logs provided to the client.	During all marine drilling works	In the event of noise generation proves unsatisfactory (exceeding 90% during soft-start), operations will cease, and adequate measures will be employed to modify or substitute work processes to mitigate impacts.
	Drilling to be undertaken as efficiently as possible and ensure equipment is maintained	Damaged or faulty equipment.	ASWA	Inspection reports	Daily	If equipment is found to be faulty or damaged is not be used until repaired or is replaced.
TTS Threshold Levels (dB) for species hearing groups not to exceed at the piling Exclusion Zone boundary.	Implement underwater noise validation program Undertake underwater noise validation during initial piling for each site and pile type. Take audio recordings in the dominant propagation sector; the direction of greatest predicted travel of piling noise, at three zones: Near-field (100- 200 m) to characterise the source. Mid-field (~0.5 × modelled TTS) to confirm propagation.	Measured level at the TTS boundary for any hearing group exceeds the applicable TTS threshold. <i>Refer to Table 30: Acoustic Monitoring Locations &amp; Trigger Values</i>	ASWA Environmental Consultant/ noise expert	<i>(Underwater noise validation program currently being developed)</i>  Monitoring location based on the modelling outputs to ensure worst-case location.  Minimum measurement of first pile installs at each location (intake and outfall) and worst-case scenario	This will be completed during the high impact scopes of works.	Any exceedances that may arise, methodology will get reviewed and implemented with a soft start procedure ensuring compliance

Management target	Management Action	Trigger value	Responsible party	Reporting and evidence	Frequency/timing	Contingency
	<p>TTS boundary (~1.0 × modelled TTS) to confirm compliance.</p> <p>Complete a single TTS boundary check in second highest propagation sector per hearing group.</p> <p><i>(Refer to Error! Reference source not found.)</i></p>			<p>(deepest pile at HAT)</p> <p>Boat-based hydrophone recordings for the first pile of each pile type per location across two recording blocks (capturing early steady-state and later steady-state piling).</p> <p>Log hammer energy and strike counts; note tide, depth and metocean conditions.</p>		
<p>No incidences of marine fauna injury or death as a result of vessel strike/ noise</p>	<p>At least two MFOs, one of which will be a Level 1 MFO, on duty at all times during vessel transit.</p> <p>All vessels are to adhere to standard set in the National Whale Watching Guidelines (DoEE 2017b) and the BC Regulations.</p> <p>Implement procedures outlined in Appendix C.3 &amp; C.6.</p> <p>Apply vessel approach distances (Appendix C.6.)</p> <p>No more than three vessels in caution zone</p>	<p>Marine fauna sighted within the Exclusion zone ( Refer to Appendix C.3, C.6 &amp; <b>Table 31: Vessel fauna management zones for marine support vessels</b>)</p>	<p>ASWA MFOs</p>	<p>Daily MFO logs (Refer to Appendix .5.)</p> <p>Report incidents as outlined in Appendix 0</p>	<p>Daily throughout marine construction works (Refer to Appendix .5.)</p> <p>Continuous MFO observations while vessel is in motion.</p>	<p>Should a travelling dolphin enter the No Approach Zone, including bow riding, the vessel shall either maintain its course and speed, or maintain its course and gradually slow down.</p> <p>If marine fauna vessel strike occurs, works are to halt until advice from Minister and vessel speeds in the Project Action area</p>

Management target	Management Action	Trigger value	Responsible party	Reporting and evidence	Frequency/timing	Contingency
	The vessel's Master is ultimately responsible for maintaining vessel approach distances and speeds, with the assistance from MFOs observing their surrounding waters to providing communications on identified observed marine mammals within the Action Zone. MFOs will have a direct line of communication with vessel Masters. The Master will contact and obtain positive communications from an duty MFO prior to entering the Action Area.					will be further reduce to 8 knots.  If higher than anticipated marine fauna sightings in the Project Action area then), which will require construction works to be halted until additional management measures can be implemented, these included but are not limited to:  Increase in the number and/or level of MFOs present while vessels are transiting  Further reduction in vessel speeds
	Maximum speed of 10 knots for all Project vessels within the Project Action Area.	Vessel speed >10 knots	Vessel master Contractor	Vessel logs (weekly vessel logs to be provided)	At all times when operational in the Project Action Area	If marine fauna are present vessel speeds to be further reduced to 6 knots (see Appendix C.6.)  Vessels exceeding speed limits are to be investigated and to continue operations must provide daily logs and have a client representative present to ensure



Management target	Management Action	Trigger value	Responsible party	Reporting and evidence	Frequency/timing	Contingency
						vessel speed adherence.
Avoid physical and behavioural impacts of noise on listed threatened and migratory southern right whales ( <i>Eubalaena australis</i> ), humpback whales ( <i>Megaptera novaeangliae</i> ) and Australian Sea Lion ( <i>Neophoca cinerea</i> )	<p>No marine construction during sensitive ecological windows (Australian sea lion, humpback whale and southern right whale, May to November)</p> <p>At least two MFOs, one of which will be a Level 1 MFO, on duty at all times for construction activities (vessel movements, drilling)</p> <p>Implement Marine Fauna/Mammal Management Protocol (Appendix C)</p>	<p>Vessel movement outside of route.</p> <p>Appendix C - tables 31, 32 and 33.</p>	<p>ASWA</p> <p>Marine Superintendent</p> <p>Marine Area Manager</p> <p>MFOs</p> <p>MFOs</p>	<p>Daily MFO logs</p> <p>See Appendix C</p>	<p>During all marine construction works (piling, drilling and vessel transits)</p>	<p>If there are more than three consecutive days of three or more whale-instigated exclusion zone situations, then work will be halted and additional management measures to be considered (See Appendix C.5)</p>
No complaints related to marine mammals from the local community	<p>Implement procedures outlined in Appendix B and C.1</p> <p>Community informed of the works 1 week minimum of piling works commencing inclusive of periods of works &amp; duration</p>	Public complaint	<p>ASWA</p> <p>Contractor</p>	<p>Noise monitoring may be undertaken if ongoing complaints are received.</p> <p>Weekly Inspection Checklist.</p> <p>Equipment Maintenance Register.</p>	<p>1 week prior to commencing works</p> <p>Duration of construction works (daily or weekly)</p>	<p>Complaints will be investigated, and the complainant contacted within seven days</p>
No reported negative impacts on marine fauna attributable to marine debris.	MFOs will indirectly assist in the identifying and reporting hazardous marine debris during construction.	Marine debris sighted in the Project Action area.	MFOs	Incident report	Daily during construction works	If marine fauna identified entangled or injured in marine debris incidents to be reported to DBCA and

Management target	Management Action	Trigger value	Responsible party	Reporting and evidence	Frequency/timing	Contingency
	Implement standard waste minimisation and reduction strategies, including providing facilities for waste disposal.		Contractor	Onsite inductions Weekly inspections	All crew to complete induction prior to arrival to site.  Daily meetings Weekly inspections	DCCEEW as soon as possible/within 24hours



## Appendix C. Marine Fauna / Mammal Management Protocol

Monitoring and enacting management actions in response to the presence of marine fauna species will have follow on effects and benefit other non-target marine fauna within the Project area. The Marine Fauna Monitoring and Management Program will be implemented throughout all piling and construction works.

### C.1. Marine fauna observers (MFOs)

#### C.1.1. Training and qualifications

As a minimum two marine fauna observers (MFOs) will be deployed whenever vessels are transiting or undertaking activities within the Action Area to maintain 360-degree observation of the observation zone and shut down zones, at all times, during hours of construction in the marine environment. At all times at least one of the marine fauna observers will have as a minimum:

- Training by reputable industry provider, who bestows industry-recognized certificates in marine mammal observing, or
  - a degree in biology, ecology, zoology or environmental sciences (Aboriginal ranger groups/ Traditional Owner Groups, where relevant experience from Caring for Country programs is accepted in place of a formal degree);
- and
- a minimum two years' work experience and demonstrated knowledge of marine mammals in the marine temperate region.

All MFOs deployed will have as a minimum undertaken marine mammal observation Project specific training, developed by a reputable industry provider who bestows industry-recognized certificates. This training will cover Project DCCEEW conditions of compliance, MCEMP, risk controls/ management strategies, marine mammal awareness in a marine temperate region including morphological and behavioural characteristics.

A summary of the required qualifications levels for the MFOs are presented in Table 26.

Table 32: MFO level definitions

MFO Level	Defintion	Evidence
Level 1 MFO	<p>Is a person:</p> <ul style="list-style-type: none"> <li>• Trained by reputable industry provider, who bestows an industry-recognized certificate in marine mammal observing or a degree in biology, ecology, zoology or environmental sciences (Aboriginal ranger groups, where relevant experience from Caring for Country programs is accepted in place of a formal degree) ; or</li> <li>• Has a degree in biology, ecology, zoology or environmental sciences and demonstrated experience with the identification and management of marine fauna. An exemption may apply to Aboriginal ranger groups/ Traditional Owner Groups, where relevant experience from Caring for Country programs is accepted in place of a formal degree..</li> </ul>	<p>Evidence of personnel suitability will be kept on record through staff curriculum vitae, training certificates and in-field record keeping, which may be used in future audits. Information will include:</p> <ul style="list-style-type: none"> <li>▪ MFO names and contact details.</li> <li>▪ Details of MFOs training (including provider and course dates)</li> <li>▪ Details on relevant degree or certificate</li> <li>▪ Completion of Project Specific training</li> <li>▪ Previous experience as MFOs on underwater piling surveys</li> <li>▪ Other MFO experience.</li> </ul>



MFO Level	Definition	Evidence
	<p>A level 1 MFO will have a minimum two years' work experience and demonstrated knowledge of marine mammals in the marine temperate region.</p> <p>A level 1 MFO will have undertaken marine mammal observation Project specific training, developed by a reputable industry provider who bestows industry-recognized certificates. This training will cover Project DCCEEW conditions of compliance, MCEMP, risk controls/ management strategies, marine mammal awareness in a marine temperate region including morphological and behavioural characteristics.</p>	
MFO's	<p>Is a person who has as a minimum undertaken marine mammal observation Project specific training, developed by a reputable industry provider who bestows industry-recognized certificates. This training will cover Project DCCEEW conditions of compliance, MCEMP, risk controls/ management strategies, marine mammal awareness in a marine temperate region including morphological and behavioural characteristics.</p> <p>Alkimos Sea Water Alliance is looking to engage an independent certified provider to provide MFO training to 12 ASWA employees already assigned roles to the Jack Up Barge.</p>	<p>Completion of Project Specific training</p> <ul style="list-style-type: none"> <li>▪</li> </ul>

### C.1.2. MFO Visibility & Operations

Two MFOs, at least one of which will be a Level 1 MFO, will be deployed at all times whenever vessels are transiting or undertaking activities within the Action Area in order to maintain 360-degree observation of the observation zone and exclusion zones (shut down zones) at all times during hours of construction in the marine environment

MFO's will have access to areas on board the jack-up barge (JUB) that allow for 360° visibility to be achieved. The JUB's bridge provides 360° visibility at a height of approximately 14 metres above sea level, which provides a visible horizon distance of approximately 13.2km. Marine support vessels provide 360° visibility at a height of approximately 2 metres above sea level, which provides a visible horizon distance of approximately 5.1km.

