



WA-61-L and WA-62-L Subsea Infrastructure Installation Environment Plan

Development Division

Revision 3

October 2023

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1 INTRODUCTION

1.1 Overview

The Scarborough gas resource, located in Commonwealth waters approximately 375 km west-northwest of the Burrup Peninsula, forms part of the Greater Scarborough gas fields, comprising the Scarborough, Thebe and Jupiter gas fields. Woodside Energy Scarborough Pty Ltd (Woodside), as Titleholder under the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (Cth) (referred to as the Environment Regulations), proposes to undertake the following petroleum activities as described in **Section 3**, within Permit Area WA-61-L and WA-62-L:

- installation of subsea infrastructure
- gravimetry surveys
- installation of floating production unit (FPU) moorings
- Inspection, Monitoring, Maintenance and Repair (IMMR) activities for installed infrastructure.

These activities will hereafter be referred to as the Petroleum Activities Program and form the scope of this Environment Plan (EP).

This EP has been prepared by Woodside as part of the requirements under the Environment Regulations, as administered by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).

The Petroleum Activities Program as defined in this EP is a part of the Scarborough Offshore Project Proposal (OPP) accepted by NOPSEMA on 30 March 2020.

1.2 Defining the Petroleum Activity

The Petroleum Activities Program to be undertaken within Permit Area WA-61-L and WA-62-L comprises petroleum activities, subsea installation, as defined in Regulation 4 of the Environment Regulations.

1.3 Purpose of the Environment Plan

In accordance with the objectives of the Environment Regulations, the purpose of this EP is to demonstrate that:

- the potential environmental impacts and risks (planned (routine and non-routine) and unplanned) that may result from the Petroleum Activities Program are identified;
- appropriate management controls are implemented to reduce impacts and risks to a level that is 'as low as reasonably practicable' (ALARP) and acceptable; and
- the Petroleum Activities Program is performed in a manner consistent with the principles of ecologically sustainable development (as defined in Section 3A of the *Environment Protection and Biodiversity Conservation Act, 1999* (Cth) (EPBC Act)).

This EP describes the process and resulting outputs of the risk assessment, whereby impacts and risks are managed to ALARP and are acceptable.

The EP defines activity-specific Environmental Performance Outcomes (EPOs), environmental performance standards (EPSs) and measurement criteria (MC). These form the basis for monitoring, auditing and management of the Petroleum Activities Program to be undertaken by Woodside and its contractors. The implementation strategy (derived from the decision support framework tools) specified within this EP provides Woodside and NOPSEMA with the required level of assurance that impacts, and risks associated with the activity are reduced to ALARP and are acceptable.

1.4 Scope of the Environment Plan

The scope of this EP covers the activities that define the Petroleum Activities Program, as described in **Section 3**. The spatial boundary of the Petroleum Activities Program has been described and assessed using two 'areas', the Operational Area and the Permit Area. The combination of the Operational Area and Permit Area defines the spatial boundary (Petroleum Activity Area or PAA) of the Petroleum Activities Program, as described, risk-assessed and managed by this EP.

This EP addresses potential environmental impacts from planned activities within the Operational Area and any potential unplanned events that originate from the activity within the Operational Area.

Transit to and from the PAA by vessels as well as port activities associated with these vessels, are not within the scope of this EP. Vessels supporting the petroleum activities operating outside the Operational Area (e.g. transiting to and from port) are subject to all applicable maritime regulations and other requirements and are not managed by this EP.

1.5 Environment Plan Summary

An EP summary will be prepared based on the material provided in this EP, addressing the items listed in **Table 1-1** as required by Regulation 11(4).

Table 1-1: EP Summary

EP Summary material requirement	Relevant section of EP containing EP Summary material
The location of the activity	Section 3.4
A description of the receiving environment	Section 4
A description of the activity	Section 3
Details of the environmental impacts and risks	Section 6
The control measures for the activity	Section 6.3
The arrangements for ongoing monitoring of the titleholder's environmental performance	Section 6
Response arrangements in the oil pollution emergency plan	Section 7.11
Consultation already undertaken and plans for ongoing consultation	Section 5
Details of the titleholders nominated liaison person for the activity	Section 1.8

1.6 Structure of the Environment Plan

This EP has been structured to reflect the process and requirements of the Environment Regulations as outlined in **Table 1-2**.

Table 1-2: EP process phases, applicable regulations and relevant section of EP

Criteria for acceptance	Content requirements/relevant regulations	Elements	Section of EP
Regulation 10A(a): <i>Is appropriate for the nature and scale of the activity</i>	Regulation 13: <i>Environmental assessment</i>	The principle of 'nature and scale' is applicable throughout the EP.	Section 2 Section 3 Section 4 Section 5 Section 6 Section 6.10
	Regulation 14: <i>Implementation strategy for the environment plan</i>		
	Regulation 16: <i>Other information in the environment plan</i>		

Criteria for acceptance	Content requirements/relevant regulations	Elements	Section of EP
<p>Regulation 10A(b): <i>Demonstrates that the environmental impacts and risks of the activity will be reduced to as low as reasonably practicable</i></p>	<p>Regulation 13(1)–13(7): 13(1) <i>Description of the activity</i> 13(2)(3) <i>Description of the environment</i> 13(4) <i>Requirements</i> 13(5)(6) <i>Evaluation of environmental impacts and risks</i> 13(7) <i>Environmental Performance Outcomes and standards</i></p>	<ul style="list-style-type: none"> • Set the context (activity and existing environment). • Define ‘acceptable’ (the requirements, the corporate policy, relevant persons). 	<p>Section 1 Section 2 Section 3 Section 4 Section 5 Section 6 Section 6.10</p>
<p>Regulation 10A(c): <i>Demonstrates that the environmental impacts and risks of the activity will be of an acceptable level</i></p>	<p>Regulation 16(a) to 16(c): <i>A statement of the titleholder’s corporate environmental policy</i> <i>A report on all consultations between the titleholder and any relevant person</i></p>	<ul style="list-style-type: none"> • Detail the impacts and risks. • Evaluate the nature and scale. • Detail the control measures – ALARP and acceptable. 	
<p>Regulation 10A(d): <i>Provides for appropriate Environmental Performance Outcomes, environmental performance standards and measurement criteria</i></p>	<p>Regulation 13(7): <i>Environmental Performance Outcomes and standards</i></p>	<ul style="list-style-type: none"> • Environmental Performance Outcomes (EPO). • Environmental performance standards (EPS). • Measurement criteria (MC). 	<p>Section 6</p>
<p>Regulation 10A(e): <i>Includes an appropriate implementation strategy and monitoring, recording and reporting arrangements</i></p>	<p>Regulation 14: <i>Implementation strategy for the environment plan</i></p>	<p>Implementation strategy, including:</p> <ul style="list-style-type: none"> • Environmental Management System (EMS) • Performance monitoring • Oil Pollution Emergency Plan (OPEP – per Table 7) and scientific monitoring • Ongoing consultation 	<p>Section 6.10</p>
<p>Regulation 10A(f): <i>Does not involve the activity or part of the activity, other than arrangements for environmental monitoring or for responding to an emergency, being undertaken in any part of a declared World Heritage property within the meaning of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)</i></p>	<p>Regulation 13(1)–13(3): 13(1) <i>Description of the activity</i> 13(2) <i>Description of the environment</i> 13(3) <i>Without limiting [Regulation 13(2)(b)], relevant values and sensitivities may include any of the following:</i> <i>(a) the world heritage values of a declared World Heritage property within the meaning of the EPBC Act;</i> <i>(b) the national heritage values of a National Heritage place within the meaning of that Act;</i> <i>(c) the ecological character of a declared Ramsar wetland within the meaning of that Act;</i> <i>(d) the presence of a listed threatened species or listed threatened ecological community within the meaning of that Act;</i></p>	<p>No activity, or part of the activity, undertaken in any part of a declared World Heritage property.</p>	<p>Section 3 Section 4 Section 6</p>

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Criteria for acceptance	Content requirements/relevant regulations	Elements	Section of EP
	<p>(e) the presence of a listed migratory species within the meaning of that Act;</p> <p>(f) any values and sensitivities that exist in, or in relation to, part or all of:</p> <p>(i) a Commonwealth marine area within the meaning of that Act; or</p> <p>(ii) Commonwealth land within the meaning of that Act.</p>		
<p>Regulation 10A(g):</p> <p>(i) the titleholder has carried out the consultations required by Division 2.2A</p> <p>(ii) the measures (if any) that the titleholder has adopted, or proposes to adopt, because of the consultations are appropriate</p>	<p>Regulation 11A:</p> <p>Consultation with relevant authorities, persons and organisations, etc.</p> <p>Regulation 16(b):</p> <p>A report on all consultations between the titleholder and any relevant person</p>	<p>Consultation undertaken in the preparation of this EP.</p>	<p>Section 5</p>
<p>Regulation 10A(h):</p> <p>Complies with the Act and the regulations</p>	<p>Regulation 13(4)a:</p> <p>Describe the requirements, including legislative requirements, that apply to activity and are relevant to the environmental management of the activity</p> <p>Regulation 15:</p> <p>Details of the Titleholder and liaison person</p> <p>Regulation 16(a):</p> <p>A statement of the titleholder's corporate environmental policy</p> <p>Regulation 16(c):</p> <p>Details of all reportable incidents in relation to the proposed activity</p>	<p>All contents of the EP must comply with the Offshore Petroleum and Greenhouse Gas Storage Act 2006 and the Environment Regulations</p>	<p>Section 1.6</p> <p>Section 1.7</p> <p>Section 1.8</p> <p>Section 6.8</p>

1.7 Description of the Titleholder

Woodside is the Titleholder for this activity on behalf of a Joint Venture comprising both Woodside Energy Scarborough Pty Ltd and Woodside Energy (Australia) Pty Ltd.

Woodside is the largest Australian natural gas producer. The company operates Australia's biggest resource development, the North West Shelf Project (NWS Project) in Western Australia.

Woodside recognises that strong environmental performance is essential to success and continued growth. Woodside has an established methodology to identify impacts and risks and assess potential consequences of activities. Strong partnerships, sound research and transparency are the key elements of Woodside's approach to the environment.

1.8 Details of Titleholder, Liaison Person and Public Affairs Contact

In accordance with Regulation 15 of the Environment Regulations, details of the titleholders, liaison person and arrangements for the notification of changes are described below.

1.8.1 Titleholders

Woodside Energy Scarborough Pty Ltd:
11 Mount Street, Perth, Western Australia
Telephone: 08 9348 4000
ABN: 650 177 227

1.8.2 Nominated Liaison Person

Ryan Felton
Senior Corporate Affairs Advisor
11 Mount Street, Perth, Western Australia
Phone: 08 9348 4000
Email: feedback@woodside.com.au

1.8.3 Arrangements for Notifying of Change

Should the titleholder, titleholder's nominated liaison person or the contact details for either change, then NOPSEMA is to be notified of the change in writing within two weeks or as soon as practicable.

1.9 Woodside Management System

The Woodside Management System (WMS) provides a structured framework of documentation to set common expectations governing how all employees and contractors at Woodside will work. Many of the standards presented in **Section 6** are drawn from the WMS documentation, which comprises of four elements: Compass and Policies, Expectations, Processes and Procedures, and Guidelines, outlined below (and illustrated in **Figure 1-1**):

- **Compass and Policies:** Set the enterprise-wide direction for Woodside by governing our behaviours, actions and business decisions and ensuring we meet our legal and other external obligations.
- **Expectations:** Set essential activities or deliverables required to achieve the objectives of the Key Business Activities and provide the basis for development of processes and procedures.
- **Processes and Procedures:** Processes identify the set of interrelated or interacting activities which transforms inputs into outputs, to systematically achieve a purpose or specific objective. Procedures specify what steps, by whom and when are required to carry out an activity or a process.
- **Guidelines:** Provide recommended practice and advice on how to perform the steps defined in Procedures, together with supporting information and associated tools. Guidelines provide advice on: how activities or tasks may be performed; information that may be taken into consideration; or, how to use tools and systems.

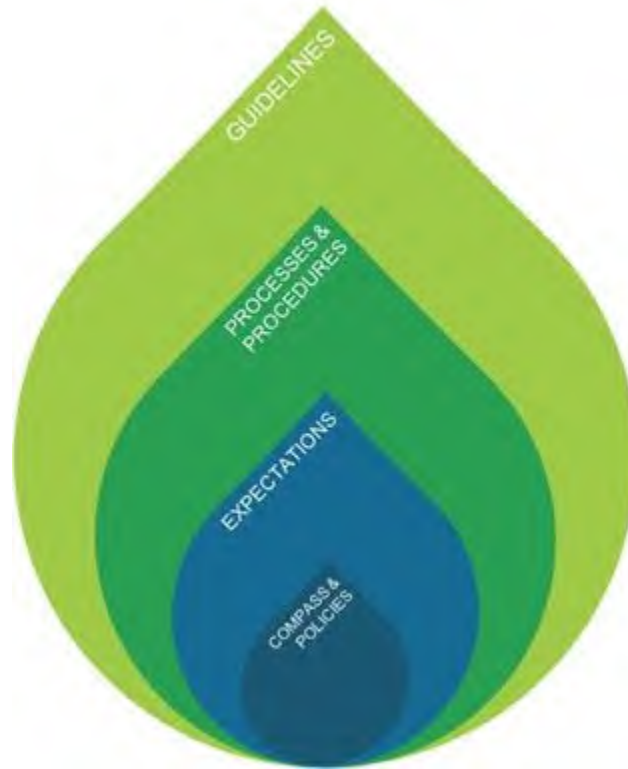


Figure 1-1: The four major elements of the WMS framework

The WMS is organised within a business process hierarchy based upon key business activities to ensure the system remains independent of organisation structure, is globally applicable and scalable wherever required. These business activities are grouped into management, support and value stream activities as shown in **Figure 1-2**. The value stream activities capture, generate and deliver value—through the exploration and production (E and P) lifecycle. The management activities influence all areas of the business, while support activities may influence one or more value stream activities.

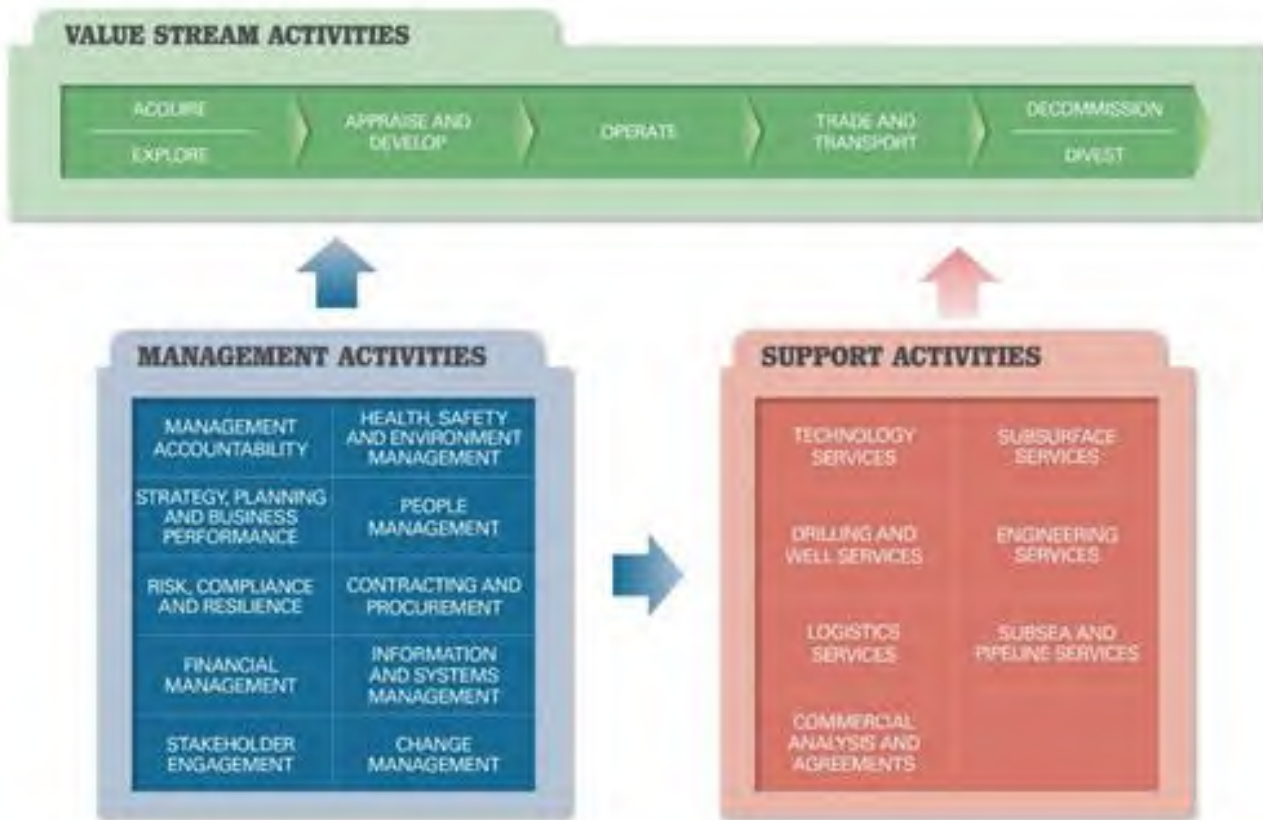


Figure 1-2 The WMS business process hierarchy

1.9.1 Environment and Biodiversity Policy

In accordance with Regulation 16(a) of the Environment Regulations, Woodside’s Environment and Biodiversity Policy is provided in **Appendix A** of this EP.

1.10 Description of Relevant Requirements

In accordance with Regulation 13(4) of the Environment Regulations, a description of requirements, including legislative requirements, that apply to the activity and relevant to the management of risks and impacts of the Petroleum Activities Program are detailed in **Appendix B**.

1.10.1 Offshore Petroleum and Greenhouse Gas Storage Act 2006

The Commonwealth *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act) provides the regulatory framework for all offshore petroleum exploration and production and greenhouse gas activities in Commonwealth waters (the ocean area beyond three nautical miles to the outer extent of the Australian Exclusive Economic Zone at 200 nautical miles).

The Act regulates all offshore petroleum activities, including decommissioning as set out in, Sections 270 and 572 of the OPGGS Act. While there are no immediate plans for decommissioning (the scope of this EP is for infrastructure installation for future operations) all equipment has been designed to allow for removal. Subsection 572(2) provides that a titleholder must maintain in good condition and repair all structures that are, and all equipment and other property that is in the title area and used in connection with the operations. Inspection, monitoring, maintenance and repair of the infrastructure installed for future production, under this Environment Plan, will be managed as described in **Section 3.12**.

The regulatory framework establishes the National Offshore Petroleum Safety and Environment Management Authority as the regulator. Under the OPGGS Act, the *Offshore Petroleum and*

Greenhouse Gas Storage (Environment) Regulations 2009 (the Environment Regulations), apply to petroleum activities in Commonwealth waters and are administered by NOPSEMA. The object of the Environment Regulations is to ensure that any petroleum activities are carried out in a manner:

- consistent with the principles of ecologically sustainable development (as set out in the EPBC Act)
- by which the environmental impacts and risks of the activity will be reduced to ALARP
- by which the environmental impacts and risks of the activity will be of an acceptable level.

1.10.2 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

One of the objectives of the EPBC Act is to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places in Australia. These are defined under Part 3 of the Act as “Matters of National Environmental Significance” (MNES). The EPBC Act sets a regime which aims to ensure actions taken on (or impacting upon) Commonwealth land or waters are consistent with the principles of ecologically sustainable development. When a person proposes to take an action that they believe may need approval under the EPBC Act, they must refer the proposal to the Commonwealth Minister for Environment.

In relation to offshore petroleum activities in Commonwealth waters, in accordance with the “Streamlining Offshore Petroleum Approvals Program” (the Program), requirements under the EPBC Act are now administered by NOPSEMA, commencing February 2014. The Program requires any offshore petroleum activities, authorised by the OPGGS Act to be conducted in accordance with an accepted EP. The definition of ‘environment’ in the Program covers all matters protected under Part 3 of the EPBC Act.

1.10.2.1 Offshore Project Proposal

Woodside submitted the Scarborough OPP to NOPSEMA for assessment in February 2019, which was accepted in March 2020. The OPP provided the detail and evaluation of potential impacts and risks from the key components of the Scarborough Development. These key components include:

- Wells – drilling of the Scarborough and North Scarborough gas fields, with potential for future fields (including Thebe and Jupiter gas fields) to be tied back to the facility.
- Trunkline installation – installation of a gas trunkline to extend for a total of 430 km using trenching and backfill (for nearshore only).
- Surface infrastructure – Floating Production Unit (FPU) in approximately 900 m of water over the Scarborough reservoir.
- Subsea infrastructure - infield infrastructure, including wellheads, manifolds, flowlines and umbilicals, trunkline and communications lines.
- Commissioning – Commissioning of the overall production system will be conducted from the FPU once on location.
- Operations – hydrocarbon extraction and processing will take place at the FPU, to meet the trunkline specifications. Gas will be exported via the trunkline.
- Decommissioning - the facilities will be decommissioned in accordance with good oilfield practice and relevant legislation and practice at the time.

In accordance with Regulation 9 and 6 a titleholder must have submitted and have an accepted EP in place before commencing an activity. Therefore, a number of EPs will be developed and submitted to NOPSEMA over the next five years, to cover components of the Scarborough Development, such as those listed above, including commissioning and operations of the FPU.

Each EP will have a defined Petroleum Activities Program and will detail and evaluate the risks and impacts, demonstrating they have been reduced to ALARP and are acceptable for that particular Program. The Scarborough OPP sets out the environmental performance outcomes (EPOs) for the project and the level of performance to be achieved, to ensure that environmental impacts and risks will be of an acceptable level and the project is consistent with the principles of ecologically sustainable development. These EPOs will be adopted into each EP, where relevant to the particular scope of the EP.

In accordance with Regulation 31 of the Environment Regulations, references to the Scarborough OPP have been made throughout this EP. The accepted OPP is available on the NOPSEMA website: [Scarborough Offshore Project Proposal » NOPSEMA Scarborough Offshore Project Proposal » NOPSEMA](#)

1.10.2.2 Recovery Plans and Threat Abatement Plans

Under s139(1)(b) of the EPBC Act, the Environment Minister must not act inconsistently with a recovery plan for a listed threatened species or ecological community or a threat abatement plan for a species or community protected under the Act. Similarly, under s268 of the EPBC Act:

“A Commonwealth agency must not take any action that contravenes a recovery plan or a threat abatement plan.”

In respect to offshore petroleum activities in Commonwealth waters, these requirements are implemented by NOPSEMA via the commitments included in the Program¹. Commitments relating to listed threatened species and ecological communities under the Act are included in the Program Report (CoA, 2014a).

1.10.2.3 Australian Marine Parks

Under the EPBC Act, Australian Marine Parks (AMPs), formally known as Commonwealth Marine Reserves, are recognised for conserving marine habitats and the species that live and rely on these habitats. The Director of Marine Parks (DNP) is responsible for managing AMP's (supported by Parks Australia) and is required to publish management plans for them. Other parts of the Australian Government must not perform functions or exercise powers in relation to these parks that are inconsistent with management plans (s.362 of the EPBC Act). Relevant AMPs are identified in **Section 4.8** and described in **Appendix I**. The North-west Marine Parks Network Management Plan (DNP, 2018a) describe the requirements for managing the marine parks that are relevant to this EP.

Specific zones within the AMPs have been allocated conservation objectives as stated below (International Union for Conservation of Nature (IUCN) Protected Area Category) based on the Australian IUCN reserve management principles outlined in Schedule 8 of the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) (the EPBC Regulations 2000):

- Special Purpose Zone (IUCN category VI)—managed to allow specific activities through special purpose management arrangements while conserving ecosystems, habitats and native species. The zone allows or prohibits specific activities.
- Sanctuary Zone (IUCN category Ia)—managed to conserve ecosystems, habitats and native species in as natural and undisturbed a state as possible. The zone allows only authorized scientific research and monitoring.
- National Park Zone (IUCN category II)—managed to protect and conserve ecosystems, habitats and native species in as natural a state as possible. The zone only allows non extractive activities unless authorised for research and monitoring.

¹ Program as described in the Program Report – Strategic Assessment of the environmental management authorization process for petroleum and greenhouse gas storage activities administered at Offshore Petroleum Safety and Environmental Management Authority under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* February 2014

- Recreational Use Zone (IUCN category IV)—managed to allow recreational use, while conserving ecosystems, habitats and native species in as natural a state as possible. The zone allows for recreational fishing, but not commercial fishing.
- Habitat Protection Zone (IUCN category IV)—managed to allow activities that do not harm or cause destruction to seafloor habitats, while conserving ecosystems, habitats and native species in as natural a state as possible.
- Multiple Use Zone (IUCN category VI)—managed to allow ecologically sustainable use while conserving ecosystems, habitats and native species. The zone allows for a range of sustainable uses, including commercial fishing and mining where they are consistent with park values.

1.10.2.4 World Heritage Properties

Australian World Heritage management principles are prescribed in Schedule 5 of the EPBC Regulations 2000. There are no world heritage properties that overlap the EMBA. No management principles are considered relevant to the scope of this EP given there is no potential impacts to any of these areas.

2 ENVIRONMENT PLAN PROCESS

2.1 Overview

This section outlines the process Woodside follows to prepare the EP once an activity has been defined as a petroleum activity. The process (**Section 2.2**) describes the environmental risk assessment methodology that is used to identify, analyse and evaluate risks to meet ALARP and acceptability requirements and to develop EPOs and EPSs. This section also describes Woodside's risk management methodologies applicable to implementation strategies applied during the activity.

Regulation 13(5) of the Environment Regulations requires the detailing of environmental impacts and risks, and evaluation appropriate to the nature and scale of each impact and risk associated with the Petroleum Activities Program and potential emergency conditions. The objective of the risk assessment process, described in this section, is to identify risks and associated impacts of an activity, so that they can be assessed, and appropriate control measures applied to eliminate, control or mitigate the impact/risk to ALARP and determine if the impact or risk level is acceptable.

Environmental impacts and risks assessed include those directly and indirectly associated with the Petroleum Activities Program and includes potential emergency and accidental events. This may include environment impacts and risks that are a result of the proposed activity but are not within Woodside's control.

- Planned activities (routine and non-routine) have the potential for inherent environmental impacts.
- An environmental risk is an unplanned event with the potential for impact (termed risk 'consequence').

Herein, the potential result of planned activities are termed 'impacts', where-as 'risks' are associated with unplanned events with the potential for impact (should the risk be realised); with such potential impacts termed 'consequence'.

2.2 Environmental Risk Management Methodology

An assessment of the impacts and risks associated with the Petroleum Activities Program has been undertaken in accordance with Woodside's Environment Impact Assessment Guideline and Risk Management Procedure. This guideline and procedure set out the broad principles and high-level steps for assessing environmental impacts across the lifecycle of Woodside's activities and managing these during project execution.

The key steps of the Woodside impact and risk management process are comprised of the:

- environmental impact and risk assessment
- communication and consultation that informs the assessment and ongoing environmental performance of the activity
- steps required during implementation of the activity including to monitor, review and report.

2.2.1 Establish the Context

Context is established by considering the proposed activities associated with a Petroleum Activities Program, and the environment in which the activities are planned to take place.

Describing the activity involves the evaluation of whether the activity meets the definition of a "petroleum activity" as defined in the Environment Regulations. The activity is then described in relation to the location, what is to be undertaken and how - this allows for the identification of environmental aspects for each activity.

2.2.2 Review of the Significance/Sensitivity of Receptors and Levels of Protection

Sensitivity of receptors relevant to the Scarborough Project, and this Petroleum Activities Program, was determined during development of the Scarborough OPP. As set out within the OPP, the sensitivity of all project receptors, was determined to be either low, medium or high based on qualitative expert judgement.

During development of this EP, OPP receptor sensitivity determinations were reviewed in the context of any changing legislation or changed knowledge regarding the sensitivity of each receptor. No relevant factors that would change receptor sensitivity (from that determined in the OPP) were identified. Receptor sensitivity determinations from the OPP are used in the risk impact assessment summaries for each environmental risk assessment (refer to **Section 6**).

2.2.3 Environmental Legislation and Other Requirements

In preparing this EP, Woodside has ensured the proposed controls and impact and risk levels are consistent with national and international standards, law and policies (including applicable plans for management and conservation advices, and significant impact guidelines for MNES).

This has included developing the project in accordance with all applicable legislation as identified in **Section 1.10**, and ensuring the requirements of the species recovery plans and conservation advices have been considered to identify any requirements that may be applicable to the risk assessment.

2.2.4 Impact and Risk Identification

Terminology used for this impact and risk assessment has been taken from the impact and risk management process, which is aligned with ISO 13001:2018 and the requirements of Part 2 (regulations 6 to 25A) of the OPPGS Regulations.

Impacts and risks of the Scarborough Project were identified in the scoping phase of the Scarborough Project (and presented within the OPP). During this phase, the relationships between the environmental aspects identified for the proposed activities and the associated potential impacts and risks for each receptor are established. This EP considers relevant impacts and risks associated with the Scarborough Project's gravimetry, mooring pre-lay and SURF (Subsea Umbilicals Risers and Flowlines) installation campaigns.

Using the OPP as a guide, all impacts and risks associated with the Petroleum Activities Program for this EP were identified during the EP scoping phase by undertaking an Environmental Risk and Impact Identification (ENVID) workshop. Impacts, risks and potential consequences were identified based on planned and potential interaction with the activity (based on the description in **Section 3**), the existing environment (**Section 4**) and the outcomes of Woodside's stakeholder engagement process (**Section 5**). The ENVID workshop was undertaken by a multidisciplinary team comprising personnel with sufficient breadth of knowledge, training and experience to reasonably assure that the hazards that may arise in connection with the Petroleum Activity Program in this EP were identified.

Impacts and risks were identified during the ENVID for both planned (routine and non-routine) activities and unplanned (accidents/incidents/emergency conditions) events. During this process, risks identified as not applicable (not credible) were removed from the assessment.

2.3 Impact and Risk Analysis and Evaluation

After identifying impacts and risks, analysis and evaluation is undertaken to determine the extent of the impacts and risks, whether they are acceptable or not, and to identify any impact and risk treatment (or controls) to be implemented.

Impact and risk evaluation are undertaken by assessing the magnitude (i.e. no lasting effect, slight, minor, moderate, major or catastrophic) of the credible environmental impacts from each aspect based on extent, duration, frequency and scale, and then either:

- assigning an impact significance level to each credible environmental impact based on the receptor sensitivity and the magnitude of the impact, OR
- assigning an environmental risk level to each environmental risk based on the receptor sensitivity, magnitude of the consequence, and the likelihood of occurrence.

2.3.1 Impact Evaluation

Impact assessment determines the impact significance of the potential impacts, based on the magnitude and the receptor sensitivity (Error! Reference source not found.).

Magnitude	Receptor Sensitivity			Significance Level
	Low	Medium	High	
Catastrophic	B	A	A	Catastrophic (A)
Major	C	B	A	Major (B)
Moderate	D	C	B	Moderate (C)
Minor	E	D	C	Minor (D)
Slight	F	E	D	Slight (E)
No lasting effect	F	F	E	Negligible (F)

Figure 2-1: Impact significance level

2.3.2 Risk Evaluation

In support of ongoing risk management (a key component of Woodside’s Process Safety Management Framework – refer to Implementation Strategy [Section 6.10]), Woodside uses the concept of ‘current risk’ and applies a current risk rating to indicate the current or ‘live’ level of risk, considering the controls that are currently in place and regularly effective. Current risk rating is effective in articulating potential divergence from baseline risk, such as if certain controls fail or could potentially be compromised. Current risk ratings aid in the communication and visibility of the risk events, and ensures risk is continually managed to ALARP by identifying risk reduction measures and assessing acceptability.

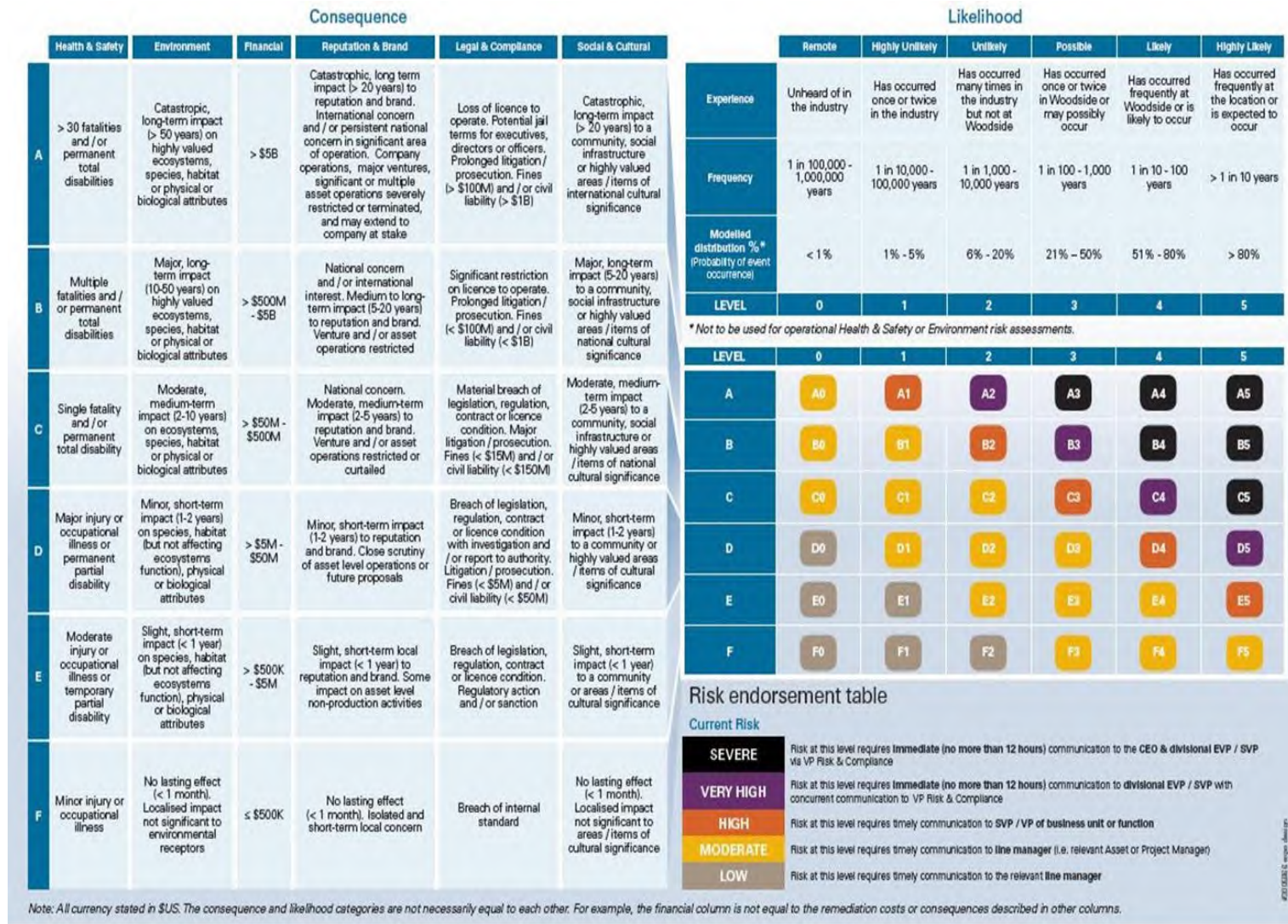


Figure 2-2: Environmental risk levels

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2.3.3 Decision Support Framework

To support the risk assessment process Woodside’s HSE risk management procedures include the use of a decision support framework based on principles set out in the Guidance on Risk Related Decision Making (Oil and Gas UK, 2014). This concept has been applied during the ENVID or equivalent preceding processes during historical design decisions to determine the level of supporting evidence that may be required to draw sound conclusions regarding risk level and whether the risk is ALARP and acceptable. This is to confirm:

- activities do not pose an unacceptable environmental risk
- appropriate focus is placed on activities where the risk is anticipated to be acceptable and demonstrated to be ALARP
- appropriate effort is applied to the management of risks based on the uncertainty of the risk, the complexity and risk rating (i.e. potential higher order environmental impacts are subject to further evaluation assessment).

The framework provides appropriate tools, commensurate to the level of uncertainty or novelty associated with the risk (referred to as Decision Type A, B or C). The decision type is selected based on an informed discussion around the uncertainty of the risk, then documented in ENVID output.

This framework enables Woodside to appropriately understand a risk, determine if the risk is acceptable and can be demonstrated to be ALARP.

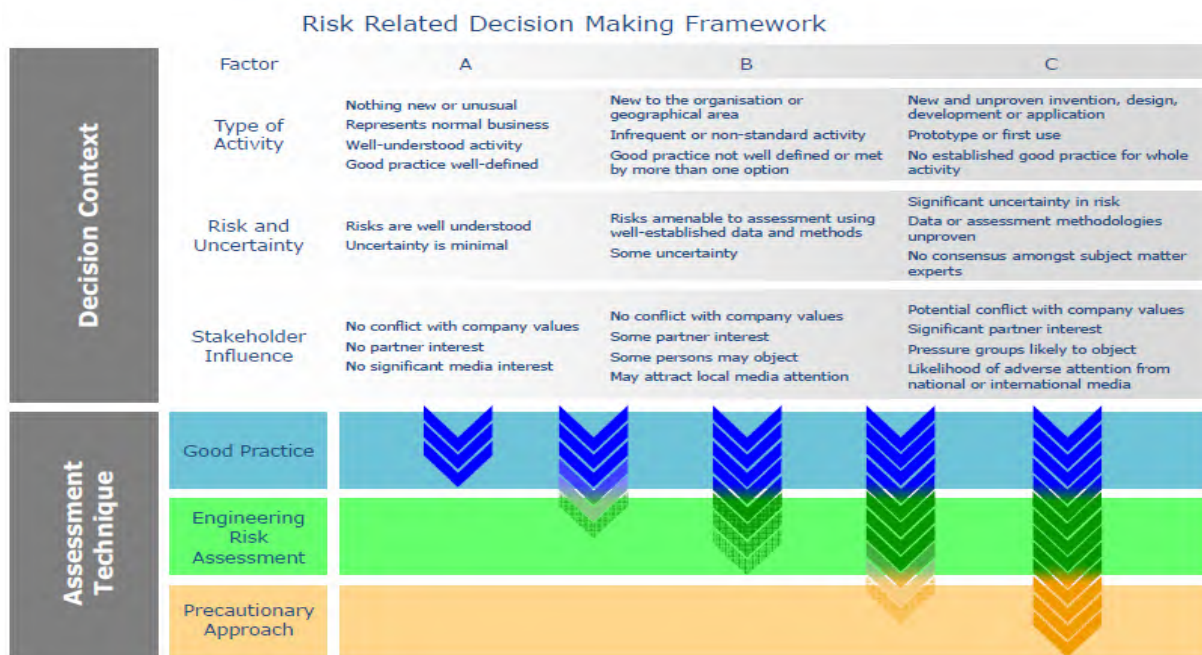


Figure 2-3: Risk related decision-making framework (Oil and Gas UK, 2014)

Decision Type A

Risks classified as a Decision Type A are well understood and established practice, they generally consider recognised good industry practice which is often embodied in legislation, codes and standards and use professional judgement.

Decision Type B

Risks classified as Decision Type B typically involve greater uncertainty and complexity (and can include potential higher order impacts/risks). These risks may deviate from established practice or

- if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
 - the principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;
 - the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making;
 - improved valuation, pricing and incentive mechanisms should be promoted.
- internal context – the proposed impacts and risk levels are consistent with Woodside policies, procedures and standards
 - external context – stakeholder expectations and feedback have been considered and activities do not have a significant impact on MNES including those with an Indigenous connection with, or traditional use in nearshore areas as defined in **Section 4.9.1**.
 - other requirements – the proposed controls and impact and risk levels are consistent with national and international standards, laws, policies and Woodside Standards (including applicable plans for management and conservation advices, and significant impact guidelines for MNES)

In this EP Woodside has demonstrated that the level of acceptability determined in the OPP has been met through the following criteria:

- Adoption of relevant OPP EPOs and controls
- Adoption of EP specific controls where required
- Impact Significance Level / Risk Consequence levels for receptors are equal to or less than the significant impact level defined in the Scarborough OPP (SA0006AF0000002, Rev 5; Section 6.5; Table 6-3) and are therefore consistent with the EPOs and managed to an acceptable level of impact or risk, and
- Consideration of internal/external context and other requirements specific to this EP Petroleum Activities Program (including issues raised during EP Stakeholder Consultation).

A summary of the process as adopted is shown in **Table 2-2**.

Table 2-2: Summary of Woodside’s criteria for Acceptability for Scarborough EPs

Risk	Impact	Decision Type
Low and Moderate	Negligible, Slight, or Minor (D, E or F)	A
Woodside demonstrates these Risks, Impacts and Decision Types are 'Broadly Acceptable' if they meet the EP criteria listed above in Section 2.3.4 . Further effort towards risk reduction (beyond employing opportunistic measures) is not reasonably practicable without sacrifices grossly disproportionate to the benefit gained.		
High, Very High or Severe	Moderate and above (A, B or C)	B and C
Woodside demonstrates these higher order Risks, Impacts and Decision Types are 'Acceptable if ALARP' if they meet the EP criteria listed above in Section 2.3.4 . In addition, these higher order risks, impacts and decision types are 'Acceptable if ALARP' if it can be demonstrated that the predicted levels of impact and/or residual risk, are managed to ALARP (as described in Section 6).		
For potential C or above consequence/impact levels where significant uncertainty exists in analysis of the risk or impact (such as, for predicted or potential high risk of significant environmental impacts, significant project risk/exposure, novel activities, lack of consensus on standards, and significant stakeholder concerns. (E.g. Decision Type C), defined acceptable levels and assessment of acceptability may be required to be conducted separately for key receptors.		

2.4 EPBC Act Assessment

To support the demonstration of acceptability, a separate assessment is undertaken across the following three legislative requirements incorporated into the EPBC Act.

2.4.1 Principles of ESD

As part of the demonstration of acceptability an assessment is undertaken to demonstrate that the EP is not inconsistent with relevant principles of ESD (refer **Section 2.3.5**).

2.4.2 MNES: Significant Impact Guidelines 1.1

A separate assessment is undertaken to determine if the potential impacts/risks of the activity trigger any relevant criteria listed in the MNES: Significant Impact Guidelines 1.1.

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of a population
- reduce the area of occupancy of the species
- fragment an existing population into two or more populations
- adversely affect habitat critical to the survival of a species
- disrupt the breeding cycle of a population
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat
- introduce disease that may cause the species to decline or interfere with the recovery of the species.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of an important population of a species
- reduce the area of occupancy of an important population
- fragment an existing important population into two or more populations
- adversely affect habitat critical to the survival of a species
- disrupt the breeding cycle of an important population
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
- introduce disease that may cause the species to decline, or
- interfere substantially with the recovery of the species.

2.4.3 Recovery Plan and Threat Abatement Plan Assessment

To support the demonstration of acceptability, a separate assessment is undertaken to demonstrate that the EP is not inconsistent with any relevant recovery plans or threat abatement plans (refer **Section 1.10.2.2**). The steps in this process are:

- identify relevant listed threatened species and ecological communities (**Section 4.6**);
- identify relevant recovery plans and threat abatement plans (**Section 6.1**);
- list all objectives and (where relevant) the action areas of these plans, and assess whether these objectives/action areas apply to government, the Titleholder, and the Petroleum Activities Program (**Section 6.9**); and
- for those objectives/action areas applicable to the Petroleum Activities Program, identify the relevant actions of each plan, and evaluate whether impacts and risks resulting from the activity are clearly not inconsistent with that action (**Section 6.9**).

2.5 Environmental Performance Objectives/Outcomes, Standards and Measurement Criteria

The OPGGS Environment Regulations define EPOs to mean: “a measurable level of performance required for the management of environmental aspects of an activity to ensure that environmental impacts and risks will be of an acceptable level”. As such, the process of defining an appropriate EPO, has relied on the required levels of performance set either in legislation (such as the OPGGS Act), regulator guidance notes such as the Matters of National Environmental Significance–Significant Impact Guidelines (DoE, 2013) or may be the result of specific agreements or expectations with other relevant stakeholders (e.g. fishers or other marine users).

EPOs for the Scarborough Project have been set within the Scarborough OPP (SA0006AF0000002, Rev 5) and assessed as meeting the requirements of the Regulations to be appropriate, consistent with the principles of ecologically sustainable development and to demonstrate that the environmental impacts and risks of the project will be managed to an acceptable level.

Environment Plans for petroleum activities submitted subsequent to the OPP process are required to contain EPOs that are appropriate by being consistent with those set out in the OPP. The EPOs presented in a subsequent EP are not required to be exactly the same however should achieve the same environmental outcome (or better) as that described in the OPP. Activity specific EPs will also be required to contain measurement criteria and performance monitoring, auditing and reporting processes relating to the EPOs.

Table 6-2 shows a comparison between EPOs in the Scarborough OPP (SA0006AF0000002, Rev 5) and this EP.

3 DESCRIPTION OF THE ACTIVITY

3.1 Overview

This section has been prepared in accordance with Regulation 13(1) of the Environment Regulations and describes the activities to be undertaken as part of the Petroleum Activities Program under this EP. It includes the location of the activities, general details of the installation, survey and associated activities, and additional information relevant to considering environmental risks and impacts.

3.2 Project Overview

Woodside proposes to install subsea infrastructure, carry out survey activities and infrastructure testing within Permit Areas WA-61-L and WA-62-L. The Petroleum Activities Program includes installation of subsea infrastructure, gravimetry preparation and baseline survey and floating production unit (FPU) mooring pre-lay. An overview of the Petroleum Activities Program is provided in **Table 3-1**. **Figure 3-1**² illustrates the indicative field layout of the proposed subsea infrastructure detailed in **Table 3-1**.

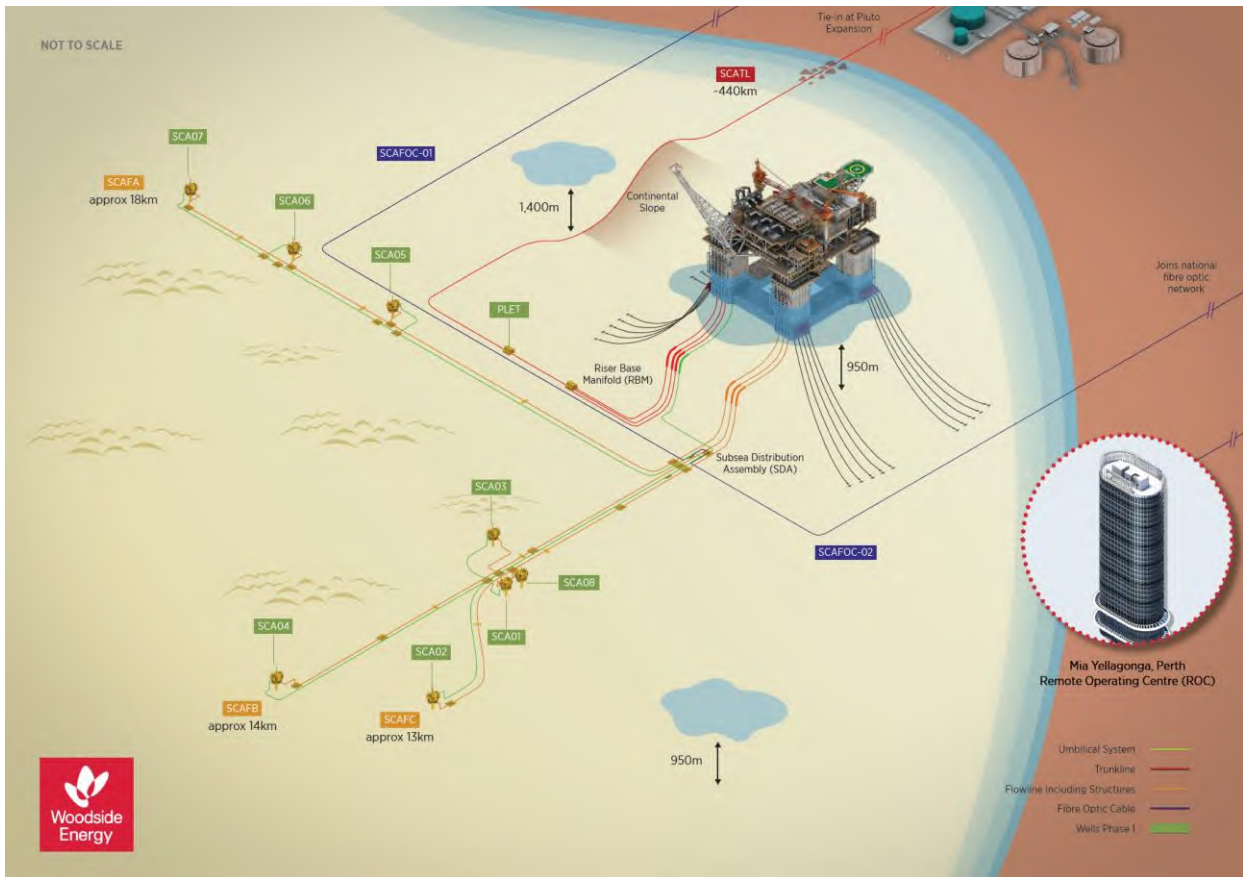


Figure 3-1: Indicative Scarborough field infrastructure layout

² Note this figure also includes additional infrastructure not within the scope of this EP, such as the FPU, wells, trunkline, fibre optic cable, and onshore infrastructure).

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Table 3-1: Petroleum Activities Program Overview

Item	Description
Permit Area	WA-61-L, WA-62-L
Location	North West Shelf
Water depth	Approximately 900–1000 m
Infrastructure installation	
Key vessel types	<ul style="list-style-type: none"> • Light construction vessel (LCV) • Heavy construction vessel (HCV) • Heavy lift vessel (HLV) • Pipelay vessel (PV) • Survey vessel • Support vessel
Key activities	<p>Installation of the following infrastructure:</p> <ul style="list-style-type: none"> • 3 x flowlines • 7 x flowline sleepers • 1 x riser base manifold (RBM) and foundation • 13 x mud mats • 12 x mud mats (contingency) • 7 x in-line structures (in-line T) • 6 x flowline end terminations (FLETS) • 7 x umbilical termination assemblies • 7 x umbilical termination heads • 2 x subsea distribution units • 1 x subsea distribution assembly • 7 x umbilicals • 9 x flexible jumpers (includes 1 spare) • Multiple flying leads • 1 x trunkline spool and support • 20 x suction piles • Up to 265 x concrete pads <p>Temporary installation of the following infrastructure:</p> <ul style="list-style-type: none"> • 1 x suction pile and leader wire for each flowline lay initiation • Installation aids (i.e. transponder arrays, frames, tide gauges) • Wet-storing of dynamic umbilicals (x 1) and risers (x 6) • Wet-storing of mooring legs (x 20) <p>Other activities:</p> <ul style="list-style-type: none"> • ROV operations • Pre-, progress and post-installation surveys • Baseline gravimetry survey • Flood, clean, gauge, and pressure and leak testing • Inspection, monitoring, maintenance and repair (IMMR) • Contingent activities including debris removal as required, transportation of equipment to field with tug and barge spread or HLV

3.3 Concordance with Scarborough OPP

The Scarborough OPP describes the scope of the project and its component activities, at a level comprehensive enough to facilitate thorough evaluation of environmental impacts and risks and appropriate setting of EPOs. However, in accordance with NOPSEMA guidance, it is acknowledged that an OPP is prepared at an early stage in project development, before detailed planning of component activities has occurred. More detailed descriptions of the component activities are therefore expected in subsequent EPs.

Refinement or modifications to methods or timing for individual project activities may occur after an OPP acceptance and before the submission of EPs. These refinements or modifications to the accepted project cannot be new activities and cannot significantly change the overall environmental impacts and risks of the project as described in the accepted OPP. **Table 3-2** shows which scopes from the Scarborough OPP may have progressed in level of definition since the Scarborough OPP was accepted by NOPSEMA.

Section 4 of the Scarborough OPP (SA0006AF0000002, Rev 5) provides a detailed description of the Scarborough project.

Table 3-2: Concordance of activities described in the Scarborough OPP with those included in this EP

Scarborough OPP Section	Scope or overview of the Activity	Relevance to this EP	Refinement or modification to methods	Refinement or modification to timing	Is this a new activity	Significance of change
4.4.2.1	With respect to reservoir monitoring methodology, the OPP states that "Pressure and saturation changes in the reservoir will be monitored over the life of the Project. Data will be used to inform decisions regarding reservoir management."	Reservoir monitoring methods have since been further defined to include gravimetry, a process involving installation of concrete pads on the seabed which are used to periodically support a passive gravity meter and enable determination a field-wide measurement of gravity (Refer to Section 3.9). The extent of seabed disturbance caused by gravimetry concrete pads across WA-61-L and WA-62-L is up to 530 m ² (concrete pads are each ~2 m ² in area). Although this area was not specifically included in the OPP seabed disturbance calculations, it is encompassed in the contingency area included in the 234,000 m ² total disturbance estimate. This area was used as a basis for impact assessment in the OPP. Hence there is no change in impact from the OPP.	Yes	No	No	This change does not significantly alter the overall environmental impacts and risks of the project as described in the accepted Scarborough OPP. Section 6.7.1 of the EP has assessed the impact / consequence of seabed disturbance from subsea infrastructure (including gravimetry concrete pads) to have a maximum impact significance level of 'D' (Minor) based on impact potential for the most sensitive receptor (KEFs). The impact significance levels for receptors are consistent with the levels rated in the Scarborough OPP. As part of consultation for this EP, all relevant stakeholders have been consulted on the activity, including the gravimetry scope.
4.4.2.2	The OPP states that "drill centres are connected to manifolds by well jumpers...."	In the current subsea infrastructure design, wells/x-mas trees are connected to the flowline via well jumpers and in-line tees, rather than well jumpers and manifolds.	Yes	No	No	This change does not significantly alter the overall environmental impacts and risks of the project as described in the accepted Scarborough OPP. The result of this change is a reduced seabed disturbance, as in-line tees have a smaller footprint than manifolds. This impact is assessed in Section 6.7.1 .

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Scarborough OPP Section	Scope or overview of the Activity	Relevance to this EP	Refinement or modification to methods	Refinement or modification to timing	Is this a new activity	Significance of change
7.2.6.1	The OPP defines the following as a credible spill scenario: "Partial or total failure of a bulk transfer hose or fittings during bunkering, combined with a failure in procedure to shutoff fuel pumps, for a period of up to five minutes, resulting in about 8 m ³ MDO loss to the deck and/or into the marine environment."	This scenario has been updated to a more conservative estimate: "Partial or total failure of a bulk transfer hose or fittings during bunkering, combined with a delay to shutoff fuel pumps, for a period of up to fifteen minutes, resulting in approximately 50 m ³ marine diesel lost to the deck and/or into the marine environment."	Yes	No	No	<p>This change does not significantly alter the overall environmental impacts and risks of the project as described in the accepted Scarborough OPP.</p> <p>The overall significance level for an unplanned hydrocarbon release during bunkering is Minor (D) based on a minor impact to the most sensitive receptors (Section 6). The impact significance levels for individual receptors are consistent with the levels rated in the Scarborough OPP.</p>

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3.4 Location

The Petroleum Activities Program is located in Permit Areas WA-61-L and WA-62-L in Commonwealth waters, about 375 km west-north-west of Dampier. The closest landfall to the Petroleum Activities Program is the North West Cape, about 216 km south-south-east at its nearest point (**Figure 3-2**). The indicative locations and depths of the key subsea infrastructure are presented in **Table 3-3**.

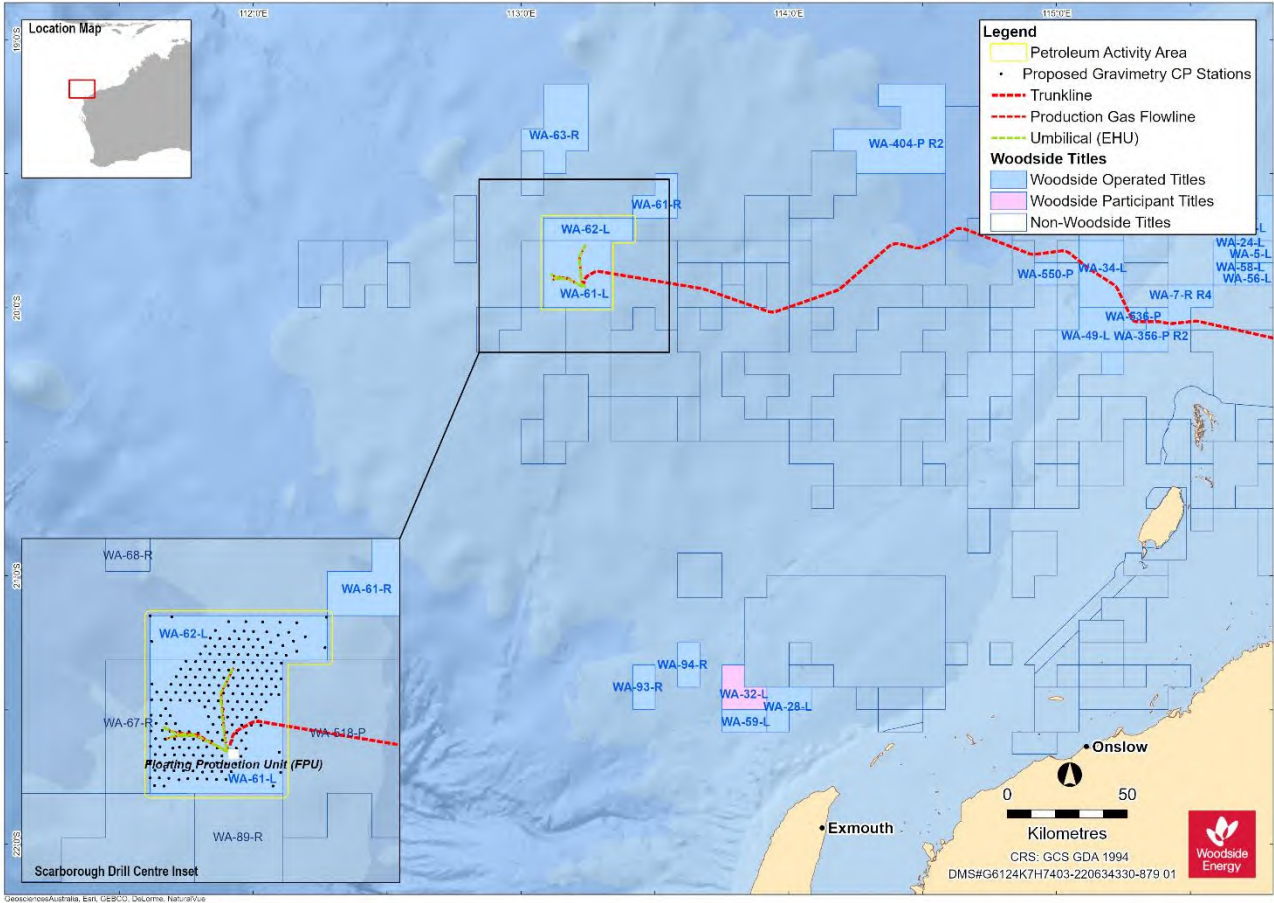


Figure 3-2: Petroleum Activities Program location and Operational Area

Table 3-3: Approximate Coordinates, water depths and permit areas of key subsea infrastructure

Structure for installation	Approx. Easting (m)	Approx. Northing (m)	Approx. Water Depth (m)	Permit Area
Start of Flowline A and associated infrastructure	106033	7810217	-907	WA-61-L
End of Flowline A and associated infrastructure	105222	7793017	-946	WA-61-L
Start of Flowline B and associated infrastructure	92743	7797625	-918	WA-61-L
End of Flowline B and associated infrastructure	105312	7792834	-948	WA-61-L
Start of Flowline C and associated infrastructure	93208	7795255	-913	WA-61-L

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When underway, activities will be 24 hours per day, seven days per week. Simultaneous operations (SIMOPS) may occur between activities within the PAA, with timing of some subsea installation, mooring and survey activities overlapping. Timing, duration and vessel selection for all activities is subject to change due to project schedule requirements, vessel availability, unforeseen circumstances, and weather.

Table 3-4: Summary of Petroleum Activities Program timing

Activity	Vessel type	Earliest estimated start & estimated duration
Gravimetry		
Installation of concrete pads	LCV	Around Nov 2023 – ~2 months
Baseline gravimetry survey	Survey vessel or LCV	Around Nov 2024 – ~2 months
SURF campaign 1		
Flowline reel-lay Installation of RBM foundation, initiation suction pile, in-line structures, mud mats, sleepers, survey array	PV, LCV, support vessels (may include tug and barge spread)	Around Nov 2023 – ~3 months
Pre-lay & post-lay surveys Infrastructure storage and transport to field (contingency only) Flood, clean, gauge and test	LCV	Around Mar 2024 - ~2 months
FPU mooring pre-lay		
Pre-lay survey	LCV	This scope will be executed by the LCV conducting the concrete pad installation scope
Mooring pre-lay Infrastructure storage and transport to field (contingency only) Post-lay survey	HCV, support vessels (may include HLV)	Around Feb 2024 – ~3 months
SURF campaign 2		
Installation of in-field umbilicals, and flying leads, control system mud mat, subsea distribution units/assembly, umbilical termination assemblies, RBM, spool, jumpers Wet storing of dynamic umbilical and risers Pre- & post-lay surveys Infrastructure storage and transport to field (contingency only) Leak testing	HCV, LCV, support vessels (may include HCV, tug and barge spread)	Around Nov 2024 – ~3 months
Inspection, monitoring, maintenance and repair		
ROV inspection Sediment relocation Marine growth removal Infrastructure repair	Offshore Construction Vessel (OCV) (or similar)	May occur any time post-infrastructure installation for the life of the EP

3.6.1 Concurrent Operations

Concurrent operations will occur between activities included in this Petroleum Activities Program and Scarborough activities covered by other EPs (i.e. drilling and completions or trunkline installation). The cumulative impact of concurrent operations has been assessed in **Section 6.2.1** of this EP. Interactions between these scopes (i.e. simultaneous operations) will be managed through SIMOPs plans if required.

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3.7 Vessel Operations

Several vessel types will be required to complete the activities associated with the Petroleum Activities Program. These are detailed in **Table 3-5**.

Vessels may mobilise from an Australian port or directly from international waters to the PAA, in accordance with biosecurity and marine assurance requirements. Vessels will not usually anchor within the PAA during the activities and instead maintain position using dynamic positioning (DP).

DP uses multiple sources of positioning data (such as satellite navigation and radio transponders) to maintain the position of the vessel at a required location. In some instances, higher levels of accuracy may be required, where satellite information is enhanced via seabed transponders. These transponders emit signals that are detected by receivers on the vessel and used to calculate position. The transponders are typically deployed in an array on the seabed, using clump weights comprising concrete. They are recovered at the end, generally by ROV, and clump weights will also be recovered.

All vessels will display navigational lighting and external lighting, as required for safe operations. Lighting levels will be determined primarily by operational safety and navigational requirements under relevant legislation, specifically the Navigation Act 2012 (Cth) (Navigation Act). The vessels will be lit to maintain operational safety on a 24-hour basis.

Typical vessel parameters are presented in **Table 3-5**.

Table 3-5: Typical vessel parameters

Parameter	LCV (Seven Pegasus)	HCV (DLV 2000)	PV (Seven Oceans)	HLV (Happy Sky)
Draft (max)	6.75 m	7.9 m	7.5 m	9.5 m
Length	131.7 m	184 m	157.3 m	154.8 m
Gross tonnage	9494 t	45,247 t	18,201 t	17,775 t
Crane capacity (AHC)	400 t	2000 t	400 t	1,100 t
Total fuel volume	1200 m ³	3751 m ³	2800 m ³	1800 m ³
Volume of largest fuel tank	362 m ³	998 m ³	514 m ³	250 m ³

Other vessels used for the survey and installation activities include survey vessels, tug and barge spreads, fuel bunkering and support vessels. These are smaller vessels than those detailed above.

Support vessels will be used to transport equipment and materials between the activity vessels and port. The loading and back-loading of equipment, materials and wastes is one of the most common supporting activities conducted. The support vessels, when in the PAA, are also available to assist in implementation of the Oil Pollution First Strike Plan, should an environmental incident occur (e.g. spills).

3.8 Support Operations

3.8.1 Refuelling

Vessels will be refuelled via support vessels as required. Refuelling may take place within the PAA and has been included in the risk assessment for this EP. Other fuel transfers that may occur on board vessels may include refuelling of cranes or other equipment as required.

3.8.2 Helicopter Operations

During the Petroleum Activities Program, crew changes may be performed using helicopters as required. Helicopter operations within the PAA are limited to helicopter take-off and landing on the

helideck. Helicopters may be refuelled on the helideck. Helicopters may also be used in emergency response events.

3.8.3 ROV Operations

Vessels will be equipped with ROV systems that are maintained and operated by specialised personnel aboard the vessel. ROVs may be used during activities including:

- Observation during installation activities.
- Physical installation assistance.
- Pre- and post-lay surveys.
- Removal of debris.

3.8.4 Surveys

Survey activities may be carried out prior to the commencement of infrastructure installation activities, during scope execution and after the activity is complete. Surveys may collect data to gather information on:

- seabed and near seabed geomorphology
- debris/obstacles
- infrastructure position

The survey activities can be undertaken either from a dedicated survey vessel, ROV or from the construction vessels themselves.

The survey methods may include multibeam echo sounders (MBES), side scan sonar (SSS), pipe trackers, and magnetometer, and may utilise underwater acoustic positioning. The survey methods used will be dependent on survey objectives. Sound waves are transmitted from a transducer mounted on either an ROV or hull of the vessel and return signals (echoes) from the seabed, near seabed or other acoustic survey equipment.

MBES can be used to undertake hydrographic surveys prior to, during and post-installation activities. SSS, pipe trackers and magnetometers may be used to verify positions of existing seabed features and infrastructure.

A baseline gravimetry survey will also be executed under this Petroleum Activities Program and is described in **Section 3.9**.

3.8.5 Underwater Acoustic Positioning

Accurate positioning of subsea infrastructure on the seabed is required and therefore Ultra Short Baseline (USBL) and/or Long Base Line (LBL) acoustic positioning will be required.

Typically, USBL subsea transponders are mounted on an ROV or structure which transmits an acoustic pulse back to the vessel receiver, which can be resolved to an accurate subsea position of the ROV or structure.

The LBL array provides accurate positioning within the array by measuring ranges to three or more transponders deployed at known locations on the seabed and structures. These transponders, and associated frames, will be recovered at the end of the petroleum activities. Alternatively, LBL transponders may be moored to the seabed by a sacrificial clump weight which are recovered by means of a hydrostatic release. The standard clump weights used, made of cement or steel, will weigh about 80 kilograms (kg).

Transmissions are not continuous but consist of short 'chirps' with a duration that ranges from between about 3 and 40 milliseconds. Transponders will not emit any sound when on standby.

3.8.6 Marine growth removal

Excess marine growth may need to be removed from subsea infrastructure using an ROV if accumulated between installation phases. Any residual cleaning debris and water will be managed in line with the approach applied to routine vessel discharges. **Table 3-6** lists the different marine growth removal techniques that may be used.

Table 3-6: Marine growth removal methods

Activity/Equipment	Description
Water jetting	Uses high-pressure water to remove marine growth
Brush systems	Uses brushes attached to an ROV to physically remove marine growth
Acid (typically sulfamic acid)	Chemically dissolves calcium deposits

3.8.7 Critical lifts / equipment transfers

Critical lifts and/or vessel to vessel transfers of equipment may occur within the PAA. Vessel to vessel equipment transfers are required when a vessel transports equipment from port (local or international) and then hips up to an installation vessel to lift equipment between vessels using the on-board cranes.

Critical lifts may occur between vessels or during installation of equipment to the seabed. Critical lifts may refer to a heavy or complicated lift, as defined in the applicable lifting standard, and require specific vessels with appropriately rated cranes, lifting equipment and lifting plan.

3.9 Gravimetry

Among the many variables which define the Scarborough reservoir range, the large regional aquifer and the associated uncertainty of water movement are a material contributor. 4D seismic monitoring alone will be challenged to reduce the uncertainty associated with water movement, and gravimetry technology has been identified as a suitable complement to 4D seismic for monitoring field-wide water movement in the reservoir. The technique delivers a field-wide measurement of gravity, providing direct measurement of water movement / saturation and reservoir compaction / subsidence.

Preparation for Scarborough gravimetry surveys involves installation of approximately 220 concrete pads (up to 265 depending on final design) by an LCV. The pads are conical frustum-shaped, 1.6 m in diameter, and will be placed in a grid like pattern approximately 2 km apart, having a cumulative seabed footprint of approximately 500 m². The concrete pads ensure that measurements are acquired at the same position on the seabed in consecutive surveys, such that observed time-lapse differences in gravity and water depth can be unambiguously attributed to the effect of hydrocarbon production. These will remain deployed on the seabed until end of field life.

Following preparations, a baseline gravimetry survey will be conducted. The survey will involve temporary placement of a passive gravity meter, sequentially on each concrete pad by, and temporary deployment of tide gauges on the seabed by a survey vessel or LCV. The tide gauges will be recovered after the survey is complete. The purpose of the survey is to monitor pressure and saturation changes in the reservoir, to inform decisions regarding reservoir management. See **Figure 3-3** for an activity diagram.

Not to scale

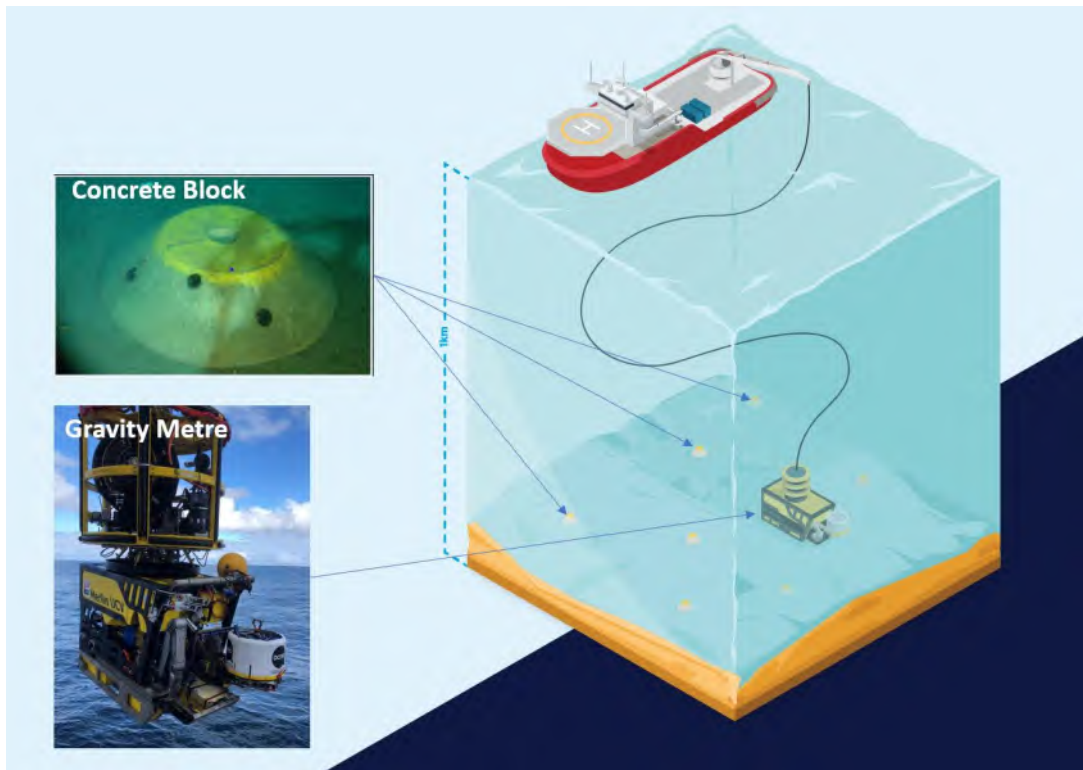


Figure 3-3: Gravimetry activity diagram

3.10 Subsea Infrastructure Installation

3.10.1 Campaign 1

It is intended that activities across subsea infrastructure installation campaign 1 will be conducted by a PV or LCV, as described in **Table 3-5**. Some activities planned for the PV and LCV may be performed by the other vessel depending on operational constraints.

Installation of the survey beacon array are planned to occur prior to the pre- and post-lay surveys. Pre-and post-lay surveys will be conducted from vessel and ROV to assess seabed condition pre-installation and confirm infrastructure location post-installation.

Thirteen mud mats, approximately 16 m x 9 m x 0.3 m in size, are planned to be installed by the LCV, to provide a base for the installation of other infrastructure (in-line structures). Up to twelve additional mud mats, 8 m x 4 m x 3 m in size, may be installed as foundations for the subsea distribution units (SDUs) and umbilical termination assemblies (UTAs). It is intended that seven flowline sleepers of approximately 30 m x 2.5 m x 1 m in size will be deployed by the LCV along the pipeline routes prior to reel lay activities.

The intention is that a single initiation suction pile will be temporarily installed by the reel-lay vessel prior to each of the three flowline installations. This 15 m high, 5 m wide pile would be lowered to the seabed and allowed to self-bury, before the ROV commences suction to penetrate pile to target depth. An initiation wire would then be attached to allow the flowline installation to commence.

Flowline installation is intended to occur across three separate stages. This process is initiated with lifting of the Flowline End Termination (FLET) from a supply vessel, which is then deployed to depth and attached to the initiation wire. The reel-lay vessel will then lay lengths of the flowline, and intermittently install in-line structures, including the In-Line Tees (ILTs) and FLETs, onto pre-installed mud mats. In total there will be three lengths of flowline, seven ILTs and six FLETs installed.

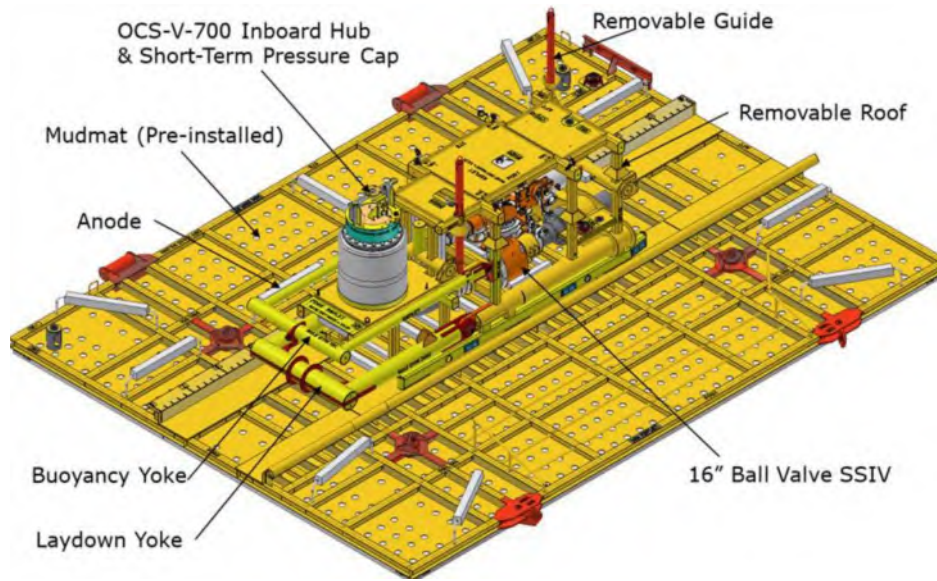


Figure 3-4: FLET diagram

The reel-lay vessel is also intended to install the riser base manifold (RBM) foundation, prior to RBM installation in Campaign 2. The foundation is comprised of four suction piles with a rigid frame attached to the top, with overall dimensions of approximately 28 m x 15 m x 6 m. The intention is that the foundation will be lifted from a transport barge and lowered to the seabed. Various equipment may be employed to assist with orientation and landing on the seabed, such as a clump weight, bridle or ROV. An ROV may also be used to penetrate the piles to target depth.

Post installation, all installation aids (i.e., transponder arrays, frames) are planned to be removed. This will be confirmed via an ROV inspection.

Following installation, it is intended that the temporary heads on the FLETs will be replaced with Pig Launcher Receivers (PLRs). The FLET valves would then be opened and the flowlines flooded, cleaned and gauged (FCG), replacing the air contents with treated seawater from a subsea flooding unit. Flowlines will be leak tested from the riser base FLETs to confirm the tightness of connections, using an ROV based hydrotesting skid. Post-hydrotest, the pressure in the flowlines is reduced by releasing a small volume of the treated water. A summary of the discharges associated with FCG and hydrotesting are in **Table 3-7**. De-watering of the installed infrastructure will occur post-FPU arrival and will therefore be the subject of a future EP.

Table 3-7: Planned discharges during subsea installation activities (Campaign 1)

Activity	System	Contents	Chemical concentration	Approximate discharge volume	Contingency discharge volume*
FCG	Flowline A	Filtered and treated seawater	600 ppm	31.4 m ³	373 m ³
	Flowline B	Filtered and treated seawater	600 ppm	31.4 m ³	288 m ³
	Flowline C	Filtered and treated seawater	600 ppm	31.4 m ³	272 m ³
Hydrotest	Flowline A	Filtered and treated seawater	600 ppm	20 m ³	N/A
	Flowline B	Filtered and treated seawater	600 ppm	20 m ³	N/A
	Flowline C	Filtered and treated seawater	600 ppm	20 m ³	N/A

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*20% of flowline volume; discharged only if there is no clear indication of pigs' arrival.

3.10.2 Campaign 2

It is intended that activities across SURF campaign 2 will be conducted by an LCV or HCV, as described in **Table 3-5**. These will occur as detailed in the following paragraphs, although not necessarily in this particular order.

Pre- and post-lay surveys are planned to be conducted from vessel and ROV to assess seabed condition pre-installation and confirm infrastructure location post-installation.

Installation of the RBM is intended to be conducted by lifting the structure from the deck of the vessel, lowering to seabed and aligning this with the pre-installed foundation, with ROV assistance. The RBM provides a connection point for the wet-parked export risers, while the production risers will be connected to the infield FLETs.

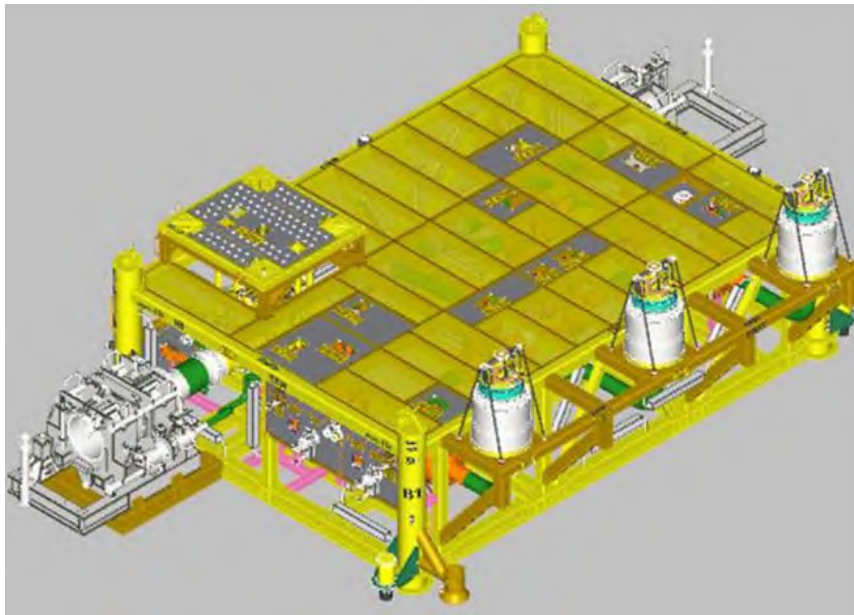


Figure 3-5: RBM diagram

A total of six risers (three export and three production) are planned to be installed. Lengths range between about 2.2 and 2.9 km, and the inner diameter is 14". The risers will have a lazy wave catenary configuration supported by bend stiffener and buoyancy modules. The HCV will lay the risers via the lay system, starting from the FPU end, using a clump weight for initiation. The riser, with ancillaries connected, will be lowered to the seabed, and as the length of the riser is continually laid out, lazy wave buoys will be installed. The subsea end of the riser will be lowered last to the seabed and connected to the appropriate tie-in structure. It is intended that the risers will be installed pre-filled onshore with treated freshwater.

Eight 8" flexible jumpers, 120 m each, are intended to be deployed to depth using the HCV cranes and connected to appropriate infrastructure with ROV support. These will be installed pre-filled onshore with treated freshwater and 60wt% Mono Ethylene Glycol (MEG).

A total of nine umbilicals, both dynamic and static, are planned to be installed. These range between about 108 mm and 212 mm in outer diameter. One dynamic umbilical will be installed similarly to the risers, initiated with an anchor (clump weight or similar) at one end, laid out from there and wet stored on the seabed. It is intended that the subsea end of the dynamic umbilical will be landed onto its pre-installed mud mat, while the topside end will be wet-stored with pick-up rigging to facilitate future connection. Like the risers, the dynamic umbilical includes a bend stiffener to maintain a lazy wave catenary configuration. It is intended that the eight static umbilicals to be connected subsea to initiate, laid away and the second end then connected subsea. The installation vessel's vertical lay

system will be used to install the umbilicals with Umbilical Termination Assemblies (UTAs) and Umbilical Termination Heads (UTHs). Flying leads will be deployed to seabed by the LCV on deployment frames. An ROV will remove the leads from the frames and connect to associated infrastructure. Two SDUs and one subsea distribution assembly (SDA) are also planned to be installed during this campaign.

A 32" rigid spool will connect the RBM to the export trunkline termination (the latter detailed in the Scarborough Seabed Intervention and Trunkline Installation (SI&TI) Environment Plan). The horizontal, s-shaped spool is approximately 51 m x 16 m x 3.6 m, and will be pre-filled onshore with treated and dyed freshwater. The intention is that it will be lifted from the deck of the HCV or transport barge, lowered and deployed to the seabed, and connected to the RBM and export trunkline termination with ROV support.

Installation of the pre-filled risers, jumpers and spool will result in small volumes of preservation fluid being discharged to the environment. This will occur during activities such as cap removal and connector tie-in. Discharges associated with subsea installation activities are expected to be negligible (<1 m³ per connector).

Following installation, various leak tests will be performed on the installed infrastructure. Flexible risers and well jumpers will be leak tested from the relevant FLET or ILT with an ROV based hydrotesting skid, and all subsea tie-ins will be visually inspected during the leak test hold period for leak detection. No MEG will be discharged subsea during leak testing of well jumpers; the volume used to pressurise will be vented to a tank and recovered to surface on completion of the test. The gas export system will also be leak tested using an ROV based hydrotesting skid, by injecting treated freshwater into the gas export system RBM, against closed valves on the PLET and high pressure (HP) caps on flexible risers; all subsea tie-ins will be visually inspected during leak test hold period for leak detection. A summary of the discharges associated with leak testing are in **Table 3-8**. De-watering of the installed infrastructure will occur post-FPU arrival, and will therefore be the subject of a future EP.