MFOs will utilise a range of equipment, including rangefinders, marine binoculars and tripod mounted spotting scopes. Tables 24 & 25 below, provide guidance on effective observational ranges for these types of equipment at levels achievable from the JUB and marine support vessels.



Table 33: Marine Mammal Visibility at 14m Elevation, (Observation Methods: Naked Eye | 7×50 Binoculars | 25–60× Spotting Scope - (horizon distance ~13.2km))

Marine Mammal	Optical Aid	Clear (km)	Choppy Sea (km)	Foggy (km)	Visibility Notes
<b>Humpback Whale</b>	Naked Eye	3–4.5	2–3	<1.5	Breaches and spouts visible in calm; harder to detect in fog
	7×50 Binoculars	~6–12	~4–8	~2–4	Tall spouts and flukes visible; reduced contrast in chop
	Spotting Scope 25×	~8–10	~6–8	~3–5	Clear view of flukes and breaches; fog limits detail
	Spotting Scope 60×	~8–12.5	~6–10	~4–6	Callosities and spouts distinguishable; fog reduces resolution
<b>Southern Right Whale</b>	Naked Eye	2.5–4	1.5–2.5	<1.2	Slow surfacing helps detection; V-shaped blow fades in fog
	7×50 Binoculars	~5–10	~3.5–6	~2–4	Body and blow visible; less surface activity than humpbacks
	Spotting Scope 25×	~8–10	~6–8	~3–5	Callosities and body arch visible; fog obscures blow
	Spotting Scope 60×	~8–12.5	~6–10	~4–6	High zoom reveals fine features; fog reduces contrast
<b>Indo-Pacific Bottlenose Dolphin</b>	Naked Eye	1–2	<1.5	<1	Group splashing helps detection; low profile limits range
	7×50 Binoculars	~2.5–3.5	~2–2.5	~1.5–2	Surfacing and leaping visible; chop masks movement
	Spotting Scope 25×	~2.5–4	~2–3	~1.5–2.5	Dorsal fins and group motion visible; fog limits clarity
	Spotting Scope 60×	~2.5–4	~2–3	~1.5–2.5	High zoom helps tracking; visibility still limited by sea state
<b>Sealions</b>	Naked Eye	<1.5	<1.2	<0.8	Only visible when hauled out or bobbing near shore
	7×50 Binoculars	~2–2.5	~1.5–2	~1–1.5	Better contrast and tracking; chop reduces visibility
	Spotting Scope 25×	~2–3.5	~1.5–2.5	~1–2	Body and movement distinguishable; fog obscures detail
	Spotting Scope 60×	~2–3.5	~1.5–2.5	~1–2	High zoom helps with distant hauled-out individuals



Table 34: Marine Mammal Visibility at 2m Elevation, (Observation Methods: Naked Eye | 7×50 Binoculars | 25–60× Spotting Scope - (horizon distance ~5.05km))

Marine Mammal	Optical Aid	Clear (km)	Choppy Sea (km)	Foggy (km)	Visibility Notes
<b>Humpback Whale</b>	Naked Eye	2–3	1.5–2	<1	Breaches and tall spouts visible in calm; limited by horizon and contrast
	7×50 Binoculars	~3.5–5	~2.5–4	~1.5–2.5	Spouts and flukes visible; chop reduces contrast
	Spotting Scope 25×	~4–5	~3–4	~2–3	Clear view of breaches and flukes; fog limits detail
	Spotting Scope 60×	~4.5–5.05	~3.5–4.5	~2.5–3.5	Callosities and dorsal features visible; fog reduces resolution
<b>Southern Right Whale</b>	Naked Eye	1.5–2.5	1–1.5	<1	V-shaped blow and slow surfacing help detection
	7×50 Binoculars	~3–4.5	~2–3.5	~1.5–2	Body and blow visible; less surface activity than humpbacks
	Spotting Scope 25×	~3.5–5	~2.5–4	~2–3	Callosities and body arch visible; fog obscures blow
	Spotting Scope 60×	~4–5.05	~3–4.5	~2.5–3.5	High zoom reveals fine features; fog reduces contrast
<b>Indo-Pacific Bottlenose Dolphin</b>	Naked Eye	<1.5	<1.2	<1	Group splashing helps detection; low profile limits range
	7×50 Binoculars	~2–3	~1.5–2.5	~1–1.5	Surfacing and leaping visible; chop masks movement
	Spotting Scope 25×	~2.5–3.5	~2–3	~1.5–2	Dorsal fins and group motion visible; fog limits clarity
	Spotting Scope 60×	~2.5–4	~2–3.5	~1.5–2.5	High zoom helps tracking; visibility still limited by sea state
<b>Sealions</b>	Naked Eye	<1.2	<1	<0.8	Only visible when hauled out or bobbing near shore
	7×50 Binoculars	~2–2.5	~1.5–2	~1–1.5	Better contrast and tracking; chop reduces visibility
	Spotting Scope 25×	~2–3	~1.5–2.5	~1–2	Body and movement distinguishable; fog obscures detail
	Spotting Scope 60×	~2–3.5	~1.5–3	~1–2.5	High zoom helps with distant hauled-out individuals

During marine works as a minimum two of the MFOs, (and of which must be a Level 1 MFO) will have no other duties and will have a clear line of communication with each other and with the supervisor of the works crew (piling, drilling etc).

At the commencement of each shift, the rostered Level 1 MFO, in consultation with the Marine Superintendent, will review the construction works, vessel movements, weather forecast and MFO Roster to plan adequate MFO



coverage to meet the observation requirements contained within this Plan. The planning will identify where MFOs will be positioned to have an unobstructed 360 degree view to meet the obligations within this Plan.

Should circumstances evolve during a shift to cause the on duty MFOs to believe they require additional MFOs on duty they will contact the Construction Superintendent to release additional MFOs as deemed necessary to comply with this Plan.

### C.1.3. MFO Shifts

MFO shifts will be managed to ensure they are exclusively rostered for observing duties only, no more than 4-hour rotations without a break. The 4-hour shift will reduce eye strain, manage fatigue, maximise concentration, and ensure marine fauna observers have amenity breaks and reduced weather exposure. Shifts will be assigned on a rotating roster with backup personnel to account for any absences.

### C.1.4. Field logs

The marine fauna observers will keep a daily field log detailing environmental and operational conditions of piling works. Daily logs will be collected and reviewed by a Level 1 MFO prior to being sent to the Sustainability and Environmental Manager for verification. The field logs will be collated and analysed for a completion report at the end of works. The details of marine fauna observer field logs will include:

- Location, date and start time of observations
- Name of the two Level 1 MFOs on shift and names of MFOs on shift during breaks
- Location and time of pre-start, soft-start, and shut-down procedures for piling
- Location, time and distance of any fauna sighting and mitigation applied
- Other non-target marine fauna observations observed within management zones
- Fauna behaviours indicative of stress or disturbance of significant marine fauna, in particular any behaviours that could be attributed to piling
- Location, times and reason when observations were hampered by poor sighting conditions
- Adherence to management responses in relation to distressed, dead or injured wildlife.

Logs of recorded sightings will be submitted to the National Cetacean Sighting Database.

## C.2. Avoidance of construction noise activities during migration

The Project is committed to avoid noise generated by construction in the marine environment during migration periods for the Australian Sea Lion, Humpback Whale and Southern Right Whale.

Independent assessments as referenced in section 15 identified noisy construction impacts on the marine environment – being piling, drilling and potentially tunnel boring. The project has monitoring tunnelling noise levels and determined that they will not impact marine mammals, as references in Appendix G. Therefore, we have identified piling and drilling as the noisy construction activities needed to be avoided during whale migration periods.

Therefore, to achieve this objective the construction methodology and schedule has been altered significantly from its initial construction methodology concept and construction program (baseline) to avoid piling and drilling construction activities occurring during whale migration periods in accordance condition 8.b.i..

Tug boats, crew boats and ancillary support vessels support JUB (construction barge) to operate safely and efficiently by supplying equipment, materials and personnel. The work they perform is not construction work, but support services, (refer to AMSA Guidance (Index 7)). Therefore, they do not form part of the construction as depicted in condition 8.b. i. However, consideration has been given to as to how to avoid and reduce vessel noise during whale migration periods.

The below table demonstrates how ASWA has modified its works methodology to avoid noisy construction works during migration period.



Table 35 : Measures to avoidance of construction noise activities during Australian Sea Lion, Humpback Whale and Southern Right Whale migration

Activities	Initial Construction Methodology and Program (Baseline)	Measures to meet condition 8b.i: Measures and commitments to Avoid Construction Noise
Piling	Piling scheduled to be completed prior to June 2026	Sequence of piling has been modified in satisfaction of clause 8b.i to consider the avoidance of noise generated by construction activities during the whale migration periods for the specified Australian sea lion, humpback whale and southern right whale by sequencing the activities in order to do those works with the highest potential noise generating impacts to occur during the non-migration periods.
Drilling	Drilling scheduled to be completed prior to June 2026	Sequence of drilling has been modified in satisfaction of clause 8b.i to consider the avoidance of noise generated by construction activities during the whale migration periods for the specified Australian sea lion, humpback whale and southern right whale by sequencing the activities in order to do those works with the highest potential noise generating impacts to occur during the non-migration periods.
Vessels	<p>Daily crew changes by marine vessel, thus high vessel movement rates</p> <p>Several trips by JUB to resupply at Henderson supply base</p> <p>Use of large anchor handling vessels for supporting JUB</p>	<p>Crew accommodated on the JUB instead ashore, reducing frequency of vessel movements between JUB and shore</p> <p>Use of supply vessels to provide materials to JUB enabling construction schedule to be shorten and enable piling and drilling to be performed outside whale migration periods</p> <p>Replacement of large anchor handling vessels with smaller harbour tugs, which are quieter.</p>
Other	Other construction activities assessed as not having an acoustic influence (emissions to cause TTS or Aud IN on protected matters.	Works such as diving, on JUB works are considered inaudible and therefore very low likelihood of causing TTS or Aud IN considering the observation & shut down zones that will be implemented.

### C.3. Underwater noise management procedures – Protection of Marine Fauna

#### C.3.1. Piling provisions

Table 36: Piling Works Summary

Pile	Number	Modelled Noise (micropascals) during works*	Approx. Time to Pile	Maximum Observable Management Zone -Based On Modelled Noise Impacts (Whales)



Intake structure support pile (~1.05m Diameter)	8	158 dB re 1 $\mu$ Pa <sub>2</sub>	2 hour installation timeframe per pile	3,750 metres
Intake Riser Casing (~3.1 m Diameter)	2	171 dB re 1 $\mu$ Pa <sub>2</sub>	12 hour installation timeframe per pile	5,150 metres
Outfall Diffuser Support Piles (~1.05m Diameter)	10	158 dB re 1 $\mu$ Pa <sub>2</sub>	2 hour installation timeframe per pile	3,850 metres
Outfall Riser Casing (3.1 m Dia) x 1no.	1	171 dB re 1 $\mu$ Pa <sub>2</sub>	12 hour installation timeframe per pile	8,100 metres

\* Reference: *Table 1: Expected Change to Marine Noise, Alkimos Seawater Desalination Plant, Environmental Review of Proposed Change to the Approves Action Area, EPBC 2019/8453, January 2025*

All piles have an observable management zone that can be achieved by MFOs stationed on the JUB in clear weather utilising equipment in *Table 24*. Additionally, MFOs can be stationed on support marine vessels to compliment observation management (refer to *Table 25*.) when deemed necessary by the on Duty Level MFO 1 to account for prevailing environmentally conditions.