Table 3-8: Planned discharges during subsea installation activities (Campaign 2)

Activity	System	Contents	Chemical concentration	Approximate discharge volume	Contingency discharge volume*
Leak test	Production Riser A	Filtered and treated freshwater	600 ppm	5 m ³	N/A
	Production Riser B	Filtered and treated freshwater	600 ppm	5 m ³	N/A
	Production Riser C	Filtered and treated freshwater	600 ppm	5 m ³	N/A
	Gas export system	Filtered and treated freshwater	600 ppm	15 m ³	N/A
	Jumpers	Dyed MEG	60wt%	1 m ³ *	N/A

*Includes MEG flush of hoses prior to connection to subsea asset. MEG will be returned to the MEG reservoir (bladder tank) during depressurisation.

3.10.3 FPU Mooring Pre-Lay

Moorings for the FPU will be installed prior to FPU arrival. Each of the 20 legs will be composed of both wire and chain components and extend approximately 1650 m from the FPU. Legs will be anchored with 23 m high by 8 m diameter suction piles, buried with only the top 1–2 m exposed above seabed. Mooring legs are connected to the suction piles and wet-stored on the seabed with attached recovery assistance, until connection to the FPU, which will be addressed by a future Environment Plan.

Moorings and suction piles will be stored on a HLV nearshore, then transported to the field and installed with an HCV crane and deep-water lowering system by placing suction piles on the seabed and engaging the suction system, via a subsea pump, to bury. Attached mooring legs will then be laid-back on the seabed in a planned configuration within the future FPU mooring footprint and wet stored until FPU arrival and hook-up. Contingency of the HLV or another supply vessel entering the PAA to deliver infrastructure to the HCV may be required.

Pre- and post-lay surveys will be conducted from vessel and ROV to assess seabed condition pre-installation and confirm infrastructure location post-installation.

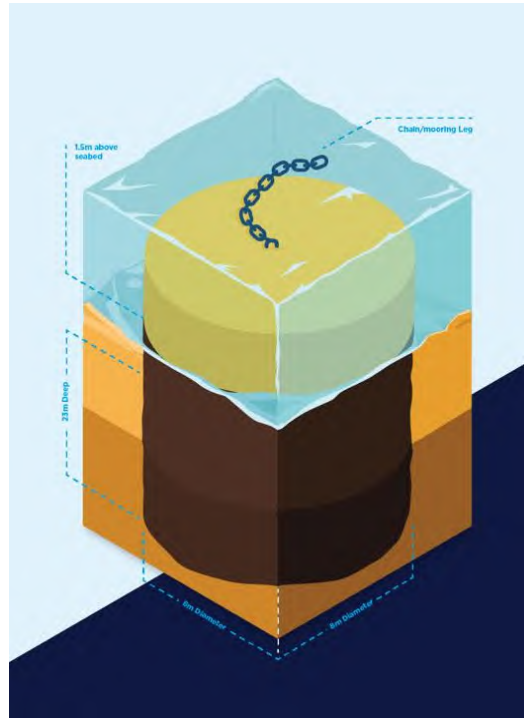


Figure 3-6: Suction pile diagram

3.11 Contingency Activities

3.11.1 Wet buckle of flowline

A wet buckle is an event that could occur during flowline installation and is typically caused by a loss of station keeping of the installation vessel and results in the flowline buckling at the touch down point on the seabed. To recover from this scenario, the damaged section of the flowline is removed, by cutting from the remainder of the flowline and moving out of the flowline route. Sediment relocation may be required to allow installation of the cutting tool. A pipeline recovery tool will then be installed on the cut end of the flowline section. Raw seawater ingress will be displaced by pigging with treated and filtered sea water, pumped using an ROV subsea skid via the associated FLET to preserve the wet-buckled flowline. Upon completion of this activity, the flowline is recovered to the installation vessel, welded to a new section of flowline, and installation activities continued. The treated seawater would be discharged during FCG of the fully installed flowline, and replaced with new treated seawater for ongoing preservation. If the wet buckle occurs early in the process, the whole section may be removed and the process re-started, if appropriate.

3.11.2 Additional well jumper

Base case is to install eight 8" 120 m flexible jumpers, although a ninth jumper, 900 m long, may be installed if an additional well is drilled.

3.11.3 Rigid spool installation

If, for any reason, the rigid spool becomes un-installable by the HCV or transport barge, an alternative option will be to use a HLV to perform the transportation and installation of the spool.

3.11.4 Span rectification

Flowlines have been engineered to reduce the requirement for span rectification and it is not anticipated to be required, although this will be confirmed post-installation. The span rectification process would involve placing grout bags under the span section; the empty bag moved into position using ROV, then filled with grout supplied from a mixing and pumping spread on the vessel via a downline. Small, prefilled bags can be installed using ROV or lowered to the seabed using a vessel crane. Following installation activities, concrete lines and equipment may be flushed clean, with wash-water discharged overboard. Typical grout volumes depend on the size of the span and may vary in weight from about 200–2000 kg per span.

3.12 Non-production phase and IMMR

Following installation of infrastructure, items will remain installed or wet-stored in a preserved state on the seabed, prior to commissioning, start-up and operations. Flowlines will be filled with treated seawater for preservation, until gas is introduced to the system. During this non-production phase, Inspection, Monitoring, Maintenance and Repair (IMMR) activities may be carried out as required any time throughout the life of this EP, post-infrastructure installation. This may include cleaning of marine growth (e.g. ROV water jet), sediment relocation, ROV inspections, infrastructure repair.

4 DESCRIPTION OF THE EXISTING ENVIRONMENT

4.1 Overview

In accordance with regulations 13(2) and 13(3) of the Environment Regulations, this section describes the existing environment that may be affected by the activity (planned and unplanned, as described in **Section 3**), including details of the particular relevant values and sensitivities of the environment, which were used for the risk assessment.

The Environment that May Be Affected (EMBA) is the largest spatial extent where unplanned events could have an environmental consequence on the surrounding environment. For this EP, the EMBA is the potential spatial extent of surface and in-water hydrocarbons at concentrations above ecological impact thresholds, in the event of the worst-case credible spill. The ecological impact thresholds used to delineate the EMBA are defined in **Section 6.8.1.3**. The worst-case credible spill scenario for this EP is the highly unlikely event of a loss of marine diesel during a vessel collision.

Woodside recognises that hydrocarbons may be visible beyond the EMBA at lower concentrations than the ecological impact thresholds defined in **Section 6.8.1.3**. These visible hydrocarbons are not expected to cause ecological impacts. In respect of this, an additional socio-cultural EMBA is defined, as the potential spatial extent within which social-cultural impacts may occur from changes to the visual amenity of the marine environment. Receptors relevant to the socio-cultural EMBA include Commonwealth and State marine protected areas (MPAs), National and Commonwealth Heritage Listed places, areas of tourism and recreation, and commercial and traditional fisheries. For this EP, the socio-cultural EMBA for surface hydrocarbons encompasses an area fully within the boundaries of the EMBA for ecological impacts. The EMBA and socio-economic EMBA are shown in **Figure 4-1** and described in **Table 4-1**.

The EMBA presented does not represent the predicted coverage of any one hydrocarbon spill or a depiction of a slick or plume at any particular point in time. Rather, the areas are a composite of a large number of theoretical paths, integrated over the full duration of the simulations under various metocean conditions.

Table 4-1: Hydrocarbon spill thresholds used to define EMBA for surface and in-water hydrocarbons

Hydrocarbon Type	EMBA ¹	Socio-cultural EMBA ¹	Planning Area for Scientific Monitoring
Surface	10 g/m ² This represents the minimum oil thickness (0.01 mm) at which ecological impacts (e.g. to birds and marine mammals) are expected to occur.	1 g/m ² This represents a wider area where a visible sheen may be present on the surface and, therefore, the concentration at which socio-cultural impacts to the visual amenity of the marine environment may occur. However, it is below concentrations at which ecological impacts are expected to occur.	NA
Dissolved	50 ppb This represents potential toxic effects, particularly sublethal effects to highly sensitive species (NOPSEMA guidance note: A652993, April 2019). As dissolved hydrocarbons are within the water column and not visible, impacts to socio-cultural receptors can be associated with ecological impacts. Therefore, dissolved hydrocarbons at this threshold also represent the level at which socio-cultural impacts may occur.		10 ppb This low exposure value establishes the planning area for scientific monitoring (based on potential for exceedance of water quality triggers) (NOPSEMA guidance note: A652993, April 2019). This area

Hydrocarbon Type	EMBA ¹	Socio-cultural EMBA ¹	Planning Area for Scientific Monitoring
Entrained	100 ppb This represents potential toxic effects, particularly sublethal effects to highly sensitive species (NOPSEMA guidance note: A652993, April 2019). As entrained hydrocarbons are within the water column and not visible, impacts to socio-cultural receptors can be associated with ecological impacts. Therefore, entrained hydrocarbons at this threshold also represent the level at which socio-cultural impacts may occur.		is described further in Appendix D : Figure 5-1. In the event of a spill, DNP will be notified of AMPs which may be contacted by hydrocarbons at this threshold (Table 7-9).
Shoreline	100 g/m ² This represents the threshold that could impact the survival and reproductive capacity of benthic epifaunal invertebrates living in intertidal habitat.	10 g/m ² This represents the volume where hydrocarbons may be visible on the shoreline but is below concentrations at which ecological impacts are expected to occur.	N/A

¹ Further details including the source of the thresholds used to define the EMBA in this table are provided in **Section 6.8.1.3**.

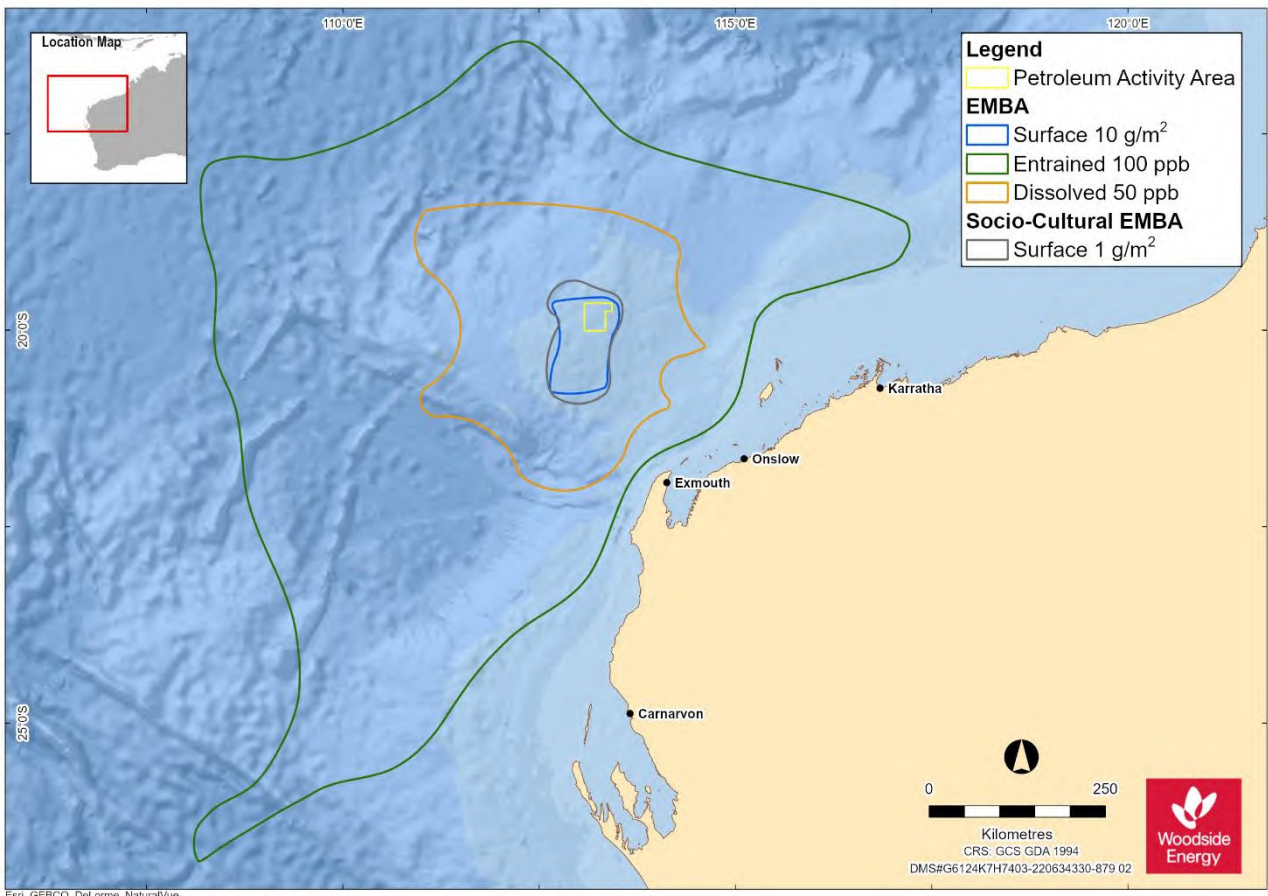


Figure 4-1: Environment that May Be Affected by the Petroleum Activities Program

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4.2 Regional Context

The PAA occurs in Commonwealth waters off the north-west coast of Western Australia (WA), located in the North-west Marine Bioregion (NWMR) (IMCRA 4.0). Within the NWMR, the PAA lies within the Northern Carnarvon Basin on the Exmouth Plateau, about 375 km offshore from the Burrup Peninsula. The PAA overlaps with the Northwest Province and the EMBA partially overlaps with the Central Western Transition, Central Western Province, Northwest Shelf Province, Northwest Transition (**Figure 4-2**). Woodside’s Description of Existing Environment (**Appendix I**) summarises the characteristics for the relevant marine bioregions.

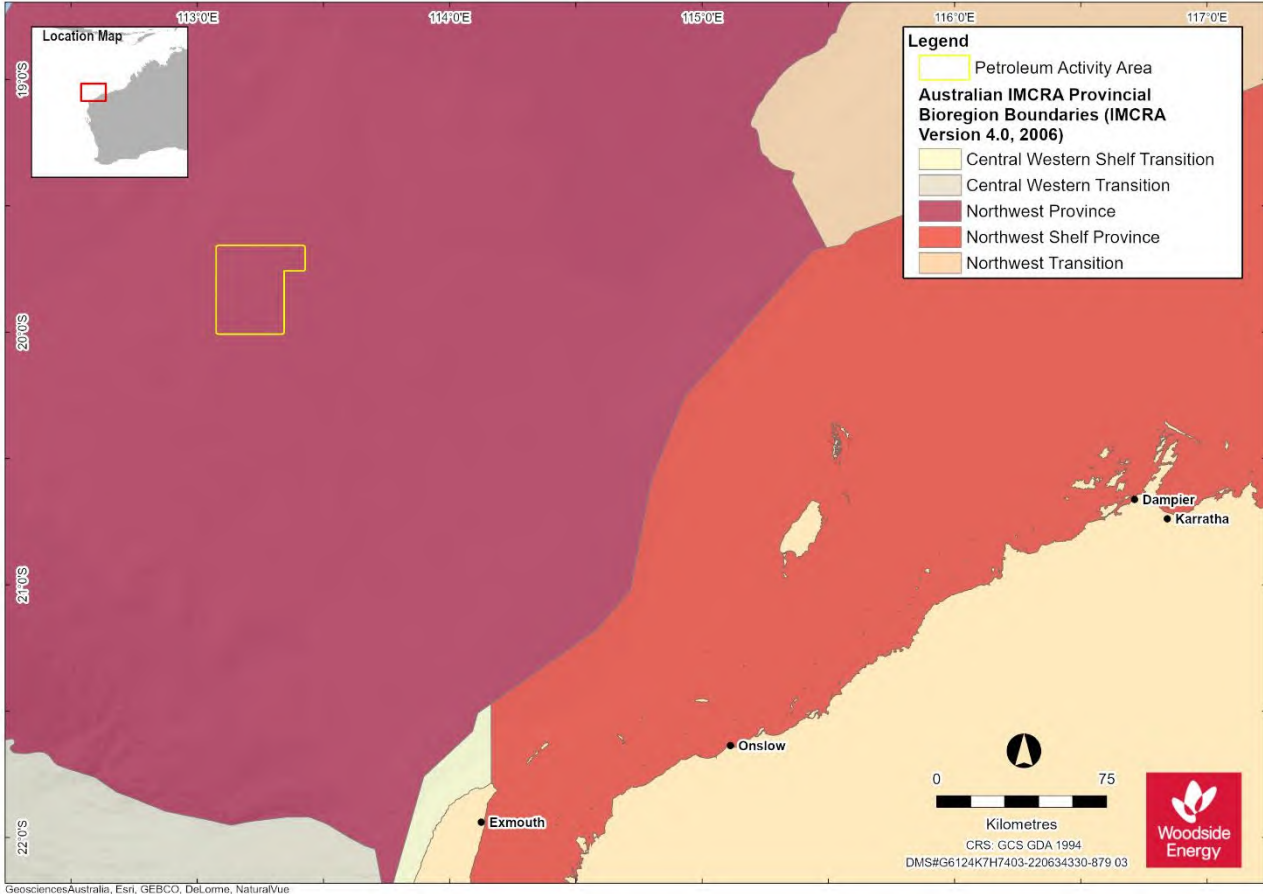


Figure 4-2: Location of the PAA and relevant marine bioregions

4.3 Matters of National Environmental Significance (EPBC Act)

Table 4-2 and **Table 4-3** summarise the matters of national environmental significance (MNES) overlapping the PAA and EMBA, respectively, according to Protected Matters Search Tool (PMST) results (**Appendix C**). It should be noted that the EPBC Act PMST is a general database that conservatively identifies areas in which protected species have the potential to occur.

Additional information on these MNES are provided in subsequent sections of this chapter.

Table 4-2: Summary of MNES identified by the EPBC Act Protected Matters Search Tool (PMST) as potentially occurring within the PAA

MNES	Number	Relevant Section
World Heritage Properties	0	Section 4.9.1
National Heritage Places	0	Section 4.9.1
Wetlands of International Importance (Ramsar)	0	Section 4.9.1

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MNES	Number	Relevant Section
Commonwealth Marine Area	1	Section 4.2
Listed Threatened Ecological Communities	0	Section 4.5
Listed Threatened Species	15	Section 4.6
Listed Migratory Species	26	Section 4.6

Table 4-3: Summary of MNES identified by the EPBC Act PMST as potentially occurring within the EMBA

MNES	Number	Relevant Section
World Heritage Properties	0	Section 4.9.1
National Heritage Places	0	Section 4.9.1
Wetlands of International Importance (Ramsar)	0	Section 4.9.1
Commonwealth Marine Area	2	Section 4.2
Listed Threatened Ecological Communities	0	Section 4.5
Listed Threatened Species	36	Section 4.6
Listed Migratory Species	54	Section 4.6

4.4 Physical Environment

Water depths of the PAA range from approximately 900 m to 1000 m. The shallowest waters are approximately in the centre of the PAA, with a gradual increase in depth to the north/north-west and also to the south/south-east (**Figure 4-3**). To the centre and west of the PAA, craters (up to 400 m across and 10 m deep) and similar pockmarks (metres to tens of metres across) have been identified through geophysical surveys (Fugro, 2010). The seafloor exhibits gradients less than 1° but extends to about 15° on the edge of craters (Fugro, 2010). These crater and pockmark formations may be associated with hydrocarbon seeps and associated authigenic carbonate formations (Fugro, 2010).

Marine sediment quality surveys within the Scarborough (WA-61-L³) title were undertaken during the 2012/2013 wet and dry seasons (ERM, 2013). The ERM marine investigation included sampling at a number of sampling sites, to:

- provide a broad characterisation of the habitats within WA-61-L
- achieve spatial coverage across WA-61-L
- provide a representative selection of the various topographic features and corresponding benthic habitats (i.e. crater/pockmark versus non-crater areas).

Key results included:

- All the sediment samples collected were predominantly (≥97% w/w) composed of clay and silt; and only small amounts (1–3% w/w) of sand and shell were detected.
- Generally, low concentrations of metals and nutrients were detected. With the exception of nickel, metal concentrations were below the sediment default guideline values (DGVs) (Simpson, 2013) for analytes with defined DGVs (arsenic, cadmium, chromium, copper, mercury, nickel, lead and zinc). Nickel concentrations were below the high guideline value (GV).
- No hydrocarbons were detected.

³ Note that the WA-1-R title expired on 1/11/2020, and was replaced by WA-61-L.

Although crater and pockmark formations have been identified in the EMBA, which have been associated with hydrocarbon seeps and authigenic carbonate formations (Fugro, 2010), the absence of hydrocarbons in sediment samples indicates the lack of recent hydrocarbon seep activity in the locations sampled (ERM, 2013).

Water quality in the PAA is typical of a tropical offshore environment. Much of the surface water in this area is nutrient poor, transported from the Indonesian Throughflow (ITF) and has low primary productivity.

The marine water quality of the offshore environment of the Exmouth Plateau was measured by collecting triplicate water samples at three stations per 15 sampling sites (across two seasons) (ERM, 2013). Water profiling and water quality sampling was undertaken in the 2012/2013 wet and dry seasons. The main findings include:

- The deeper waters had significantly lower dissolved oxygen concentrations (about 23%) compared to the oxygen-saturated ($\geq 100\%$) surface waters.
- Generally low concentrations of metals, nutrients and chlorophyll-a were detected. With the exception of cobalt, copper and zinc, mean metal concentrations throughout WA-61-L during both the wet and dry season studies were below the ANZECC guidelines trigger value for 95% species protection (ANZECC and ARMCANZ 2000).
- Total suspended solid mean concentrations were higher during the wet season (22,450 $\mu\text{g/L}$) than the dry season study (4000 $\mu\text{g/L}$) and showed variability across sites and throughout the water column.
- No hydrocarbons were detected.

Results from the studies indicated that the water quality within the WA-61-L title is generally typical of the NWMR's tropical deep-water environment (ERM, 2013).

Appendix I provides a summary of the physical characteristics of the environment within the EMBA.

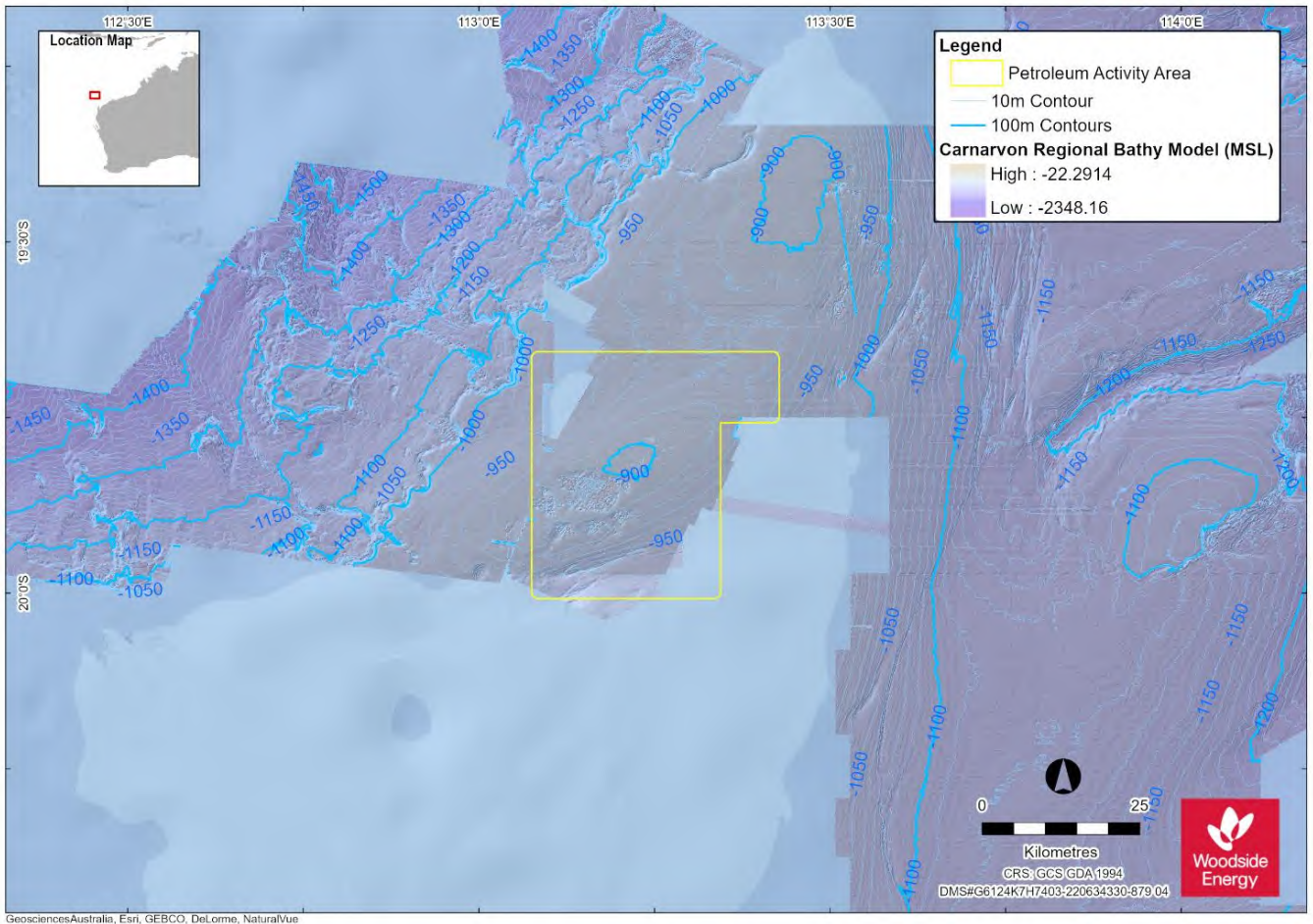


Figure 4-3: Bathymetry of the PAA

4.5 Habitats and Biological Communities

The seafloor in the PAA is characterised by sparse marine life dominated by motile organisms (ERM, 2013). This soft bottom habitat also supports patchy distributions of mobile epibenthos, such as sea cucumbers, ophiuroids, echinoderms, polychaetes and sea-pens (DEWHA, 2008a). Bivalve shell debris and bacterial mats (both with low percent cover) were the only identified features that may be indicative of historic hydrocarbon seep activity. A benthic infauna analysis reported by ERM in 2013 provided no evidence of the presence of unique hydrocarbon seep chemosynthetic benthic communities, which are typically characterised by species from the family Dorvilleidae (ERM, 2013; Thornhill et al., 2012).

Seabed habitat is characterised by sparse marine life dominated by mobile benthic biota (ERM, 2013). The benthic biota are predominantly deposit feeders such as epifauna (living on the seabed): shrimp (crustaceans) and sea cucumbers (echinoderms), and infauna (living within the surface sediments) small, burrowing worms (polychaetes) and crustaceans (ERM, 2013). Bioturbation traces (seabed surface sediment animals trails, mounds and burrows) are characteristic of such deepwater benthic habitats and were recorded during baseline survey work (ERM, 2013) and are thought to be common within the PAA and EMBA. The seabed bioturbation indicates the presence of benthic biota (epifauna and infauna) including echinoderms, crustaceans and echiurans (spoon worms) and annelids (polychaetes) (ERM, 2013).

Sampling within the Permit Area returned low phytoplankton densities (ERM, 2013). Seasonal variation was observed in the samples with total recorded taxa, species richness and species diversity (Shannon-Weiner) being significantly greater in the dry season than in the wet season

(ERM, 2013). Dinoflagellates were the most abundant group within wet season study, and diatoms were generally the most abundant group in dry season study (ERM, 2013).

Similarly, greater species abundance and diversity was recorded in zooplankton samples during the dry season compared to the wet season (ERM, 2013). Copepods were the most dominant taxonomic group during both studies in terms of abundance and concentrations, with other zooplankton including ostracods, molluscs (pteropods), euphausiids (krill) and larvaceans also being identified in relatively abundant amounts (ERM, 2013).

Concentrations of fish larvae were similar in both wet and dry season samples. For both seasons ichthyoplankton communities largely comprised the larvae of meso-pelagic fishes (Myctophidae [lantern fishes] and Gonostomatidae [bristlemouths]) (ERM, 2013).

It is noted that these survey findings do not reflect the productivity trends reported in scientific literature for the region (DEWHA, 2008a; Brewer et al., 2007), whereby productivity is typically greater during the wet season when the weakening of surface currents allows for increased upwelling. However, the findings do indicate that productivity remains low across the seasons and that while seasonal variations in plankton species composition potentially occurs, overall variations in abundance are likely to be minor (ERM, 2013).

Key habitats and ecological communities within the EMBA are identified in **Table 4-4** and described in **Appendix I**.

Table 4-4: Habitats and communities within the EMBA

Habitat/community	Key locations within the EMBA
Marine primary producers	
Coral	Key locations for coral/habitat communities within the EMBA are at Rankin Bank ⁴ , approximately 233 km east of the PAA. Refer to Appendix H: Section 4 for a description of coral communities in the NWMR.
Seagrass beds and macroalgae	There are no recognised key locations for seagrass beds and macroalgae habitat/communities within the EMBA.
Mangroves	Shoreline accumulation of hydrocarbons is not expected above ecological thresholds and therefore no mangrove systems occur within the EMBA.
Sandy beaches	Shoreline accumulation of hydrocarbons is not expected above ecological thresholds and therefore no sandy beaches occur within the EMBA.
Salt marshes	Shoreline accumulation of hydrocarbons is not expected above ecological thresholds and therefore no sandy beaches occur within the EMBA.
Other communities and habitats	
Plankton	Plankton within the EMBA is expected to reflect the conditions of the NWMR. Primary productivity of the NWMR appears to be largely driven by offshore influences, with periodic upwelling events and cyclonic influences driving coastal productivity with nutrient recycling and advection. Refer to Appendix H: Section 4.3 for a description of planktonic communities in the NWMR.
Pelagic and demersal fish populations	In the EMBA, fish diversity and abundance is typically correlated with habitat distribution, with complex habitats, such as coral and rocky reefs, hosting more diverse and abundant assemblages. Notable habitats hosting diverse fish assemblages include the Continental slope demersal fish communities KEF. Refer to Appendix H: Section 5.5 for a description of pelagic and demersal fish populations in the NWMR.

⁴ While the spatial extent of the EMBA extends to Rankin Bank based on the modelling outputs there is no contact to Rankin Bank, at depth.

Habitat/community	Key locations within the EMBA
Epifauna and infauna	The EMBA contains deep water habitats dominated by soft, fine grain sediments and sparse benthic biota. The benthic communities are characterised by benthic filter feeders and other epifauna, and infaunal bioturbators. Refer to Appendix H : Section 5.5 for a description of epifauna and infauna in the NWMR.

4.6 Protected Species

A total of 64 EPBC Act listed species considered to be MNES were identified as potentially occurring within the EMBA, of which a subset of 29 species were identified as potentially occurring within the PAA. The full list of marine species identified from the PMST reports is provided in **Appendix C**, including several MNES that are not considered to be credibly impacted (e.g. terrestrial species within the EMBA). Two conservation dependent species have also been identified with a potential to occur within the PAA and / or EMBA, and one within the EMBA. One of those species, southern bluefin tuna, has a spawning area within the South of Java Island Ecologically or Biologically Significant Marine Areas (EBSA) directly to the north of the PAA (**Figure 4-4**).

Species identified as potentially occurring within the PAA and EMBA and Biologically Important Areas (BIAs) or Habitat Critical to their Survival (Habitat Critical) that overlap the PAA and EMBA are listed in **Table 4-5** to **Table 4-13**, and a description of species is included in **Appendix I**. **Figure 4-5** to **Figure 4-11** show the spatial overlap with relevant BIAs and Habitat Critical areas and the PAA.

4.6.1 Fish, Sharks and Rays

Table 4-5: Threatened and Migratory fish, shark and ray species predicted to occur within the PAA and EMBA

Species name	Common name	Threatened status	Migratory status	Potential for interaction	
				PAA	EMBA
<i>Carcharodon carcharias</i>	White shark	Vulnerable	Migratory	Species or species habitat may occur within area	Species or species habitat known to occur within area
<i>Carcharhinus longimanus</i>	Oceanic whitetip shark	Vulnerable	Migratory	Species or species habitat may occur within area	Species or species habitat likely to occur within area
<i>Thunnus maccoyii</i>	Southern bluefin tuna	Conservation Dependent	N/A	Breeding known to occur within area	Breeding known to occur within area
<i>Sphyrna lewini</i>	Scalloped hammerhead shark	Conservation Dependent	N/A	Species or species habitat may occur within area	Species or species habitat known to occur within area
<i>Isurus oxyrinchus</i>	Shortfin mako	N/A	Migratory	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
<i>Isurus paucus</i>	Longfin mako shark	N/A	Migratory	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
<i>Mobula birostris</i>	Giant manta ray	N/A	Migratory	Species or species habitat may occur within area	Species or species habitat known to occur within area
<i>Pristis clavata</i>	Dwarf sawfish	Vulnerable	Migratory	N/A	Species or species habitat known to occur within area
<i>Pristis</i>	Freshwater sawfish	Vulnerable	Migratory	N/A	Species or species habitat likely to occur within area

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Species name	Common name	Threatened status	Migratory status	Potential for interaction	
				PAA	EMBA
<i>Pristis zijsron</i>	Green sawfish	Vulnerable	Migratory	N/A	Species or species habitat known to occur within area
<i>Rhincodon typus</i>	Whale shark	Vulnerable	Migratory	N/A	Foraging, feeding or related behaviour known to occur within area
<i>Carcharias taurus</i> (west coast population)	Grey nurse shark	Vulnerable	N/A	N/A	Species or species habitat known to occur within area
<i>Centrophorus zeehaani</i>	Southern dogfish	Conservation Dependent	N/A	N/A	Species or species habitat likely to occur within area
<i>Anoxypristis cuspidata</i>	Narrow sawfish	N/A	Migratory	N/A	Species or species habitat known to occur within area
<i>Lamna nasus</i>	Porbeagle	N/A	Migratory	N/A	Species or species habitat may occur within area
<i>Mobula alfredi</i> as <i>Manta alfredi</i>	Reef manta ray	N/A	Migratory	N/A	Species or species habitat known to occur within area

Table 4-6: Fish, shark and ray BIAs within the EMBA

Species	BIA type	Approx. distance (km) and direction from PAA
Whale shark	Foraging (Northward from Ningaloo along 200 m isobath)	165 km east

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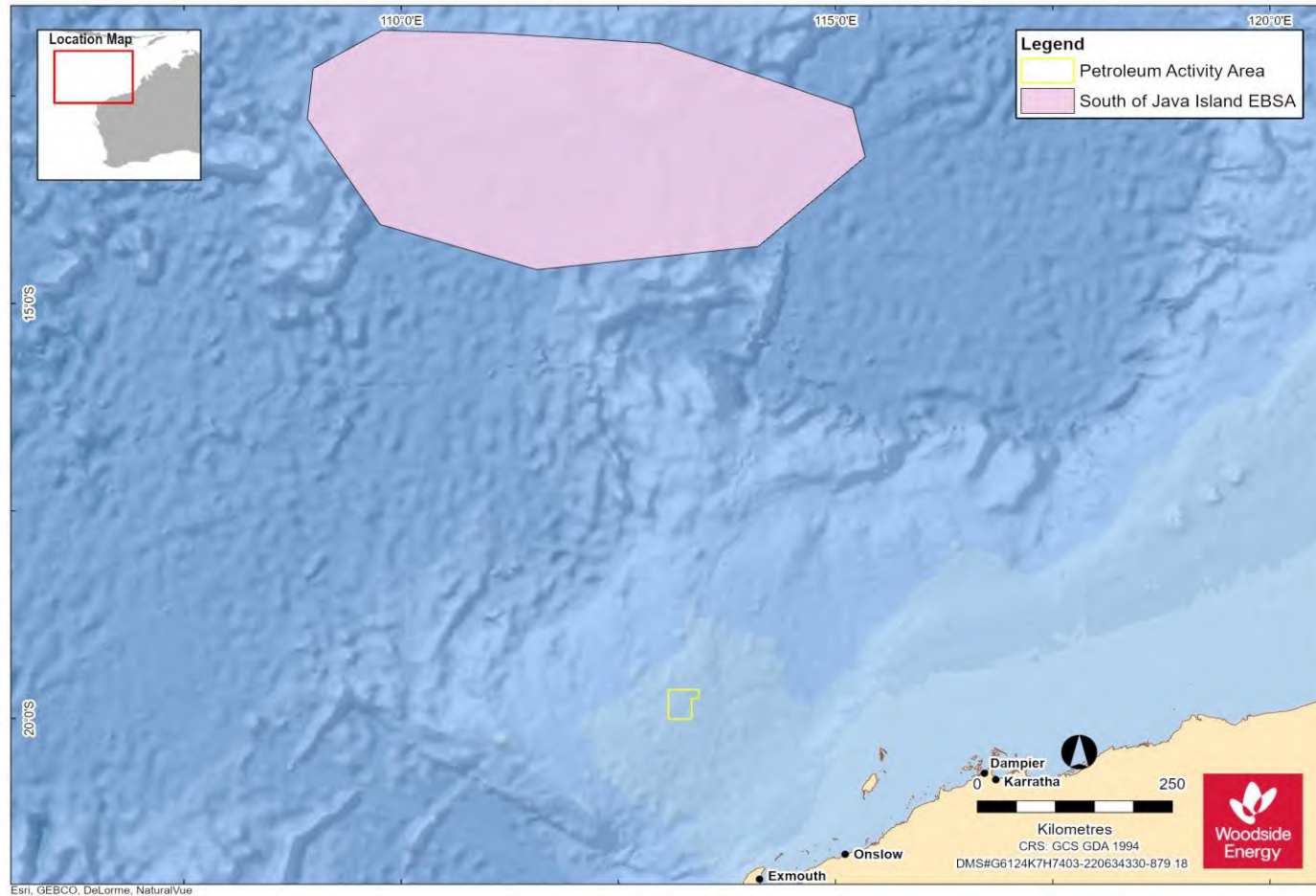


Figure 4-4: Southern bluefin tuna spawning area – South of Java Island EBSA¹

¹ EBSA – Ecologically or Biologically Significant Marine Areas <https://www.cbd.int/ebsa/>

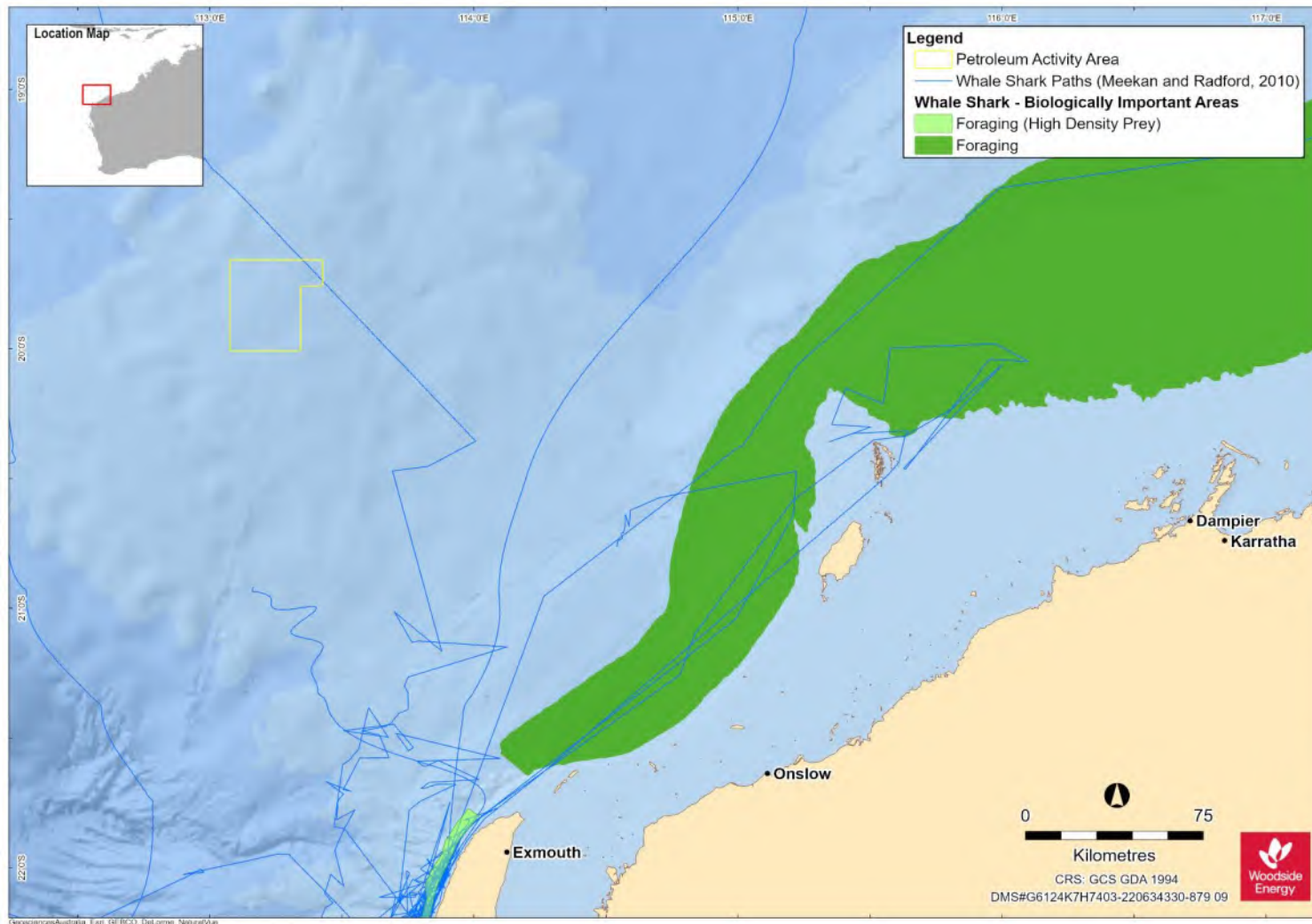


Figure 4-5: Whale shark BIAs and satellite tracks (Meehan and Radford, 2010)

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4.6.2 Marine Reptiles

Table 4-7: Threatened and Migratory marine reptile species predicted to occur within the PAA and EMBA

Species name	Common name	Threatened status	Migratory status	Potential for interaction	
				PAA	EMBA
<i>Caretta</i>	Loggerhead turtle	Endangered	Migratory	Species or species habitat likely to occur within area	Congregation or aggregation known to occur within area
<i>Dermochelys coriacea</i>	Leatherback turtle	Endangered	Migratory	Species or species habitat likely to occur within area	Species or species habitat known to occur within area
<i>Chelonia mydas</i>	Green turtle	Vulnerable	Migratory	Species or species habitat likely to occur within area	Congregation or aggregation known to occur within area
<i>Eretmochelys imbricata</i>	Hawksbill turtle	Vulnerable	Migratory	Species or species habitat likely to occur within area	Congregation or aggregation known to occur within area
<i>Natator depressus</i>	Flatback turtle	Vulnerable	Migratory	Species or species habitat likely to occur within area	Congregation or aggregation known to occur within area
<i>Aipysurus foliosquama</i>	Leaf-scaled seasnake	Critically Endangered	N/A	N/A	Species or species habitat known to occur within area
<i>Aipysurus apraefrontalis</i>	Short-nosed seasnake	Critically Endangered	N/A	N/A	Species or species habitat known to occur within area

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Table 4-8: Marine turtle BIAs within or adjacent to the EMBA

Species	BIA type	Approx. distance (km) and direction from PAA
Flatback turtle	Internesting buffer (Montebello Island – Hermite Island, NW Island, Trimouille Island)	165 km east
	Internesting buffer (Thevenard Island – South coast)	167 km south-east
Green turtle	Internesting buffer (Montebello Islands)	207 km east
	Internesting buffer (Montebello Island – Hermite Island, NW Island, Trimouille Island)	211 km east
	Internesting buffer (Middle Is. West Coast Barrow Island West Coast and North Coast)	202 km south-east
	Internesting buffer (North and South Muiron Islands)	187 km south-east
Loggerhead turtle*	Internesting buffer (Montebello Islands)	212 km east
Hawksbill turtle*	Internesting buffer (Montebello Island – Hermite Island, NW Island, Trimouille Island)	211 km east
	Internesting buffer (Barrow Island)	202 km south-east

*Loggerhead and Hawksbill BIA are adjacent to the EMBA only

Table 4-9: Marine turtle Habitat Critical within or adjacent to the EMBA

Species	Overlaps with EMBA	Genetic Stock	Nesting locations	Approx. distance of area from PAA	Internesting buffer	Nesting period	Hatching period
Flatback turtle	✓	Pilbara	Barrow Island, Montebello Islands, coastal islands from Cape Preston to Locker Island	198 km east	60 km	Oct – Mar (peak: Nov-Jan)	Feb- Mar
Hawksbill turtle	✗	Western Australia	Cape Preston to mouth of Exmouth Gulf including Montebello Islands and Lowendal Islands	215 km east	20 km	All year (peak: Oct – Jan)	All year (peak: Dec – Feb)
Green turtle	✗	North West Shelf	Barrow Island, Montebello Islands, Serrier Island and Thevenard Island	215 km east	20 km	Nov – Mar (peak: Dec-Feb)	Jan - May (peak: Feb – Mar)

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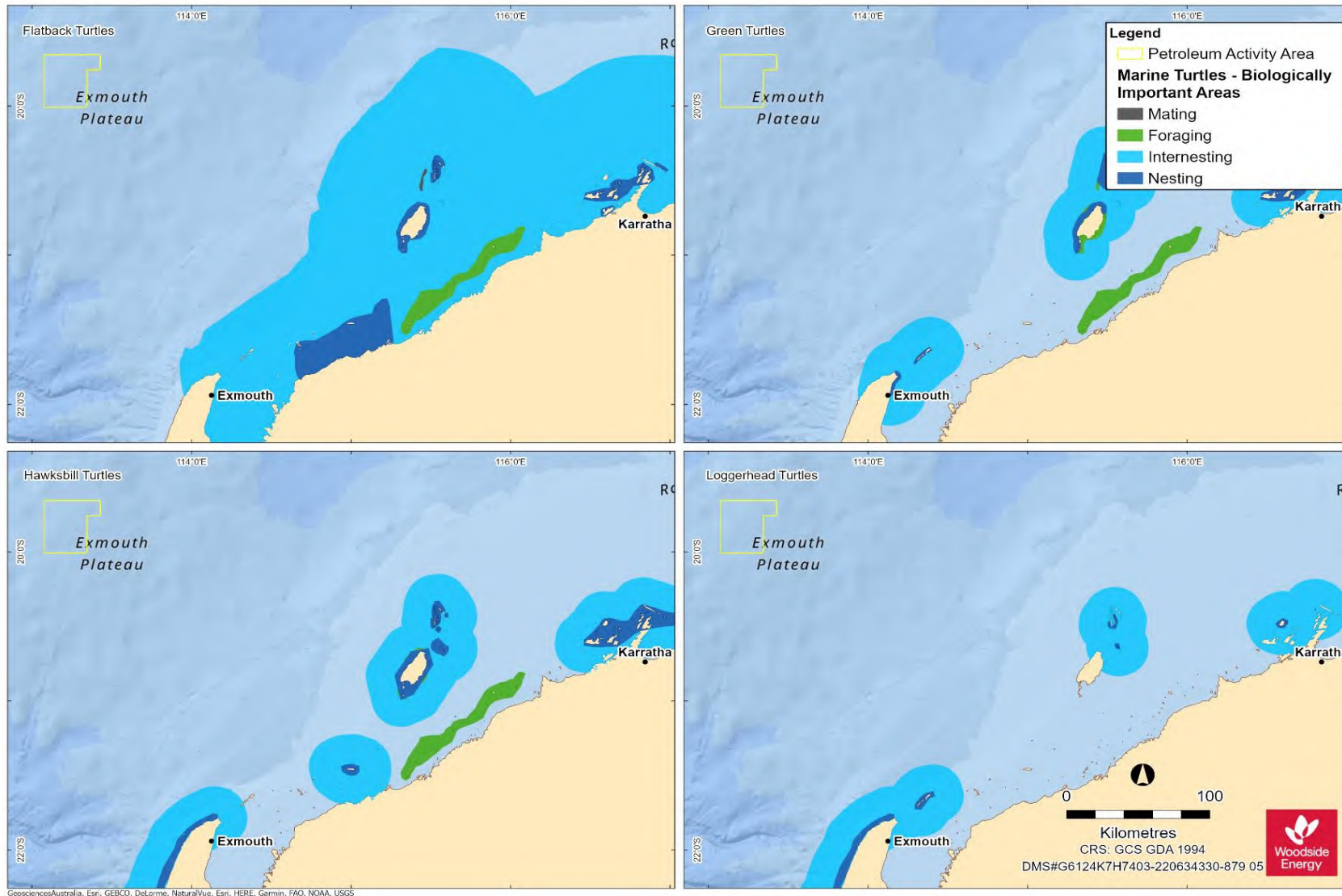


Figure 4-6: Marine turtle BIAs

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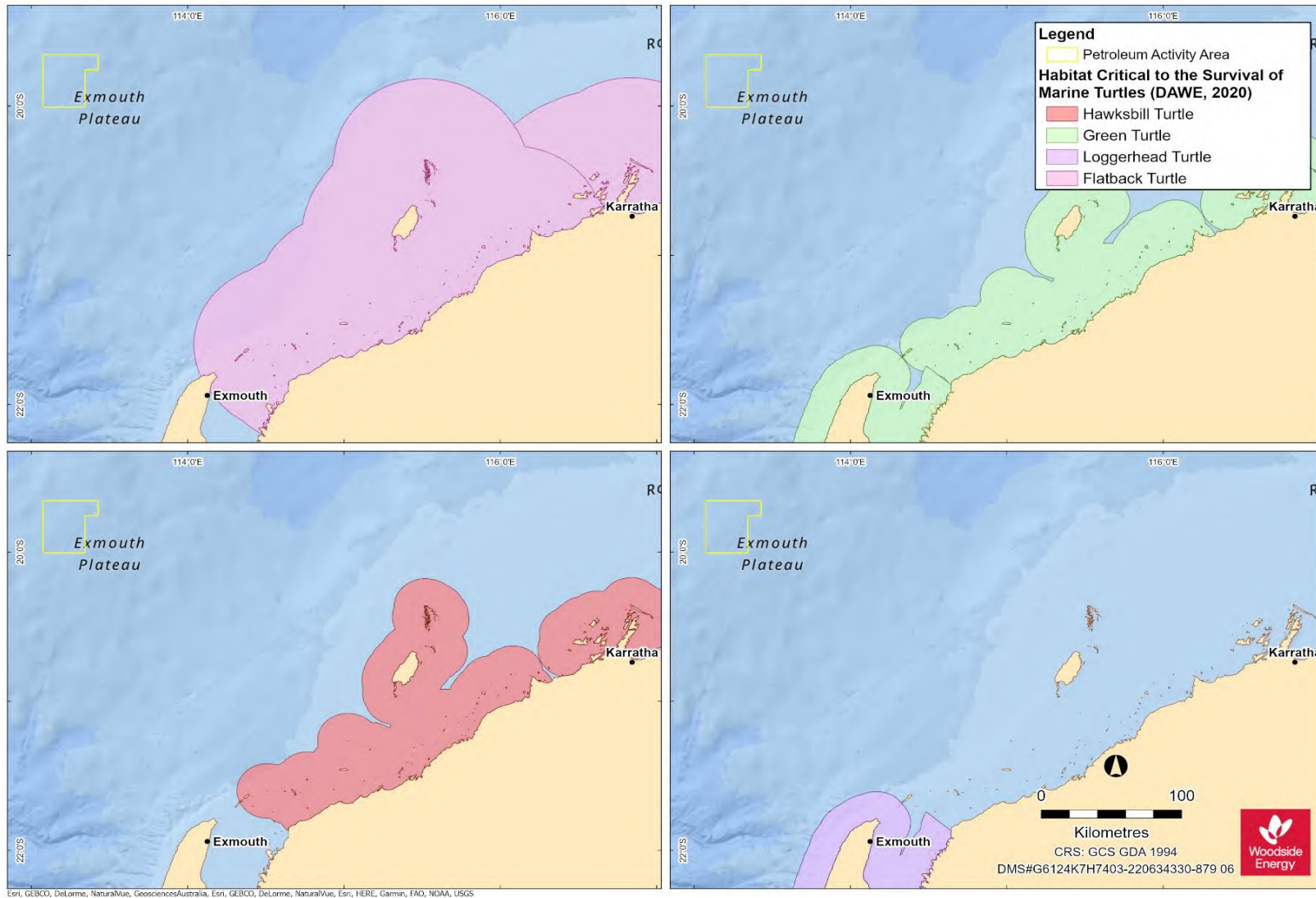


Figure 4-7: Habitat critical to the survival of marine turtles

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4.6.3 Marine Mammals

Table 4-10: Threatened and Migratory marine mammal species predicted to occur within the PAA and EMBA

Species name	Common name	Threatened status	Migratory status	Potential for interaction	
				PAA	EMBA
<i>Balaenoptera musculus</i>	Blue whale	Endangered	Migratory	Species or species habitat likely to occur within area	Migration route known to occur within area
<i>Balaenoptera borealis</i>	Sei whale	Vulnerable	Migratory	Species or species habitat likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
<i>Balaenoptera physalus</i>	Fin whale	Vulnerable	Migratory	Species or species habitat likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
<i>Megaptera novaeangliae</i>	Humpback whale	N/A	Migratory	Species or species habitat may occur within area	Breeding known to occur within area
<i>Balaenoptera edeni</i>	Bryde's whale	N/A	Migratory	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
<i>Physeter macrocephalus</i>	Sperm whale	N/A	Migratory	Species or species habitat may occur within area	Species or species habitat may occur within area
<i>Balaenoptera bonaerensis</i>	Antarctic minke whale	N/A	Migratory	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
<i>Orcinus orca</i>	Killer whale, orca	N/A	Migratory	Species or species habitat may occur within area	Species or species habitat may occur within area
<i>Eubalaena australis</i>	Southern right whale	Endangered	Migratory	N/A	Species or species habitat likely to occur within area
<i>Dugong dugon</i>	Dugong	N/A	Migratory	N/A	Species or species habitat known to occur within area
<i>Orcaella heinsohni</i>	Australian Snubfin Dolphin	N/A	Migratory	N/A	Species or species habitat may occur within area
<i>Sousa sahalensis</i>	Australian humpback dolphin	N/A	Migratory	N/A	Species or species habitat likely occur within area

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Species name	Common name	Threatened status	Migratory status	Potential for interaction	
				PAA	EMBA
<i>Tursiops aduncus</i>	Spotted bottlenose dolphin (Arafura/Timor Sea populations)	N/A	Migratory	N/A	Species or species habitat known to occur within area

*Note: Dolphins of unconfirmed species (potentially Risso's or spinner dolphins) also present in the area (McCauley, 2011b)

Table 4-11: Marine mammal BIAs within the EMBA

Species	BIA type	Approx. distance (km) and direction from PAA
Blue and pygmy blue whales	Migration (Augusta to Derby)	35 km east
	Foraging (Ningaloo)	184 km south
Humpback whale	Migration (north and south) (Kimberley region to south of Shark Bay)	156 km south-east

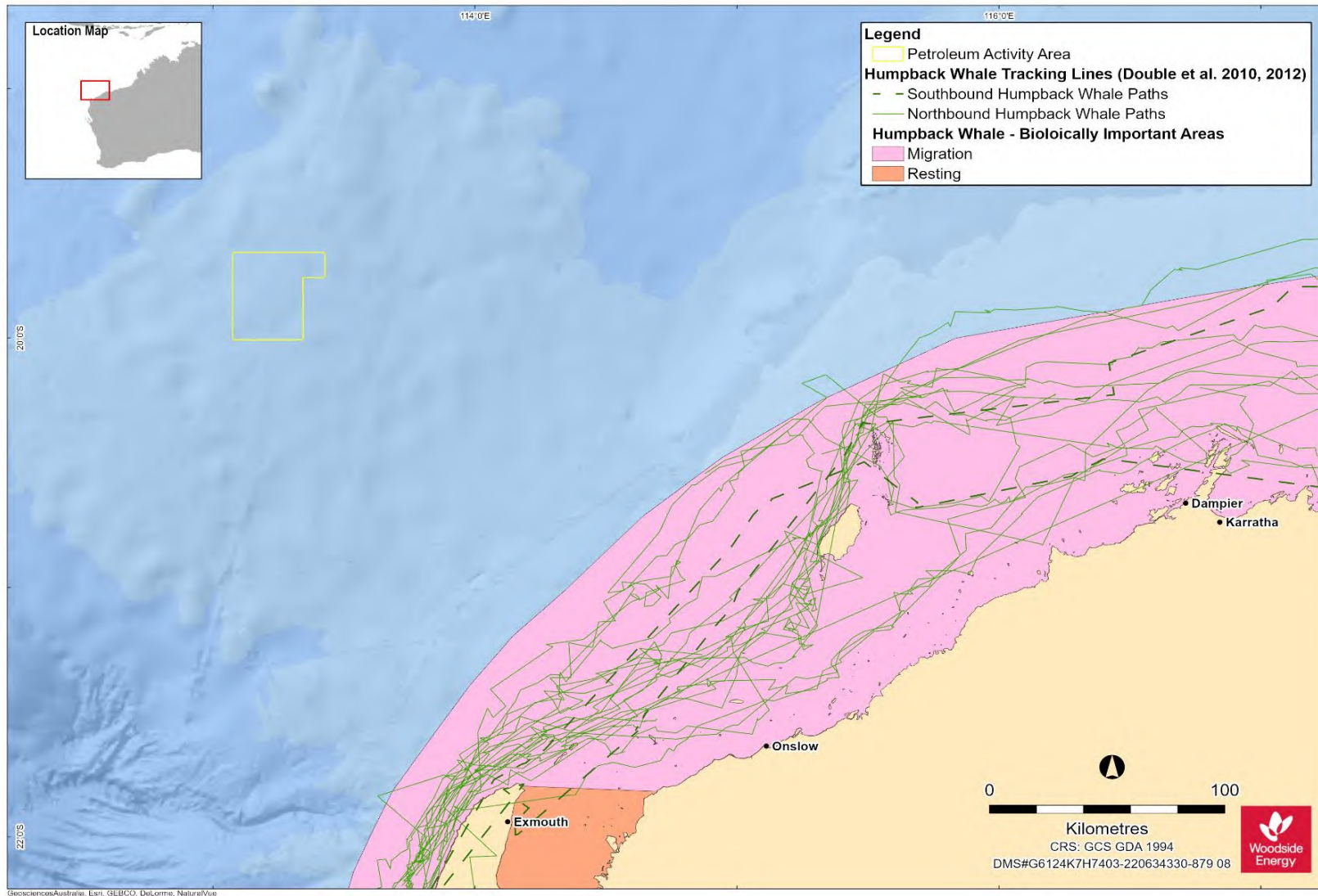


Figure 4-8: Humpback whale BIAs and satellite tracks (Double et al. 2010, 2012)

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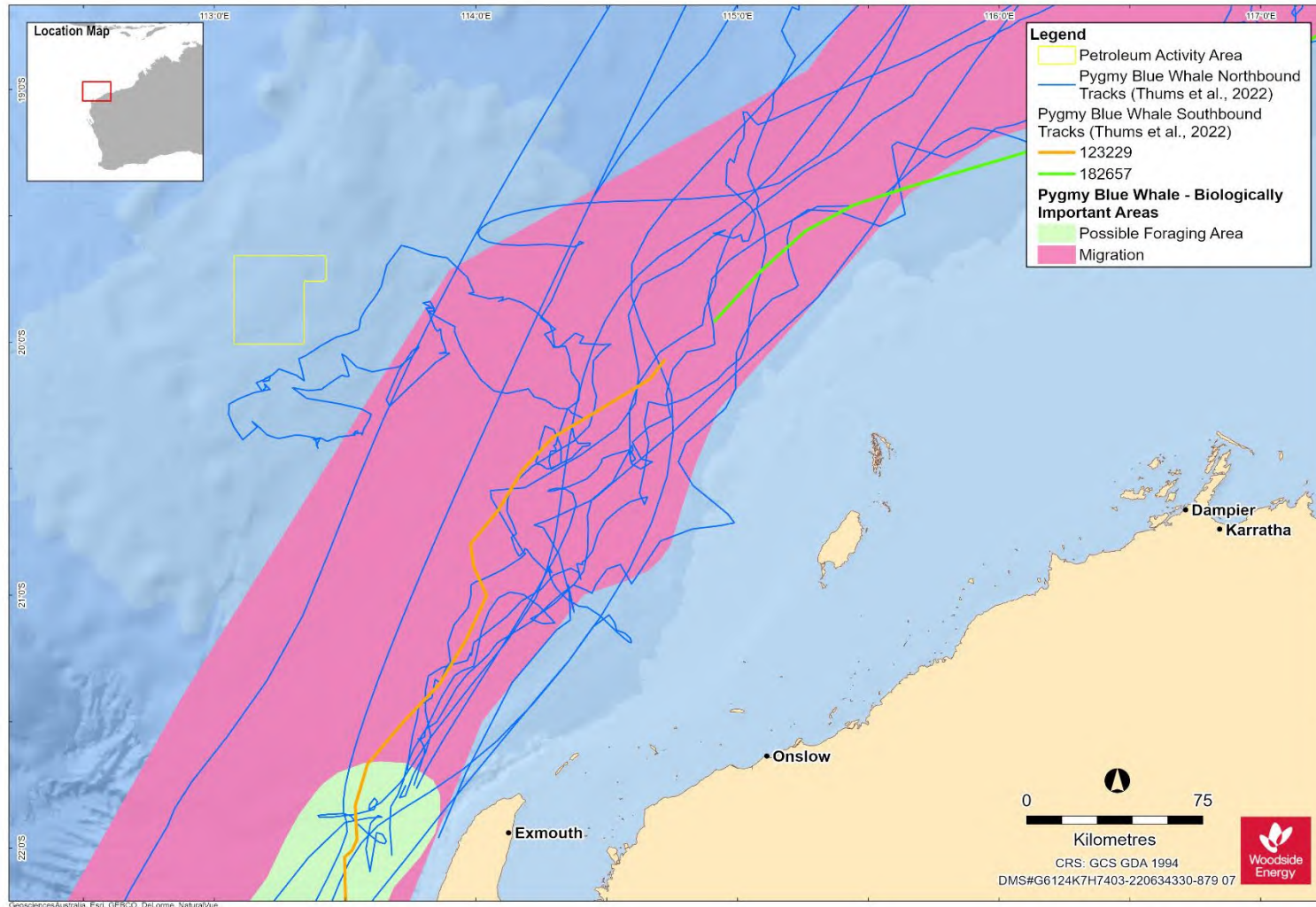


Figure 4-9: Pygmy blue whale BIAs and distribution range

Note: as per the NCVA and Blue Whale Conservation Management Plan (BWCMP), respectively) with reference to the PAA and the 20 tracks of satellite tagged pygmy blue whales recorded in the NWMR, of the 22 tracks presented in Thums et al. (2022)

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4.6.3.1 Pygmy Blue Whales

The blue whale (*Balaenoptera musculus*) is currently listed as Endangered, Migratory and Cetacean under the EPBC Act and Endangered under the WA Biodiversity Conservation Act 2016 (BC Act, September 2018).

The important biological habitats for critical life stages of the pygmy blue whale life cycle are presented in the Blue Whale Conservation Management Plan (CMP) (CoA, 2015a) and the National Conservation Values Atlas (NCVA). The PAA is located ~35 km west of the western edge of the migration BIA (**Figure 4-9**) and overlaps the broader pygmy blue whale distribution BIA (**Figure 4-10**).

The pygmy blue whale distribution range is a spatially defined area where pygmy blue whales are known to occur based on direct observations, satellite tagged whales or based on acoustic detections (Commonwealth of Australia, 2015). Thums et al. (2022) acknowledged that the majority of important migration areas for north-west Australia were encompassed by the pygmy blue whale migration BIA, as shown by 20 tracks for northbound pygmy blue whale, as presented in **Figure 4-9**. Furthermore, the analysis identified areas off from Ningaloo Reef to the Rowley Shoals as important for foraging (and/or breeding/resting) using the overlay of three modelled metrics (occupancy, number of whales and move persistence) by Thums et al. (2022). These include areas within and to the west of the migration BIA. The possibility that some migrating pygmy blue whales could be opportunistically foraging to the west of the migration BIA is supported by the track of one northbound individual tagged off the North West Cape in early June 2020. This tagged whale spent about 486 hours (20 days) in what appeared to be opportunistic foraging movement behaviour (Thums et al. 2022; AIMS, 2022), over an area that included time in the southern area of the Exmouth Plateau and within the migration BIA, refer to **Figure 4-9**. The area the whales have been shown to fan out and migrate beyond the BIA (Thums et al. (2022) is north of the PAA. Two southbound tracked whales also travelled predominantly within the migration BIA (refer to **Figure 4-9**).

Considering the proximity of the pygmy blue whale migration BIA to the PAA (~35 km), as well as the recorded presence of an individual, within the distribution range (~5km from the PAA), it is possible that individuals may transit in and around the PAA during migratory periods. However, only transient individuals or small groups are expected occasionally during the north and south bound migratory seasons (April to July and October to January, respectively) (McCauley, 2011, Gavrillov et al. 2018; Thums et al., 2022).

The Exmouth Plateau KEF (refer to **Section 4.7**) is an area of localised upwelling and may be a source of food for occasional pygmy blue whale foraging. Migrating pygmy blue whales display predominantly relatively fast, directed travel (mean travel rate 2.8 ± 0.8 km hr⁻¹) during the northbound peak period of May and June. This is indicating limited foraging behaviour; however it is interspersed with relatively short periods of slower speeds which may be indicative of opportunistic foraging (Thums et al., 2022). By contrast, acoustic detection (McCauley, 2011) suggests that whales are travelling faster during the southbound migration than during the northbound migration. Thums et al. (2022) also noted the rate of southbound travel was faster than on the northern migration (based on the tracks of two whales). However, short periods of putative foraging were noted for one whale.

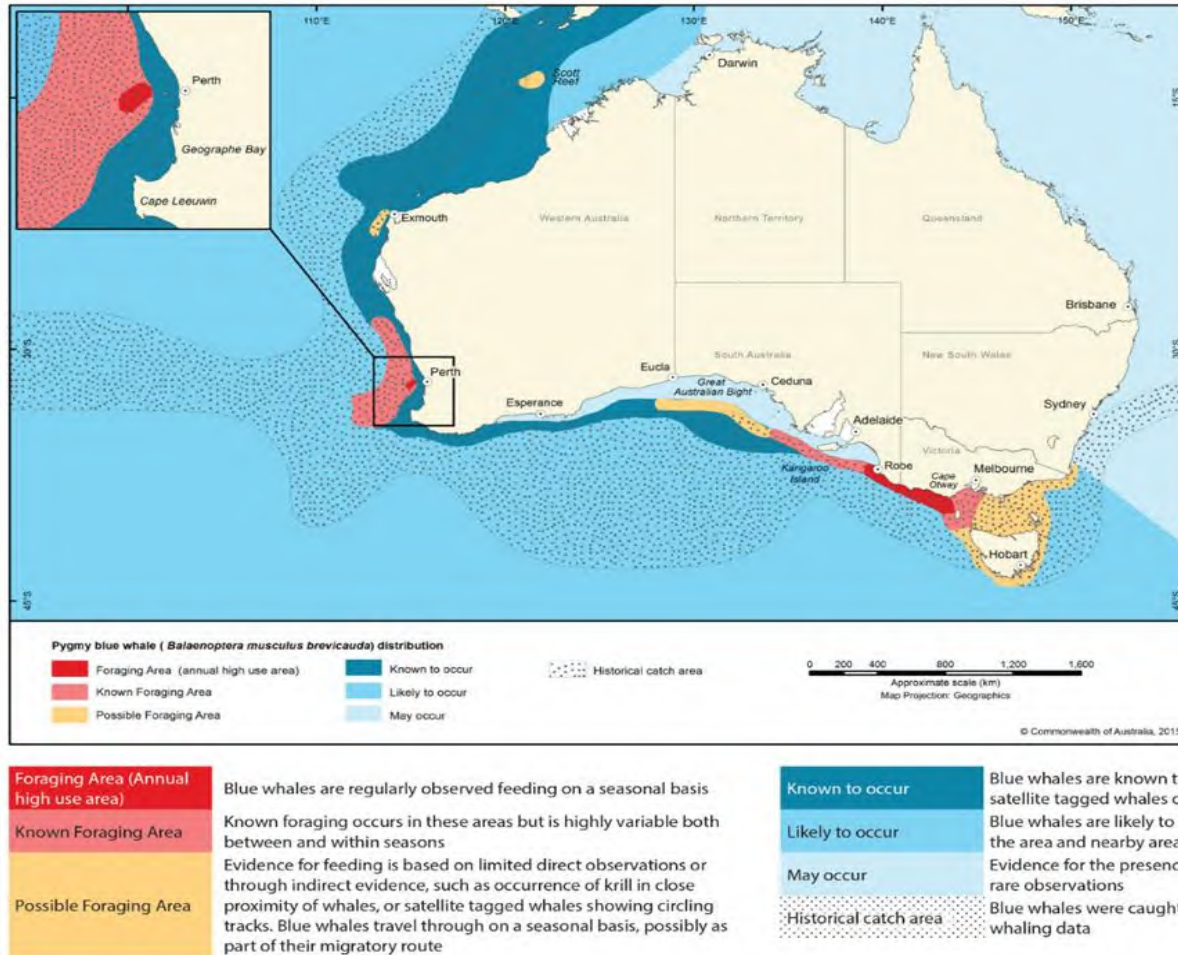


Figure 4-10: Important foraging and areas of occurrence for pygmy blue whales as presented in the Blue Whale Conservation Plan

Source: Commonwealth of Australia, 2015

Note: Known to occur area in the BWCMP is the same as the distribution range presented in the National Conservation Values Atlas.

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4.6.4 Seabirds and Migratory Shorebirds

Table 4-12: Threatened and Migratory seabird and shorebird species predicted to occur within the PAA and EMBA⁵

Species name	Common name	Threatened status	Migratory status	Potential for interaction	
				PAA	EMBA
<i>Macronectes giganteus</i>	Southern giant petrel	Endangered	Migratory	Species or species habitat may occur within area	Species or species habitat may occur within area
<i>Phethon lepturus fulvus</i>	Christmas island white-tailed tropicbird	Endangered	N/A	Species or species habitat may occur within area	Species or species habitat may occur within area
<i>Phaethon lepturus</i>	White-tailed tropicbird	N/A	Migratory	Species or species habitat may occur within area	Species or species habitat known to occur within area
<i>Fregata ariel</i>	Lesser frigatebird	N/A	Migratory	Species or species habitat may occur within area	Species or species habitat likely to occur within area
<i>Anous stolidus</i>	Common noddy	N/A	Migratory	Species or species habitat may occur within area	Species or species habitat may occur within area
<i>Diomedea amsterdamensis</i>	Amsterdam albatross	Endangered	Migratory	N/A	Species or species habitat likely to occur within area
<i>Diomedea exulans</i>	Wandering albatross	Vulnerable	Migratory	N/A	Species or species habitat may occur within area
<i>Macronectes halli</i>	Northern giant petrel	Vulnerable	Migratory	N/A	Species or species habitat may occur within area

⁵ N.B. The wedge-tailed shearwater was not identified in the PMST as potentially occurring within the EMBA; however, given a BIA for wedge-tailed shearwater breeding partially overlaps the EMBA, it is considered possible that the species may be encountered within the EMBA

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Species name	Common name	Threatened status	Migratory status	Potential for interaction	
				PAA	EMBA
<i>Thalassarche cauta</i>	Shy albatross	Endangered	Migratory	N/A	Species or species habitat may occur within area
<i>Thalassarche melanophris</i>	Black-browed albatross	Vulnerable	Migratory	N/A	Species or species habitat may occur within area
<i>Thalassarche steadi</i>	White-capped albatross	Vulnerable	Migratory	N/A	Species or species habitat may occur within area
<i>Thalassarche carteri</i>	Indian yellow-nosed albatross	Vulnerable	Migratory	N/A	Species or species habitat may occur within area
<i>Thalassarche impavida</i>	Campbell albatross	Vulnerable	Migratory	N/A	Species or species habitat may occur within area
<i>Pterodroma mollis</i>	Soft-plumaged petrel	Vulnerable	N/A	N/A	Foraging, feeding or related behaviour likely to occur within area
<i>Papasula abbotti</i>	Abbott's booby	Endangered	N/A	N/A	Species or species habitat may occur within area
<i>Sternula nereis</i>	Australian fairy tern	Vulnerable	N/A	N/A	Breeding known to occur within area
<i>Fregata minor</i>	Great frigatebird	N/A	Migratory	N/A	Species or species habitat may occur within area
<i>Ardenna carneipes</i>	Flesh-footed shearwater	N/A	Migratory	N/A	Foraging, feeding or related behaviour likely to occur within area

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Species name	Common name	Threatened status	Migratory status	Potential for interaction	
				PAA	EMBA
<i>Calonectris leucomelas</i>	Streaked shearwater	N/A	Migratory	N/A	Species or species habitat likely to occur within area
<i>Onychoprion anaethetus</i>	Bridled tern	N/A	Migratory	N/A	Foraging, feeding or related behaviour likely to occur within area
<i>Sterna dougallii</i>	Roseate tern	N/A	Migratory	N/A	Breeding likely to occur within area
<i>Pandion haliaetus</i>	Osprey	N/A	Migratory	N/A	Species or species habitat known to occur within area
Migratory Shorebirds					
<i>Calidris canutus</i>	Red knot, knot	Endangered	Migratory	Species or species habitat may occur within area	Species or species habitat may occur within area
<i>Actitis hypoleucos</i>	Common sandpiper	N/A	Migratory	Species or species habitat may occur within area	Species or species habitat may occur within area
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	N/A	Migratory	Species or species habitat may occur within area	Species or species habitat may occur within area
<i>Calidris melanotos</i>	Pectoral sandpiper	N/A	Migratory	Species or species habitat may occur within area	Species or species habitat may occur within area
<i>Numenius madagascariensis</i>	Eastern curlew	Critically Endangered	Migratory	N/A	Species or species habitat may occur within area
<i>Calidris ferruginea</i>	Curlew sandpiper	Critically Endangered	Migratory	N/A	Species or species habitat may occur within area

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Table 4-13: Seabird BIAs within the EMBA

Species	BIA type	Approx. distance (km) a direction from PAA
Wedge-tailed shearwater	Breeding and foraging (Pilbara coast)	127 km south-east
Roseate tern	Breeding and foraging (Ningaloo)	245 km south

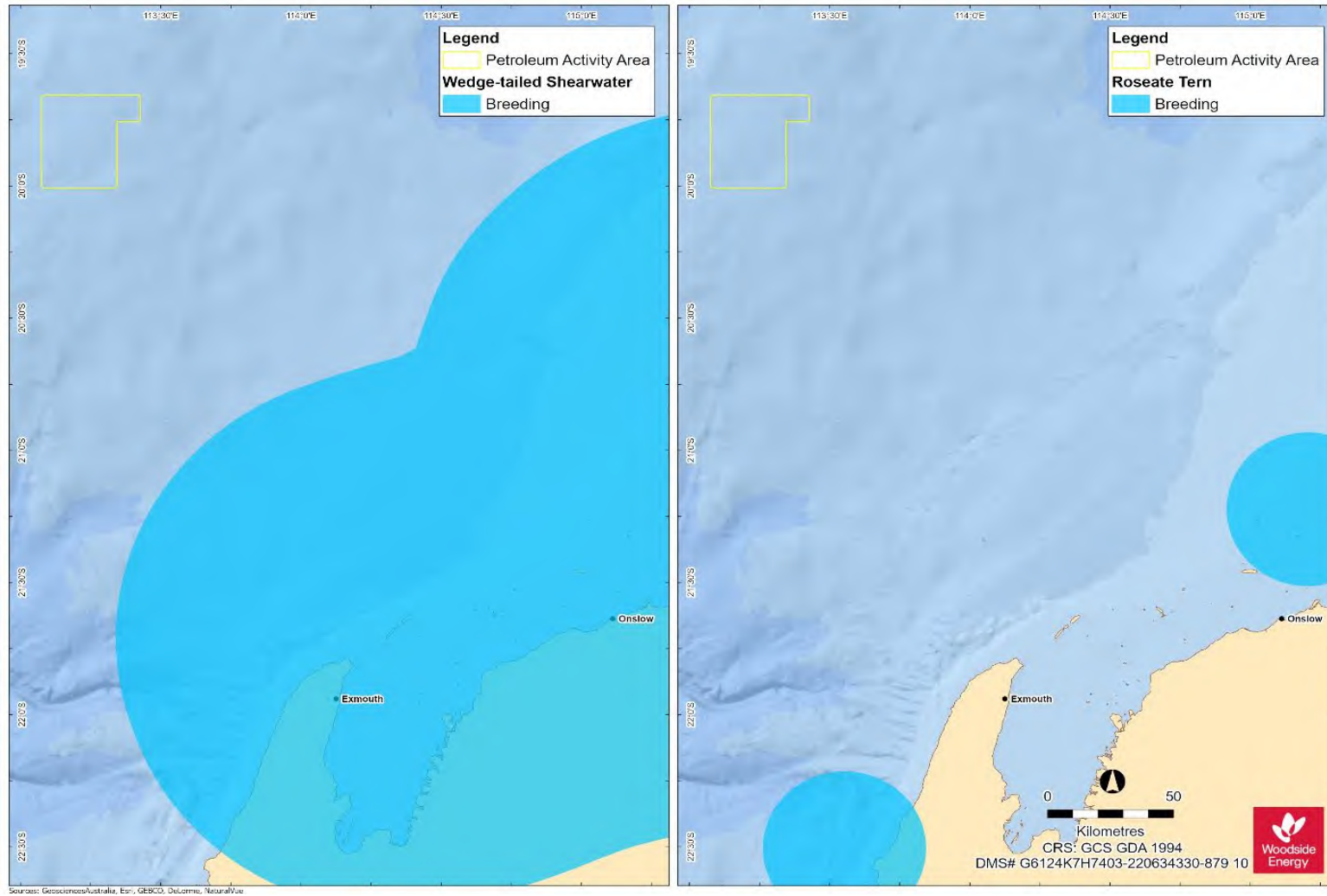


Figure 4-11: Seabird BIAs within the EMBA

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4.6.5 Seasonal Sensitivities for Protected Species

Seasonal sensitivities for protected migratory species identified as potentially occurring within the PAA are identified in **Table 4-14**.

As shown in **Figure 4-9**, the PAA is located 35 km from the pygmy blue whale migratory corridor and 187 km from the possible foraging area off North-west Cape / Ningaloo Coast.

In September 2021, DAFF (formerly DAWE) and NOPSEMA released guidance on key terms within the Conservation Management Plan for the Blue Whale CMP⁶. This guidance recognises the potential for whale foraging and feeding to occur in areas of high primary productivity outside of designated foraging areas. Migrating pygmy blue whales are not necessarily confined to the designated migratory corridor, and there is the potential for individuals to undertake opportunistic foraging within and adjacent to the PAA, particularly during the northbound migration.

Table 4-14: Key seasonal sensitivities for protected migratory species

Species	Life stage/Activity**	J	F	M	A	M	J	J	A	S	O	N	D
Marine turtles													
Green	Nesting	*	*									*	*
	Emergence	*	*	*									
Flatback	Nesting	*	*	*									*
	Emergence	*	*	*									*
Hawksbill	Nesting										*	*	*
	Emergence	*	*									*	*
Loggerhead	Nesting	*											
	Emergence												
Marine mammals													
Pygmy blue whale	Northbound					*	*						
	Southbound											*	
Humpback whale	Northbound					*	*						
	Southbound								*				
Fish / Elasmobranchs													
Whale shark	Foraging – north of Ningaloo along 200m Isobath												
Manta rays	Presence/aggregation-breeding (Ningaloo)												
Seabirds													
Wedge-tailed shearwater	Foraging/breeding				*								
Roseate tern	Breeding												
Migratory shorebirds													
General	Peak presence (non-breeding)												

* asterisk denotes peak periods

**Note given the offshore location of the PAA, and distance from islands/mainland, specific life stages such as nesting do not occur in the PAA.

⁶ <https://www.environment.gov.au/epbc/publications/guidance-key-terms-blue-whale-conservation-management-plan>

4.7 Key Ecological Features (KEFs)

The PAA is situated on the Exmouth Plateau and lies entirely within the Exmouth Plateau Key Ecological Feature (KEF). The Exmouth Plateau KEF starts approximately 110 km offshore and extends to 370 km from the shore. The KEF occupies an area of 49,310 km² within water depths of 800–4000 m (Exon and Wilcox, 1980, cited in Falkner et al., 2009; Heap and Harris, 2008).

KEFs within the EMBA are identified in **Table 4-15** and described in **Appendix I**. **Figure 4-12** shows the spatial overlap with KEFs and the PAA

Table 4-15: KEFs within the PAA and/or EMBA

Key Ecological Feature	Distance (km) and direction from PAA to KEF	Overlaps with EMBA	Description
Exmouth Plateau	Overlaps PAA	✓	Water depth: 500–5000 m. Unique seafloor features with regional ecological significance. Believed to affect deep water flow and associated with internal tides, contributing to localised upwelling.
Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula	131 km south	✓	Interacts with Leeuwin Current to create localised upwellings and support aggregations of marine megafauna, migratory fish and seabirds.
Continental Slope Demersal Fish Communities	117 km south-east	✓	High biodiversity values, hosting more than 500 fish species, 76 of which are endemic.
Ancient coastline at 125 m depth contour	173 km south-east	✓	Water depths 115–135 m. Provides hard benthic substrate for regionally significant biodiversity hotspots and localised upwelling.
Wallaby Saddle	567 km south west	✓	Water depths 4000–4700 m. Unique habitat that does not occur at this size in the region. Historically significant sperm whale and baitfish aggregations and relatively enhanced biodiversity.
Western demersal slope and associated fish communities	622 km south	✓	Supports high biodiversity of demersal fish communities, with over 480 species described and 31 endemic to the region. Diversity attributed to overlap of ancient and extended Indo-west Pacific and temperate Australasian fauna.