The marine fauna monitoring and management program for piling (Figure 5) will be implemented throughout all piling works to achieve the managements targets outlined in Appendix A.



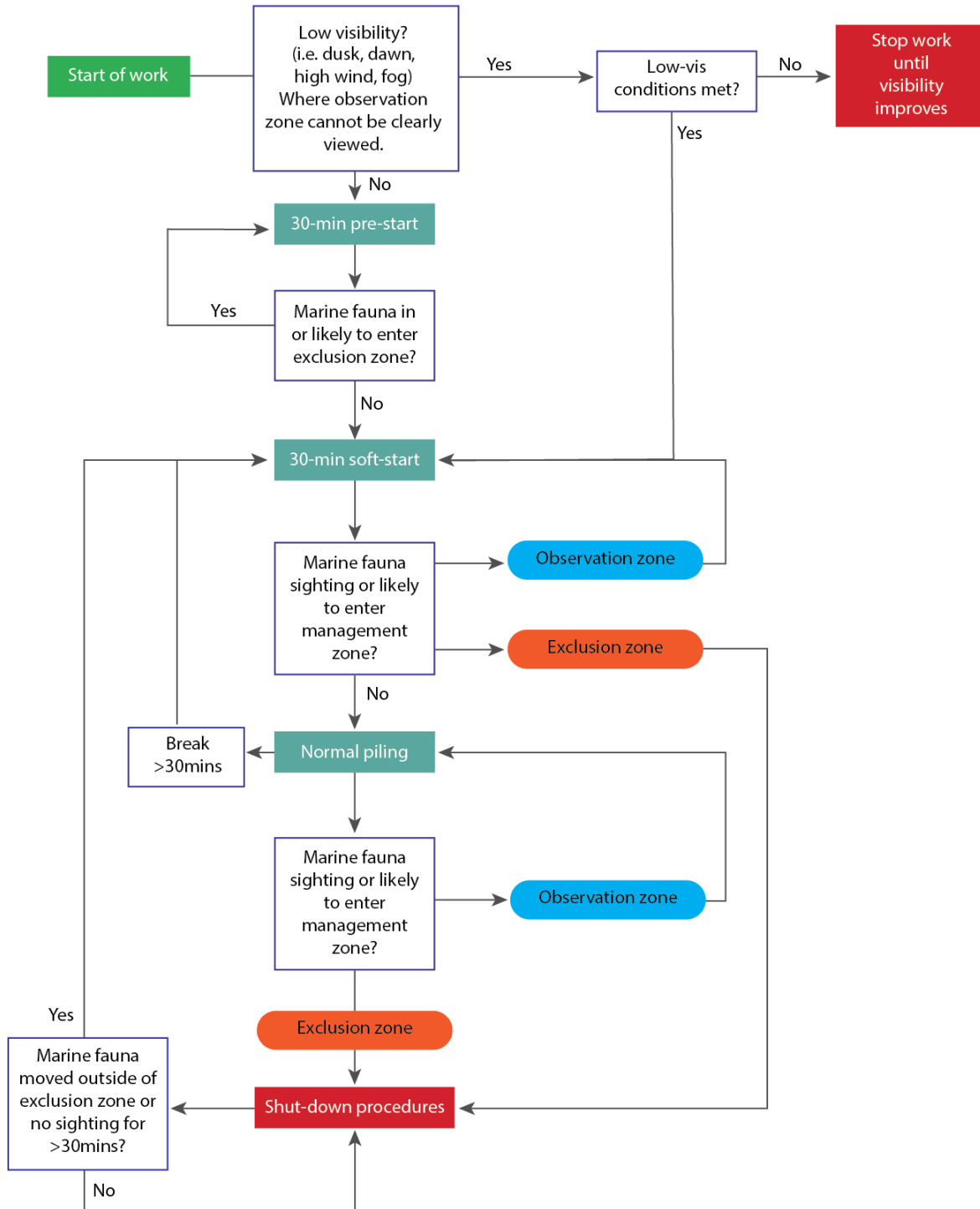


Figure 5: Tiered management framework/decision tree for the piling marine fauna management protocol



**C.3.1.1. Management zones**

Two Management Zones, that will be monitored by MFOs (See Appendix C.1) during marine piling works, have been set for target marine fauna groups, comprising of two zones, namely:

- Observation Zones
- Exclusion Zones.

The management zones have been informed by results of the underwater noise modelling (Talis Consultants 2025). These management zones are presented in Table 27 and Table 28, and Figure 6, Figure 7,

Figure 8 and Figure 9 depending on the piling. Developing Project specific management zones using underwater noise modelling results is an approach defined within the Underwater Piling and Dredging Noise Guidelines (DIT 2023) and is considered best-practice based on correspondence with the WA Environmental Protection Authority (EPA).

The adopted management zones are broader than the modelled outputs, based on the inherent variability between underwater noise modelling and empirical values. Therefore, a buffer has been applied to the TTS range to inform the exclusion zone and an additional 250 m applied to inform the observation zone. The TTS range has been used for the worst-case scenario (high-tide, HAT). These zones are intended to function as a primary mitigation measure for protecting marine fauna and are therefore designed to prevent TTS and AUD INJ impacts, rather than to simply delineate the outer boundary of a threshold exceedance distance. To achieve this, the management zones have been set more conservatively and are broader than the modelled outputs.

At least two MFOs will be used prior to and throughout piling works, one of which must be a Level 1 MFO. The MFOs during piling works will monitor in accordance to Table 25: Marine fauna management zones for piling at intake location and Table 26: Marine fauna management zones for piling at outfall location.

Table 37: Marine fauna management zones for piling at the intake location

Species	AUD INJ	TTS	Exclusion Zone	Observation Zone
<b>Intake structure support pile (1.05m Diameter) – 8 total in number</b>				
Whales	550	3,450	3,500	3,750
Dolphins	<50	70	200	450
Sea lions	100	1,000	1,200	1,450
Turtles	<50	105	200	450
<b>Intake Riser Casing (3.0m Diameter) - 2 total in number</b>				
Whales	1,250	4,800	4,900	5,150
Dolphins	<50	100	350	600
Sea lions	130	1,100	1,000	1,250
Turtles	50	250	350	600

\*Noting turtles are unlikely to be present (Water Corporation 2022), however if sighted given the species EPBC Act listing and BC Act listing, stop work procedures will be applied.

Table 38: Marine fauna management zones for piling at the outfall location

Species	AUD INJ	TTS	Exclusion Zone	Observation Zone
<b>Outfall Diffuser Support Piles (1.05m diameter) - 10 total in number</b>				



Species	AUD INJ	TTS	Exclusion Zone	Observation Zone
Whales	550	3,550	3,600	3,850
Dolphins	<50	60	200	450
Sea lions	85	700	800	1,050
Turtles	<50	150	200	450
<b>Outfall Riser Casing (3.0m diameter) 1 total in number</b>				
Whales	1,000	7,750	7,850	8,100
Dolphins	<50	80	200	450
Sea lions	90	750	850	1,100
Turtles	<50	300	400	650

*\*Noting turtles are unlikely to be present (Water Corporation 2022), however if sighted given the species EPBC Act listing and BC Act listing, stop work procedures will be applied.*

Sharks and rays are not surface breathers; therefore, they do not bask at the surface which makes observations an ineffective mitigation measure. However, larger elasmobranchs may be present (e.g. rays and sharks) and can occasionally be viewed from the surface if weather conditions and water clarity allows for it. As a precautionary approach, if rays or sharks are sighted within the turtle zones the procedures outlined below will be implemented.

As piling is scheduled to avoid the whale migration season, when whales are most likely not to be present (peak seasonal occurrence), their occurrence in the Project area is not expected. Nevertheless, management zones for whales have been developed as a precaution. If whale sightings occur in higher numbers than anticipated, adaptive management measures outlined in Appendix C.5 will be implemented.



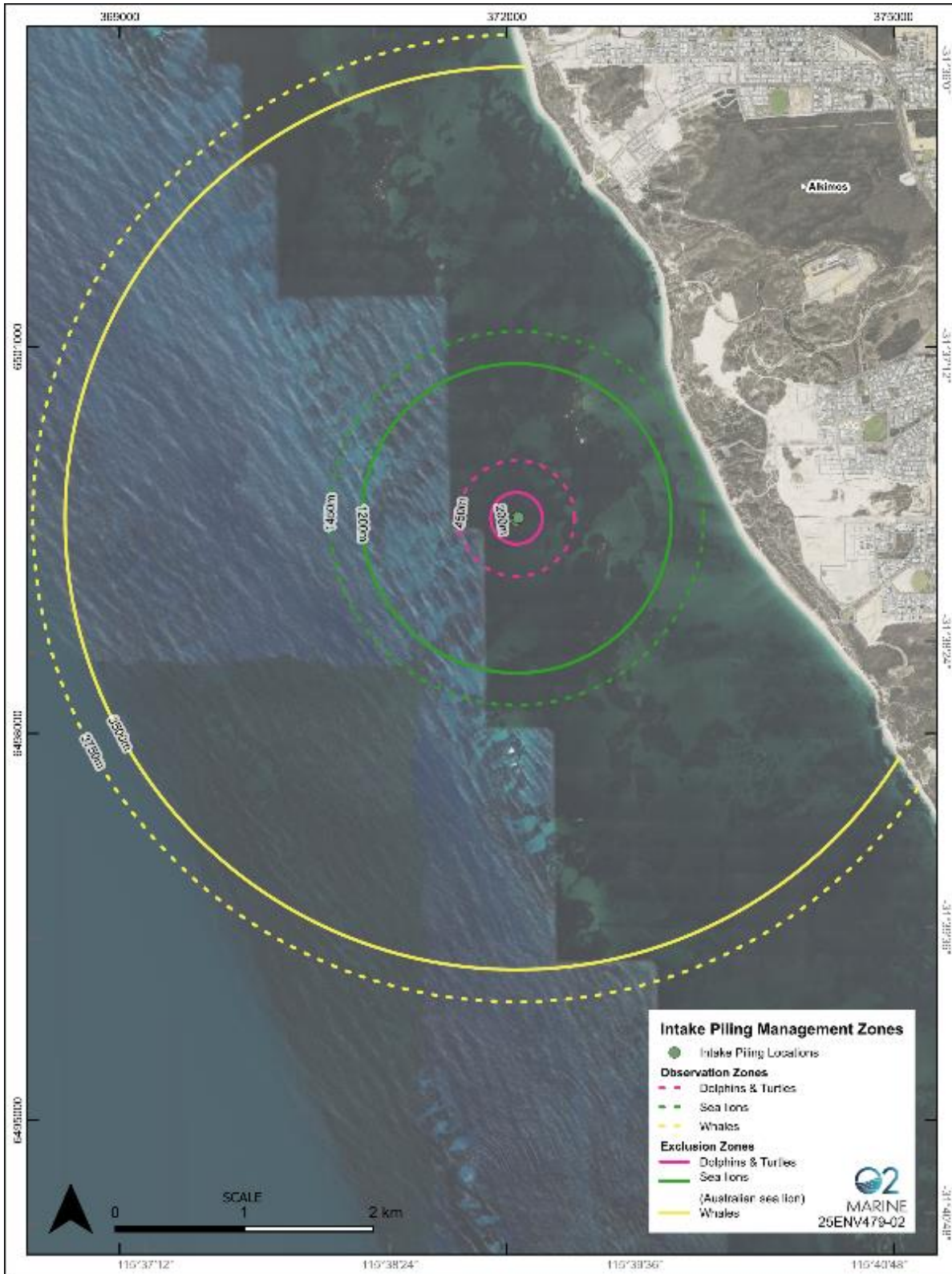


Figure 6: Management zones (Observation and Exclusion Zones) for Intake structure support pile (1.05m Diameter)