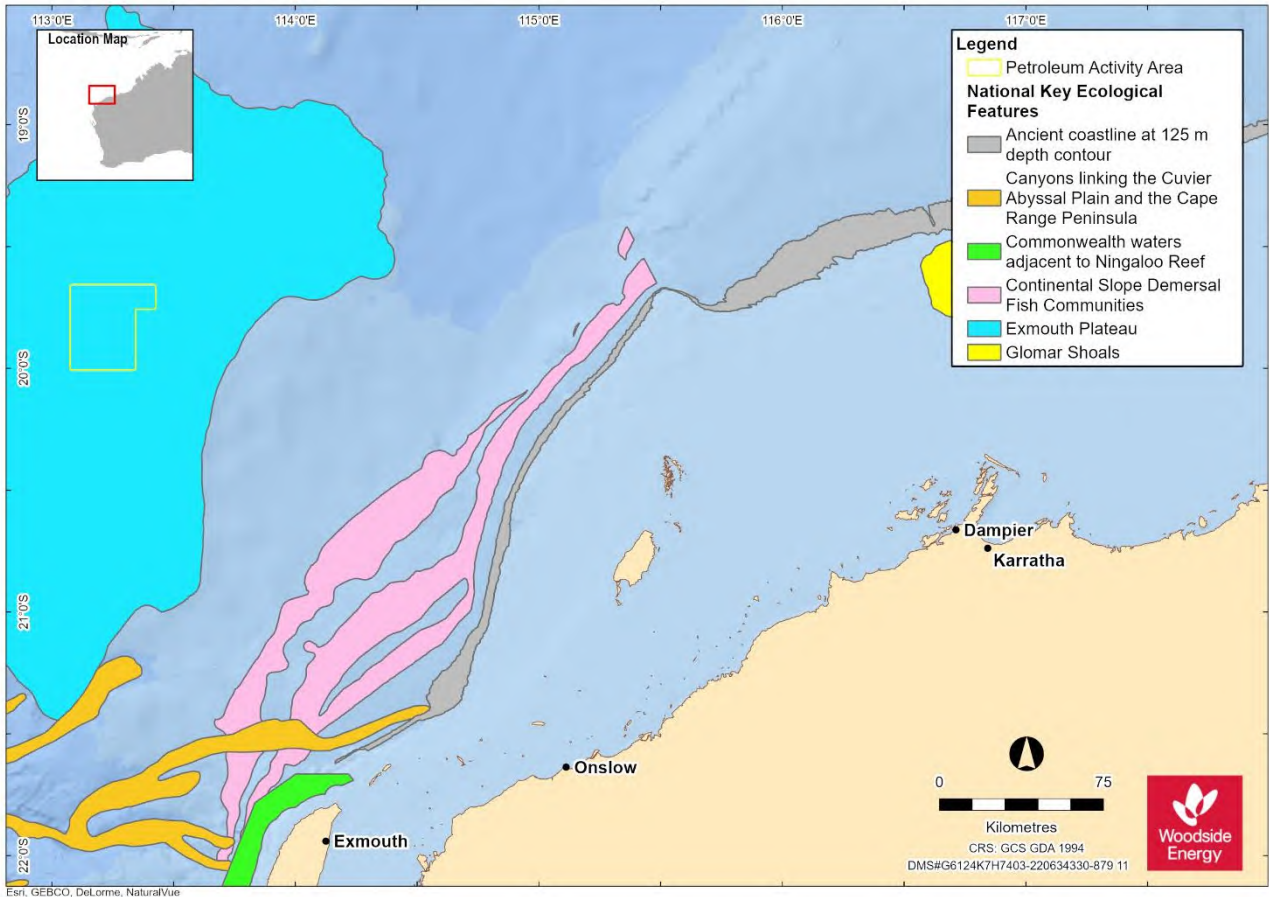


Figure 4-12: KEFs overlapping PAA

4.8 Protected Places

No protected places overlap the PAA. Protected places within the EMBA are identified in **Table 4-16** and presented in **Figure 4-13**. **Appendix I** outlines the values and sensitivities of protected places and other sensitive areas in the EMBA.

Table 4-16: Established protected places and other sensitive areas overlapping the EMBA

	Distance (km) and direction from PAA to protected place or sensitive area	IUCN category* or relevant park zone overlapping the PAA and/or EMBA
Australian Marine Parks (AMPs)		
Gascoyne AMP	77 km south	IUCN VI
	205 km south-west	IUCN II
	207 km south-west	IUCN IV
Abrolhos AMP	564 km south-west	Habitat Protection Zone (IUCN IV)
Carnarvon Canyon AMP	423 km south-west	Habitat Protection Zone (IUCN IV)
State Marine Parks and Nature Reserves		
Marine Parks		
None		
Marine Management Areas		
None		
Nature Reserves		
None		
Other protected areas		
Fish Habitat Protection Areas		
None		

*Conservation objectives for IUCN categories include:

Ia: Strict Nature Reserve

Ib: Wilderness Area

II: National Park

III: Natural Monument or Feature

IV: Habitat/Species Management Area

V: Protected Landscape

VI: Protected area with sustainable use of natural resources – allow human use but prohibits large scale development.

IUCN categories for the marine park are provided and, in brackets, the IUCN categories for specific zones within each Marine Park as assigned under the North-west Marine Parks Network Management Plan 2018 and South-west Marine Parks Network Management Plan 2018.

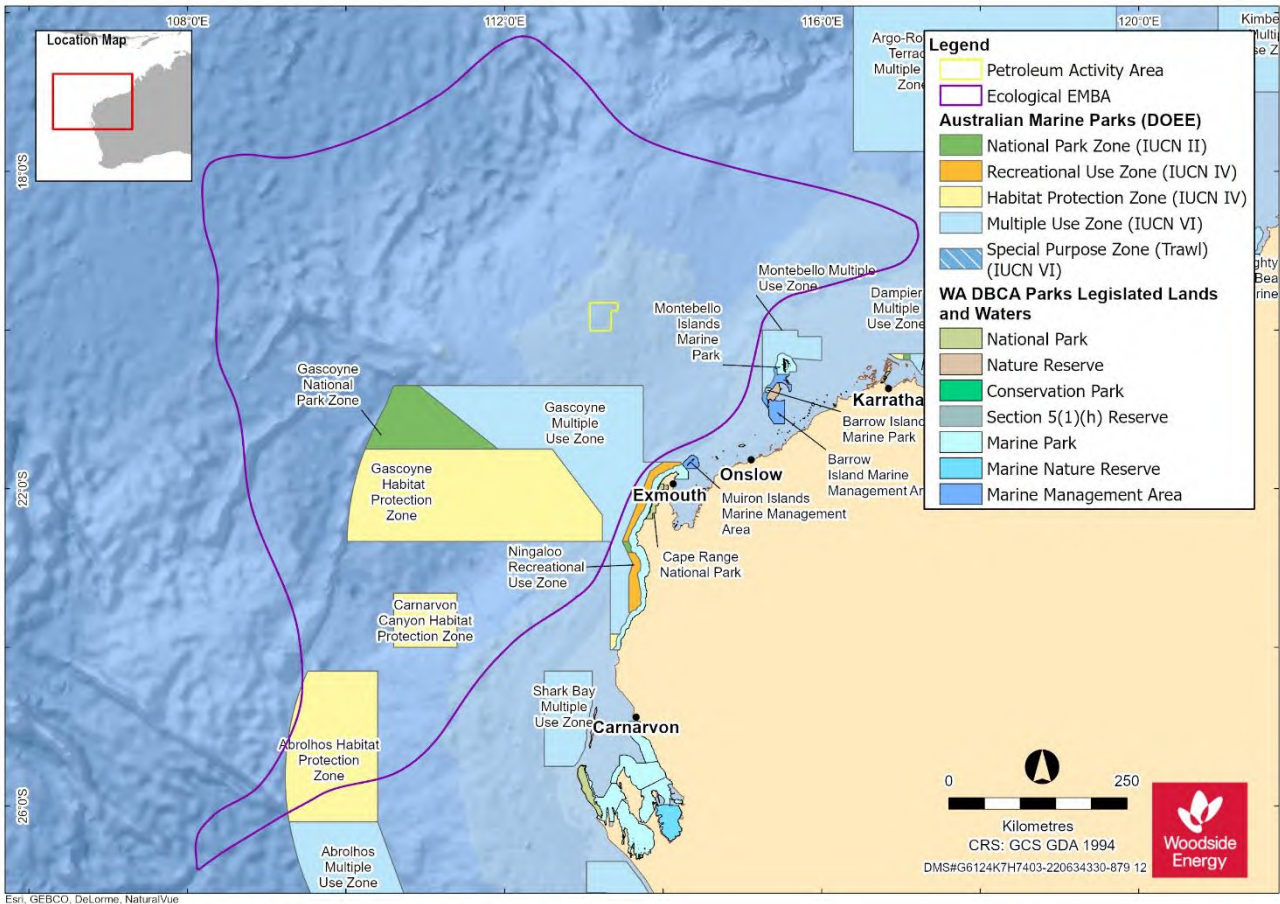


Figure 4-13: Protected areas overlapping the EMBA

4.9 Socio-economic Environment

4.9.1 Cultural Features and Heritage Values

4.9.1.1 Background

Woodside recognises the 'environment' for the purpose of the evaluation required under the Environment Regulations includes:

- the heritage value of places; and
- the social, economic, and cultural features of the broader environment.

In this section, the heritage value of places within the PAA and EMBA and the cultural features of the PAA and EMBA are described.

In line with The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance (ICOMOS 2013) (Burra Charter) and associated practice notes, Woodside understands heritage value to refer to the cultural significance of a place to an individual or group. A cultural feature, by contrast, is understood to be comparable to the Burra Charter term “fabric” and refer to a place’s elements, fixtures, contents and objects which have cultural values. Although these features are necessarily physical, the place they inhabit or comprise may have tangible and intangible dimensions (ICOMOS 2013).

Woodside has undertaken archaeological assessments and ethnographic surveys to identify potential cultural values or features that may be impacted by Scarborough activities. These works

have not identified heritage places, objects or values which will be impacted by the activities planned under this EP. However, through consultation with relevant persons, Woodside recognises the deep spiritual and cultural connection to the environment⁷ that First Nations people hold.

4.9.1.2 First Nations peoples

As a starting point for understanding cultural features of the environment for First Nations groups, Woodside uses the existing systems, such as native title, to identify First Nations groups that may have functions, interests or activities that may be affected. To that end, Woodside identifies native title representative bodies and nominated representative entities (defined in Section 5.3), as well as native title claims, determinations and Indigenous Land Use Agreements (ILUAs) which the EMBA overlaps, Native title claims, determinations and ILUAs are defined under the *Native Title Act 1993* (Cth). While acknowledging that cultural features and heritage values may exist outside of the native title framework, Woodside considers this to be the broadest extent over which First Nations groups have claimed native title rights and interests.

Native title claims are applications made to the Federal Court under the *Native Title Act 1993* for a determination or decision about native title in a particular area. A claim is made by a native title claim group which asserts it holds native title rights and interests in an area of land and/or water, according to its traditional laws and customs. By making a claim, the native title claim group seeks a decision that native title exists so that its native title rights and interests are recognised by the common law of Australia. This is called a native title determination. A determination is a decision by a recognised body, such as the Federal Court or High Court of Australia, that native title either does or does not exist in relation to a particular area ([Native Title Tribunal](#)).

A requirement to establishing a positive determination of native title in court is proving that there is an organised society that occupied the land and/or waters at the time of British annexation. The requirement of an 'organised society' is set out by Justice Toohey in the historic judgment of *Mabo v Queensland (No 2)* [[1992\] HCA 23](#); [[1992\] 175 CLR 1](#) ('Mabo'). Justice Toohey had the following to say (at 187):

it is inconceivable that indigenous inhabitants in occupation of land did not have a system by which land was utilized in a way determined by that society. There must, of course, be a society sufficiently organized to create and sustain rights and duties...

Therefore, Woodside understands that native title rights and interests are held communally by an organised society, that native title claims are understood to represent the area over which First Nations groups are claiming these rights and interests, and that native title determinations provide clarity on where native title rights and interests are found to either exist or not exist. Where native title rights or interests are determined to exist they will be held by a Registered Native Title Body Corporate (section 57, *Native Title Act 1993*) in trust or as agent for native title holders.

ILUAs are voluntary agreements between native title parties and other people or bodies about the use and management of land and/or waters and are registered by the Native Title Registrar in the Register of ILUAs. An ILUA can be made over areas where:

- native title has been determined to exist in at least part of the area; or

⁷ Definition of 'Environment' in Regulation 4 of the OPPGS (Environment) Regulations are defined as:

- ecosystems and their constituent parts, including people and communities; and
- natural and physical resources; and
- the qualities and characteristics of locations, places and areas; and
- the heritage values of places; and includes
- the social, economic and cultural features of the matters mentioned in paragraphs (a), (b), (c) and (d)

- a native title claim has been made; or
- where no native title claim has been made.

While registered, ILUAs operate as a contract between the parties, including relevant native title holders ([Native Title Tribunal](#)).

The *Native Title Act 1993* provides for a Representative Aboriginal/Torres Strait Islander Body (Native Title Representative Body) to be recognised by the Commonwealth Minister for an area. Native Title Representative Bodies have specialist functions set out in the Native Title Act within the area for which they are the Native Title Representative Body. However, the functions of a Native Title Representative Body are such that they do not hold details on the cultural features or heritage values of an area and therefore do not inform Woodside's understanding of heritage values or cultural features.

For the activity in this EP, there are no coastal ILUAs, native title claims or determinations overlapping the EMBA (see **Figure 4-14**).

4.9.1.3 Coastally Adjacent First Nations groups

Woodside understands that First Nations groups are keenly aware of the extent of their rights, interests and responsibilities for Country, and these are generally discrete, defined areas, including areas of sea (Smyth 2007). To identify cultural features and heritage values which may exist outside of native title claim, determination and ILUA areas, Woodside considers native title claims, determinations and ILUAs coastally adjacent to the EMBA to be an instructive means of identifying potentially relevant First Nations groups to be consulted (See **Table 4-17**).

That said, Woodside understands from engagement with stakeholders that extending a native title group's responsibility to areas which those groups have elected to not include in their claims or ILUAs can have significant cultural consequences for First Nations groups and individuals. This may also, over time, build expectations in the broader First Nations community that a group is responsible for maintaining environmental values in areas for which they do not hold traditional knowledge. Woodside also acknowledges that a First Nations group's relative proximity to the PAA or EMBA is not necessarily a meaningful indicator of the connection of First Nations groups to the area, and providing advice over such areas can be culturally dangerous. As a result, caution must be used when conducting broader engagement.

A summary of native title claims, determinations and ILUAs overlapping or coastally adjacent to the EMBA is set out in **Table 4-17**. Claims and determinations have not been differentiated in this table, as it is acknowledged that either of these may indicate the existence of rights and interests.

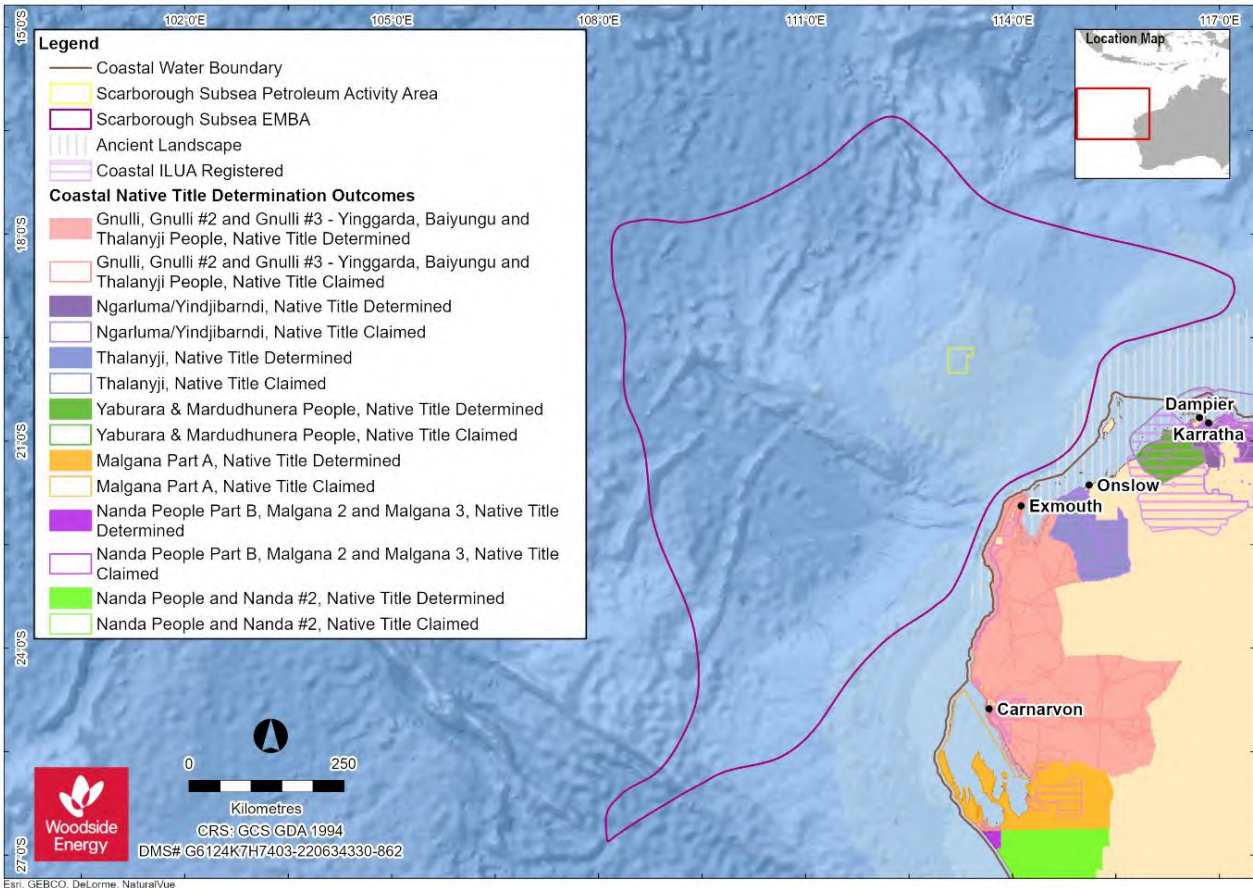


Figure 4-14: PAA and EMBA in relation to native title claims, determinations and ILUAs.

Table 4-17: Summary of Native Title Claims, Determinations and ILUAs which overlap or are coastally adjacent to the EMBA

Claim / Determination / ILUA	Registered Native Title Body Corporate	Overlap with EMBA	Coastally Adjacent to the EMBA
Claim / Determination			
Gnulli, Gnulli #2 and Gnulli #3 - Yinggarda, Baiyungu and Thalanyji People	Nganhurra Thanardi Garrbu Aboriginal Corporation (NTGAC), Yinggarda Aboriginal Corporation (YAC)	No	Yes
Malgana Part A	Malgana Aboriginal Corporation	No	Yes
Nanda People and Nanda #2	Nanda Aboriginal Corporation	No	Yes
Nanda People Part B, Malgana 2 and Malgana 3	Malgana Aboriginal Corporation and Nanda Aboriginal Corporation	No	Yes
Ngarluma People	Ngarluma Aboriginal Corporation (NAC)	No	Yes
Ngarluma/Yindjibarndi People	NAC, Yindjibarndi Aboriginal Corporation	No	Yes
Thalanyji	Buurabalayji Thalanyji Aboriginal Corporation (BTAC)	No	Yes

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Claim / Determination / ILUA	Registered Native Title Body Corporate	Overlap with EMBA	Coastally Adjacent to the EMBA
Yaburara & Mardudhunera People	Wirrawandi Aboriginal Corporation (WAC)	No	Yes
ILUA			
Anketell Port, Infrastructure Corridor and Industrial Estates Agreement	NAC	No	Yes
Brickhouse and Yinggarda Aboriginal Corporation ILUA	YAC	No	Yes
Cape Preston Project Deed (YM Mardie ILUA)	WAC	No	Yes
Cape Preston West Export Facility	WAC	No	Yes
Gnarloo ILUA	NTGAC	No	Yes
KM & YM ILUA	WAC, Robe River Kuruma Aboriginal Corporation	No	Yes
Kuruma Marthudunera and Yaburara and Coastal Mardudhunera Indigenous Land Use Agreement	No representative body specified.	No	Yes
Macedon ILUA	BTAC	No	Yes
Malgana Tamala Pastoral Lease Agreement	Malgana Aboriginal Corporation	No	Yes
Malgana Woodleigh Carbla Pastoral Lease Agreement	Malgana Aboriginal Corporation	No	Yes
Malgana Wooramel Pastoral Lease Agreement	Malgana Aboriginal Corporation	No	Yes
Ningaloo Conservation Estate ILUA	NTGAC	No	Yes
RTIO Ngarluma ILUA (Body Corporate Agreement)	NAC	No	Yes
RTIO Kuruma Marthudunera People ILUA	Robe River Kuruma Aboriginal Corporation	No	Yes
Quobba – Yinggarda Pastoral ILUA	YAC	No	Yes

4.9.1.4 Marine Parks

Woodside acknowledges that Commonwealth and State Marine Park Management Plans have sought to recognise cultural values of First Nations groups. Australian Marine Parks (AMP) describe this framework in the following way: ‘when making decisions about what can occur in marine parks and what action we will take to protect marine parks, we take values into account’. AMP summarises these values as natural values, cultural values, heritage values and socio-economic values. Woodside is triggered to undertake an assessment of cultural values within Marine Park Management Plans where the Operational Area or EMBA overlaps an AMP. Woodside considers the management plans of marine parks that overlap the PAA and EMBA to determine whether cultural features and heritage values have been identified whether there are specified representative bodies referenced to contact regarding potential cultural features and heritage places.

The PAA does not overlap any Commonwealth Marine Parks. The EMBA overlaps with features of the Abrolhos AMP managed under the South-West Marine Parks Network Management Plan 2018 and Carnarvon Canyon AMP and Gascoyne AMP managed under the North-West Marine Parks Network Management Plan 2018. The PAA and the EMBA do not overlap any State Marine Parks. Where these plans specify identifiable representative bodies who may hold knowledge of heritage values or cultural features—including but not limited to Registered Native Title Bodies Corporate—these bodies are consulted (See **Appendix F**, Table 1). Consultation with these groups may identify heritage values and cultural features beyond those addressed in the marine park management plans. No identifiable representative bodies were specified for the marine parks overlapped by the EMBA (See **Table 4-18**).

The marine park management plans did note for the Abrolhos AMP and Gascoyne AMP that the Yamatji Marlpa Aboriginal Corporation (YMAC) is the relevant Native Title Representative Body (DNP 2018a, 2018b). YMAC was requested to identify Traditional Custodians who may hold knowledge of heritage values or cultural features (See **Appendix F**, Table 1).

Table 4-18: Summary of Commonwealth and State Marine Park Management Plans that overlap the EMBA

Marine Park Management Plan	PAA Overlap	EMBA Overlap	Specified Bodies
Commonwealth Marine Park Management Plan			
Abrolhos AMP	No	Yes	No identifiable body specified.
Carnarvon Canyon AMP	No	Yes	No identifiable body specified.
Gascoyne AMP	No	Yes	No identifiable body specified.
State Marine Park Management Plan			
[None]			

In the management plans for AMPs it is noted that “Sea country is valued for Indigenous cultural identity, health and wellbeing.” Cultural identity is understood to refer to the fact that “essence of being a ‘Saltwater’ person is ontological rather than merely technological. That is, it is about how people relate spiritually to the sea and engage with spiritual forces that created it, the marine flora and fauna and people.” (McDonald and Phillips, 2021) This connection may be damaged where people are displaced or disrupted (e.g. during colonisation) or where there is a loss of technical skills or environmental knowledge (McDonald and Phillips, 2021) but no impacts of this nature are considered to arise from this activity.

The South West Marine Parks Network Management Plan 2018 (DNP 2018b) also notes that cultural features of the Abrolhos AMP include strong stories that connect ocean and land. No impact pathway that may disrupt the preservation of stories or other intangible heritage from this activity has been identified. The plan also references artefacts located outside of the AMP and the EMBA on islands in state waters.

4.9.1.5 Sea Country Values

‘Sea Country’ can be defined as the area of sea over which a First Nations group has interests, cultural value, connection and use. It has been noted that “the saltwater peoples of the north-west are associated with discrete clan estates or tribal areas, often referred to in contemporary Aboriginal English as ‘saltwater country’ or ‘sea country’. Country’ refers to more than just a geographical area: it is shorthand for all the values, places, resources, stories and cultural obligations associated with that geographical area.” (Smyth 2007). “Sea country is valued for Indigenous cultural identity, health and wellbeing” (DNP 2018a, 2018b). Cultural identity is understood to refer to the fact that “essence of being a ‘Saltwater’ person is ontological rather than merely technological. That is, it is about how

people relate spiritually to the sea and engage with spiritual forces that created it, the marine flora and fauna and people” (McDonald and Phillips, 2021).

In terms of seascape extent, McNiven (2004) suggests that “For those mainland groups whose exploitation of the sea was limited to littoral resources, it is likely that seascapes extended no more than c. 20–30 km out to sea, out to the horizon and the limit of human visibility. ... However, in some coastal places, clouds that can be seen well over 100 km out to sea are imbued with spiritual significance. For those groups with elaborate canoe technology, seascapes extend well over the horizon.” While there is some evidence of traditional watercraft in Australia’s North West, the recorded evidence is limited to travel across inland rivers (e.g. Barber and Jackson 2011) or travel between coastal islands (Paterson et al 2019).

Woodside recognises the potential for marine ecosystems to include cultural features as well as environmental values. The link between environmental protection and cultural heritage protection is illustrated in the Australian Government’s Indigenous Protected Areas Program. The Indigenous Protected Areas program provides for “areas of land and sea managed by Indigenous groups as protected areas for biodiversity conservation...IPAs deliver environmental benefits...Managing IPAs also helps Indigenous communities protect the cultural values of their country for future generations...” (DCCEEW, 2023). This intrinsic link concept is also described by MAC (2021 as cited in Woodside 2023) as it relates to the values of the marine environment that are of cultural importance to MAC based on engagement with their Elders and Murujuga Land and Sea Unit Rangers. Elders were clear that all living things in Mermaid Sound are connected and that Mermaid Sound and Dampier Archipelago (Murujuga) are considered one place where the entire environment and all ecosystems hold both cultural and environmental value, with these types of values (cultural and environmental) intrinsically linked (MAC, 2021 as cited in Woodside 2023).

Cultural features of coastal areas may include marine species that may travel many thousands of kilometres through areas with similar cultural values to multiple First Nations language groups. Some species may travel as far as 5,000 km from Antarctica to the Kimberley region of Western Australia (Double et al., 2010, 2012), passing First Nations language groups along the entire west coast of Australia. Distribution and migratory patterns of migratory species are described in Section 4.6 and Appendix I.

Sea country values have been defined using multiple lines of evidence including:

- Desktop assessment of sea country values from publicly available sources
- Specific studies including ethnographic surveys and archaeological heritage assessments
- Consultation with First Nations groups and individuals

The process for identifying First Nations groups who may have interests and connection in Sea Country are set out in **Section 4.9.1.3** and **Section 5.35.9**. The scope of advice Traditional Custodians were encouraged to provide through ethnographic surveys (see **Section 4.9.1.5.1**) or through project consultation was not limited by reference to any particular boundaries or limits of Sea Country.

4.9.1.5.1 Desktop Assessment of Sea Country Values

Cultural features and heritage values identified in publicly available literature

Publicly available sources were assessed for any records of previously identified Sea Country values or cultural features that may overlap with the Operational Area or EMBA. Where cultural features or Sea Country values were identified these are summarised in Table 4-19 according to the First Nations groups (where identified or inferable) who hold these values.

All cultural features and heritage values restricted to onshore locations or inland waters have been excluded in Table 4-19, noting that the closest boundary of the PAA is approximately 215 km from

the closest landfall (approximately 360 km from Dampier), while the closest boundary of the EMBA is about 25 km from closest landfall with no shoreline contact. Where the geographical extent is not specified or unclear it has been included for completeness.

Table 4-19: Cultural features and heritage values identified in publicly available literature

First Nations Group	Features and Values	Source	Potential for overlap	
			PAA	EMBA
Gnulli (Baiyungu, Thalanyji, Yinggarda)	Feature: resources including marine animals. Value: traditional knowledge holds that ancestors live on the land and in the water. Therefore, people have obligations to access and care for these places (e.g., keeping them clean).	Peck on behalf of the Gnulli Native Title Claim Group v State of Western Australia [2019] FCA 2090	Possible (unspecified) Possible (unspecified)	Possible (unspecified) Possible (unspecified)
	Feature: heritage sites in the Ningaloo region include shell middens, artefact scatters, skeletal material/burial sites, camps, meeting places, hunting places and water sources. Feature: resources including gajalbu (emu), bundgurdi (kangaroo), bardurra (bush turkey), majun (marine turtles), turtle eggs, bilygurumarda (osprey), fish, shellfish and plants. Feature: mudflats, mangroves and sand dunes provide a critical breeding ground for marine and terrestrial wildlife. Value: the Ningaloo region contains cultural heritage dating back at least 32,000 years, including ceremonial Thalu sites. Value: connection to Country is important to the Traditional owners' spirituality and religion. Value: caring for Country - "The southern coastal reserves along the Ningaloo Coast are jointly managed by Traditional Owners and the DBCA. The Joint Management Body ensures that the Traditional Owners have an opportunity to make decisions about environmental management and land use". This document also includes information that is marked that cannot be copied, reproduced or used without consent.	DBCA 2022	No Possible (turtles, fish) No (other resources) No No Possible (unspecified) No	No Possible (turtles, fish) No (other resources) No Possible (unspecified, but likely refers to onshore areas outside the EMBA) Possible (unspecified, but unlikely given distance offshore) No
	Feature: resources including mangrove crabs, gastropods, shellfish, dugong, turtle.	Morse 1993.	Possible (turtles, dugong) No (other resources)	Possible (turtle, dugong) No (other resources)

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First Nations Group	Features and Values	Source	Potential for overlap	
			PAA	EMBA
Malgana	Feature: resources including bobtail, long-tail, kangaroo, emu, pink-grey galah, mull-hawk, bird eggs (shags [cormorants], seagull, divers), turtle eggs, dugongs, turtle, mullet, bluebone, whiting, snapper, oysters, mussels, crabs, prawns, scallops, cockles, little 'redies', black snapper and mallee fowl. Value: access to Country	Oxenham on behalf of the Malgana People v State of Western Australia [2018] FCA 1929	Possible (turtles, fish) No (other resources) No	Possible (turtles, fish, dugongs) No (onshore resources) Possible (unspecified)
	Feature: resources including dugong, green and loggerhead turtles and sharks. Value: traditional knowledge maintains records of freshwater seeps in the submerged landscape.	Statton et al. 2021.	Possible (turtles, sharks) No (dugong) Possible (unspecified, but unlikely due to location of PAA)	Possible (turtles, dugong, sharks) Possible (unspecified, but unlikely due to location of PAA)
	Feature: resources including fish, shellfish, turtles and dugong. Feature: archaeological sites.	Briggs and Green, 2008.	Possible (turtles, fish) No (other resources) No	Possible (turtles, dugong, fish) No (other resources) Possible (submerged)
	Feature: green sea turtles, dugongs, shags and bottlenose dolphins are species of cultural significance.	Malgana Land and Sea Management et al. 2021.	Possible (turtles, dolphins, seabird (shag unlikely as coastal bird) No (dugong)	Possible (turtles, dugong, dolphins, seabird)
	Value: sharing and controlling the sharing of knowledge.	Lyons et al. 2021.	Possible (unspecified, but unlikely due to location of PAA)	Possible
	Value: access to Country resulting in physical and mental health. Value: Water serpents must not be disturbed in pools.	Drury on behalf of the Nanda People v State of Western Australia [2018] FCA 1849	Possible (unspecified, but unlikely due to location of PAA) No	Possible No

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First Nations Group	Features and Values	Source	Potential for overlap	
			PAA	EMBA
	Value: traditional knowledge recalls that a water serpent swam down the Murchison River towards the sound of the ocean's waves and created a tunnel to the sea. Scared by the waves, the serpent swam back up the Murchison.	Kalbarri Visitor Centre 2023	No	No
	Value: traditional knowledge recalls that the turtle used to live on the land, but became trapped in the sea due to its greed for berries in the water.	Capewell 2020	Possible (turtles)	Possible (turtles)
	Value: traditional knowledge recalls that creation ancestors danced at the mouth of the river at Kalbarri and established the Law.	Murdock 2010	No	No
Ngarla-Ngarli (Mardudhunera, Ngarluma, Wong-Goo-Tt-Oo, Yaburara and/or Yindjibarndi)	Feature: archaeological sites on Murujuga. Feature: ceremonial sites. Feature: dreaming sites.	Department of the Environment and Heritage 2006	No No Possible (unspecified)	No No Possible (unspecified)
	Value: traditional knowledge recalls that the sea is a source of creation for flying foxes. Value: petroglyphs are understood as permanent signs left by ancestral beings. Value: petroglyphs depict the law. Value: cultural obligations to look after places of special potency.	DEC 2013.	Possible (unspecified) No No Possible (unspecified) – unlikely given distance offshore No	Possible (unspecified) Possible (submerged) Possible (submerged) Possible (unspecified) Possible (submerged)
	Value: petroglyphs are important in initiation and education.		No	Possible (submerged)
	Value: the sea is acknowledged a starting point for songlines, including the flying fox songline.	MAC 2023a	Possible (unspecified)	Possible (unspecified)
	Feature: resources including fishes, turtles and dugong. Value: traditional knowledge recalls a sea serpent which travelled from the coast to inland pools.	Water Corporation 2019	Possible (turtles, fish) No (dugong) Possible (unspecified)	Possible (turtles, dugong, fish) Possible (unspecified)

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First Nations Group	Features and Values	Source	Potential for overlap	
			PAA	EMBA
	Value: traditional knowledge recalls a water serpent from the ocean now lives in an inland pool. He created many sites and punishes law breakers. Value: In a separate account a sea serpent punishing people was driven back to the sea by a freshwater serpent.	Barber and Jackson 2011	Possible (unspecified) Possible (unspecified)	Possible (unspecified) Possible (unspecified)
	Value: traditional knowledge recalls Manggan created the seas.	NAC n.d.	Yes	Yes
	Value: traditional knowledge recalls Pannawonica Hill being carried from the sea near Barrow Island or Murujuga by a spirit bird.	Hook et al 2004.	No	No
	Value: traditional knowledge recalls Murujuga is where ancestral beings emerged from the sea and brought the Law.	Australian Heritage Council 2012	Possible (unspecified)	Possible (unspecified)
	Feature: Submerged First Nations archaeological sites in Cape Bruguieres channel.	Benjamin et al 2020	No	No
	Feature: Submerged First Nations archaeological sites in Cape Flying Foam Passage.	Benjamin et al 2023	No	No
	Value: traditional knowledge recalls Maarga (creation ancestors) lifted the land and sky out of the ocean.	Milroy and Revell 2013	Possible (unspecified)	Possible (unspecified)
	Value: traditional knowledge recalls Maarga (creation ancestors) lifted the land and sky out of the ocean.	Japingka Aboriginal Art Gallery 2023.	Possible (unspecified)	Possible (unspecified)
	Feature: submerged waterholes related to the Kangaroo songline. Value: traditional knowledge holds that Songlines continue beyond the current coast and across the submerged landscape.	Kearney et al 2023.	No (feature restricted to Ancient Landscape) Possible (unspecified)	Possible Possible (unspecified)
	Value: songlines are captured through storytelling, rock art, songs and dance, and in the landmarks themselves. Value: Murujuga is the start of many songlines, including the Seven Sisters.	Bainger 2021	No No	Possible (unspecified) Possible (unspecified)
	Value: songlines at Murujuga date back to times when the sea-level was lower.	MAC 2023b.	Possible (unspecified) – unlikely given distance beyond Ancient Landscape	Possible (unspecified)

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First Nations Group	Features and Values	Source	Potential for overlap	
			PAA	EMBA
	Feature: rock art Feature: sacred sites	Weerianna Street Media Production 2017.	No Possible (unspecified)	Possible (submerged) Possible (unspecified)
	Feature: resources including fish, turtles. Feature: fish traps exist throughout the archipelago. Feature: shell middens exist on coastal margins. Feature: submerged archaeological sites. Value: Law emerged from the sea and travelled inland.	Leach 2020.	Possible (turtles, fish) No No No (feature restricted to Ancient Landscape) Possible (unspecified)	Possible (turtles, fish) Possible Possible Possible Possible (unspecified)
	Feature: resources including mangrove seeds, turtles, turtle eggs Value: it is recalled that ceremonies were conducted on islands.	Smyth 2007	Possible (turtles) No (other resources) No	Possible (turtles) No (other resources) No
	Feature: archaeological sites on Murujuga.	McDonald 2015	No	No
	Feature: archaeological sites on Murujuga.	McDonald 2023	No	No
	Feature: archaeological sites on Enderby Island.	McDonald et al 2022a	No	No
	Feature: archaeological sites on Rosemary Island.	McDonald et al 2022b	No	No
	Feature: petroglyph and other archaeological sites at Murujuga. Feature: archaeological evidence of the use of resources including fish, turtles, marine mammals, crocodiles, crabs and sea urchins.	Dortch et al 2019	No No	No Possible (submerged, highly unlikely for most evidence of faunal use to survive inundation)
Thalanyji	Feature: resources including fish, shellfish, crabs, crustaceans, sea urchins, turtle, dugong and flora and fauna associated with mangrove communities. Feature: archaeological sites on Barrow Island. Value: connection to Country.	Commonwealth of Australia 2002.	Possible (fish, turtle, invertebrates) No (dugong) No Possible (unspecified)	Possible (fish, turtle, dugong, invertebrates) No Possible (unspecified)
	Feature: resources include turtles, eggs, fish, shellfish and plants.	DBCA et al. 2022.	Possible (fish, turtle)	Possible (fish, turtle)

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First Nations Group	Features and Values	Source	Potential for overlap	
			PAA	EMBA
	Value: traditional knowledge recalls a water snake is located in inland waters.	Hayes on behalf of the Thalanyji People v State of Western Australia [2008] FCA 1487	No (inland waters)	No (inland waters)
	Value: connection to Country. Value: transfer of knowledge. Value: access to Country.	DBCA 2022	Possible (unspecified) Possible (unspecified) Possible (unspecified)	Possible (unspecified) Possible (unspecified) Possible (unspecified)
	Value: access to Barrow and possibly Montebello Islands	Hook et al. 2004.	No	No
	Feature: artefact scatters are located in coastal sand dunes. Feature: burials are located in coastal sand dunes. Value: traditional knowledge recalls a water snake is located in inland waters.	Hook 2020.	No No No	No No No
	Feature: archaeological sites are located on Barrow Island.	Ditchfield et al. 2018	No	No
	Feature: archaeological sites are located on Barrow Island.	Paterson 2017	No	No
	Feature: archaeological sites are located at Barrow and Montebello Islands. Feature: archaeological evidence of the use of resources including fish, turtles, marine mammals, crocodiles, crabs and sea urchins.	Dortch et al. 2019.	No No	No Possible (submerged, highly unlikely for most evidence of faunal use to survive inundation)
	Feature: thalu ceremonial sites for the increase of turtle, shark, ray, fish, squid, octopus, hill kangaroo and emu. Feature: ceremonies. Value: connection to Country. Value: transfer of knowledge. Value: access to Country.	DBCA 2022	No No Possible Possible Possible	No (ceremonial use) Possible (submerged thalu sites e.g., petroglyphs) No Possible Possible Possible

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First Nations Group	Features and Values	Source	Potential for overlap	
			PAA	EMBA
Unspecified	Feature: the ocean can include sacred sites and songlines.	Smyth 2008	Possible (unspecified) – unlikely given distance offshore	Possible (unspecified)
	Value: people have kin relationships to important animals, plants tides and currents.		Possible (unspecified)	Possible (unspecified)
	Feature: archaeological sites in submerged landscapes.	Bradshaw 2021.	No (feature restricted to Ancient Landscape)	Possible
	Value: sea country has customary law defining ownership and management rights and responsibilities.	Muller 2008.	Possible (unspecified)	Possible (unspecified)
	Value: knowledge of Sea Country Value: connection to Sea Country Value: care for Sea Country Value: the extent of Sea Country is determined by the travels of dreaming ancestors. This is recorded and conveyed through songlines.	Kearney et al 2023.	Possible (unspecified)	Possible (unspecified)
			Possible (unspecified)	Possible (unspecified)
	Feature: archaeological sites indicate that islands were occupied prior to sea level rise.	DBCA 2020	No	Possible (submerged)

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First Nations Group	Features and Values	Source	Potential for overlap	
			PAA	EMBA
	<p>Value: sea country includes values, places, resources, stories and cultural obligations.</p> <p>Value: activities relating to resources included:</p> <ul style="list-style-type: none"> • Dugong hunting; • Turtle hunting; • Turtle egg collecting; • Seabird egg collecting; • Spearing fish; • Reef trapping fish; • Herding fish; • Line fishing; • Collecting fish in stone fish traps; • Poisoning fish; • Gathering shellfish and other marine resources. 	Smyth 2007	<p>Possible (unspecified)</p> <p>Possible (unspecified) – unlikely given distance offshore</p>	<p>Possible (unspecified)</p> <p>Possible (unspecified)</p>
	<p>Value: people have kinship relationships with every plant and animal.</p> <p>Value: certain species, including fish and seafood, must not be eaten during initiation rituals due to their sacredness to the creation being Barrimirndi. Breaking this law may lead to cyclones.</p>	Juluwarlu 2004	<p>Possible (unspecified)</p> <p>No</p>	<p>Possible (unspecified)</p> <p>No</p>
	<p>Feature: tangible and intangible heritage.</p> <p>Feature: archaeological evidence of varied occupation and adaptation.</p> <p>Value: a distinct way of life centred around the use of limited water and coastal resources.</p>	Macfarlane and McConnell 2017	<p>Possible (unspecified)</p> <p>No (feature restricted to Ancient Landscape)</p> <p>No</p>	<p>Possible (unspecified)</p> <p>Possible (submerged, highly unlikely for most evidence of faunal use to survive inundation)</p> <p>No</p>

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4.9.1.5.2 Studies of Cultural Features and Heritage Values

First Nations-Archaeological Heritage Assessment

Woodside understands that communal cultural connection may exist between Traditional Custodians and land and waters. It is understood from the onshore archaeological record that First Nations people have occupied the Australian continent for at least 65,000 years (Clarkson et al 2017) and in many places maintain a strong continuing connection that is said to extend back in First Nations cosmology to the beginning of time.

It is understood that the sea level has risen significantly during the 65,000 years of First Nations occupation, and areas that were once inhabited are now submerged on the continental shelf (Veth et al 2019; UWA 2021). Woodside also understands that, at its lowest level during First Nations occupation, sea level was between 125 m (O’Leary et al 2020, Veth et al 2019, Williams et al 2018) and 130 m below current levels (Benjamin et al 2020, Benjamin et al 2023, UWA 2021). Archaeological material preserved on the Ancient Landscape has the potential to provide further information about the earliest periods of human occupation (Veth et al 2019; UWA 2021).