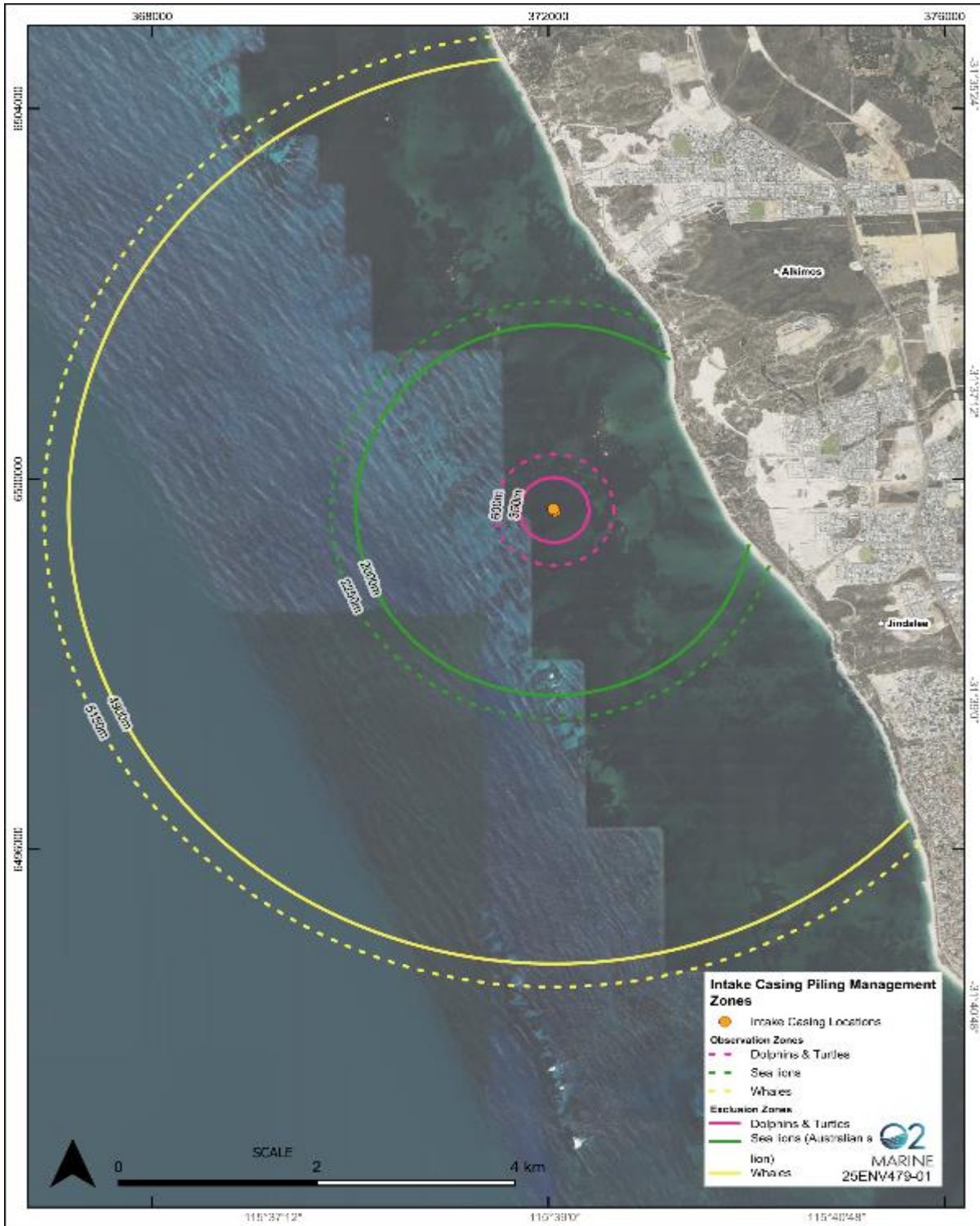


Figure 7: Management zones (Observation and Exclusion Zones) for Intake Riser Casing (3.1m Diameter)



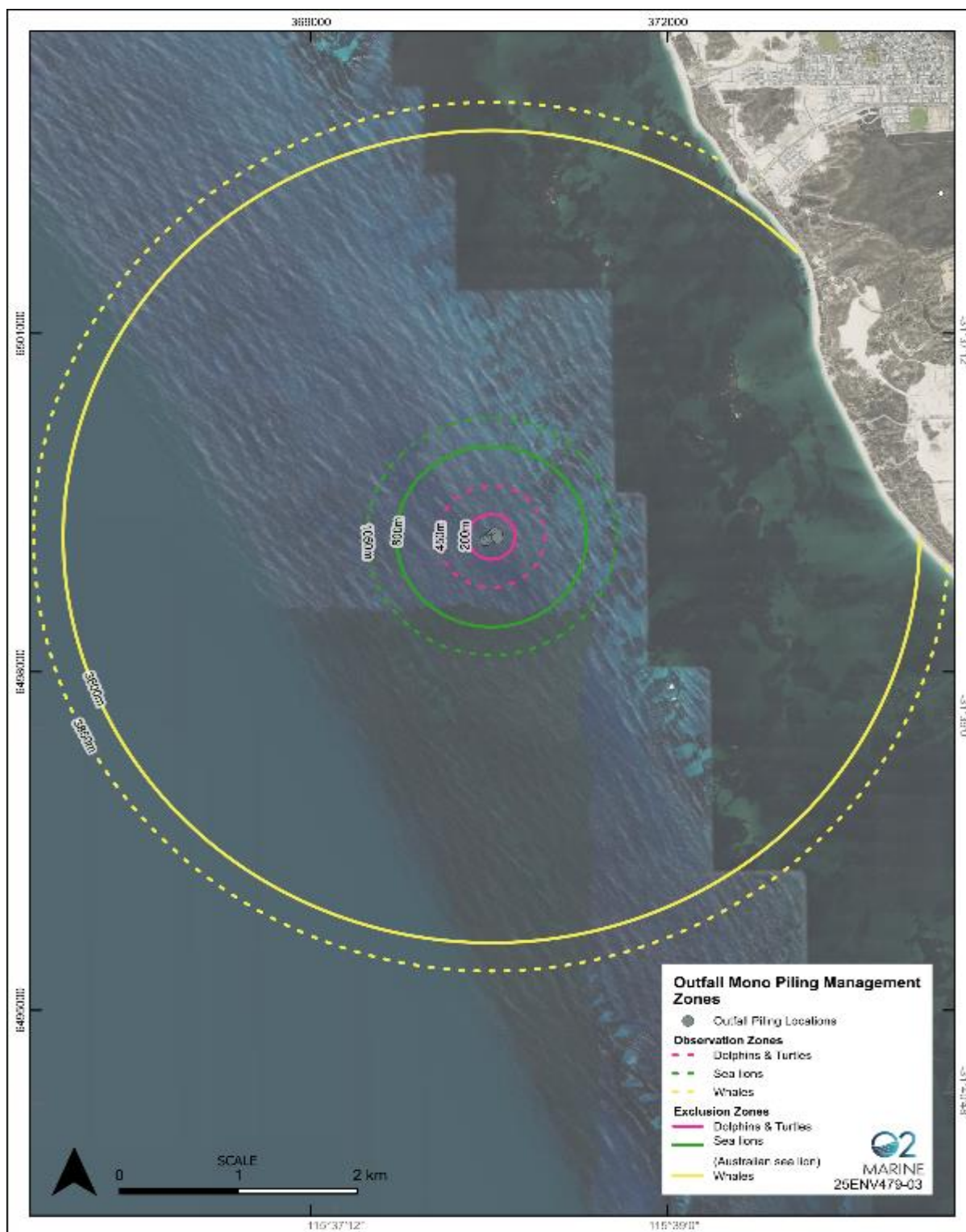


Figure 8: Management zones (Observation and Exclusion Zones) for piling outfall mono casing for the Project



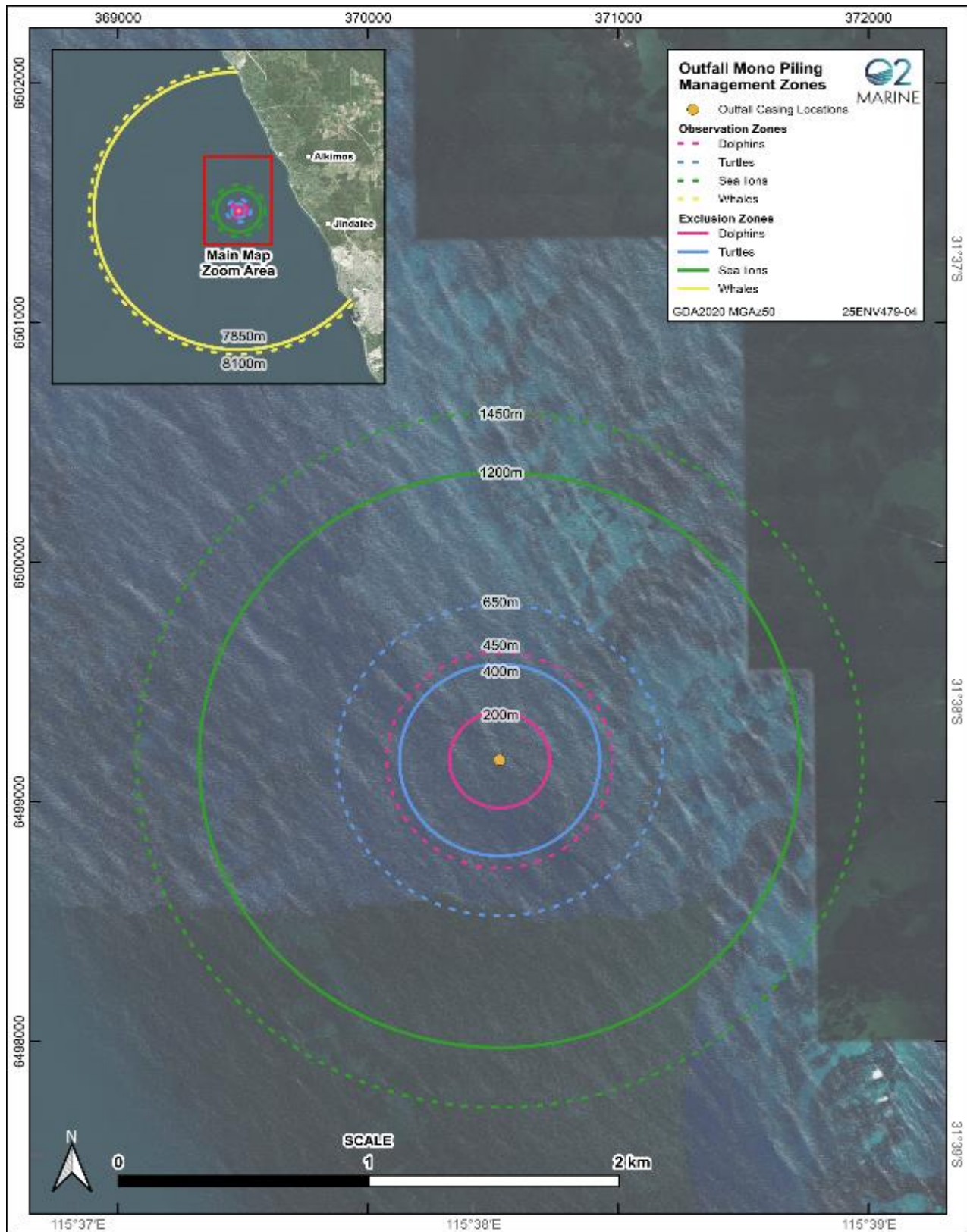


Figure 9: Management zones (Observation and Exclusion Zones) for piling outfall Riser Casing (3.1m diameter)



### C.3.1.2. Pre-start procedures

Prior to piling works each day and for each pile two MFOs, one of which must be a Level 1 MFO, will commence continuous visual observation within the management zones for 30 minutes. Pre-start observations for every pile installation must be undertaken during daylight hours for a minimum of 30 minutes. MFOs are to maintain continuous observations and have a vantage point of the entirety of the management zones, as required specific to that pile type. MFOs in conjunction with underwater piling contractors and Project Manager will carry out the following duties and comply with the following protocols in regard to pre-start procedures:

- If target marine fauna species are observed within the **exclusion zone** within 30-minutes before of piling works, then continuous observations must continue and observe the species until it is no longer in the **exclusion zone**. Pre-start will recommence for another 30-minutes pending confirmation of marine fauna outside of the **exclusion zone**.
- If target marine fauna species are not observed within the **exclusion zone** within 30-minutes before piling works, continuous observations must continue, and soft-start procedures may commence.

### C.3.1.3. Soft-start procedures

Following procedures of the EPBC policy statement 2.1, soft-start procedures may commence for piling works only if pre-start procedures are completed.

Soft-start involves the commencement of impact hammer piling at low energy, where the hammer energy gradually increases but remains below 90% capacity over a continuous 30-minute period. This procedure may alert marine fauna to the presence of the piling activity and enable them to move away to distances where injury is unlikely. The two MFOs will continuously monitor the management zones during soft-start procedures. Full energy may only be used after the 30-minute soft-start period, if no marine fauna are sighted within the **exclusion zone**.

- If target marine fauna are observed in the **observation zone**, soft-start procedures will continue and the MFOs will continue to monitor the marine fauna
- If target marine fauna species are observed in the **exclusion zone**, soft-start procedures will cease until the observed target marine fauna leaves the **exclusion zone** or has not been seen for 30 minutes, on completion of the 30-minutes duration and no animal has been observed in the **exclusion zone** soft-start procedures will recommence

If it is evident that the marine fauna are in distress (where distress can be described as unusual surfacing, laboured breathing, disorientation, stranding, visible wounds, lethargy, unusual vocalisation and separation from group) then piling operations shall cease until marine fauna have exited the management zones or have not been seen for 30 minutes. Once target marine fauna have exited the management zone, soft start piling may recommence.

Further, the 30-minute soft-start procedure will be implemented following a shut-down or a break >15 minutes.

### C.3.1.4. Normal piling

Normal piling works involves commencement of full energy piling and may only commence after the completion of pre-start and soft-start. The MFOs must continuously observe the management zones until piling works are completed. If marine fauna is sighted then the shut-down procedures will be implemented.

### C.3.1.5. Shut-down procedures

At least two MFOs, one of which must be a Level 1 MFO, will maintain continuous observations during underwater piling. They will notify the Piling Supervisor and Marine Superintendent if target marine fauna is sighted within the corresponding **observation, exclusion zone**.

Where marine fauna is observed within the **observation zone** (but outside the exclusion zone) during piling activities (including soft-start procedures), then the following action shall be taken:

- If target marine fauna is sighted and is in distress then the Piling Supervisor will suspend piling activities within two minutes of notification by the MFO of the sighting, or as soon as safely possible



- If target marine fauna is not showing signs of distress and remains within the **observation zone** (but outside the **exclusion zone**), the MFO Level 1 will inform the Piling Supervisor piling activities may continue and the MFOs will continue to monitor the target marine fauna
- Underwater piling works will cease if target marine fauna enters the **exclusion zone**.

Where marine fauna is observed within the **exclusion zone** during piling activities (including soft-start procedures), MFOs must notify the Piling Supervisor and Marine Superintendent then the following actions will be taken:

- Piling works will cease when target marine fauna is identified within, or about to enter, the **exclusion zone**
- Piling activities that have been suspended must not recommence until the target marine fauna has exited the corresponding **exclusion zone** and **observation zone** of its own accord or has not been seen by the MFO within these zones for a period of 30-minutes
- Once able to resume, piling will recommence following soft-start procedures.

#### C.3.1.6. Low-visibility procedures

During periods of low visibility (i.e. dusk and dawn, high winds or fog, where the distance of the specific observation zone (see Table 24 & Table 25) cannot be clearly viewed), note that piling will not occur at night, piling may commence with soft-start procedures provided that during the preceding 24hour period:

- A 2-hour period of continual observations was undertaken in good visibility within the 24-hour period prior to proposed piling and no marine fauna sighted
- Less than three shutdowns occurred in the preceding 24 hours, operations may proceed with soft start conditions
- Piling works can only operate in low-power settings
- MFOs continuously observe and focus on exclusion zones.

If the above has been met, then piling can commence following soft-start procedures during periods of low-visibility. If marine fauna are sighted in the exclusion zone then piling will cease until visibility improves.

If the above has not been met, then piling cannot commence until visibility improves.

### C.3.2. Marine Drilling

Marine drilling may occur within each of the piling casings once the pile has been installed.

The marine fauna monitoring and management program for drilling (Figure 10) will be implemented throughout all marine drilling works to achieve the management targets outlined in Appendix B.



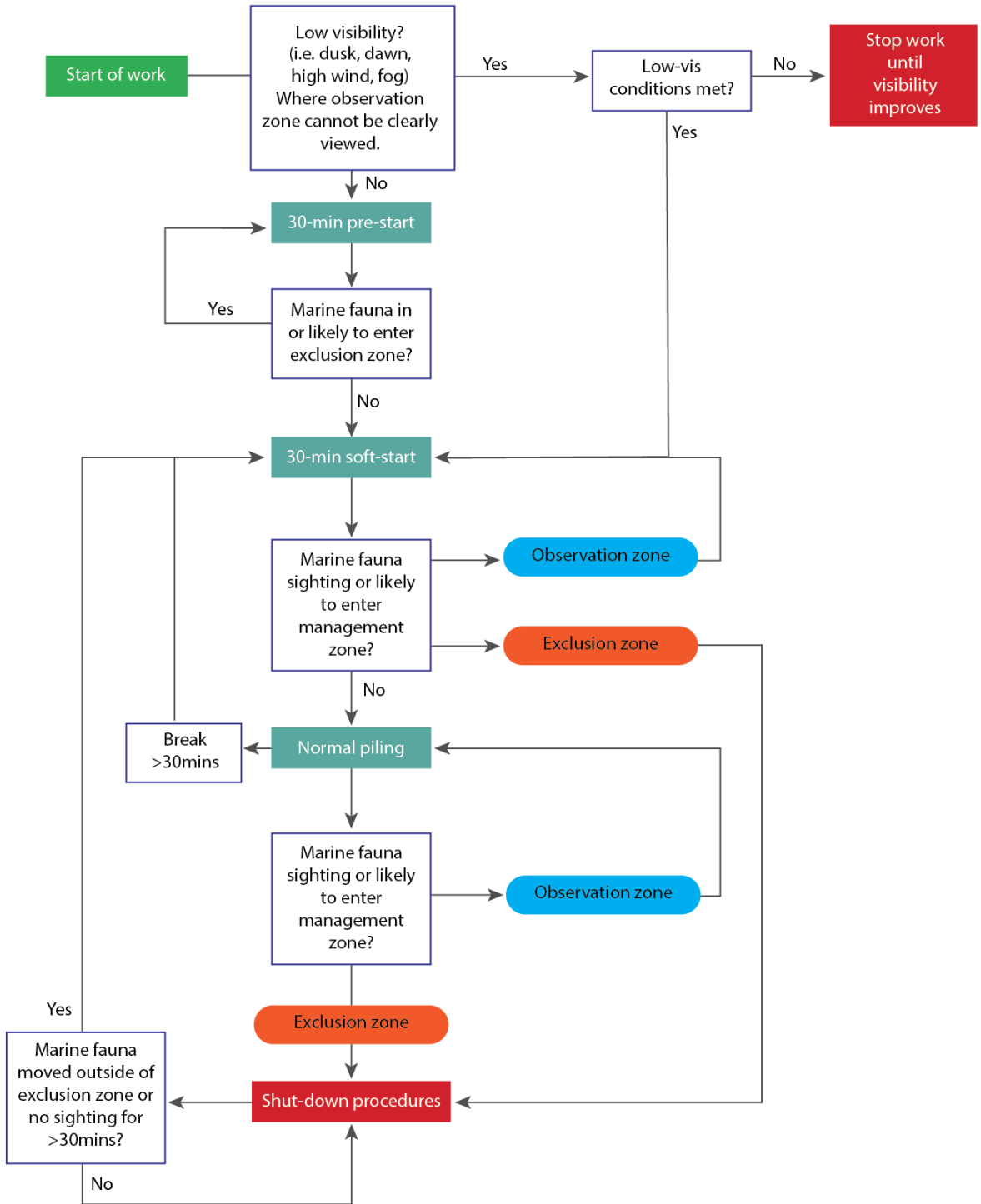


Figure 10: Tiered management framework/decision tree for the drilling marine fauna management protocol

C.3.2.1. Drilling Procedures Management Zones

Drilling procedures require as a minimum two MFOs, with one at least a Level 1 MFO, to be present and maintain observations throughout the entirety of drilling works. Drilling management zones outlined in Table 29 These zones are consistent with B6-2 (2).



Table 39: Marine fauna management zones for drilling

Species	Observation Zone (m)	Exclusion Zone (m)
Whales	1000	500
Dolphins	1000	500
Seals and sea lions	1000	500
Turtles*	1000	500

\*Noting turtles are unlikely to be present (Water Corporation 2022), however if sighted given the species EPBC Act listing and BC Act listing, stop work procedures will be applied.

Sharks and rays are not surface breathers; therefore, they do not bask at the surface which makes observations an ineffective mitigation measure. However, larger elasmobranchs may be present (e.g. rays and sharks) and can occasionally be viewed from the surface if weather conditions and water clarity allows for it. As a precautionary approach, if rays or sharks are sighted within the turtle zones the procedures outlined below will be implemented.

**C.3.2.2. Pre-start**

For all drilling works to commence, a 30-minute pre-start must be completed by at least two MFOs, one of which must be a Level 1 MFO. Pre-start procedures are visual observations by marine fauna observers undertaken during daylight hours for a minimum of 30 minutes. Marine fauna observers should maintain continuous observations throughout and have a vantage point of the entirety of the management zones.