Recent archaeological discoveries demonstrate that the now submerged landscape was occupied and inhabited, and can retain archaeological material from this time (Benjamin et al, 2020; Benjamin et al 2023; see Ward et al 2022 for an opposing view).

In recognition of this, Woodside considers the Ancient Landscape between the mainland and the Ancient Coastline KEF (see Table 4-15) as an area where potential First Nations archaeological material may exist on the seabed, as this covers the full extent of this possible First Nations occupation. The PAA does not overlap the Ancient Landscape. There is slight overlap of the EMBA with the Ancient Landscape but no potential for seabed disturbance from planned activities and therefore no potential for impacts to archaeological material. As noted in Section 6.8.2, the Ancient Landscape will not be directly impacted by the worse case marine diesel spill as hydrocarbons (surface, entrained and dissolved) are confined to the upper layers of the water column.

Known First Nations heritage places including archaeological sites may be protected subject to declarations under the Aboriginal and Torres Strait Islander Heritage Protection Act 1984, Underwater Cultural Heritage Act 2018 or EPBC Act 1999. However, these Acts only extend protection to First Nations heritage places specified by declaration or otherwise included on a statutory list. Woodside understands that there is no First Nations archaeology known to exist anywhere within Commonwealth waters and no areas subject to declarations or prescriptions under these Acts are located within the EMBA.

For this EP, a search of DPLH’s Aboriginal Cultural Heritage Inquiry System was undertaken, which showed no registered Aboriginal sites in the EMBA (see Appendix I).

Where First Nations archaeological material is identified within the EMBA, Woodside will discuss the management of this material with appropriate Traditional Custodian group(s), starting with any adjacent Native Title Body Corporate.

First Nations Ethnographic Heritage Assessment

Ethnographic surveys are a form of heritage survey conducted by anthropologists or ethnographers to understand cultural features of heritage significance and heritage values within a landscape. This is distinguished from archaeological survey (which focusses on the material remains of human culture) and consultation (which is not confined to an assessment of heritage, is not limited to values of a landscape and may be conducted without an ethnographic methodology).

Ethnographic surveys are undertaken to identify Aboriginal cultural heritage sites and values that are identifiable as tangible and intangible elements that are important to the Aboriginal people of the

State, and are recognised through social, spiritual, historical, scientific or aesthetic values, as part of Aboriginal tradition.

To achieve this, an ethnographic survey is undertaken with an Aboriginal person or persons who in accordance with Aboriginal tradition, holds particular knowledge about the Aboriginal cultural heritage and has traditional rights, interests and responsibilities in respect of the Aboriginal cultural heritage (Mott 2023).

Woodside seeks to undertake ethnographic surveys where planned impacts overlap an area where First Nations group has an established cultural jurisdiction over an area of land or sea. Cultural jurisdiction is essential to ensure ethnographic survey participants “in accordance with Aboriginal tradition, hold particular knowledge about the Aboriginal cultural heritage”, and may be established through a number of mechanisms, including prescription under heritage legislation (e.g. Local Aboriginal Cultural Heritage Services under the Western Australian *Aboriginal Cultural Heritage Act 2021*), recognition through the determination of Native Title rights, or through land access agreements including ILUAs or ILUA-like agreements.

Where ethnographic surveys are requested during broader consultation in which a relevant person articulates their cultural jurisdiction, Woodside will assess this request and, where appropriate, undertake surveys. Surveys may not be appropriate, for example, where another party has established cultural jurisdiction or an adequate ethnographic survey has already been carried out over the area.

As ethnographic surveys are dependent on the participation of traditional knowledge holders, it is not possible to meaningfully conduct ethnographic surveys proactively over areas for which cultural jurisdiction is not established or unclear.

To supplement understanding of the area subject to MAC’s cultural jurisdiction nearshore, Woodside commissioned an ethnographic survey to support the Scarborough Project (McDonald and Phillips 2021), including the PAA (See **Table 4-19**). An ethnographic survey determines both the tangible and intangible cultural heritage which may be associated with a particular story, person/peoples, animals, plants, area, features or objects. Typical results from surveys of this nature may include the identification of songlines, ceremonial places such as ‘thalu’ sites for managing environmental resources, or places where activities such as birthing, initiation or other significant activities are performed. As a form of heritage survey, distinct from more general consultation, surveys were limited to discussions of the relevant landscape. However, participants were not restricted in the types of tangible and intangible cultural heritage they were encouraged to identify.

The survey was conducted by MAC as representatives of Traditional Custodians for the onshore and nearshore aspects of the Scarborough Project. MAC appointed their preferred heritage consultants to meet on Country with the MAC Circle of Elders to discuss the project and identify any cultural values (McDonald and Phillips 2021). The resulting report is owned by MAC and was approved by the Circle of Elders prior to being provided to Woodside. Representatives from the Mardudhunera, Ngarluma, Yaburara, Yindjibarndi and Wong-Goo-Tt-Oo Peoples—all five First Nations groups represented by MAC (MAC 2022)—participated in this survey (McDonald and Phillips 2021). The scope of works for this survey defines the purpose of this survey as follows:

The ethnographic consultation aims at providing an understanding of the cultural heritage values associated with the submerged landscape.

Specifically, the survey and reporting will provide Woodside understanding of the cultural values within the coastal, nearshore and offshore proposed Scarborough trunkline and associated works areas.

The scope of the assessment was informed by the Scarborough project’s development footprint as provided in Figure 4-15, however a landscape-scale approach was undertaken, considering heritage

values that may be identified by participants well beyond this footprint. No boundary was imposed on the participants, and participants were not restricted in the types of heritage value they were encouraged to identify. As an indication of the breadth of the cultural landscape that the survey considered, cultural features and heritage values were identified more than 60 km from the development footprint. Participants were shown an introductory video explaining the key parameters of the Scarborough project including the proposed pipeline (McDonald and Phillips 2021).

The survey identified ethnographic sites onshore, but these are outside the PAA and EMBA and hence scope of this EP (McDonald and Phillips 2021). It is not appropriate or practical to request Traditional Custodians to list all ethnographic values onshore which they have not identified as potentially impacted, however some identified in the report included stories related to Eaglehawk Island and several sites at Withnell Bay. Some of these sites have spiritual connections throughout the landscape including to Cape Preston and Depuch Island. It was not proposed in the report that the Project would pose any risk to these sites or values, which are located well outside the EMBA. It was noted that some traditional knowledge of ethnographic values may have been lost through the effects of colonisation generally, and as a result of the Flying Foam Massacre in particular (McDonald and Phillips 2021).



Figure 4-15: Scarborough Development Extent considered in the 2020 ethnographic survey

Source: McDonald and Phillips 2021

Future Ethnographic Surveys

McDonald and Phillips (2021) represents the findings of Phase I of a planned two-part ethnographic survey, and recommends that the Phase II ethnographic survey be initiated. The second phase goes beyond industry standard by engaging with neighbouring First Nations groups to identify potential ethnographic values that traverse traditional group boundaries. Per Appendix F, Table 1, Woodside

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has communicated its commitment to the Phase II survey to MAC on multiple occasions, is ready to progress these at MAC's earliest availability, and believes it has taken all reasonable steps to progress the Phase II survey. MAC has not yet elected to progress this work.

Phase I of the ethnographic survey was run by MAC, and the scope of this survey required "Full recording and significance assessment. The consultant is to provide advice as to whether there are cultural values within and nearby the footprint area..." Discussion with MAC's then CEO has confirmed that MAC do not consider that they have failed to deliver on this scope. The survey was conducted with members of MAC's Circle of Elders, who are recognised as cultural authorities for Murujuga, and the final report was approved by the Circle of Elders prior to being provided to Woodside.

Therefore, Woodside understands the Phase I works to adequately describe and assess the cultural, spiritual, aesthetic and social values held by Traditional Custodians for the project area and surrounding land and seascape. Woodside does not consider the Phase II works to be necessary to the construction of the Scarborough Project.

Woodside has also conducted extensive engagement with appropriate representatives as determined by MAC over the course of several years as well as a number of neighbouring First Nations groups and representatives as detailed in **Section 5**. As reported in **Section 4.9.1.5** this consultation with MAC has resulted in the detailing of cultural values beyond the heritage values that may be identified through ethnographic survey, and in greater detail than the results of ethnographic survey to date. On 21 July 2023, MAC advised by letter that MAC "have no concerns at this point in time" regarding the proposed activities subject to this EP.

Beyond MAC, no First Nations group has articulated cultural jurisdiction over any area of waters subject to impacts from planned activities. BTAC has stated that their Sea Country extends "out to the vast islands off the coast of the Pilbara, including the Monte Bello Islands, Barrow Island, and the Mackerel Islands." These locations are outside of the extent of planned impacts. A review of publicly available literature has been undertaken to seek clarity on the extent of Sea Country for Thalanyji people in **Section 4.9.1.5** and has not identified any areas recorded as Thalanyji Sea Country which overlap the extent of proposed impacts. Woodside has implemented a Thalanyji Sea Country Management Process as described in Section 7.4.

Woodside has offered support, through ongoing consultation, for initiatives proposed by Traditional Custodians to record Sea Country values (see Program of Ongoing Engagement with Traditional Custodians, **Appendix J**).

Woodside engages in ongoing consultation throughout the life of an EP. Should feedback be received (including any relevant new information on cultural values from the Phase II survey or other sources), it will be assessed and, where appropriate, Woodside will apply its Management of Change and Revision process (see **Section 7.8**).

4.9.1.5.3 Consultation Feedback to Inform Existing Environment

Summary of values raised during consultation

A summary of the topics/interests and values raised by First Nations groups through consultations on this Petroleum Activities Program, or raised in context of general Scarborough Project activities or other activities are provided in **Table 4-20**.

First Nations cultural values are communally held. This is reflected in Vision 3 of Dhawura Ngilan that "Aboriginal and Torres Strait Islander heritage is managed... according to community ownership" (Heritage Chairs of Australia and New Zealand 2021). Dhawura Ngilan also specifically notes that "Aboriginal and Torres Strait Islander... intangible knowledge systems, which are held in songlines and language, are endangered. This knowledge is held by Elders and the community..." Through

consultation Registered Native Title Bodies Corporate and nominated representative corporations have identified or raised topics relating to environmental values of cultural interest. Woodside recognises the deep spiritual and cultural connection to the environment⁸ that First Nations people hold.

The Program of Ongoing Engagement with Traditional Custodians (Appendix J) provides a mechanism for ongoing dialogue between Woodside and Traditional Custodians, beyond that required by regulation 11A. The program enables Woodside to manage the potential impacts and risks to cultural values which may be identified at any time during Woodside's activities via ongoing dialogue with Traditional Custodians. As an example, Woodside is developing a framework for ongoing consultation with BTAC and other groups (Appendix J). Should feedback be received (including any relevant new information on cultural values), it will be assessed and, where appropriate, Woodside will apply its Management of Change and Revision process (see **Section 7.8**).

8 Definition of 'Environment' in Regulation 4 of the OPPGS (Environment) Regulations are defined as:

- a) ecosystems and their constituent parts, including people and communities; and
- b) natural and physical resources; and
- c) the qualities and characteristics of locations, places and areas; and
- d) the heritage values of places; and includes
- e) the social, economic and cultural features of the matters mentioned in paragraphs (a), (b), (c) and (d)

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Table 4-20: Feedback Received via Consultation to Inform Existing Environment Description

Relevant First Nation Group /Individuals	Consultation context	Description of Value / Interest	Potential for overlap	
			PAA	EMBA
BTAC representing some of the Gnulli native title claimants (Baiyungu and Thalanyji people)	Raised in context of general Scarborough Project activities	Value: Cultural obligation to care for the environmental values of sea country	Possible (unspecified)	Possible (unspecified)
		Sea country extends “out to the vast islands off the coast of the Pilbara, including the Monte Bello Islands, Barrow Island, and the Mackerel Islands”	No	Possible (unspecified)
Malgana Aboriginal Corporation	Raised in context of general Scarborough Project activities	Interest: Shark Bay environment is unique and has the largest living organism in the world	No	No
		Feature: Stromatolites Interest: Shark Bay contains stromatolites and microbial mats which are amongst the oldest living in the world.	No	No
		Interest: Seagrass For Shark Bay Malgana Aboriginal Corporation stated that they had observed a nearly 25% loss of seagrass from a hypersaline discharge into the bay	No	No
Murujuga Aboriginal Corporation representing Ngarda-Ngarli people (Mardudhunera, Ngarluma, Wong-Goo-Tt-Oo, Yaburara and Yindjibarndi)	Raised in context of Nearshore Scarborough Project activities (MAC 2021 as cited in Woodside 2023)	Value: Mermaid Sound ecosystem health	No	No
		Feature: Whale Value: A whale Thalu is an increase at a totemic site that brings whales into beach	Possible (whale) Possible (unspecified)	Possible (whale) Possible (unspecified)
		Value: Whales and other species of totemic importance need to be protected, including their populations, biodiversity, and migration patterns	Possible (whales) Possible (unspecified; other species)	Possible (whales) Possible (unspecified; other species)
		Value: Whales are culturally important species that migrate through Mermaid Sound. Humpback whales in particular.	No (based on defined location)	Possible
		Feature: Dolphins Value: There are cultural ceremonies associated with communicating with dolphins	Possible (dolphins) Possible (unspecified)	Possible (dolphins) Possible (unspecified)
Feature: Dugongs Value: Are a food source associated with seagrasses near Gidley Island	No No (based on defined location)	Possible (dugongs) No (based on defined location)		

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Relevant First Nation Group /Individuals	Consultation context	Description of Value / Interest	Potential for overlap	
			PAA	EMBA
		<p>Feature: Fish</p> <p>Value: There are Thalu ceremonies associated with increasing fish stocks</p>	<p>Possible (fish)</p> <p>Possible (unspecified)</p>	<p>Possible (fish)</p> <p>Possible (unspecified)</p>
		<p>Feature: Sea snakes</p> <p>Specifically mentioned as culturally important species</p>	<p>Possible (sea snakes)</p>	<p>Possible (sea snakes)</p>
		<p>Feature: Flatback, green, hawksbill, loggerhead and leatherback turtles</p> <p>Turtles are culturally important species that moves through Mermaid Sound. Turtles are most often seen in shallower areas and where there are seagrasses</p> <p>Most beaches are nesting sites for turtles, including those on Gidley and Legendre Islands</p> <p>Value: The songline associated with the turtle comes from Fortescue to Withnell Bay. This song is sung by four or five tribes for day and night without consuming food or water</p>	<p>Possible (turtles)</p> <p>No (based on defined location)</p> <p>No (based on defined location)</p> <p>No (songline geographically restricted nearshore)</p>	<p>Possible (turtles)</p> <p>No (based on defined location)</p> <p>No (based on defined location)</p> <p>No (songline geographically restricted nearshore)</p>
		<p>Feature: Coral</p> <p>Fish are attracted to areas with coral</p> <p>Concerned about coral bleaching because corals are important. Beautiful colours. They also attract a lot of other things</p> <p>Fish carry coral spawn like bees pollinate flowers. If fish were looked after, the corals would get brighter and brighter (by transmitting nutrients and performing other ecosystem services, fish can be symbiotic with corals)</p> <p>Spawning events should be avoided (associated with full moon). Locations identified during consultation include Withnell Bay; Conzinc Bay; south west of Legendre Island</p>	<p>No</p>	<p>No</p>
		<p>Feature: Seagrass</p> <p>Seagrasses provide protection for animals.</p> <p>Locations identified during consultation include Conzinc Island; between Angel and Gidley Island.</p>	<p>No</p>	<p>No</p>

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Relevant First Nation Group /Individuals	Consultation context	Description of Value / Interest	Potential for overlap	
			PAA	EMBA
		Value: Mangroves would have provided shelter, crabbing, digging for shellfish, could be turtle nurseries Locations identified during consultation include Conzinc Bay north end; Flying Foam Passage; Searipple Passage; north-east bay of West Lewis Island	No	No
		Interest: Macroalgal communities, which are important primary production sites, habitats, and food sources (not explicitly identified by elders) Interest: Subtidal soft-bottom communities, which support invertebrate diversity (not explicitly identified by elders) Interest: Intertidal sand and mudflat communities, which are important primary production sites, support invertebrate diversity and provide food for shorebirds (not explicitly identified by elders) Interest: Rocky shores, which are habitats for intertidal organisms and provide food for shorebirds (not explicitly identified by elders)	No Yes No No	No Yes No No
		Feature: Fish traps There are known fish traps in Conzinc Bay, and others would have or do exist in coastal areas of islands, such as Angel and Gidley Islands. People still use the Conzinc Bay fish traps regularly for catching mangrove jack, trevally and other fish Value: Squidding (harvesting of squid from the ocean) around Conzinc Island	No No No	Possible (submerged) No (based on defined location) No
Nanda Aboriginal Corporation	Raised in a general context not specific to an EP/ Project.	Interest: Shorelines Asserted the importance of shorelines culturally and asked what would be done in the event of an oil spill to protect the shoreline	No	No
	Raised in context of general Scarborough Project activities	Interest: Whales – query regarding potential impacts to whales	Possible (whales)	Possible (whales)
Nganhurra Thanardi Garrbu Aboriginal	Raised specific to PAP (See	Interest: Whales - query regarding noise impacts, monitoring and operational responses to whale sightings	Possible (whales)	Possible (whales)

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Relevant First Nation Group /Individuals	Consultation context	Description of Value / Interest	Potential for overlap	
			PAA	EMBA
Corporation representing Baiyungu and Thalanyji people	Appendix F; Table 1) Raised in context of general Scarborough Project activities			
	Raised in context of decommissioning activities	Interest: Whale sharks – query regarding activity timing	Possible (whale sharks)	Possible (whale sharks)
		Interest: Marine parks – query regarding risks from activity in relation to decommissioning	No	Yes
Ngarluma Aboriginal Corporation (NAC)	No values raised	-	-	-
Ngarluma Yindjibarndi Foundation Ltd (NYFL)	No values raised	-	-	-
Robe River Kuruma Aboriginal Corporation (RRKAC)	Raised in context of general Scarborough Project activities	Feature: Underwater heritage	No	Possible
Save Our Songlines, ██████████ ██████	Raised specific to PAP (See Appendix F; Table 1) Raised in context of general Scarborough Project activities	Feature: Songlines, dreaming and energy lines ⁹ (unspecified)	Possible (unspecified)	Possible (unspecified)
		Feature: Whales – including migratory patterns	Possible	Possible
		Interest: Turtles – including migration patterns	Possible	Possible
		Interest: Dugongs - unspecified	No	Possible
		Interest: Plankton - unspecified	Possible	Possible
		Interest: Seagrass - unspecified	No	No
		Interest: where saltwater and freshwater meet	No	Possible (submerged)

██████████ and Save our Songlines have referred to and described Energy Lines which Woodside understands to be the same as Songlines. This document will refer to songlines from this point forward

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Relevant First Nation Group /Individuals	Consultation context	Description of Value / Interest	Potential for overlap	
			PAA	EMBA
	Raised in Concise Statement and Affidavit ³¹⁰ in context of Scarborough seismic activities	<p>Value: Caring for Country</p> <p>██████ asserts holders of women’s lore with cultural obligations to protect, preserve and promote the environment, animals and plants threatened by the Activity (specific to Seismic)</p> <p>██████ asserts the spiritual health and wellbeing of Murujuga and all the plants and animals present on Murujuga and connected to the songlines in and around Murujuga</p>	Possible (unspecified)	Possible (unspecified)
		<p>Feature: Whales</p> <p>██████ asserts the following values:</p> <p>“Whales carry important songlines, the whale Dreaming, and connection between land and sea”</p> <p>“As the biggest animal on earth, the whale has the greatest heart connection to songlines, people and animals and carries the songlines around the ocean, connecting places.”</p> <p>“Whale Dreaming story has a strong connection to the heart centre in each person, this story helps people to open up and to realise, understand and raise awareness of the environment and everything humans are connected to.”</p> <p>“In their own families, female whales have a caretaker or midwife role, and those who are connected to the Whale Dreaming and carry the women’s lore also have obligations as caretakers of the earth.”</p> <p>“The women’s lore that ██████ and ██████ carry is the songline of the whale, which is important for sustaining the creation of all animals and humans.”</p> <p>“██████ and ██████ connect to the whales like this through their songlines, they sing to the whales, the whales feel that song and the connection through their hearts, regardless of the distance.”</p> <p>“the whales tell ██████ and ██████ a story, and ██████ and ██████ are the people who feel and who are connected to that story. ██████ and ██████ have that feeling of connection inside them all the time, they live and breathe it, they are in and everything about it.”</p>	Possible (whales) Possible (songlines, unspecified)	Possible (whales) Possible (songlines, unspecified)

¹⁰ [Cooper v NOPSEMA: Online File \(fedcourt.gov.au\)](https://www.fedcourt.gov.au)

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Relevant First Nation Group /Individuals	Consultation context	Description of Value / Interest	Potential for overlap	
			PAA	EMBA
		"Because each animal uses songlines for migration, breeding and feeding, the disruption or distortion to the songlines causes the animals to become disoriented, confused or lost."		
		Interest: Whales Interest: Pygmy Blue whales "Potential impacts on marine species and natural environment, relevant to the natural environment, relevant to the Applicant's interests, including but not limited to ii. behavioural changes (leaving or avoiding the area where the Activity occurs) to turtles, pelagic fish (such as tuna and billfish), sharks, pygmy blue whales iii. whales' sonar communications systems, particularly between mothers and calves, from sound and vibrations emitted by the Activity v. potential impacts on water quality and consequent potential impacts on marine fauna such as whales, dugongs, sharks, rays, and seabirds from the risk of unplanned chemical discharges (non-hydrocarbon); and vi. vehicle collision and/ or entanglement with marine fauna"	Possible (whales)	Possible (whales)
		Interest: Turtles "Other animals, such as turtles, dolphins, dugongs, and krill follow the whale's songlines, because they're all connected together - the whale creates a path for the other animals like 'grading a road'." "Potential impacts on marine species and natural environment, relevant to the natural environment, relevant to the Applicant's interests, including but not limited to: ii. behavioural changes (leaving or avoiding the area where the Activity occurs) to turtles, pelagic fish (such as tuna and billfish), sharks, pygmy blue whales v. potential impacts on water quality and consequent potential impacts on marine fauna such as whales, dugongs, sharks, rays, and seabirds from the risk of unplanned chemical discharges (non-hydrocarbon); and vi. vehicle collision and/ or entanglement with marine fauna"	Possible (turtles)	Possible (turtles)
		Interest: Dugongs	No (dugong)	Possible (dugong)

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Relevant First Nation Group /Individuals	Consultation context	Description of Value / Interest	Potential for overlap	
			PAA	EMBA
		<p>“Potential impacts on marine species and natural environment, relevant to the natural environment, relevant to the Applicant's interests, including but not limited to:</p> <p>v. potential impacts on water quality and consequent potential impacts on marine fauna such as whales, dugongs, sharks, rays, and seabirds from the risk of unplanned chemical discharges (non-hydrocarbon)”</p>		
		<p>Interest: Pelagic fish</p> <p>“Potential impacts on marine species and natural environment, relevant to the natural environment, relevant to the Applicant's interests, including but not limited to:</p> <p>ii. behavioural changes (leaving or avoiding the area where the Activity occurs) to turtles, pelagic fish (such as tuna and billfish), sharks, pygmy blue whales”</p>	Possible (fish)	Possible (fish)
		<p>Interest: Sharks</p> <p>“Potential impacts on marine species and natural environment, relevant to the natural environment, relevant to the Applicant's interests, including but not limited to:</p> <p>ii. behavioural changes (leaving or avoiding the area where the Activity occurs) to turtles, pelagic fish (such as tuna and billfish), sharks, pygmy blue whales</p> <p>v. potential impacts on water quality and consequent potential impacts on marine fauna such as whales, dugongs, sharks, rays, and seabirds from the risk of unplanned chemical discharges (non-hydrocarbon)”</p>	Possible (sharks)	Possible (sharks)
		<p>Interest: Plankton</p> <p>“Potential impacts on marine species and natural environment, relevant to the natural environment, relevant to the Applicant's interests, including but not limited to:</p> <p>i. chronic mortality to some marine organisms, including zooplankton</p>	Possible	Possible
		<p>Interest: Water quality</p> <p>“Potential impacts on marine species and natural environment, relevant to the natural environment, relevant to the Applicant's interests, including but not limited to:</p>	Yes	Yes

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Relevant First Nation Group /Individuals	Consultation context	Description of Value / Interest	Potential for overlap	
			PAA	EMBA
		iv. potential operational discharges associated with the presence of ships in the area, including potential impacts to water quality v. potential impacts on water quality and consequent potential impacts on marine fauna such as whales, dugongs, sharks, rays, and seabirds from the risk of unplanned chemical discharges (non-hydrocarbon)		
		Interest: Seabirds "Potential impacts on marine species and natural environment, relevant to the natural environment, relevant to the Applicant's interests, including but not limited to: v. potential impacts on water quality and consequent potential impacts on marine fauna such as whales, dugongs, sharks, rays, and seabirds from the risk of unplanned chemical discharges (non-hydrocarbon)	Possible	Possible
		Interest: Where saltwater and freshwater meet "The places where the saltwater from the sea and the freshwater from the land connect are where the biggest energy lines ¹¹ are, and that connection is a core of creation relevant to a Dreaming story."	No	Possible
		Value: Rock Art "Rocks at Murujuga symbolise stories, the totems (the depicted artwork) - whether representing plants or animals - and tell a story of their history, and how long they've been there."	No	Possible (submerged)
		Value: Bungarra, Eagle, Kangaroo Identified totemic species	No	No
		Interest: Murujuga "When ██████ and ██████ and their people stand on Country they are connected to their songlines through the rocks. As holders of women's lore, ██████ and ██████ put healing energy into the rocks and use that to heal the songlines." ██████ and ██████ connect to their bloodline, old people and songlines through Country, including the rocks at Murujuga, which are	No	No

¹¹ ██████ and Save our Songlines have referred to and described Energy Lines which Woodside understands to be the same as Songlines. This document will refer to songlines from this point forward

Relevant First Nation Group /Individuals	Consultation context	Description of Value / Interest	Potential for overlap	
			PAA	EMBA
		encrypted with ancient stories that keep connection to the bloodline and songlines alive and well."		
Wirrawandi Aboriginal Corporation representing Ngarda-Ngarli (Mardudhunera and Yaburara)	Raised in context of general Scarborough Project activities	Interest: Whales - query with regard to whale migration and timing of Project activities; impact of noise on whale communication	Possible	Possible
		Interest: Turtles - query with regard to turtle monitoring programs	Possible	Possible
		Interest: Underwater heritage – query with regard to where sites have been recently found	No	Possible
	Raised in context of decommissioning activities	Interest: Rock Art – query whether air emissions from activities impacts rock art and controls to minimise potential impacts	No	No
Yamatji Marlpa Aboriginal Corporation (YMAC)	No values raised	-	-	-
Yindjibarndi Aboriginal Corporation	No values raised	-	-	-
Yinggarda Aboriginal Corporation representing Yinggarda People.	Raised in context to Scarborough project activities.	Interest: Whales – query with regard to potential impacts to whale migration patterns and impacts from vessel collision	Possible	Possible
		Value: Shark Bay Mullet – important resource	No (coastal species)	No (coastal species)
		Interest: Dugong – raised in context of Shark Bay	No (geographically limited)	No (geographically limited)
		Interest: Seagrass being food source for Dugong	No	No

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Further Information regarding BTAC's Sea Country values

During consultation, BTAC, on behalf of the Thalanyji People, advised it has a cultural obligation to care for the environmental values of Sea Country (refer to **Appendix F**, Table 1).

In correspondence from 20 February 2023 relating to the Scarborough Project, BTAC advised that:

- BTAC seeks support from Woodside to enable BTAC to define and articulate its values on Sea Country in a manner that could be more clearly understood by the offshore sector, government, and the community. This would enable BTAC and Woodside to collaborate to develop effective management plans that can provide adequate protection to Sea Country values; and
- BTAC seeks support from Woodside to obtain technical support to review the information and provide BTAC and its members with feedback on the project risks to Sea Country and help BTAC contemplate the potential management controls that could be developed to protect its values and interests

These requests do not constitute a request for ethnographic survey. Woodside has agreed to BTAC's request, and the resulting offer of technical support is detailed in **Appendix F**, Table 1. However, Woodside's offer for technical support has not yet been accepted.

BTAC noted that this Sea Country extends "out to the vast islands off the coast of the Pilbara, including the Monte Bello Islands, Barrow Island, and the Mackerel Islands." In the absence of further advice from BTAC, Woodside understands from this description that BTAC's interests extend to the Montebello Marine Park Multiple Use Zone in the vicinity of the islands.

While an ethnographic survey has not been requested by BTAC, a review of publicly available literature has been undertaken to seek clarity on the extent of Sea Country for Thalanyji people. This review identified a number of heritage research projects undertaken for the Montebello and Barrow Islands which acknowledge the support of BTAC (e.g., Manne and Veth 2015, Veth et al. 2017), though no information regarding Sea Country values, or the extent of Sea Country, were identified.

Publicly available heritage assessment reports elsewhere on Thalanyji Country tend to rely on established native title boundaries (e.g., Chisholm 2013) or draw on historic maps, particularly those compiled by Norman Tindale and published in 1947 (e.g., Hook et al. 2020).

An early 1940's map by Tindale shows "Talandji" (Thalanyji) Country as exclusively terrestrial and further west than areas typically recognised today as Thalanyji Country (Tindale 1940). This map also shows the Noala people as custodians of the Onslow area and defines Barrow and the Montebello Islands as "Mardudunera" (Mardudhunera) Country—it is unclear from the map if the boundary of Mardudhunera is proposed to represent an extent of Sea Country, or merely note that these islands are part of Mardudhunera Country.

A further refined version of this map was produced in 1974 which shows "Talandji" in a location more closely aligned with contemporary understanding of Thalanyji Country and removes the apparent extent of Mardudhunera over Barrow and the Montebello Islands (Tindale 1947). This definition of Thalanyji Country is still confined to the mainland in this map.

A more contemporary attempt at mapping traditional country is shown in The AIATSIS Map of Indigenous Australia (Horton 1996). This map similarly confines Thalanyji Country to terrestrial areas west of Onslow and leaves Barrow and the Montebello Islands unmarked as an area with "No published information available". It is also noted that "This map is based on data collected up to 1994 and is not intended to show precise areas or boundaries" (Horton 1996).

Collective assessments of Sea Country in the Pilbara (Lincoln and Hedge 2019, YMAC et al. 2010) were also found to rely on existing native title boundaries. It is noted in the Pilbara Sea Country Plan (YMAC et al. 2010) that:

Although some differences remain, between and among native title groups, there is now a general sense that most groups have coalesced into final forms that will, in future, be the groups that exercise rights and interests in their respective areas. many of these rights and interests will relate directly to native title. however, there is also a more broadly based appreciation of the need to accept and discharge responsibilities for land and marine management within native title areas regardless of whether native title per se is affected. (YMAC et al. 2010, emphasis added).

The office of the Registrar of Indigenous Corporations records four corporations using the name Thalanyji:

- Buurabalayji Thalanyji Aboriginal Corporation
- Buurabalayji Thalanyji Aboriginal Corporation RNTBC
- Onslow Thalanyji Aboriginal Corporation
- Wurrumalu Thalanyji Aboriginal Corporation

The only currently operative organisation, and the only organisation with an identified website, is Buurabalayji Thalanyji Aboriginal Corporation RNTBC. This website states that "Thalanyji Country spreads out across the Ashburton River coastal plain south to Tubridji Point, then across to Yannarie River and upstream to Emu Creek, across the range hills of southwest Pilbara to Henry River and Cane River in the north." (BTAC 2021) This description includes coastal areas but provides no description of the extent of Sea Country.

A search of the National Native Title Tribunal register of applications and determinations identified four historic Native Title claims with the name Thalanyji:

- Thalanyji People (WC1995/002)
- Thalanyji People #2 (WC1996/082)
- Thalanyji (WC1999/045)
- Thalanyji 2 (WC2010/004)

Most of these claims were dismissed, and Woodside makes no assessment of the merits of these claims.

The area of WC1995/002, as defined in the map forming Attachment 1 to the Native Title Application,¹² does not include any areas of Sea Country.

WC1996/082 does not include a publicly available map on the National Native Title Tribunal website. The Native Title Application¹³ does describe the area covered by the claim, including "This country extends from the Tubridji Point on the coast south west of Onslow and tracking south to Yanarrie River." and "The area also includes the waters and associated islands between Tubridji point and Cane River. These islands were visited by Thalanyji People." The extent of this Sea Country from the coast is unclear, but would presumably include islands as distant as Airlie Island, approximately 30 km from the shore.

¹²http://www.nntt.gov.au/searchRegApps/NativeTitleClaims/NTDA%20Extracts/WC1995_002/Attachment%20A-%20Thalanyji%20Map.pdf

¹³http://www.nntt.gov.au/searchRegApps/NativeTitleClaims/NTDA%20Extracts/WC1996_082/SNTAExtract_WC1996_082.pdf

The area of WC1999/045, as defined in the map forming Attachment C to the Native Title Application,¹⁴ includes an area of water extending approximately 30 km from the mainland coast in encompassing a number of islands, including:

- Airlie Island
- Ashburon Island
- Bessieres Island
- Direction Island
- Flat Island
- Locker Island
- Round Island
- Serrurier Island
- Table Island
- Thevenard Island
- Tortoise Island, and
- the Twin Islands

The area also includes the south-most of the Mangrove Islands, but does not include the other Mangrove Islands.

The area of WC2010/004, as defined in the map forming Attachment C to the Native Title Application¹⁵ includes localised areas of sea up to approximately 5 km beyond the coast.

Woodside has developed a robust understanding of Thalanyji Sea Country cultural values and heritage features through publicly available information (**Section 5.2**) and consultation with BTAC under Regulation 11A. Woodside considers that it has taken all reasonable and practicable steps to identify cultural features and heritage values of Thalanyji people in the EMBA.

If further guidance from BTAC is received as part of ongoing consultation which changes Woodside's understanding of the extent of Thalanyji Sea Country, Woodside's Management of Change and Management of Knowledge process with EPO 28 will be applied to manage potential impact to newly identified cultural values or features to ALARP and Acceptable levels. This estimation does not limit the extent of consultation with BTAC or the features and values they are encouraged to identify and communicate.

4.9.1.5.4 Summary of cultural features and heritage values

Woodside has developed a robust understanding of cultural features and heritage values relevant to the activity through examination of publicly available information, studies and consultation with relevant persons under regulation 11A.

Table 4-21 consolidates the cultural features and heritage values identified in **Section 4.9.1.5.4** and confirms whether there is any potential for these to exist within the PAA or EMBA. As previously described topics which have been raised in the context of an interest linked to the natural environment are impact and risk assessed in **Section 6.7** and **6.8**.

¹⁴ http://www.nntt.gov.au/searchRegApps/NativeTitleClaims/NTDA%20Extracts/WC1999_045/1999_11_09%20Attachment%20B%20Map%20of%20Claim%20Area.pdf

¹⁵ http://www.nntt.gov.au/searchRegApps/NativeTitleClaims/NTDA%20Extracts/WC2010_004/WC2010_004%202.%20Map%20of%20Application%20Area.pdf

As cultural features are physical elements of a place, these can generally be assessed for impacts; where a feature is avoided, it is not impacted. Heritage values relate less to what is significant and more to why something is significant; interaction between heritage values and the PAA can only be reliably informed by consultation with Traditional Custodians where they are willing to share the necessary knowledge. Assessment of heritage values beyond cultural features alone is addressed in **Section 6.10** subject to these caveats.

Table 4-21: Summary of cultural features and heritage values

Identified cultural features and heritage values	Context	EP Source				Potential for overlap	
		Consultation Feedback	First Nations Archaeological Heritage Assessment	Ethnographic Heritage Assessment	Desktop Literature Assessment	PAA	EMBA
Archaeological Heritage and Landscapes							
Petroglyphs	Petroglyphs are a form of rock art. Petroglyphs are a prominent feature particularly at Murujuga where it is found on hard, volcanic rock.	✓	X	✓	✓	No	Possible (submerged)
Fish traps	Stone arrangements constructed in intertidal areas which fill with fish at high tide and trap them at low tide.	✓	X	X	✓	No	Possible (submerged)
Submerged archaeological sites	The Ancient Landscape extends between 125m and 130m below current sea level. Ancient occupation of this area may have left traces through now submerged archaeological sites.	✓	X	X	✓	No	Possible
Waterholes and seeps	Water sources on the Ancient Landscape which may be culturally significant or archeologically prospective. Traditional knowledge retains knowledge of some water sources on the Ancient landscape and some submerged waterholes are related to a Kangaroo songline.	X	X	X	✓	No	Possible
Intangible values							

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Identified cultural features and heritage values	Context	EP Source				Potential for overlap	
		Consultation Feedback	First Nations Archaeological Heritage Assessment	Ethnographic Heritage Assessment	Desktop Literature Assessment	PAA	EMBA
Songlines	Ethnographic survey noted dreaming tracks from locations onshore and to islands outside of the EMBA, but was not able to determine the routes of any dreaming tracks that may extend across the submerged landscape.	✓	X	✓	✓	Possible (unspecified)	Possible (unspecified)
Creation/ dreaming sites, sacred sites and ancestral beings	Ethnographic survey noted some sites associated with creation/dreaming or ancestral beings are known on land outside the EMBA. Publicly available literature talks to creation/dreaming and ancestral beings, including water serpents, connected to or originating from the sea generally.	✓	X	✓	✓	Possible (unspecified)	Possible (unspecified)
Cultural obligations to care for Country	Cultural obligation to care for the environmental values of Sea Country. Exclusion of Traditional Custodians from Sea Country or decision making processes may inhibit ability to care for Country.	✓	X	X	✓	Possible (unspecified)	Possible (unspecified)
Knowledge of Country/ customary law and transfer of knowledge	The preservation and transmission of knowledge is dependent on the preservation of the environment generally. Exclusion of Traditional Custodians from Sea Country may inhibit the transfer of knowledge.	✓	X	✓	✓	Possible (unspecified)	Possible (unspecified)

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Identified cultural features and heritage values	Context	EP Source				Potential for overlap	
		Consultation Feedback	First Nations Archaeological Heritage Assessment	Ethnographic Heritage Assessment	Desktop Literature Assessment	PAA	EMBA
Connection to Country	Connection to Country is described in publicly available literature as "important to the Traditional owners' spirituality and religion". Connection to Country may be damaged where people are displaced or disrupted (e.g. during colonisation) or where there is a loss of technical skills or environmental knowledge	✓	X	X	✓	Possible (unspecified)	Possible (unspecified)
Access to Country	Limitations on Traditional Custodians accessing or enjoying areas of Sea Country	✓	X	X	✓	Possible (unspecified) – Unlikely due to distance offshore	Possible (unspecified)
Kinship systems and totemic species	Traditional Custodians have connection to species through kinship and totemic systems. An individual may have obligation to care for or not consume a species to which they are kin.	✓	X	X	✓	Possible	Possible
Resource collection	Fishing, hunting, gathering of marine species including marine mammals, marine reptiles, fish and invertebrates.	✓	X	X	✓	No	Possible
Marine ecosystems and species							
Water quality	Interest only, raised as a natural environment interest	✓	X	X	X	Yes	Yes
Marine species	Generally raised in consultation and literature	✓	X	X	✓	Possible	Possible

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Identified cultural features and heritage values	Context	EP Source				Potential for overlap	
		Consultation Feedback	First Nations Archaeological Heritage Assessment	Ethnographic Heritage Assessment	Desktop Literature Assessment	PAA	EMBA
Marine mammals: Whales	Generally raised in consultation Thalu species of totemic importance Linked to songlines and dreaming stories Humpback whales in particular	✓	X	X	X	Possible	Possible
Marine mammals: Dolphins	Cultural ceremonies associated with communicating with dolphins Culturally important species	✓	X	X	✓	Possible	Possible
Marine mammals: Dugongs	Culturally important species Used as a resource	✓	X	X	✓	No	Possible
Marine reptiles: Marine turtles	Culturally important species and migration There are Thalu ceremonies associated with turtles Turtles and turtle eggs as a resource Law run through the sea, including turtles	✓	X	X	✓	Possible	Possible
Marine reptiles: Sea snakes	Culturally important species	✓	X	X	X	Possible	Possible
Fish: Fish, sharks	Culturally important species Used as a resource Law run through the sea, including fish There are Thalu ceremonies associated with increasing fish stocks Fish are totemic species Fish, including sharks and rays raised as a natural environment interest	✓	X	X	✓	Possible	Possible
Seabirds	Culturally important species Birds (including shags, seagulls and osprey) and bird eggs as a resource	✓	X	X	✓	Possible	Possible

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Identified cultural features and heritage values	Context	EP Source				Potential for overlap	
		Consultation Feedback	First Nations Archaeological Heritage Assessment	Ethnographic Heritage Assessment	Desktop Literature Assessment	PAA	EMBA
Plankton	Interest only, raised as a natural environment interest	✓	x	x	x	Possible	Possible
Benthic habitats: Epifauna and infauna	Interest only, subtidal soft bottom communities raised as a natural environment interest.	✓	x	x	x	Yes	Yes
Marine Park	Interest only	✓	x	x	x	No	Yes

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Further context: Archaeological heritage

Assessment of the PAA has not identified archaeological sites. Consultation with Traditional Custodians has not identified any Aboriginal cultural features or heritage values specifically associated with the PAA.

No archaeological sites have been identified beyond terrestrial or intertidal areas, with the exception of two sites at Murujuga in Cape Bruguieres channel and Flying Foam Passage (Benjamin et al. 2020; Benjamin et al 2023), which are outside of the EMBA. However, it is recognised that there is the potential for submerged archaeological sites on the Ancient Landscape which is overlapped by the EMBA.