**C.3.2.3. Soft-start drilling**

Where engineering and operating requirements of drilling equipment allow it, drilling will begin with a 30-minute soft-start, where the drilling intensity will gradually increase over a 30-minute period. If engineering and operating requirements of the drill do not allow this, evidence of technical manual are to be provided and documented.

- If target marine fauna species are observed in the exclusion zone, soft-start procedures may not commence until marine fauna is sighted outside of management zones or 30 minutes since last sighting.
- If target marine fauna species are observed in the exclusion zone during soft-start procedures, drilling operations must cease immediately and may not recommence until marine fauna is sighted outside of management zones or 30 minutes since last sighting.

Further, the 30-minute soft-start procedure will be implemented following a shut-down or a break >30 minutes.

**C.3.2.4. Normal drilling**

Normal drilling works involve commencement of full energy until the drilling is completed. Normal drilling may only commence after the completion of pre-start and soft-start. As a minimum, two MFOs, one of which must be a Level 1 MFO must continuously observe the management zones until drilling works are completed. If marine fauna is sighted, then the shut-down procedures will be implemented.

**C.3.2.5. Shut-down procedures**

The two MFOs will maintain continuous observations during marine drilling. They will notify the Piling Supervisor and Marine Superintendent if target marine fauna is sighted within the corresponding Observation or Exclusion Zone. Where marine fauna is observed within the Observation Zone (but outside the Exclusion Zone) during marine drilling activities (including Soft-start procedures), then the following action shall be taken:

- If target marine fauna is sighted and is in distress then marine drilling activities shall be suspended as soon as possible (within two minutes of the sighting), or as soon as safely possible
- If target marine fauna is not showing signs of distress and remains within the Observation Zones (but outside the Exclusion Zones), marine drilling activities will continue and the MFO will continue to monitor the target marine fauna
- Marine drilling works will cease if target marine fauna enters the Exclusion Zone.



Where target marine fauna is observed within the Exclusion Zone during marine piling activities (including Soft-start procedures), then the following actions will be taken:

- Marine drilling works will cease when target marine fauna is identified within, or about to enter, the Exclusion Zone
- Marine drilling activities that have been suspended must not recommence until the target marine fauna has exited the corresponding Exclusion Zone and Observation Zone of its own accord or has not been seen by the MFO within these zones for a period of 30-minutes
- Once able to resume, marine drilling will recommence following soft-start procedures.

#### C.3.2.6. Low-visibility procedures

During periods of low visibility (i.e. dusk and dawn, high winds or fog, where, where the distance of the specific observation zone, 1 km, cannot be clearly viewed), note that construction works (e.g. Piling) will not occur at night, then marine drilling operations may commence with soft-start procedures provided that during the preceding 24hour period:

- A 2-hour period of continual observations was undertaken in good visibility within the 24-hour period prior to proposed piling and no marine fauna sighted
- Less than three shutdowns occurred in the preceding 24-hours, operations may proceed with soft start conditions
- Drilling works can only operate in low-power settings
- MFOs continuously observe and focus on exclusion zones.

If the above conditions are met, then drilling can commence following soft-start procedures during periods of low-visibility. If marine fauna are sighted in the exclusion zone, then drilling will cease until visibility improves.

If the above conditions are not met, then drilling cannot commence until visibility improves.

### C.4. Underwater noise modelling validation and monitoring program

A fit-for-purpose approach has been developed, being a targeted boat-based transect monitoring under worst-case conditions (deepest pile, highest astronomical tide (HAT), highest hammer energy) for each site and piling type, with rapid, same-day analysis on the field laptop and fail-safe ST600 recorders at the stations.

Continuous telemetry buoy system will not be used. This is because continuous, multi-month telemetry would generate very large datasets, require multiple moored stations, and be logistically disproportionate to the validation need.

#### Acoustic monitoring equipment model

- Boat-based measurement chain (primary):
  - Hydrophone: RESON TC4033 (1 Hz–160 kHz)
  - Preamp: wideband, low-noise preamp (≥160 kHz bandwidth)
  - Recorder: Sound Devices MixPre-3 II (24-bit; fs ≥192 kHz where required)
  - Processing: onboard field laptop running Python script to compute SEL (per strike), SELcum, and SPLpeak immediately after each 20-min block.
- Fail-safe acoustic recorders (secondary / redundancy):
  - Ocean Instruments SoundTrap ST600 deployed at near-field, mid-field, and boundary stations during boat runs for parallel capture and verification.

#### Locations of monitoring relative to acoustic source

The table below outlines the monitoring locations and placement. Waypoints will be set from propagation maps at HAT and the validated TTS and AUD INJ distances for the relevant hearing group. Boat-based hydrophone at mid-water depth on the dominant propagation sector, with a boundary-only check on the secondary sector.



SoundTrap ST600 units to be deployed as fail-safe recorders at near-field, mid-field, and boundary during boat runs.

Table 40: Acoustic Monitoring Locations & Trigger Values

Site	Pile type	Hearing group	Propagation sector	Zone	Placement rule (HAT conditions)	Notes
Intake / Outfall	Pin / Caisson	LF (whales) / MF (dolphins) / OW (pinnipeds)	Primary (longest reach)	Near-field	Just outside safety radius, aligned with dominant sector; used for source characterisation and MF spot-check	Short block; confirm no clipping at ~100 m check
Intake / Outfall	Pin / Caisson	LF / MF / OW	Primary	Mid-field	0.5 × hearing-group TTS distance along dominant sector	Propagation fit; supports SELcum extrapolation
Intake / Outfall	Pin / Caisson	LF / MF / OW	Primary	Boundary (TTS)	1.0 × hearing-group TTS distance along dominant sector	Primary compliance check for that hearing group
Intake / Outfall	Pin / Caisson	LF / MF / OW	Primary	AUD INJ check (if distinct)	At hearing-group AUD INJ distance along dominant sector (if outside mid-field stop)	Confirms peak/AUD requirement when applicable
Intake / Outfall	Pin / Caisson	LF / MF / OW	Secondary (2nd-longest reach)	Boundary (TTS)	1.0 × hearing-group TTS distance along secondary sector	Directionality check; boundary-only block

Trigger Values

- Trigger value: any boundary result  $\geq$  applicable TTS (or peak) threshold, or margin  $\leq$  3 dB.
- Notification: a traffic-light protocol is used:
  - Green: compliant with  $\geq$ 3 dB margin  $\rightarrow$  proceed.
  - Amber: margin  $<$ 3 dB  $\rightarrow$  increase vigilance; schedule additional boundary block; prepare to expand zones.
  - Red: exceedance  $\rightarrow$  pause piling, expand exclusion/observation zones, brief crews/MFOs, and re-validate at the revised boundary before resuming.
- ST600 fail-safes provide parallel recordings for verification; if a trigger occurs, their data are retained to corroborate boat measurements.



Table 41: Piling table

Pile	Number	Modelled Source Level (SEL) Single Strike dB re 1µPa <sup>2</sup> .s @ 1m	Modelled Source Level (SEL) Cumulative dB re 1µPa <sup>2</sup> .s @ 1m	Pile duration	Maximum Observable Management Zone (m) -Based on Modelled Noise Impacts (Whales) based on TTS values	Observation Zone (m)
Intake structure support pile (~1.05m Diameter)	8	189	216.2	2 hour installation timeframe per pile	3,450	3750
Intake Riser Casing (~3.1 m Diameter)	2	193.4	222	12 hour installation timeframe per pile	4,800	5150
Outfall Diffuser Support Piles (~1.05m Diameter)	10	191.7	218.3	2 hour installation timeframe per pile	3,550	3850
Outfall Riser Casing (3.1 m Dia) x 1no.	1	192.8	221.9	12 hour installation timeframe per pile	7,750	8,100

**Contingency and adaptive management**

If noise-validation results exceed thresholds, impact-piling shall cease immediately. The Project Manager, acoustic consultant and marine-fauna lead will review data within 24 hours and determine whether to adjust the piling schedule, enhance noise mitigation or extend the ecological window.

**C.5. Adaptive management**

In accordance with Policy 2.1, marine construction activities are required to implement adaptive management for biologically important habitats for whales. Construction activities are scheduled to avoid whale migration season, however given there is an increased likelihood of encountering lingering whales, the proponent should be aware of adaptive management procedures that may be implemented to address these sightings.

Adaptive management associated with the construction activities is presented in Table 30.

Table 36 42: Projects adaptive management

Activity	Trigger	Response options/Adaptive Management
Piling	In line with EPBC Act Policy Statement 2.1. If there are more three consecutive days of three or more whale-	<ul style="list-style-type: none"> <li>Increased marine fauna management zone</li> </ul>



Activity	Trigger	Response options/Adaptive Management
	instigated shut-downs situations, then work is be halted and additional management measures should be employed.	<ul style="list-style-type: none"> <li>distances (exclusion and observation zones)</li> <li>▪ Additional MFOs rostered</li> </ul>
Piling	Underwater noise validation/monitoring shows a TTS exceedance beyond the exclusion-zone boundary for one or more hearing groups.	<ul style="list-style-type: none"> <li>▪ Increase exclusion zone to cover the TTS exceedance distances.</li> </ul>
Piling	Exclusion zone increased to a distance not suitable for Level 1 MFOs to monitor.	Implement additional and adaptive management measures, such as: <ul style="list-style-type: none"> <li>▪ Additional roaming Level 1 MFOs</li> <li>▪ Piling to occur at lower energies (e.g. all below 90%).</li> </ul>
Construction activities	Other construction activities extend into other sensitive ecological windows for target marine fauna (May to November), a review should be undertaken to implement additional and adaptive management measures	Implement additional and adaptive management measures, such as: <ul style="list-style-type: none"> <li>▪ Increased marine fauna management zones</li> <li>▪ Additional MFOs.</li> <li>▪ No night works.</li> </ul>
Vessel movements	If sightings of marine fauna are higher than expected.	<ul style="list-style-type: none"> <li>▪ Additional MFOs rostered</li> <li>▪ Shift non-critical transits away from periods of elevated sightings</li> </ul>
Drilling	If sightings of marine fauna are higher than expected.	<ul style="list-style-type: none"> <li>▪ Additional MFOs rostered</li> <li>▪ Avoid drilling during peak sighting periods where practicable</li> </ul>



### C.6. Vessel Management

In line with approval condition 8bvii, during vessel transit two MFOs must be on duty, one of which will be a Level 1 MFO. Below details how the Project will protect protected matters from injury or death, in particular as a result from noise and vessel strike.

A Jack-Up Barge (JUB) will serve as a stable platform for construction activities and will be supported by tugs, crew transfer vessels, and utility vessels. Among these, tugs have the highest potential to generate underwater noise due to their larger size and more powerful propulsion systems.

For pulling and pushing tugs, an anchor-handling supply tug operating in transit has an overall source sound exposure level (SEL) of 184.9 dB re 1 µPa, as reported by GHD (2022). While these levels have the potential to cause temporary disturbance to nearby marine fauna, modelling undertaken for the Project indicates that auditory injury (PTS) or temporary threshold shift (TTS) thresholds are only reached within relatively short distances from the source (Table 11). And it should be noted that the modelled anchor-handling supply tug is a significantly larger and noisier than what will be utilised on the Project.

Crew transfer and utility vessels are smaller & quieter than anchor-handling supply tugs but may still contribute to elevated background noise levels capable of eliciting short-term behavioural responses in sensitive species.

To ensure that vessel noise management measures remain both effective and practicable, the management zones within the Action Area (Table 38) have been refined to align with the TTS onset distances presented in Table 11 for relevant hearing groups (i.e. whales, dolphins, and sea lions), (note: Table 11 the modelled anchor-handling supply tug is a significantly larger and noisier than what will be utilised on the Project). These are consistent with the South Australian Underwater Piling and Dredging Noise Guidelines (SA DIT 2023), where the observation zone distances are set using exclusion zones plus 250 m. For sea lions, the exclusion zone is not less than 100 m, satisfying the Biodiversity Conservation (BC) Regulations 2018 (WA Gov 2025) vessel separation requirement.

Overly conservative exclusion zones can inadvertently increase cumulative exposure durations by extending vessel idling and manoeuvring times (e.g. stopping, starting, or waiting for fauna to leave the zone). The revised approach therefore establishes exclusion zones based on TTS thresholds, with observation zones extending beyond these distances to allow sufficient visual monitoring while maintaining operational efficiency.

Table 43: Vessel fauna management zones for marine support vessels

Species	Observation Zone (m)	Exclusion Zone (m)
	(No Approach)	(Caution Zone)
Whales (LF cetaceans)	750	500
Dolphins (HF cetaceans)	400	150
Seals and sea lions (OCW)	350	100

The vessel’s Master remains responsible for maintaining appropriate approach distances and speeds, with direct support from designated Marine Fauna Observers (MFOs). MFOs will maintain continuous watch during all vessel operations within the Action Area and will have open communication with the vessel Master. Prior to entering an observation zone, the Master must obtain confirmation from an on-duty MFO that no marine fauna are present within or approaching the exclusion zone.

If fauna are sighted in the observation zone the vessel master is to reduce speed to <6knots. If fauna are sighted in the exclusion zone the vessel is to gradually reduce speed and come to a stop, with the expectation of a dolphin bow-riding. If a travelling dolphin is bow-riding, the vessel shall either maintain its course and speed or maintain its course and gradually slow down without abrupt manoeuvres, in line with the Commonwealth Australian National Guidelines for Whale and Dolphin Watching 2017 (DoEE 2017b).



At least two MFOs are required during all vessel operations (including towing, anchor handling, and crew transfers), with one holding Level 1 MFO accreditation. Continuous observations are to be maintained throughout all operations occurring within the designated Action Area.

As per Australian National Guidelines for Whale and Dolphin Watching 2017, there are stated distances in figures 2-5 of the guidelines. These include “No approach” and “caution” zones, which range from, 100m (without calves) to 300m (with calves) for whales and 50m (without calves) to 150m (with calves) for dolphins.

However, ASWA has taken a conservative approach in adopting “No approach” and “caution” zones which are aligned with the “observation” and “exclusions zones” stated in table 37 for the duration of construction.



## C.7. Marine fauna reporting

### Reportable incidents

All workers will immediately report all environmental incidents as a non-conformance, whether these are reportable non-reportable incidents (i.e. performance indicators are not met, or management actions are not followed to the Contractor site supervisor who will investigate the incident). It is a requirement that all incidents follow ASWA Incident Management Procedure. The worker is to report the incident immediately to their site supervisor, who is to notify the Marine Superintendent. The Marine Superintendent will notify the Environment and Sustainability Manager and Marine Manager who will investigate the incident and notify Water Corporation within 30 minutes. In every case the incident is to be documented using ASWA's Incident Management System.

Any injury to a conservation significant fauna or listed species as a result of the Project activities, or general observations of injured wildlife not related to proposal activities, is a reportable incident to DBCA and DWER. The Project's Marine induction will cover the requirement for the immediate reporting of any death or injury to a protected matter to the Marine Superintendent or their delegate. The Marine Superintendent will notify immediately the Project's Environment and Sustainability Manager and Construction Manager, who will contact the Water Corporation within 30 minutes. The Water Corporation will notify DBCA, DCCEEW and DWER within required time frames.

A summary of the reporting requirements are presented in Table 38. Any death of MNES (Threatened or Migratory species under the EPBC Act), requires a formal notification and construction works (drilling, pilling, vessel movements) are not to resume until notified by the Minister in writing that these works may resume.

Table 44: Reporting requirements and contact details for injured marine fauna

Wildlife	Content	Timeframe	Responsibility	Recipient
Sick or injured wildlife; snake removal	<ul style="list-style-type: none"> <li>▪ Location including GPS coordinate</li> <li>▪ Within or outside of work area</li> <li>▪ Time of observation</li> <li>▪ State/condition of individual/s</li> <li>▪ Affected species</li> <li>▪ Image (if possible).</li> </ul>	Within 24 hours as being notified (as soon as possible)	Sustainability and Environment Manager	WILDCARE Helpline (24 hr) (08) 9474 9055 DBCA and DWER
Fish deaths	<ul style="list-style-type: none"> <li>▪ Location including GPS coordinate of fish kill</li> <li>▪ Estimated number of dead fish</li> <li>▪ Species affected</li> <li>▪ Photograph.</li> </ul>	Within 24 hours as being notified (as soon as possible)	Sustainability and Environment Manager	Fish Watch (24 hr hotline) 1800 815 507
Animal or plant deaths obviously caused by pollution	<ul style="list-style-type: none"> <li>▪ Location including GPS coordinate</li> <li>▪ Within or outside of work area</li> <li>▪ Time of observation</li> <li>▪ Cause of pollution</li> <li>▪ Condition of species and estimated number.</li> </ul>	Within 24 hours as being notified (as soon as possible)	Water Corporation (Approval Holder)	DWER (24 hr Pollution Watch Hotline) 1300 784 784
Death or injury of a protected matter (MNES Threatened or Migratory under the EPBC Act)	<ul style="list-style-type: none"> <li>▪ Location including GPS coordinate</li> <li>▪ Within or outside of work area</li> <li>▪ Time of observation</li> <li>▪ State/condition of individual/s</li> <li>▪ Affected species</li> <li>▪ Image (if possible).</li> </ul>	Within 5 business days	Water Corporation (Approval Holder)	DCCEEW – the Minister



Wildlife	Content	Timeframe	Responsibility	Recipient
	<ul style="list-style-type: none"> <li>Response actions taken</li> </ul>			
Possible IMP	<ul style="list-style-type: none"> <li>Location (GPS coordinate, or nearest landmark) and water depth</li> <li>Date and time of detection</li> <li>Size and colour of IMP</li> <li>Environment (i.e. beach, sand, rock pool, in weed, water, attached to structure)</li> <li>Photo.</li> </ul>	Within 24 hours as being notified (as soon as possible)	Water Corporation (Approval Holder)	FishWatch on 1800 815 507 Email: aquatic.biosecurity@dprid.wa.gov.au Local DPIRD office

## C.8. Reporting

### C.8.1. Compliance

Reporting of works will comply with EPBC Act Policy Statement 2.1 (Part A - Standard Management Measures) (DEWHA, 2008). Any recorded sightings, locations and behaviours indicative of stress or disturbance of significant marine fauna will be submitted to the National Cetacean Sighting Database. Level 1 MFOs will support the documentation and reporting any incidents relating to significant marine fauna injury/mortality to relevant regulators (refer to C6).

### C.8.2. Completion report

On completion of all piling and drilling works (construction phase), a final report written with input from a MFO with a degree in biology, ecology, zoology or environmental sciences, will be submitted which will allow for compliance auditing. The completion report will take into account an analysis of the collated field logs completed by the MFOs. The completion report will include a summary of construction works with the following details:

- The location, date and start time of the piling activities.
- Name, qualifications and experience of any Marine Fauna Observers
- The location, times and reasons when observations were hampered by poor visibility or high winds.
- The location and time of any start-up delays or stop work procedures instigated as a result of marine fauna sightings.
- The location, time and distance of any marine fauna sighting including species where possible.
- The date and time of construction activities completion.
- Any non-compliance activity.

Completion report will be submitted to DCCEEW as part of annual compliance reporting.



## Appendix D. Marine works location



## Appendix E. Site Environment Plan

### Marine Site Environmental Plan



<b>This SEP scope is</b>	<b>ASWA Marine Scope only</b>	<b>The SEP is Valid between</b>	<b>24/07/2025 &amp; 24/10/2026</b>
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Name	Role	Number	Hrs-of-Work	Notify
Peter Scheiwe	Alliance Director	0404-812-442	Works to be undertaken during standard construction hours Monday - Saturday (7am-7pm) excl public holidays Approval required to work outside of these hours	- → Environmental Incidents / Hazards / Observations → Impact to Native Fauna / Flora
William Carter	Sustainability and Environment Manager	0424-192-170		
Peter Grant-Smith	HSEQS Manager	0428-295-279		
Noel Martin	Area Manager	0448-970-947		
Mario Buterin	Construction Manager	0409-634-242		
Ravish Rasmessur	Environment Advisor	0420-962-630		

ENVIRONMENTAL CONTROL TO MINIMISE POTENTIAL IMPACTS	
<p><b>Limits of Works</b></p> <p>No works are permitted outside the project boundary unless otherwise approved by the Environment Team and no unauthorised discharge to water</p> <p><b>Air Quality and Dust</b></p> <p>Notify Supervisor and the Environment Team if Air quality issues are observed Wait for high winds to pass before continuing works where practicable</p> <p><b>Fire</b></p> <p>During total fire bans, works can be undertaken if the Department of Fire and Emergency services (DFES) is notified and the additional controls are in place for those activities considered to be a fire risk such as hot works and off-road activity Controls are set out by DFES, and checklists will be provided by the Safety Team when a total Fire Ban is announced</p> <p><b>Noise &amp; Vibration</b></p> <p>Vibration activities such as piling and drilling are planned so that works are undertaken in the shortest timeframe possible with Acoustic &amp; vibration monitors installed as required Ensure all equipment is well maintained and operating effectively Works outside of standard hours shall be undertaken in specific conditions imposed by the LGA Report on any acoustic related or vibration complaints to the Supervisor and the Environment Team as soon as becoming aware of them</p>	<p><b>Refuelling and Hazardous Material</b></p> <p>All refuelling will occur on a sealed system or contained area Chemical shall be stored in accordance with AS 1940 Uncontrolled release of hazardous substances to be attended to immediately via the onsite spill response procedure All plant to be maintained in accordance with manufacturers recommendation</p> <p><b>Flora (Benthic Habitat)</b></p> <p>All works to remain within the construction zone / development footprint</p> <p><b>Marine Mammals</b></p> <p>Do not approach Marine Mammals (incl. disturbing, maiming or intentional killing) MFO to advise the works crew when marine mammals are inside the observation, low power and shut down zones Notify the Supervisor and Environment Team if injured wildlife are sighted During construction, daily records and to be kept and communicated daily to the environment team on Marine mammal interactions / sightings</p> <p><b>Waste / Recycling</b></p> <p>Reduce the production of waste as much as possible and dispose of any waste in a proper onsite skips and bins to minimise risk of waste blowing offsite Segregate the waste materials in the provided skips and bins as signed Avoid littering particularly accidental littering such as ear plugs, gloves and small pieces of plastic etc</p>

## Appendix F. Consultation with the Australian Sea Lion experts at the Marine Science Program, Biodiversity and Conservation Science, DBCA

File Message Help BLUEBEAM PDF-XChange Attachments

Open Quick Print Remove Attachment Save As Save All Attachments Upload Upload All Attachments Select Copy Show Message

Actions Save to Computer Save to Cloud Selection Message

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FW: Alkimos Sea-Water Alliance - Marine Mammal Management Plan

Holly Raudino <holly.raudino@dbca.wa.gov.au>  
To: William Carter

You replied to this message on 18/08/2025 7:03 PM.