Archaeological sites identified onshore with the potential to exist in intertidal or submerged locations include petroglyphs, fish traps and artefact scatters or burials contained within sand dunes. As archaeological sites, these features have archaeological value which relates to the preservation of their fabric (i.e. the tangible features) and their context (i.e. their location and relationship to other archaeological and natural features). Archaeological sites may also have intangible dimensions (ICOMOS 2013). Cultural values that exist in addition to their archaeological or scientific value and are assessed separately.

Publicly available literature also noted traditional knowledge for underwater waterholes (Kearney et al 2023) and freshwater seeps (Statton et al 2021). In addition to the non-archaeological values of these features, water sources on the ancient landscape may have been focuses for human occupation and thus be more prospective for human occupation (Veth 2019).

Further context: Intangible cultural heritage

Intangible cultural heritage has been identified through consultation with First Nations people as culturally important. 4.9.1.5.3. Cultural knowledge, as expressed through songlines, dreaming, dance and other cultural practices, can be associated with tangible objects and physical sites that are culturally important to First Nations people (Ardler 2021; Bursill et al. 2007). Intangible cultural heritage can also be embodied in the practices, representations, expressions, knowledge, uses and skills associated with physical sites (UNESCO 2003). As a result, physical features may have intangible dimensions (ICOMOS 2013).

In terms of identified cultural features and heritage values related to intangible values summarised in **Table 4-21**, see below some additional context:

- **Songlines:** Oral Songlines are often described by First Nations people as the law of the land and make up part of the Dreaming (Neale and Kelly 2020:30). Songlines are viewed in Western academia as a framework for relating people to land and consist of a series of invisible, interconnected routes across the landscape that mark significant sites for First Nations people (Higgins 2021:723). Songlines demonstrate First Nations peoples' strong connections to land by revealing sacred knowledge that is place-specific (Roberts 2023:5). The land's physical features are instrumental in maintaining songlines because this is how ancestral spirits journeyed through, and interacted with, the physical landscape leaving sacred knowledge behind. The interconnection between the physical and spiritual is where songlines become intrinsically tied to significant places across Country. As a result, geographical landforms are recorded within songlines and become sacred places. Such landforms can include inter alia: rocks, mountains, rivers, caves and hills (Higgins 2021:724). Songlines can become lost, fragmented or broken when there is a loss of Country or forced removal from Country (Neale and Kelly 2020:30). Physical sites that have been identified as comprising a component of a songline are important to protect to prevent the fragmenting or breaking apart of songlines and loss of sacred cultural knowledge.

In Australia, songlines can stretch thousands of kilometres, making up a complex and organic network of stories containing cultural knowledge of First Nations communities across the land

(Neale and Kelly 2020:35). Songlines can also extend out to Sea Country and contain cultural knowledge that is tied to geographic features, atmospheric phenomena and marine plants and animals. Often songlines containing references to a seascape or Sea Country make mention of mythical events occurring around marine life, fishing areas, submerged rocks or coral. Songlines that embody seascapes can reflect how a group may relate to, or value, Sea Country—for example connections to nearby islands that they once inhabited in their songlines (Smyth and Isherwood 2016:307). Songlines can also be used as proof of long-standing connection to land and support a legal entitlement to land rights (Higgins 2021:74). Examples where songlines contain strong references to Sea Country are more common in Pacific Islander and Torres Strait Islander communities, who often refer to seascapes and skylines in their songlines in order to communicate sacred knowledge that assists in safe navigation of the ocean (Neale and Kelly 2020:83-84). The routes of any songlines in the EMBA have not been provided by Traditional Custodians through consultation.

- Creation/dreaming sites, sacred sites and ancestral beings: The only sources located by Woodside with detailed descriptions of the location ancestral beings or creation/ dreaming/ sacred sites placed these on land or within inland water sources such as rivers or pools. However, some ancestral beings are noted to live within or originate from the sea generally, and some creation stories talk to the creation of features from or in the sea. Additionally, every place on shore or at sea must be assumed to have been created on some level in First Nations cosmology.
- Cultural obligations to care for Country: Caring for Country collectively refers to the cultural obligations of individuals and groups, as well as rituals and ceremonies required for the physical and spiritual health of the environment. In the literature reviewed by Woodside, caring for Country was noted to include, but is not limited to, maintenance of the physical environment and ecosystem. It may also have cultural, spiritual and ritual dimensions such as caring for ancestral beings or ensuring cultural safety. Thalu are places where increase ceremonies are performed to enhance or maintain populations of plants, animals or phenomena. All mentions of active ceremonial sites were confined to onshore locations, though the values may extend offshore where e.g., a thalu relates to marine species populations.
- Knowledge of Country/customary law and transfer of knowledge: Knowledge of and familiarity with the features of Sea Country is itself a value. The inherent potential for restricted or secret knowledge makes this difficult to assess even through consultation with Traditional Custodians. However, aspects such as limitations on access to sites or disruption/relocation of First Nations communities may have implications for the preservation of First Nations knowledge. Further, connection to Country may be damaged where people are displaced or disrupted (e.g., during colonisation) or where there is a loss of technical skills or environmental knowledge (McDonald and Phillips, 2021). Transfer of knowledge includes continuing traditional practices to pass on practical skills. This transfer of knowledge may be integral to managing a group’s intangible cultural heritage (UNESCO 2003).
- Connection to Country: Describes the multi-faceted relationship between First nations people and the landscape, which is envisioned as having personhood and spirit. It is also an aspect of personal identity for many First nations people. In the case of Sea Country this can mean identifying as a Saltwater person, where “essence of being a 'Saltwater' person is ontological... it is about how people relate spiritually to the sea and engage with spiritual forces that created it, the marine flora and fauna and people” (McDonald and Phillips, 2021).
- Access to Country, including Sea Country: Is necessary for the continuation of other values including caring for Country and the transfer of traditional knowledge. Being on Country can be an important way of expressing or maintaining connection to Country (Australian Indigenous HealthInfoNet n.d.). Access is also a value in its own right, as a continuation of traditional Sea Country access and use.

- Kinship systems and totemic species: Individuals may have kinship to specific species (Smyth 2008, Juluwarlu 2004) and/or a responsibility to care for species (Muller 2008). Kinship arises from totemic associations within First Nations “skin group” systems. It is forbidden for an individual to kill or eat a species who is from the same “skin group” (Juluwarlu 2004). They may also have certain obligations linked to the discussion of caring for Country below. It is assumed that marine species may have kinship/totemic relationships to Traditional Custodians, but it is understood that these relationships do not prohibit people outside of that “skin group” from hunting or eating that same species (Juluwarlu 2004).
- Resource collection: A number of marine species are identified through consultation and literature as important resources, particularly as food sources. In addition to their immediate value as sustenance, the gathering and preparation of these resources is informed by cultural knowledge, and an inability to use these resources may result in a loss of ability to transfer that knowledge to future generations.

Further context: Marine ecosystems and species

First Nations people have raised through consultation that they have a general interest in environmental management and ecosystem health (i.e., natural environment interest), where a group/individual was seeking further information about potential impacts and risks from the Petroleum Activities Program on marine species and benthic communities in the PAA and EMBA. This includes marine mammals, marine reptiles, fish, seabirds, plankton, benthic habitats and marine parks, which are described in context of their distribution and populations in **Section 4.6**, with further details in **Appendix I** (Master Existing Environment).

In terms of identified cultural features and heritage values related to marine ecosystems and species summarised in **Table 4-21**, see below some additional context:

- **Marine mammals:** Whales, and in particular humpback whales, have been identified through consultation with First Nations people as culturally important species, with totemic importance including their populations, biodiversity, and migration patterns. Cultural ceremonies associated with communicating with dolphins have also been raised by MAC through consultation and dugongs predominantly as a resource. Details pertaining to whales, dugongs and dolphins, their distribution, migration patterns and populations are described in **Section 4.6**, with further details in **Appendix I** (Master Existing Environment).
- **Marine reptiles:** Turtles and sea snakes have been identified through consultation with First Nations people as culturally important species, with turtles identified as a resource. First Nations people that identify marine reptiles as species of totemic importance or integral to songlines may place high cultural value on their protection. No marine reptile related songlines have been identified that have the potential to interact with the PAA or EMBA. Note the only songline related to marine reptiles (turtles) was shared by MAC, and was geographically restricted from Fortescue to Withnell Bay, in Mermaid Sound (MAC 2021). Cultural knowledge of turtles at a population level (turtle migration, behaviour and the related marine environment) may all be important in ensuring the continuation of cultural functions and activities that remain valuable to First Nations people (Fijn 2021:47; Delisle et al.2018). Details pertaining to marine reptiles, their distribution, and populations are described in **Section 4.6**, with further details in **Appendix I** (Master Existing Environment).
- **Fish:** Fish have been identified through consultation with First Nations people as a culturally important species, with fish generally being identified as a resource. First Nations may identify cultural values associated with fish species as important to maintaining both tangible (physical cultural sites) and intangible (cultural knowledge) cultural heritage. Tangible cultural heritage associated with fish can include important cultural sites such as midden sites, fish traps and thalu sites. Thalu are places where these increase ceremonies are performed. Details

pertaining to fish are described in **Section 4.6**, with further details in **Appendix I** (Master Existing Environment).

- **Seabirds:** Seabirds, and in particular shags, have been identified through literature as a culturally significant species (Malgana Land and Sea Management et al. (2021), as well as a resource (seabird eggs; Smyth 2007). Details pertaining to seabirds and migratory shorebirds are described in **Section 4.6**, with further details in **Appendix I** (Master Existing Environment).

4.9.1.6 Historic Sites of Significance

There are no known sites of historic heritage of significance within the PAA. **Appendix I** describes cultural heritage sites within the EMBA.

4.9.1.7 Historic Underwater Heritage

A search of the Australasian Underwater Cultural Heritage Database, which records all known Maritime Cultural Heritage (shipwrecks, aircraft, relics and other underwater cultural heritage) in Australian waters does not contain records of sites within the PAA but does include seven sites within the EMBA. The closest Underwater Cultural Heritage site is the wreck of the Wild Wave, a Chinese sailing vessel which sank off the Montebello Islands, approximately 191 km east of the PAA.

4.9.1.8 World, National and Commonwealth Heritage Listed Places

No listed world, national or commonwealth heritage places overlap the PAA or EMBA.

4.9.2 Commercial Fisheries

A number of Commonwealth and State fishery management areas are located within the PAA and EMBA. FishCube and ABARES data were requested to analyse the potential for interaction of fisheries with the PAA, which was used to determine which fisheries may be impacted by proposed petroleum activities (REF ABARES, Department of Primary Industries and Regional Development [DPIRD], 2021)¹⁶. **Table 4-22** provides an assessment of the potential interaction provides further detail on the fisheries that have been identified through desk-based assessment and consultation (**Section 5**). No fisheries were identified as having a potential interaction with the Petroleum Activities Program in the Operational Area.

Table 4-22: Commonwealth and State commercial fisheries overlapping the PAA and EMBA

Fishery	Potential for interaction		
	PAA	EMBA	Description
Commonwealth Managed Fisheries			
North West Slope Trawl Fishery	*	✓	The North West Slope Trawl Fishery management area overlaps the EMBA. Fishery Status Report 2022 indicates current fishing effort is concentrated from Barrow Island to Broome, and occurred within the EMBA in the 2021–2022 season (ABARES, 2021). Accordingly, Woodside considers it a possibility that interactions with the fishery may occur in the EMBA.
Western Deepwater Trawl Fishery	*	✓	The Western Deepwater Trawl Fishery management area overlaps the PAA and the EMBA. Fishery Status Report 2022 indicates current fishing effort is concentrated between Shark Bay and Cape Range, and occurred within the EMBA in the last five years (ABARES, 2021). Accordingly, Woodside considers it a possibility that interactions with the fishery may occur in the EMBA.
Western Tuna and Billfish Fishery	*	✓	The Western Tuna and Billfish Fishery management area spans the Australian Fishing Zone west of Victoria and the Torres Strait and overlaps the PAA and the EMBA. Fishery Status Report 2022 indicates current fishing effort is concentrated between Carnarvon and Albany, and occurred within the EMBA in the last five years (ABARES, 2021).

¹⁶Data from Fishcube and ABARES was reviewed from the last 5 years as a subset of past fishing effort. This was deemed an appropriate period as it represents potential future fishing effort over the lifecycle of the EP (no longer than 5 years).

Fishery	Potential for interaction		
	PAA	EMBA	Description
			Accordingly, Woodside considers it a possibility that interactions with the fishery may occur in the EMBA.
Southern Bluefin Tuna Fishery	x	x	The Southern Bluefin Tuna Fishery management area overlaps the PAA and the EMBA. The Southern Bluefin Tuna Fishery spans the Australian Fishing Zone, however since 1992, the majority of Australian catch has concentrated in south-eastern Australia. (ABARES, 2021). Accordingly, Woodside considers there to be no potential for interaction with this fishery and the Petroleum Activities Program.
Western Skipjack Tuna Fishery	x	x	The Western Skipjack Tuna Fishery management area spans the Australian Fishing Zone west of Victoria and the Torres Strait and overlaps the PAA and the EMBA. The Fishery is not currently active and no fishing has occurred since 2009 (ABARES, 2021). Accordingly, Woodside considers there to be no potential for interaction with this fishery and the Petroleum Activities Program.
Southern Tuna and Billfish Fishery	x	x	The Southern Tuna and Billfish Fishery management area spans the Australian Fishing Zone and overlaps the PAA and the EMBA. Fishery Status Report 2022 indicates current fishing effort is concentrated in south-eastern Australia (ABARES, 2021). Accordingly, Woodside considers there to be no potential for interaction with this fishery and the Petroleum Activities Program.
State Managed Fisheries			
Pilbara Line Fishery	x	✓	The Pilbara Line Fishery licensees are permitted to operate anywhere within Pilbara waters (Newman et al., 2021), overlapping the PAA and EMBA. The fishery is active in the EMBA, with six 60 NM Catch and Effort System (CAES) blocks reporting up to five licences across the 2017 – 2022 seasons (DPIRD, 2022). FishCube data is not available at the 10 NM scale however data at the 60 NM scale suggest fishing effort is concentrated to the east of the EMBA (DPIRD, 2022). Woodside considers it a possibility that interactions with the fishery may occur within the EMBA.
Pilbara Fish Trawl (Interim) Managed Fishery	x	✓	The Pilbara Fish Trawl (Interim) Managed Fishery management area overlaps the EMBA. The fishery has remained consistently active in the EMBA over the last 5 years, with two 60 NM CAES blocks reporting up to four vessels across each season between 2017 – 2022 (DPIRD, 2022). FishCube data reported no active fisheries at 10 NM overlapping the PAA (DPIRD, 2022). Woodside considers it a possibility that interactions with the fishery may occur within the EMBA.
Pilbara Trap Managed Fishery	x	✓	The Pilbara Trap Managed Fishery management area overlaps the EMBA. The fishery is active across the EMBA with seven 60 NM CAES blocks reporting up to three vessels active between the 2017 – 2022 seasons (DPIRD, 2022). Accordingly, Woodside considers it a possibility that interactions with the fishery may occur in the EMBA.
Marine Aquarium Fish Managed Fishery	x	✓	The Marine Aquarium Fish Managed Fishery management area overlaps the PAA and EMBA. The fishery is active across the EMBA with three 60 NM CAES blocks reporting up to five licences active between the 2017 – 2022 seasons (DPIRD, 2022). The FishCube data reported no active fisheries at 10 NM overlapping the PAA (DPIRD, 2022). Woodside considers it a possibility that interactions with the fishery may occur within the EMBA.
West Coast Deep Sea	x	✓	The West Coast Deep Sea Crustacean Managed Fishery is permitted to fish in waters deeper than the 150 m isobath overlapping the EMBA. The fishery has remained consistently active in the EMBA

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Fishery	Potential for interaction		
	PAA	EMBA	Description
Crustacean Managed Fishery			between the 2017 – 2022 seasons with eight 60NM CAES blocks overlapping the EMBA reported less than 3 vessels with active fishing effort (DPIRD, 2022). The FishCube data reported no active fisheries at 10 NM overlapping the PAA (DPIRD, 2022). Accordingly, Woodside considers it a possibility that interactions with the fishery may occur in the EMBA.
Mackerel Managed Fishery (Area 2 and Area 3)	x	✓	The Mackerel Managed Fishery management area overlaps the PAA and the EMBA. The fishery is active across the EMBA with seven 60 NM CAES blocks reporting up to six vessels active between the 2017 – 2022 seasons (DPIRD, 2022). The FishCube data reported no active fisheries at 10 NM overlapping the PAA (DPIRD, 2022). Accordingly, Woodside considers it a possibility that interactions with the fishery may occur in the EMBA.
Western Australian Sea Cucumber Fishery	x	✓	The Western Australian Sea Cucumber Fishery is permitted to fish throughout WA waters. FishCube data reported one CAES blocks overlapping the EMBA (DPIRD, 2022). Fishing effort was reported by less than three vessels across the 2017 – 2019 seasons (DPIRD, 2022). The FishCube data reported no active fisheries at 10 NM overlapping the PAA (DPIRD, 2022). Accordingly, Woodside considers it a possibility that interactions with the fishery may occur in the EMBA.
Gascoyne Demersal Scalefish Fishery	x	✓	The Gascoyne Demersal Scalefish Fishery management area overlaps the EMBA (DPIRD 2022). FishCube data reports fishing effort occurs within the EMBA across three CAES blocks reporting up to eleven licenses across 2017 – 2022 seasons (DPIRD, 2022). FishCube data reported no active fisheries at 10 NM CAES blocks overlapping the PAA (DPIRD, 2022). Accordingly, Woodside considers it a possibility that interactions with the fishery may occur within the EMBA.
Specimen Shell Managed Fishery	x	✓	The Specimen Shell Managed Fishery management area overlaps the EMBA. The fishery is active across the EMBA with four 60 NM CAES blocks reporting up to six licences active between the 2017 – 2022 seasons (DPIRD, 2022). FishCube data reported no active fisheries at 10 NM overlapping the PAA (DPIRD, 2022). Accordingly, Woodside considers it a possibility that interactions with the fishery may occur within the EMBA.
Onslow Prawn Managed Fishery	x	✓	The Onslow Prawn Managed Fishery management area overlaps the EMBA. FishCube data reports fishing effort occurs within the EMBA across three CAES blocks reporting less than three licenses across 2018 – 2022 seasons (DPIRD, 2022). The FishCube data reported no active fisheries at 10 NM overlapping the PAA (DPIRD, 2022). Accordingly, Woodside considers it a possibility that interactions with the fishery may occur in the EMBA.
Nickol Bay Prawn Managed Fishery	x	✓	The Nickol Bay Prawn Managed Fishery management area overlaps the EMBA. The fishery is active across the EMBA with one 60 NM CAES blocks reporting less than three vessels active between the 2020 – 2021 season (DPIRD, 2022). The FishCube data reported no active fisheries at 10 NM overlapping the PAA (DPIRD, 2022). Accordingly, Woodside considers it a possibility that interactions with the fishery may occur in the EMBA.
Abalone Managed Fishery	x	x	The Abalone Managed Fishery management area overlaps the EMBA. FishCube reported no fishing effort within the EMBA and Woodside considers there to be no potential for interaction with this fishery and the Petroleum Activities Program.

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Fishery	Potential for interaction		
	PAA	EMBA	Description
Pilbara Crab Managed Fishery	x	x	The Pilbara Crab Managed Fishery management area overlaps the PAA and the EMBA. FishCube reported no fishing effort within the EMBA and Woodside considers there to be no potential for interaction with this fishery and the Petroleum Activities Program.
West Coast Demersal Gillnet Managed Fishery	x	x	The West Coast Demersal Gillnet Managed Fishery management area overlaps the EMBA. FishCube reported no fishing effort within the EMBA and Woodside considers there to be no potential for interaction with this fishery and the Petroleum Activities Program.
West Coast Rock Lobster Fishery	x	x	The Western Rock Lobster Fishery management area overlaps the EMBA (DPIRD 2022). FishCube reported no fishing effort within the EMBA and Woodside considers there to be no potential for interaction with this fishery and the Petroleum Activities Program.
South West Coast Salmon Managed Fishery	x	x	The South West Coast Salmon Fishery management area overlaps the PAA and EMBA. FishCube data reported no fishing effort occurs north of the Perth metropolitan area (DPIRD, 2022). Accordingly, no fishing effort occurs within the EMBA and Woodside considers there to be no potential for interaction with this fishery and the Petroleum Activities Program.
Charter based commercial operators			
Tour Operators	x	✓	Fishing Tour Operators are permitted to operate across WA state waters and are required to report monthly logbook records of client fish catches. FishCube data reports consistent fishing effort across ten 60 NM CAES blocks that overlap the EMBA (DPIRD 2022). Fishing effort was reported by up to twenty vessels across the 2017 – 2022 seasons (DPIRD, 2022). The FishCube data reported no active tour operators at 60 NM overlapping the PAA (DPIRD, 2022) and indicates tour operator fishing effort highest around Ningaloo and Murion Islands and at Barrow Island and the Montebello Islands. Accordingly, Woodside considers it a possibility that interactions with tour operators will occur within the EMBA.

4.9.3 Traditional Fisheries

There are no traditional, or customary, fisheries within the PAA, as these are typically restricted to shallow coastal waters and/or areas with structures such as reefs. However, it is recognised that Barrow Island, Montebello Islands, Exmouth, Ningaloo Reef and the adjacent foreshores have a known history of fishing when areas were occupied (as from historical records).

Areas that are covered by registered native title claims are likely to practice Aboriginal fishing techniques at various sections of the WA coastline.

4.9.4 Tourism and Recreation

Current FishCube data (2011–2020) indicates that no tour operators use the waters within or surrounding the PAA (DPIRD, 2021). The PAA is considered too far offshore for recreational fishing or tourism activities to occur. Additionally, the wider EMBA does not overlap with any recognised tourism or recreational areas, however, it is adjacent to the Montebello Islands (~230 km east-south-east of the PAA), and Ningaloo Marine Park (~198 km south-east of the PAA), where fishing, surfing, snorkelling and diving activities occur year round. Current FishCube data (2011–2020) indicates tour operators may be active in offshore waters adjacent to the regionally significant Ningaloo National Park and Montebello Islands, overlapping the edge of the EMBA (DPIRD, 2021).

It is acknowledged that there are growing tourism and recreational sectors in WA. These sectors have expanded in area over the last couple of decades. Potential for growth and further expansion in tourism and recreational activities in the Pilbara and Gascoyne regions is recognised, particularly with the development of regional centres and a workforce associated with the resources sector (Gascoyne Development Commission, 2012).

4.9.5 Commercial Shipping

The Australian Maritime Safety Authority (AMSA) has introduced a network of marine fairways across the NWMR off WA to reduce the risk of vessel collisions with offshore infrastructure. It is noted that none of these fairways intersect with the PAA; the nearest fairway is approximately 38 km east of the PAA (**Figure 4-16**). Vessel tracking data suggest the majority of shipping is concentrated to the east of the PAA, which is likely associated with ports.

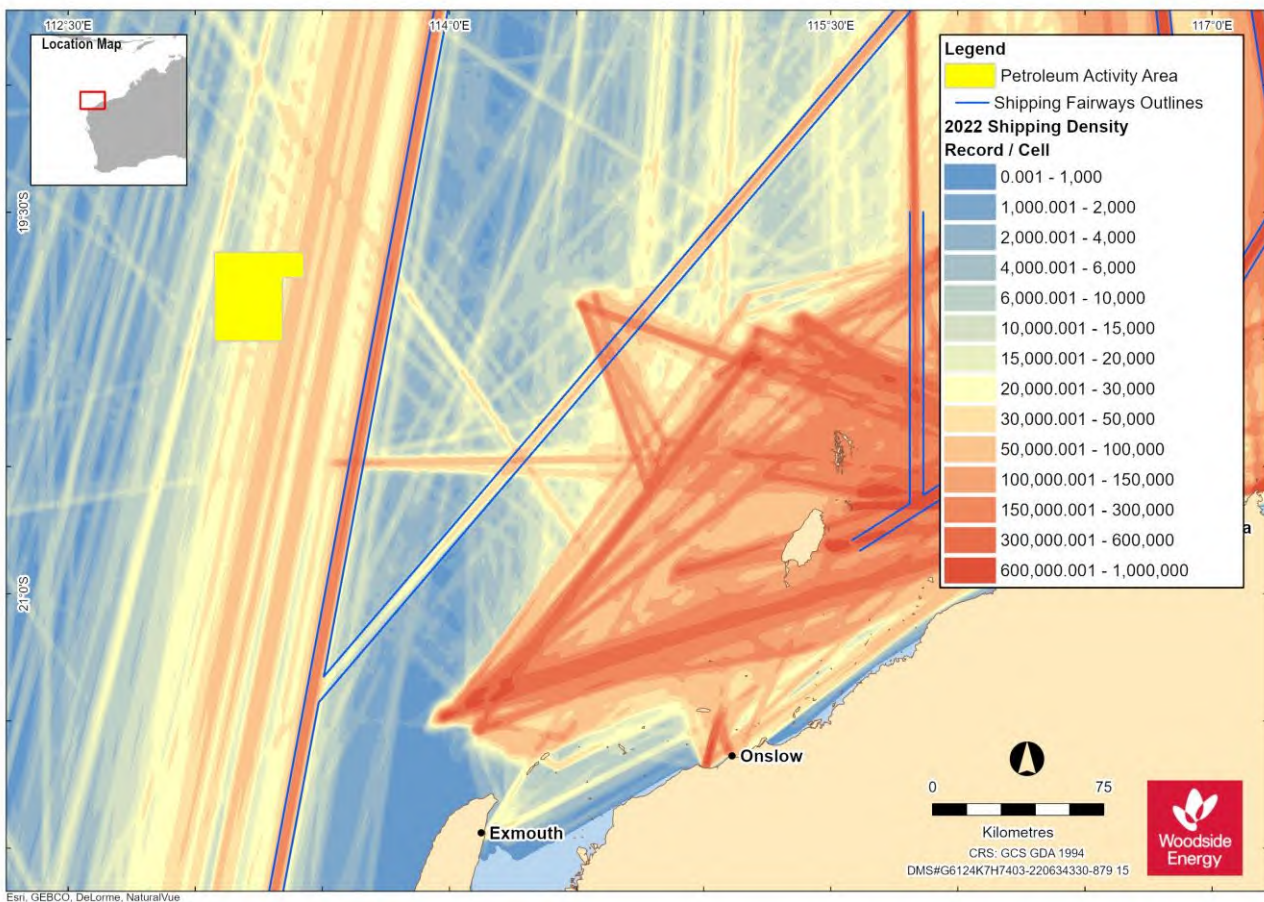


Figure 4-16: Vessel density map for the PAA, derived from AMSA satellite tracking system data

Note: Vessels include cargo, LNG tanker, passenger vessels, support vessels, and others/unnamed vessels

4.9.6 Oil and Gas

The PAA is located in the Exmouth Plateau area of the Northern Carnarvon Basin. One appraisal well is present within the PAA; North Scarborough 1. Eight proposed development wells (plus 2 contingent wells) covered under the Scarborough Drilling & Completions EP may also be completed when this Petroleum Activities Program is executed. There are no oil and gas platforms owned or operated by other petroleum titleholders located within 50 km of the PAA (**Figure 4-17**) describes current oil and gas development within the EMBA.

Table 4-23: Petroleum wells located within the PAA

Well	Operator	Title	Easting (m)	Northing (m)	Distance from PAA
North Scarborough 1 ST1	BHP Billiton Petroleum (North West Shelf) Pty. Ltd.	WA-346-P	736110	7815120	Overlap
Scarborough 1	Esso Australia Ltd	WA-69-P	724797	7799935	Overlap
Scarborough 2	Esso Australia Ltd	WA-1-R	728860	7797701	Overlap
Scarborough 3	BHP Billiton Petroleum Pty Ltd	WA-1-R	733168	7796433	Overlap
Scarborough 4	BHP Billiton Petroleum Pty Ltd	WA-1-R	732198	7805189	Overlap
Scarborough 5	BHP Billiton Petroleum Pty Ltd	WA-1-R	719935	7797452	Overlap
(Proposed) Well 1	Woodside Energy Scarborough Pty Ltd	WA-61-L	96296	7795872	Overlap
(Proposed) Well 2			93124	7795254	
(Proposed) Well 3			98559	7796277	
(Proposed) Well 4			92664	7797617	
(Proposed) Well 5			104450	7797598	
(Proposed) Well 6			103840	7803545	
(Proposed) Well 7			105975	7810167	
(Proposed) Well 8			96303	7795949	
(Proposed) Contingent wells			Unconfirmed	Unconfirmed	

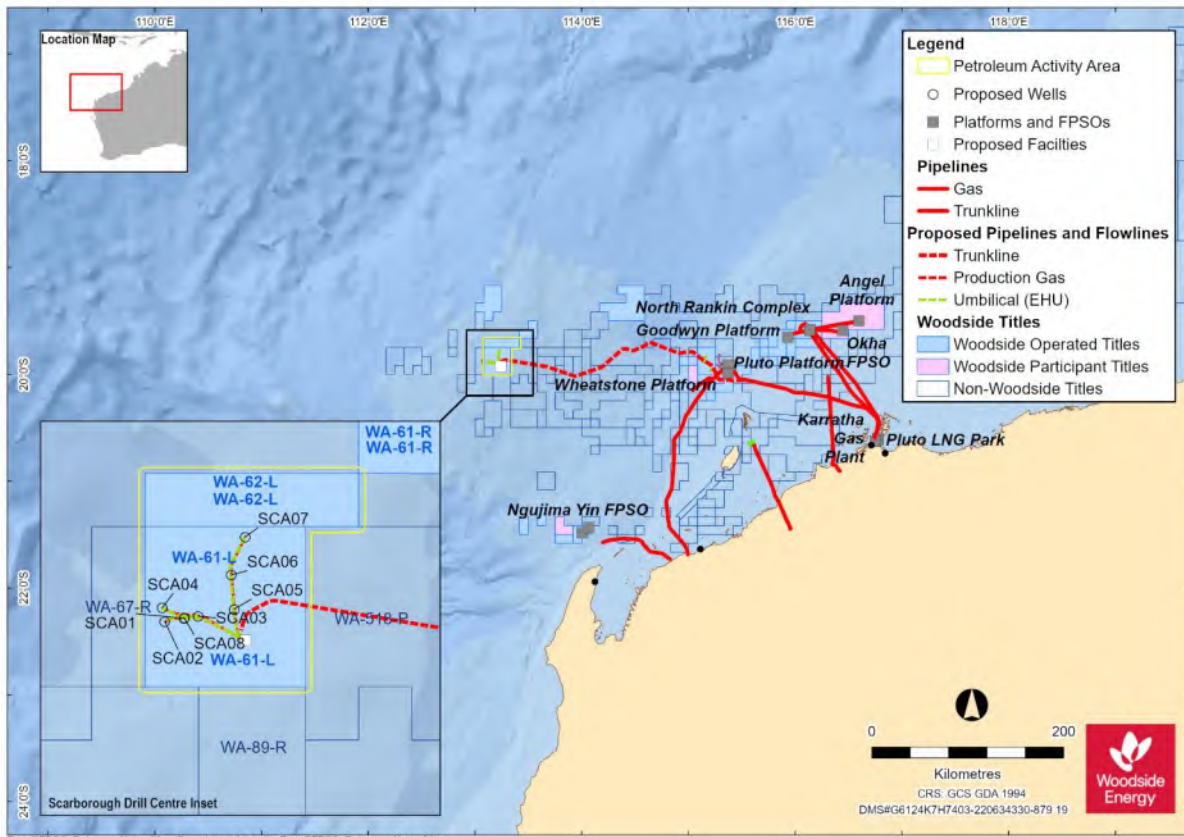


Figure 4-17: Oil and gas titles and infrastructure within the region

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4.9.7 Defence

There are designated Department of Defence practice areas in the offshore marine waters off Ningaloo Reef and the North West Cape in the EMBA. The PAA lies within the northern tip of one of these defence training areas, the North West Exercise Area (NWXA) accessed by Royal Australian Air Force (RAAF) Base Learmonth (**Figure 4-18**). The Learmonth Air Weapons Range (AWR) practice area is located approximately 70 km south of the PAA. The closest site where unexploded ordnance is known to occur is 20 km north-west of Bessieres Island, located approximately 211 km from the PAA, and outside of the EMBA. Defence areas overlapping the PAA are presented in **Figure 4-18**.

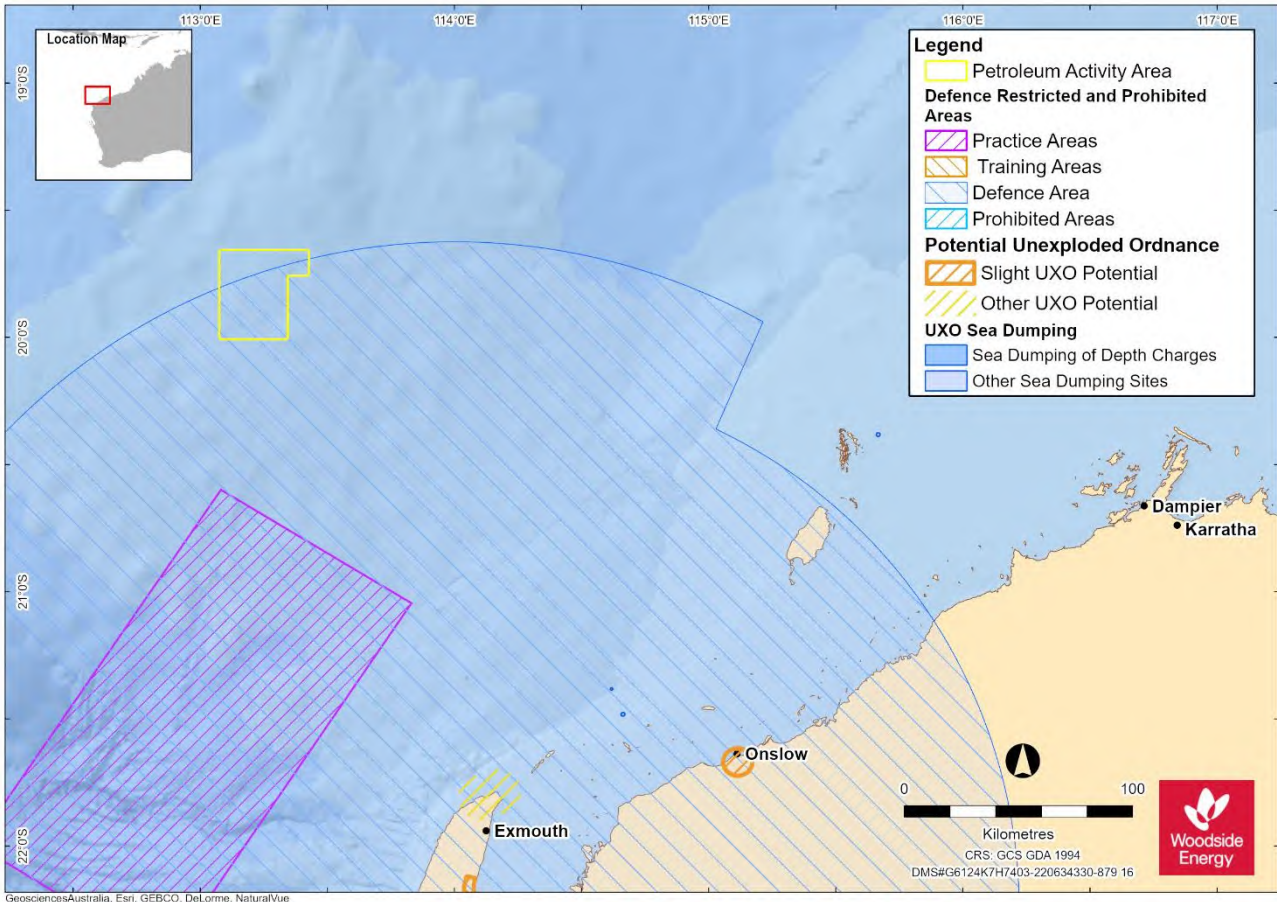


Figure 4-18: Defence Restricted and Prohibited areas relative to the PAA

5 CONSULTATION

5.1 Summary

Woodside consults relevant persons in the course of preparing an EP in accordance with regulation 11A of the Environment Regulations. Woodside acknowledges that consultation is designed to ensure that relevant persons are identified and given sufficient information and a reasonable period to allow them to make an informed assessment of the possible consequences of the proposed activity on them and, to ensure that titleholders can consider and adopt appropriate measures in response to the matters raised by relevant persons. Consistent with regulation 3 of the Environment Regulations, consultation also supports Woodside's objective to ensure that the environmental impacts and risks of the activity are reduced to ALARP and an acceptable level.

Woodside acknowledges that a titleholder's approach to consultation must be informed by both the Environment Regulations and the findings of the Full Federal Court in the *Santos NA Barossa Pty Ltd v Tipakalippa* [2022] FCAFC 193 (see **Section 5.5.1** and **5.5.2**) delivered on 2 December 2022.

For this Petroleum Activities Program (PAP), Woodside has considered both the Operational Area and the broader EMBA in undertaking consultation (see further discussion in **Section 5.2**). The broadest extent of the EMBA has been determined by reference to the highly unlikely event of a hydrocarbon release resulting from the PAP (see **Section 4**).

Woodside's consultation methodology is divided into three parts:

- The first section (**Section 5.2 to 5.7**) provides an overview of Woodside's consultation methodology for its EPs, including how we apply regulation 11A(1) of the Environment Regulations to identify relevant persons.
- The second section (**Section 5.8**) explains Woodside's application of the consultation methodology and Woodside's assessment of relevant persons for this EP.
- The third section (**Section 5.9**) details the:
 - Opportunities provided to persons or organisations to be aware of Woodside's proposed EP and participate in consultation, including individual Traditional Custodians.
 - Consultation information provided to relevant persons, feedback received and Woodside's assessment of the merits of objections or claims.
 - Engagement with persons or organisations that Woodside chose to contact who are not relevant persons for the purposes of regulation 11A(1) of the Environment Regulations (see Section 5.3.4).

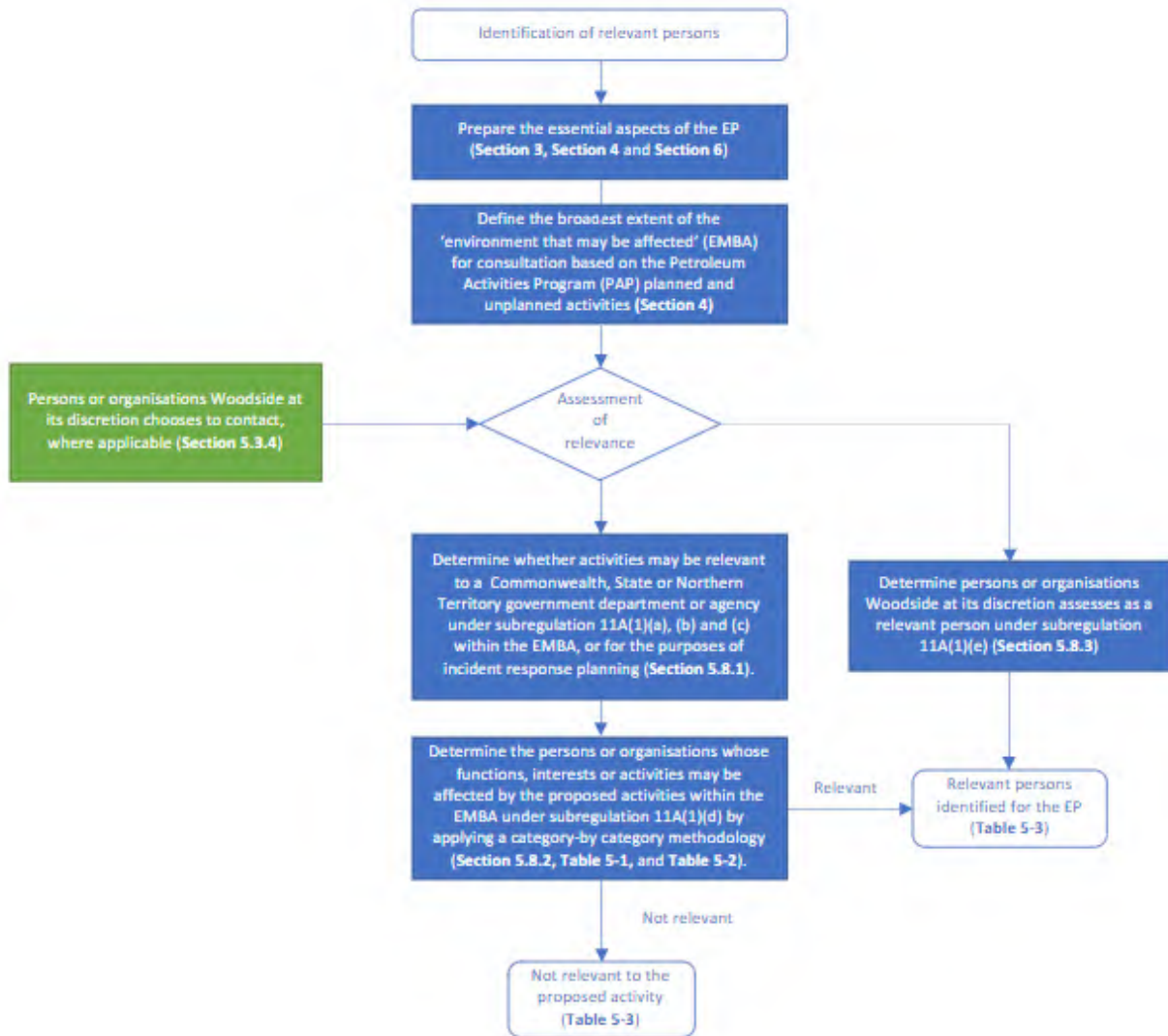


Figure 5-1: Overview of Woodside’s methodology to identify relevant persons

5.2 Consultation – General Context

Woodside has a portfolio of quality oil and gas assets and more than 30 years of operating experience. We have a strong history of working with local communities, the relevant regulators and a broad range of persons and organisations to understand the potential risks and impacts from our proposed activities and to develop appropriate measures to manage them.