ASWA-DBCA MCEMP Meeting Minutes\_20241125.pdf 201 KB  
 ASWA DBCA MCEMP Presentation\_20241125.pdf 1 MB

You don't often get email from [holly.raudino@dbca.wa.gov.au](mailto:holly.raudino@dbca.wa.gov.au). [Learn why this is important](#)

OFFICIAL

Hi William,

Please find the attached minutes from Rachel that confirms my advice from the meeting 25/11/2024. I don't recall seeing the updated management plan come through with this incorporated though? Let me know if you require more for DCCEEW.

Many thanks,  
Holly

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Biodiversity and Conservation Science  
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[Researchgate Holly Raudino](#)

**Ngala kaaditj Noongar moort keyen kaadak nidja boodja**

We acknowledge the Noongar people as the original custodians of this land  
I am privileged to live in the south west and work with Tjaltjraak, Malgana, Yamatji, Yawuru and Dambeemangarddee people on their sea country.

Check out our latest work on [beaked whales](#), [humpback whales](#), [duqong](#), [whale sharks](#), [dolphins from air](#) in [Frontiers](#) and in [Mammalian Biology](#) and [false killer whales](#), [snubfin dolphin distribution and ranging](#) and on the Australian sea lion in [Endangered Species Research](#)



## Alkimos Seawater Desalination Plant



### Meeting Minutes

Meeting Name:	ASWA DBCA MCEMP Meeting
Date / Time:	25/11/2024 – 10:30am – 11:30am
Venue:	Microsoft Teams
Chair:	Rachel Champion

### Attendees

Name	Role	Organisation	Attendance <small>(Present, Apology, Virtual)</small>
Rachel Champion	Approvals Lead	ASWA	Present
Amy Elkington	Environment and Sustainability Manager	ASWA	Present
William Carter	Environment and Sustainability Manager	ASWA	Present
Anthony Michell	Marine Construction Lead	ASWA	Present
Holly Raudino	Senior Research Scientist – Marine Science Program	DBCA	Present
Tom Forgie	Environment and Sustainability Consultant	ASWA	Present

Item	Minutes of Meeting
1.	<p><u>How big are the openings for the intake structure?</u></p> <ul style="list-style-type: none"> <li>- The grills for the intake Anthony says are approximately 100mm. There can be bycatch via these grills. Need to ensure the sealions cannot get their heads in.</li> <li>- This will not feature in the MCEMP, but we will discuss with design team if there are potential improvements.</li> </ul>
2.	<p><u>Wildcare helpline – is the use of this helpline appropriate?</u></p> <ul style="list-style-type: none"> <li>- Holly confirmed Wildcare Helpline is the appropriate contact number in the event of injury or death of a marine mammal.</li> </ul>

Alkimos Seawater Desalination Plant



Item	Minutes of Meeting
3.	<p><u>Material to be covered in induction</u></p> <ul style="list-style-type: none"> <li>- May to November period relates to situation of migratory whales.</li> <li>- Sealions are expected to start breeding over summer.</li> <li>- Male sealions will leave haulouts to travel to breeding sites, around the end of Summer. They will move through this area to breed.</li> <li>- Sea lions have an 18 month breeding cycle.</li> <li>- Holly suggests reference to the recovery plan. Interesting info in there that could be beneficial for the inductions.</li> <li>- Sea lions are dynamic, curious individuals. They can sometimes feed in suboptimal conditions. Soft starts will help to provide time for sealions to move away. It is difficult to generalise the species as some like to revisit the area that they feed.</li> <li>- A haul out is an area used for activities like resting – predominantly used by male population when not foraging or breeding. Generally do not haul out on mainland beaches. They are normally on Dyre island, Seal island, Penguin island, Carnac island, Little island, Burns rocks, and Shellwater.</li> <li>- Dolphins will generally avoid the noisy area – per Biddingup Desal Plant research.</li> <li>- Mostly Australian sea lions, and maybe fur seals as well.</li> <li>- If the sea lions catch something near the operations, they may spend more time at the surface to break the food up. They generally feed on the sea floor (benthic habitat) – they only come up to the surface to breath.</li> <li>- We will be avoiding most of the whale species by working in summer – it can vary depending on year though.</li> <li>- Marine fauna can be difficult to detect. Need to ensure the MFO’s are diligent.</li> </ul>
4.	<p><u>Shutdown, low-power, and observation zones</u></p> <ul style="list-style-type: none"> <li>- Distances outlined within the MCEMP are appropriate.</li> <li>- Distances are standard, fine, and should be able to be monitored.</li> <li>- Well trained monitors that can differentiate between the species is important.</li> </ul>
5.	<p><u>Distressed behaviour within the MCEMP</u></p> <ul style="list-style-type: none"> <li>- Holly noted high intensity noise from the impact piling is a major concern for impacting the sea-lions.</li> </ul>
6.	<p><u>Drone monitoring</u></p> <ul style="list-style-type: none"> <li>- Holly noted it can be difficult to detect marine mammals aerially, particularly with the required separation distances and is not recommended.</li> </ul>

## Appendix G – Acoustic TBM Monitoring Results

Location 1 – Stage 1

16/10/2025



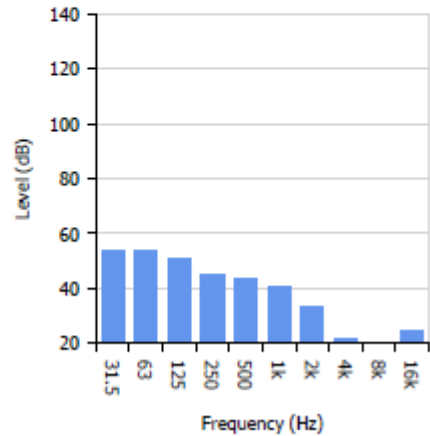
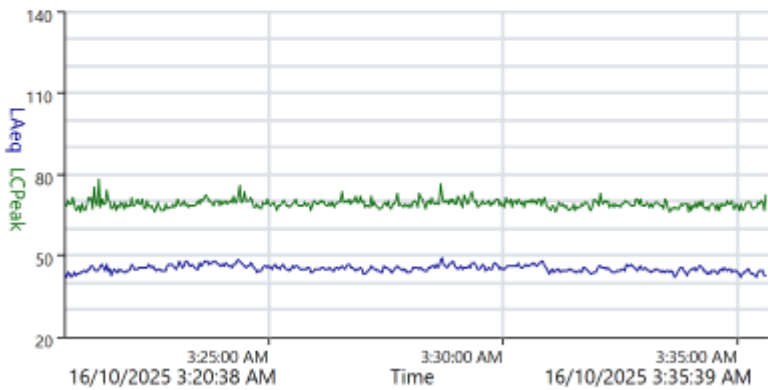
### Measurement Summary Report

**Name** 69  
**Time** 16/10/2025 3:20:38 AM **Person** William Carter **Place** ASWA **Project** Alkimos Desalination  
**Duration** 00:15:00  
**Instrument** G305002, CR:162C

**Calibration**

**Before** 8/10/2025 11:34 AM **Offset** -0.37 dB **After** Offset

Basic Values		Projected Exposure	
LAeq	45.2 dB	30 Minutes	33.2 dB
LCPeak	77.8 dB	1 Hour	36.2 dB
C-A	12.1 dB	2 Hours	39.2 dB
LEX8	30.2 dB	4 Hours	42.2 dB
LAFMax	51.3 dB	6 Hours	44.0 dB
		8 Hours	45.2 dB
		10 Hours	46.2 dB
		12 Hours	47.0 dB



Location 1 – Stage 2



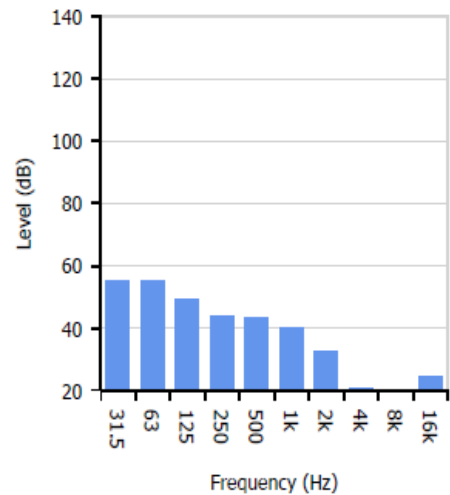
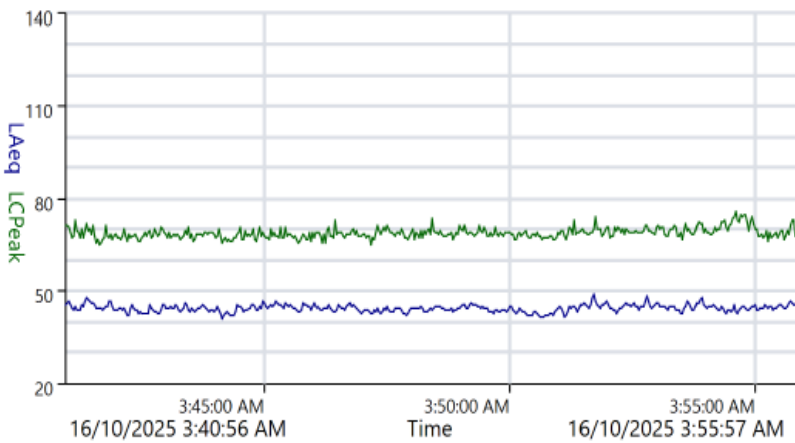
## Measurement Summary Report

**Name** 70  
**Time** 16/10/2025 3:40:56 AM **Person** William Carter **Place** ASWA **Project** Alkimos Desalination  
**Duration** 00:15:00  
**Instrument** G305002, CR:162C

### Calibration

**Before** 8/10/2025 11:34 AM **Offset** -0.37 dB **After** Offset

Basic Values		Projected Exposure	
LAeq	44.5 dB	30 Minutes	32.5 dB
LCPeak	75.5 dB	1 Hour	35.5 dB
C-A	13.4 dB	2 Hours	38.5 dB
LEX8	29.5 dB	4 Hours	41.5 dB
LAFMax	49.7 dB	6 Hours	43.3 dB
		8 Hours	44.5 dB
		10 Hours	45.5 dB
		12 Hours	46.3 dB





## Measurement Summary Report

**Name** 71  
**Time** 16/10/2025 3:56:08 AM **Person** William Carter **Place** ASWA **Project** Alkimos Desalination  
**Duration** 00:15:00  
**Instrument** G305002, CR:162C

### Calibration

**Before** 8/10/2025 11:34 AM **Offset** -0.37 dB **After** **Offset**

Basic Values		Projected Exposure	
L <sub>Aeq</sub>	45.1 dB	30 Minutes	33.1 dB
L <sub>CPeak</sub>	78.7 dB	1 Hour	36.1 dB
C-A	12.2 dB	2 Hours	39.1 dB
LEX8	30.1 dB	4 Hours	42.1 dB
LAF <sub>Max</sub>	53.6 dB	6 Hours	43.9 dB
		8 Hours	45.1 dB
		10 Hours	46.1 dB
		12 Hours	46.9 dB