The length of time that we have operated in Commonwealth and State waters, and the history of continued engagement with a wide range of persons and organisations enables Woodside to develop an extensive consultation list to inform its consultation process. This consultation list is not used as a definitive list of persons to consult, but rather, assists Woodside as an input to its understanding of relevant persons with whom to consult on a proposed petroleum activity. The information in the consultation list has been captured from years of experience, it contains insights relating to the type of information particular persons or organisations want to receive during consultation, the appropriate method of consultation for relevant persons and includes appropriate contact details, which are reviewed and updated periodically.

Woodside acknowledges NOPSEMA's Guideline on *Consultation in the course of preparing an environment plan* (12 May 2023) as well as recent judicial guidance (in the Full Federal Court's decision in *Santos NA Barossa Pty Ltd v Tipakalippa* [2022] FCAFC 193) on the intent of consultation as follows:

- At paragraph 54 of the appeal decision: ... provide a basis for NOPSEMA's considerations of the measures, if any, that a titleholder proposes to take or has taken to lessen or avoid the deleterious effect of its proposed activity on the environment, as expansively defined.
- At paragraph 89 of the appeal decision: ...its purpose is to ensure that the titleholder has ascertained, understood and addressed all the environmental impacts and risks that might arise from its proposed activity. Consultation facilitates this outcome because it gives the titleholder an opportunity to receive information that it might not otherwise have received from others affected by its proposed activity. Consultation enables the titleholder to better understand how others with an objective stake in the environment in which it proposes to pursue the activity perceive those environmental impacts and risks. As the Regulations expressly contemplate, it enables the titleholder to refine or change the measures it proposes to address those impacts and risks by taking into account the information acquired through the consultations. Objectively, the scheme intends that this is likely to improve the minimisation of environmental impacts and risks from the activity.
- The Tipakalippa Appeal has also been further considered in the context of specific methods for consultation with First Nations relevant persons (**Section 5.5.1**).

In order to undertake consultation, Woodside has developed a methodology for identifying relevant persons, in accordance with regulation 11A(1) of the Environment Regulations (**Section 5.3**). This methodology reflects NOPSEMA's recent guideline and demonstrates that, in order to meet the requirements of regulation 10A (criteria for EP acceptance) when preparing the EP, Woodside understands:

- our planned activities in the Operational Area, being the area in which our planned activities are proposed to occur (see **Section 3.5**); and
- the geographical extent to which the environment may be affected (EMBA) by risks and impacts from our activities (unplanned) (identified in **Section 4.1** and assessed in **Section 6.8**).

Woodside has undertaken consultation in the course of preparing this EP in compliance with regulation 11A of the Environment Regulations, which requires a titleholder to:

- consult with each of the following (a **relevant person**) in the course of preparing an environment plan:
 - each Department or agency of the Commonwealth to which the activities to be carried out under the environment plan, or the revision of the environment plan, may be relevant;
 - each Department or agency of a State or the Northern Territory to which the activities to be carried out under the EP, or the revision of the EP, may be relevant;
 - the Department of the responsible State Minister, or the responsible Northern Territory Minister;
 - a person or organisation whose functions, interests or activities may be affected by the activities to be carried out under the EP, or the revision of the EP; and
 - any other person or organisation that the titleholder considers relevant (regulation 11A(1)).

- give each relevant person sufficient information to allow the relevant person to make an informed assessment of the possible consequences of the activity on their functions, interests or activities (regulation 11A(1)(2));
- allow a relevant person a reasonable period for the consultation (regulation 11A(1)(3)); and
- tell each relevant person that the titleholder consults with, that the relevant person may request that particular information it provides in the consultation not be published and any information subject to such a request is not to be published (regulation 11A(1)(4)).

Further, Woodside seeks to carry out consultation in a manner that:

- is consistent with the principles of ecologically sustainable development (ESD) set out in section 3A of the EPBC Act – see **Section 2**;
- is intended to reduce the environmental impacts and risks from the activity to ALARP and an acceptable level;
- seeks to ensure that the environmental impacts and risks of the activity will be of an acceptable level;
- is intended to minimise harm to the relevant person and the environment from the proposed petroleum activities and to enable Woodside to consider measures that may be taken to mitigate the potential adverse environmental impacts that the petroleum activity may otherwise cause;
- is collaborative; Woodside respects that for a relevant person, consultation is voluntary. Where the relevant person seeks to engage, Woodside collaborates with the relevant person with the aim of seeking genuine and meaningful two-way dialogue; and
- provides opportunities for relevant persons to provide feedback throughout the life of the EP through its ongoing consultation process (refer to Section 5.7 and Section 7.10.2.1).

An overview of Woodside's consultation approach is outlined below at Error! Reference source not found..

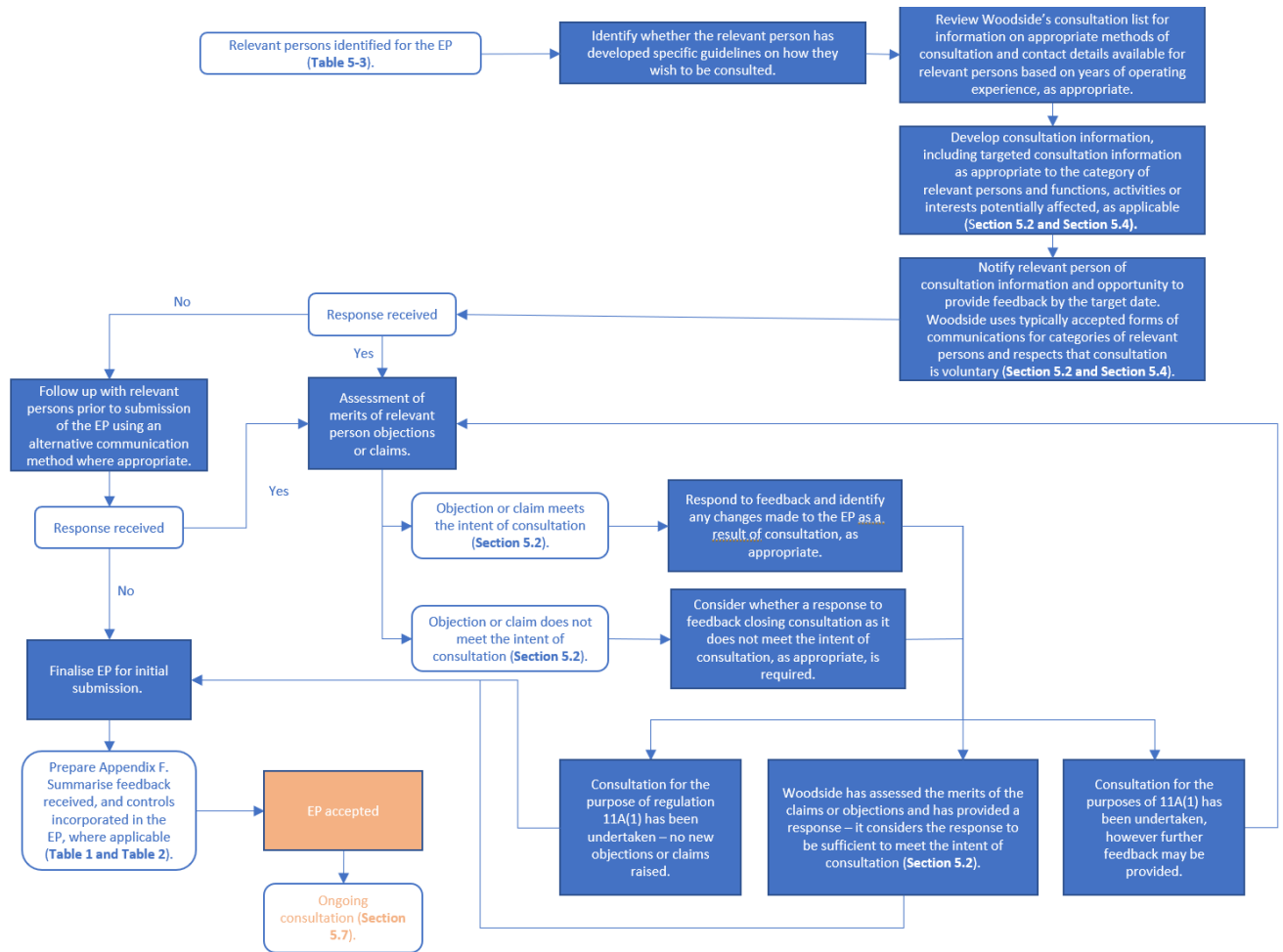


Figure 5-2: Overview of Woodside’s consultation approach

The methodology for consultation for this activity has been informed by various guidelines and relevant information for consultation on planned activities, including:

Federal Court:

- [Santos NA Barossa Pty Ltd v Tipakalippa \[2022\] FCAFC 193](#)

NOPSEMA:

- [GL2086 – Consultation in the course of preparing an environment plan – May 2023](#)
- [GN1847 - Responding to public comment on environment plans - July 2022](#)
- [GN1344 - Environment plan content requirements - September 2020](#)
- [GL1721 - Environment Plan Decision Making Guideline - December 2022](#)
- [GN1488 - Oil pollution risk management - July 2021](#)
- [GN1785 – Petroleum activities and Australian Marine Parks – June 2023](#)
- [GL1887 – Consultation with Commonwealth agencies with responsibilities in the marine area – January 2023](#)
- [PL2098 – Draft Policy for managing gender-restricted information](#)

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- [Consultation on offshore petroleum environment plans – Information for the community](#)

Department of Climate Change, Energy, the Environment and Water:

- [Sea Countries of the North-West; Literature review on Indigenous connection to and uses of the North West Marine Region](#)

Australian Fisheries Management Authority:

- [Petroleum industry consultation with the commercial fishing industry](#)

Commonwealth Department of Agriculture and Water Resources:

- [Fisheries and the Environment – Offshore Petroleum and Greenhouse Gas Act 2006](#)
- [Offshore Installations Biosecurity Guide](#)

WA Department of Primary Industries and Regional Development:

- [Guidance statement for oil and gas industry consultation with the Department of Fisheries](#)

WA Department of Transport:

- [Offshore Petroleum Industry Guidance Note](#)

Good practice consultation:

- [IAP2 Public Participation Spectrum](#)
- [Interim Engaging with First Nations People and Communities on Assessments and Approvals under the Environment Protection and Biodiversity Act 1999](#)

5.3 Identification of Relevant Persons for Consultation

5.3.1 Regulations 11A(1)(a), (b) and (c)

The relevant inquiry for determining relevant persons within the description of regulations 11A(1)(a) and (b) is whether the activities to be carried out under the EP may be relevant to one of the government departments or agencies in those regulations. These government departments and agencies are listed in **Table 5-3** below. In accordance with regulation 11A(1)(c), Woodside consults with the department of the relevant State Minister, which for this EP is the Department of Mines, Industry Regulation and Safety (DMIRS).

5.3.2 Regulation 11A(1)(d)

In order to identify a relevant person for the purposes of regulation 11A(1)(d), the meaning of “functions, interests or activities” needs to be understood. In regulation 11A(1)(d), the phrase “functions, interests or activities” should be construed broadly and consistently with the objects of the Environment Regulations (regulation 3) and the objects of the EPBC Act (section 3A).

In developing its methodology for consultation, Woodside acknowledges that the guidance on the definition of functions, interests and activities is as follows in accordance with NOPSEMA’s *GL2086 – Consultation in the course of preparing an environment plan* guideline (May 2023):

Functions	Refers to a power or duty to do something.
Interests	Conforms to the accepted concept of ‘interest’ in other areas of public administrative law and includes any interest possessed by an individual whether or not the interest amounts to a legal right or is a proprietary or financial interest or relates to reputation.

Activities	Broader than the definition of 'activity' in Regulation 4 of the Environment Regulations and is likely be directed to what the relevant person is already doing.
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As discussed in **Section 5.1** and **Section 5.2**, Woodside’s methodology for determining ‘relevant persons’ for the purpose of regulation 11A(1)(d) of the Environment Regulations includes consideration of:

- whether a person or organisation has functions interests or activities that overlap with the Operational Area and EMBA; and
- whether a person or organisation’s functions, interests or activities may be affected by Woodside’s proposed planned or unplanned activities.

5.3.3 Regulation 11A(1)(e)

In addition to assessing relevance under regulation 11 A(1)(d), Woodside has discretion to categorise any other person or organisation as a relevant person under regulation 11A(1)(e).

5.3.4 Persons or Organisations Woodside Chooses to Contact

In addition to undertaking consultation with relevant persons under regulation 11A(1) there are persons or organisations that Woodside chooses to contact, from time to time, in relation to a proposed activity. For example, these are persons or organisations:

- that are ‘not relevant’ pursuant to regulation 11A(1) but that Woodside has chosen to seek additional guidance from, for example, to inform the correct contact person that Woodside should consult, or engage with;
- that are ‘not relevant’ pursuant to regulation 11A(1) but have been contacted as a result of consultation requirements changing or updated guidance from the Regulator; and
- where it is unclear what their functions, interests or activities are, or whether their functions, interests or activities may be affected. In this circumstance, engagement is required to inform relevance under Woodside’s methodology. Woodside follows the same methodology for assessing a person or organisation’s relevance as it does during its initial assessment (as described in **Figure 5-1** and **Section 5.8**). The result of Woodside’s assessment of relevance during the development of the EP is outlined at Table 5-3.
- Engagement undertaken with persons or organisations Woodside assessed as not relevant but chose to contact are summarised at **Appendix F**, Table 2.

5.4 Consultation Material and Timing

Regulation 11A(2) provides that a titleholder must give each relevant person sufficient information to allow the relevant person to make an informed assessment of the possible consequences of the activity on the functions, interests or activities of the relevant person. Regulation 11A(3) provides that the titleholder must allow a relevant person a reasonable period for the consultation.

As set out in **Section 5.2**, Woodside notifies relevant persons, of the proposed activities, respecting that consultation is voluntary (for the relevant person) and collaborates on a consultation approach where further engagement is sought by the relevant person. Woodside understands that the consultation process should be appropriate for the category of relevant persons and that not all persons or organisations will require the same level of engagement. Woodside recognises that the level of engagement is dependent on the nature and scale of the Petroleum Activities Program. Woodside recognises published guidance for good practice consultation relevant to different sectors and disciplines (see **Section 5.2**). Woodside’s methodology for providing relevant persons with

sufficient information as well as a reasonable period of time to provide feedback is set out in this section.

5.4.1 Sufficient Information

Woodside produces a Consultation Information Sheet for each EP (**Appendix F**, reference 1.1 and 1.106). This is provided to relevant persons and organisations and is also available on Woodside's website for interested parties to access and to provide feedback on. The Consultation Information Sheet typically includes a description of the proposed petroleum activity, the Operational Area where the activity will take place, the timing and duration of the activity, a location map of the Operational Area and EMBA, a description of the EMBA, relevant exclusion zones as well as a summary of relevant risks and mitigation and/or management control measures relevant to the proposed petroleum activity. It also sets out contact details to provide feedback to Woodside.

Woodside recognises that the level of information necessary to assist a person or organisation to understand the impacts of the proposed activity on their functions, interests or activities may vary and, also may depend on the degree to which a relevant person is affected. For example, Woodside considers that relevant persons who may be impacted by planned activities in the Operational Area, for example as a result of temporary displacement due to exclusion zones, may require more targeted information relevant to their functions, interests or activities. Woodside also acknowledges NOPSEMA's brochure entitled *Consultation on offshore petroleum environment plans information for the community*, which advises consultees that they may inform titleholders that they only want to be consulted in the very unlikely event of an oil spill.

Woodside places advertisements in a selected local, state and national newspaper. This typically includes the name of the EP Woodside is seeking feedback on, an overview of the activity, the consultation feedback date and the ways in which a person or organisation can provide feedback. Advertising in the local paper in the area of the activity is also consistent with the public notification process under section 66 of the *Native Title Act* for native title applications. Woodside typically aligns advertisement feedback timeframes with the timing described below. Feedback received is assessed in accordance with Section 5.7 to determine relevance and evidenced in Appendix F, Table 1 as appropriate.

Woodside utilises a range of tools to provide sufficient materials to relevant persons, which may include one or more of the following:

- Consultation Information Sheet available on Woodside's website;
- Simplified Overview Consultation Information Sheet, presentations or summaries specific to a particular relevant person group;
- subscription available on Woodside's website to receive notification of new Consultation Information Sheets for Woodside EPs;
- emails;
- letters;
- phone calls;
- face-to-face meetings (virtual or in person) with presentation slides or handouts as appropriate;
- maps outlining a persons or organisations defined area of responsibility in relation to the proposed activity, for example a fisheries management area or defence training area; and
- community meetings, as appropriate.

Woodside recognises that information may need to be provided to relevant persons in an iterative manner during the consultation process. Woodside considers that in line with the intent of

consultation (see Section 5.2), the threshold for genuine two-way engagement is met via feedback on incorporation of controls, where applicable, being provided to the relevant person to ensure the relevant persons understand how their input has been considered in the development of the EP.

Woodside communicates with relevant persons in different ways. Woodside recognises that as part of genuine two-way dialogue, these forms of communication may evolve, including for example due to changes to organisation representation, as relationships are further established, or an alternative form of communication is expressed by a person or organisation. Woodside acknowledges that there might be limitations in how it can consult with relevant persons.

Typical forms of communications for categories of relevant persons are set out below.

Category of relevant person	Typically accepted form of communication
Government departments / agencies – marine	Woodside applies NOPSEMA’s guideline for engagement with Commonwealth government departments or agencies in line with <u>GL1887 – Consultation with Commonwealth agencies with responsibilities in the marine area – January 2023</u> by using email for its consultation unless another form of communication is requested.
Government departments / agencies – environment	
Government departments / agencies – industry	Other forms of communication, such as phone calls, and meetings and/or presentation briefings are used where requested.
Commercial fisheries and peak representative bodies	Commonwealth commercial fisheries: Email is used as the primary form of communication with Commonwealth commercial fisheries in the ordinary course of business. Other forms of communication, such as phone calls, and meetings and/or presentation briefings are used where requested.
Recreational marine users and peak representative bodies	State commercial fisheries and recreational marine users: The Western Australian Department of Primary Industries and Regional Development (DPIRD) has responsibility for managing the <i>Fish Resources Management Act 1994</i> and <i>Aquatic Resources Management Act 2016</i> , which limits the provision of contact details from the register to the name and business address of licence holders. Alternative forms of communication are at the licence holder’s discretion. Other forms of communication, such as phone calls, and meetings and/or presentation briefings are used where requested. Peak representative bodies: Email is used as the primary form of communication with commercial fishery and recreational marine user peak representative bodies in the ordinary course of business. Other forms of communication, such as phone calls, and meetings and/or presentation briefings are used where requested.
Titleholders and Operators	Email is used as the primary form of communication between titleholders and operators in the ordinary course of business. Other forms of communication, such as phone calls, and meetings and/or presentation briefings are used where requested.
Peak industry representative bodies	Email is used as the primary form of communication with peak representative bodies in the ordinary course of business. Other forms of communication, such as phone calls, and meetings and/or presentation briefings are used where requested.
Traditional Custodians and nominated representative corporations	The forms of communication that Woodside engages in are often bespoke and applied on a case-by-case basis and as appropriate to, or as requested by the specific group, such as email, phone calls, meetings and community forums. Other forms of communication are used where requested.
Native Title Representative Bodies	The forms of communication that Woodside engages in are often bespoke and applied on a case-by-case basis and as appropriate to the specific group, such as email, phone calls, meetings and community forums. Other forms of communication are used where requested.
Historical heritage groups or organisations	NOPSEMA’s guideline (<u>GL1887 – Consultation with Commonwealth agencies with responsibilities in the marine area – January 2023</u>) for engagement with government departments or agencies is used as a reference for Woodside’s approach for communicating with historical heritage groups or organisations. Other

	forms of communication, such as phone calls, and meetings and/or presentation briefings are used where requested.
Local government and recognised local community reference/liaison groups or organisations	Local government: NOPSEMA’s guideline (<i>GL 1887 – Consultation with Commonwealth agencies with responsibilities in the marine area – January 2023</i>) for engagement with local government is used as a reference for Woodside’s approach for communicating with historical heritage groups or organisations. Community reference/liaison groups and chambers of commerce: Email is used as the primary form of communication with local community reference/liaison groups or organisations in the ordinary course of business. Other forms of communication, such as phone calls, and meetings and/or presentation briefings are used where requested.
Other non-government groups or organisations	Email is used as the primary form of communication with Other non-government groups or organisations. Other forms of communication, such as phone calls, and meetings and/or presentation briefings are used where requested.
Research Institutes and Local conservation groups or organisations	Email is used as the primary form of communication with research institutes and local conservation groups or organisations. Other forms of communication, such as phone calls, and meetings and/or presentation briefings are used where requested.

Information which is provided to relevant persons for the purposes of consultation on this EP is summarised at **Appendix F**, Table 1.

Appendix F, Table 2 sets out the information which is provided to persons or organisations that are not relevant for the purposes of regulation 11A but which Woodside has chosen to contact (see Section 5.3.4).

When engaging in consultation, Woodside notifies relevant persons that, in accordance with regulation 11A(4), the relevant person may request that particular information the person or organisation provides in the consultation not be published and that information subject to that request will not be published.

5.4.2 Reasonable Period for Consultation

Woodside seeks feedback in order to support preparation of its Environment Plan. Woodside recognises that what constitutes a reasonable period for consultation should be considered on a case-by-case basis, with reference to the nature, scale and complexity of the activity.

Woodside recognises that information may need to be provided to relevant persons in an iterative manner during the consultation process. Woodside considers that in line with the intent of consultation (see **Section 5.2**), the threshold for genuine two-way engagement is met via engagement on incorporation of controls, where applicable, being provided to the relevant person so that the relevant person understands how their input has been considered in the development of the Environment Plan.

Woodside has allowed a reasonable period for relevant persons, including Traditional Custodian relevant persons, to participate in consultation for this Environment Plan. The consultation period for this Environment Plan spans more than 12 months, from initial commencement of Woodside’s consultation period in September 2022, to submission of this Environment Plan, in October 2023.

The consultation period under this Environment Plan greatly exceeds benchmark periods under other relevant legislative processes:

- Consultation under Regulation 11B of the Regulations sets out a public consultation period of 30 days.
- The Department of Mines and Petroleum “Guidelines for Consultation with Indigenous People by Mineral Explorers” directs a period of 21- 30 days of consultation with traditional owners.

- Guidance taken from the previous *Aboriginal Cultural Heritage Act 2021—Consultation Guidelines* (Government of Western Australia, 2023) suggests that up to 12 weeks may be a reasonable period of time to allow identification, contact, and response, from First Nations peoples (subject to any alternative timeframe being agreed through co-design of consultation).

This extended period of consultation demonstrates that Woodside has provided a “reasonable period” for consultation in accordance with regulation 11A(3). Commentary in the Tipakalippa Appeal judgment limits consultation to a process that must be capable of being discharged within a reasonable time:

“it must be taken to be the regulatory intention that the consultation requirement cannot be one that is incapable of being complied with within a reasonable time...”

Woodside seeks feedback in order to support preparation of its Environment Plan. What constitutes a reasonable period for consultation is considered on a case-by-case basis, with reference to the person being consulted and the nature, scale and complexity of the activity.

Woodside's typical approach to enable a reasonable period for consultation is as follows:

- advertising in a selected local, state and national newspapers to give persons or organisations the opportunity to understand the activity and identify whether their functions, interests or activities may be affected;
- providing consultation materials directly to identified relevant persons as well as persons who are not relevant but Woodside chose to contact (see **Section 5.3.4**), and providing a target date for feedback. Woodside acknowledges that feedback may be received from relevant persons following the target date;
- acknowledging that the way in which Woodside provides consultation information may vary depending on the relevant person or organisation and, may depend on the degree to which a relevant person or organisation is affected. Different consultation processes may be required for relevant persons and organisations depending on the information requirements;
- following up with relevant persons prior to EP submission. Where possible, Woodside will endeavour to use an alternative method of communication to contact the relevant person; and
- engaging in two-way dialogue with relevant persons or organisations where feedback is received.

Appendix F, Table 1 and Table 2 sets out a history of consultation and demonstrates that a reasonable period of consultation has been afforded for each relevant person.

Woodside considers that the “reasonable period” of consultation for this Environment Plan has been provided and the consultation under regulation 11A is complete.

As detailed in **Section 5.7** and **Section 7.8**, if comments and feedback are received after the Environment Plan has been submitted, Woodside will consider those comments and update controls as appropriate, at all stages during the life of the Environment Plan, as per Woodside's ongoing consultation approach.

5.4.3 Discharge of Regulation 11A

The Full Federal Court made clear in the Tipakalippa Appeal that consultation should be approached in a “reasonable”, “pragmatic” and “not so literal” way, so that consultation obligations were capable of being met by titleholders (**Section 5.5.1**). Consultation is a “real world activity” and must be capable of reasonable discharge. The Full Federal Court referred to Native Title cases as an illustration that reasonable limits should be applied to consultation efforts to ensure the process is workable.

When the titleholder demonstrates that it has provided sufficient information and a reasonable period for consultation, the regulation 11A consultation requirements are met. Meeting these requirements is the evaluative judgment to determine reasonable satisfaction of the consultation obligation, and as such, the regulator uses its discretion to determine if these criteria are met. The nature of the person being consulted, and their function, interest and activity that may be affected, will inform the manner of consultation and the reasonable period to be afforded.

The titleholder is not required to obtain consent from a consultee to engage in the activity or confirmation from a consultee that consultation is complete. A titleholder is required to provide an opportunity to consult.

The Federal Court has commented that a “reasonable opportunity” for consultation must be afforded to relevant persons. A reasonable opportunity may not be every opportunity requested and is limited to reasonable opportunities to consult.

Woodside has completed all practicable and reasonable steps to discharge its consultation obligations. Woodside has provided sufficient information and a reasonable period of time to enable relevant persons to make an informed assessment of the possible impacts and risks of the activity on their functions, interests or activities, and sufficient time to provide relevant feedback for Woodside to assess relevant persons' claims and action the assessment and response. Woodside has also provided a reasonable opportunity for relevant persons to engage in genuine two-way dialogue on environmental impacts and concerns.

Woodside has discharged its duty under regulation 11A. Woodside considers that consultation under regulation 11A is complete.

Appendix F, Table 1 and Table 2 of this Environment Plan sets out the history of consultation under regulation 11A. To the extent a relevant person says that it has further information to share or claims that consultation under regulation 11A has not completed Appendix F, Table 1 and Table 2 provide reasons specifically why Woodside considers consultation under regulation 11A has been met in relation to that relevant person.

5.5 Context of Consultation Approach with First Nations

To comply with regulation 11A, Woodside identifies and consults Traditional Custodians whose functions, interests or activities may be affected by the activities under an Environment Plan.

5.5.1 Approach to Methodology – Woodside’s Interpretation of Tipakalippa

Woodside has implemented a consultation methodology consistent with regulation 11A and guidance provided in the Tipakalippa Appeal (**Section 5.2**). Woodside’s consultation methodology allows for a sufficiently broad capture of Traditional Custodian relevant persons, provides for informed consultation, follows cultural protocols and allows a reasonable opportunity for consultation with Traditional Custodians whose functions, interests and activities may be affected by the activity described in this Environment Plan (**Section 5.5.2.1 to 5.5.2.3**)

Woodside notes the Full Federal Court discussed several Native Title Act 1993 (Cth) (NTA) cases in response to a submission made in that case that a requirement under regulation 11A to consult “each and every” relevant person would be “unworkable”. The reference to native title cases dealt with how decision-making processes under the NTA requiring “all” members of a group to be contacted for communal approval are interpreted by courts in a “reasonable”, “pragmatic” and “not so literal” way, and how obligations to consult “each and every” person under regulation 11A should be interpreted in a similarly pragmatic way so that consultation is workable. The reference to NTA authorities was made by analogy:

“It can be seen that the terms of [the native title legislation] are somewhat absolute – “all”. However, [the native title legislation] has consistently been construed in a way that is not so literal ... The cases

concerning [the native title legislation] ... have reiterated ... that [the native title legislation] does not require that “all” of the members of the relevant claim group be involved in the decision. The key question will be whether a reasonable opportunity to participate in the decision-making process has been afforded by the notice for a relevant meeting.”

“We consider the authorities in relation to processes under the NTA to be illustrative of how a seemingly rigid statutory obligation to consult persons holding a communal interest may operate in a workable manner” (emphasis added).

“there is no definition of what constitutes “consultation for the purpose of ref 11A... A titleholder will need to “demonstrate” to NOPSEMA that what it did constituted consultation appropriate and adapted to the nature of the interests of the relevant persons” (emphasis added).

It is clear from the Court's statement in relation to consultation with organisations that a Titleholder will have some decisional choice in identifying which natural person(s) are to be approached, how the information will be given to allow the "relevant person" to assess the possible consequence of the proposed activities on their functions, interests or activities, and how the requisite consultation is undertaken. Woodside takes this to mean that consultation is not fixed to a rigid process, and indeed, will need to be adapted so that it is informed by the relevant person or group. Woodside has met its regulation 11A requirements through its consultation methodology (**Section 5.5.2**).

Consistent with the Tipakalippa Appeal, Woodside considers NTA-style “full group” meetings are not the only way for there to be compliance with regulation 11A in relation to Traditional Custodian relevant persons. Nominated representative corporations (such as the Prescribed Bodies Corporates (PBCs) established under the NTA) have a designated role of representing the views of their own member Traditional Custodians. They have established methods for engaging with their own members. Woodside will not undermine the purpose and authority of nominated representative corporations by requiring full group meetings where the nominated representative corporations have not requested engagement of members via full group meetings. We do not consider it appropriate for titleholders to direct or challenge the nominated representative corporations on how to engage with their members.

Woodside's approach described below demonstrates that sufficient information and a reasonable opportunity is provided to individual Traditional Custodians to provide feedback on Woodside activities beyond the opportunity provided to nominated representative corporations.

5.5.2 Consultation Method

Woodside's First Nations team has extensive expertise in engaging and working with First Nations organisations and individuals, including having worked within the Commonwealth native title and cultural heritage systems and state and territory cultural heritage and land rights systems, for several decades. The team understands the complexities of making information accessible to groups and individuals and engaging in accordance with First Nations groups' established channels of communication and methods of consultation. The First Nations team exercises its professional judgement and is deeply respectful of long-standing relationships (where in place) when considering consultation with First Nations groups. The First Nations team's approach is also informed by the established systems of recognition for First Nations groups and their nominated representative corporations within particular jurisdictions.

For example, the methodology for engaging with First Nations groups in the Northern Territory (not relevant for this EP) tends to centre around engagement through Aboriginal land councils (under the Aboriginal Land Rights (Northern Territory) Act 1976 (Cth)) as well as community meetings that target clan groups where they do not have PBCs or other nominated representative corporations to represent them. By contrast, recognition for First Nations groups and their nominated representative corporations in Western Australia falls under the Native Title Act 1993 (Cth) because the vast majority of the Western Australian coastline is settled under the native title regime. This means that

the methodology and process for consultation in Western Australia places greater emphasis on, but is not limited to Native Title Representative Bodies and PBCs.

Native title determinations provide certainty about the appropriate Traditional Custodian groups that have the cultural authority to speak for country adjacent to the EMBA, and also help Woodside to identify Traditional Custodian persons and groups asserting Traditional Custodianship. The Full Court in the Tipakalippa Appeal explicitly endorsed methods of consultation with groups of relevant persons that are appropriate and adapted to the characteristics of groups. Woodside's consultation methodology is adapted and appropriate to the recognised systems of communal interests in Western Australia.

In Western Australia (relevant for this EP), Woodside has sought to follow the established, effective and respectful means of communication used by Native Title Representative Bodies and nominated representative corporations (including PBCs) with their respective First Nations communities. Woodside follows these processes for the appropriate broad capture of individuals' awareness of our activities, to self-identify (**Section 5.5.2.2**), and to provide feedback to inform the management of environmental impacts and risks.

Using these tools, Woodside communicates information about Environment Plans by:

- advertising in relevant newspapers. This encourages self-identification, by advertising proposed activities widely through newspapers that have national and intra-state circulation, i.e., Koori Mail, National Indigenous Times, The West Australian;
- creating carefully considered Consultation Summary Sheets with information developed by an Indigenous member of the First Nations Team to remove jargon and provide relevant information for people to have informed understandings about the activities;
- direct contact through nominated representative corporations;
- utilising social media (ie. Facebook/Instagram), texts and emails. These mediums are the preferred communication methods used by Traditional Custodians throughout Western Australia and on that basis used by Native Title Representative Bodies and other government agencies and industry, to engage with Traditional Custodians or call meetings. First Nations woman, Professor Bronwyn Castle through 10 years of research found "Social media is an intrinsic part of daily life. The use of Facebook is around 20 per cent higher [among First Nations people] than the national average across all geographical locations" (Social media mob: being Indigenous online, Professor Bronwyn Carlson (2018));
- For ongoing consultation post regulation 11A consultation, Woodside introduced a Program of Ongoing Engagement with Traditional Custodians which sets out the commitment to ongoing engagement and support to care for and manage country, including Sea Country. The program was developed in response to Traditional Custodian feedback;
- Woodside has members of its First Nations team who are based in Karratha and Roebourne and who serve as on-Country points of contact for First Nations organisations and individuals. These team members have broad local knowledge and established, on-the-ground relationships within communities. This helps contribute to positive outcomes including encouraging First Nations attendance and involvement at Woodside's information sessions and Community roadshows. Team members on the ground engage in a great deal of preparatory work including by distributing information and providing notice to the community to support First Nations attendance at information sessions and Community roadshows;
- From the commencement of engagement with Traditional Custodians, Woodside seeks direction on how they prefer to be consulted and has consulted accordingly. Consultation processes that are informed by Traditional Custodians and co-designed on a case-by-case

basis and includes their direction as to cultural protocols, structure of consultation and whom to appropriately consult with (such as elders).

- Holding meetings on country at a place and time agreed with the Traditional Custodians and offering and providing financial assistance for meeting expenses (as appropriate);
- Providing information specifically designed to be easily understood, to reach all relevant people, and give a reasonable period of time for those people to make an informed assessment of the possible consequences of the proposed activity on them.

5.5.2.1 Identification of Relevant Persons

In order to undertake consultation, Woodside has developed a methodology for identifying all relevant persons, in accordance with regulation 11A(1) of the Regulations (**Section 5.2** and **5.3**).

Specific to Woodside's approach for identifying relevant Traditional Custodians, Woodside's First Nations Communities Policy and consultation approach is guided by Traditional Custodians by directing consultations through their nominated representative corporation. This has been implemented by Woodside through consultation with a nominated representative corporation where that corporation has advised Woodside that it acts as the representative body for a Traditional Custodian group and has requested that Woodside engage with it as the representative body for that Traditional Custodian group.

Woodside asks nominated representative corporations (such as PBCs) and Native Title Representative Bodies to identify individuals that should be consulted, and enables individuals to self-identify in response to national and local advertising, social media and community engagement opportunities (**Section 5.5.2.2** and **5.9.1**). Where there is a nominated representative corporation for an area, unless directed by the nominated representative corporation, Woodside does not directly approach individuals for consultation, because this has the potential to undermine the role of the nominated representative corporations. Approaching individuals directly is a practice that is no longer considered acceptable because of divisions it has been shown to cause in communities. In addition to asking for the identification of individuals, Woodside also asks nominated representative corporations to distribute consultation information to whomever the nominated representative corporations deem appropriate including members of the nominated representative corporations who are communal rights holders.

Having said this, as set out in further detail in **Section 5.5.2.2** below, individuals are also given the opportunity to self-identify, consult and provide their own feedback on the proposed activity. When approached in this way, Woodside will engage individuals as relevant persons and will also (subject to any confidentiality or cultural restrictions) advise the nominated representative body of the consultation where it relates to cultural values. These methods of consultation are consistent with requirements for notification under the *Native Title Act 1993* (Cth), such as under the future act provisions (section 29), which requires notification of the Native Title Representative Body, the PBC (or nominated representative) and notification through newspapers. The notification process has been selected as a respectful, practical and pragmatic analogue for consultation with First Nations peoples, rather than requiring members to be notified via a formal authorisation process which aims to seek, from members, authorisation of agreements and native title/compensation claims under the *Native Title Act 1993* (Cth).

In this consultation, Woodside requested nominated representative corporations to identify any potential individual relevant persons for consultation, and to distribute consultation materials to their members. However, Woodside recognises that the process is voluntary and that it cannot compel nominated representative corporations (such as PBCs) to do so. Woodside also recognises that it would not be appropriate to seek to audit the nominated representative corporations for compliance with any member consultation request.

5.5.2.2 Opportunity to Self-identify and Identifying Other Individuals

Woodside requests nominated representative corporations and the Native Title Representative Bodies to identify other individuals to consult with or individuals who may seek to self-identify for a proposed activity. Woodside also advertises broadly through Indigenous, national and local advertising, social media and community engagement opportunities (as described in **Section 5.9.1**) to provide individuals with an opportunity to consult. Woodside does not directly approach individuals for consultation, as this undermines the role of the nominated representative corporations (**Section 5.5.2.1**). Woodside's approach to providing individual Traditional Custodians the opportunity to self-identify and consult for an Environment Plan is as follows:

- Woodside applies the principles of self-determination when consulting with Traditional Custodians by consulting through the Traditional Owners' authorised representative entities.
- Recognising the function of a PBC to represent communal interests and manage cultural values, Woodside requests that the information provided to representative entities is provided to their members but Woodside recognises the process is voluntary and Woodside cannot compel them to do so nor seek to audit the representative entities for compliance with any request
- Representative entities cannot provide membership details to Woodside due to individual confidentiality requirements.
- Woodside requests advice as to who else Woodside should be consulting but recognises the process is voluntary and cannot compel nominated representative corporations to provide this information.
- Modern Indigenous engagement practises rely on the building and maintaining of respectful relationships. Most nominated representative corporations to date have requested the building of that relationship, where one is not already in place.
- While Woodside has, in some cases, approached individual directors and elders outside of this process due to requirements imposed in Environment Plan consultation, this approach is considered inappropriate by modern Indigenous engagement standards, fundamentally undermining the authority of the authorised representative entity and can be detrimental to the relationship.

For this proposed activity, Woodside requested nominated representative corporations (including PBCs) and Native Title Representative Bodies to identify any potential individual relevant persons for consultation, and to distribute consultation materials to their member base. However, Woodside recognises the process is voluntary and it cannot compel them to do so nor seek to audit the representative entities for compliance with any request. Woodside has not been directed to engage individual Traditional Custodians by nominated representative corporations for this proposed activity. Woodside has nevertheless provided reasonable opportunity for individual Traditional Custodians to engage in consultation through appropriate and adapted consultation methods.

5.5.2.2.1 Sufficient Information

Woodside recognises that the information sufficient to allow a person or organisation to make an informed assessment of the possible consequences of the proposed activity on their functions, interests or activities may vary and also may depend on the degree to which a relevant person is potentially affected.

Woodside produces a Consultation Information Sheet for each Environment Plan which is provided to relevant persons and organisations to provide the opportunity for feedback on the activity (**Section 5.4.1**). In response to Traditional Custodians' feedback, Woodside has tailored effective consultation methods for its activities, specifically designed for Traditional Custodians, so that

information is provided in a form that is readily accessible and appropriate. The targeted Consultation Summary Sheet (as described in **Section 5.9.1**) developed and reviewed by Indigenous representatives so that content is appropriate to the intended recipients, is then provided to relevant Traditional Custodian groups. Phone calls are made to provide context to the consultation.

Where face to face consultation meetings are requested, Woodside coordinates engagement at the Traditional Custodians' location of choice (where practicable) and with their nominated attendees. Key project personnel, environmental and First Nations relations experts are typically present to enable effective communication and prompt response to questions. Materials for these sessions incorporate visual aids such as photos, maps and videos, and plain language suitable for people with a non-technical background.

Woodside has sought to provide sufficient information to individual members of nominated representative corporations (such as PBCs) by providing information to representative bodies and suggesting dissemination with members. However, Woodside recognises consultation is voluntary and it cannot compel them to do so nor would it be appropriate to seek to audit the representative entities for compliance with any request.

5.5.2.3 Reasonable Period for Consultation

Woodside seeks to consult in order to support preparation of its Environment Plan. Woodside recognises that what constitutes a reasonable period for consultation should be considered on a case-by-case basis, with reference to the nature, scale and complexity of the activity (**Section 5.4.2**).

5.5.2.4 Discharge of Regulation 11A

In relation to Traditional Custodian relevant persons (and all relevant persons), Woodside has discharged its duty under regulation 11A. Woodside considers that consultation under regulation 11A is complete (**Section 5.4.3**).

5.6 Providing Feedback and Assessment of Merit of Objections or Claims

There are a number of ways in which feedback can be provided. Feedback can be provided through the Woodside feedback email or via the Woodside feedback toll free phone line as outlined in the Consultation Information Sheet and the Woodside website. Where appropriate, consultation may also be supported by phone calls or meetings. An Environment Plan feedback form is also available on Woodside's website enabling stakeholders to provide feedback on proposed activities, or to request additional information.

Woodside consults widely on its EPs and notes that feedback is received in various forms. Feedback that is considered inappropriate or that puts the environment, health, safety or wellbeing of Woodside employees or operations at risk will not be tolerated. Woodside respects people's rights to protest peacefully and lawfully but actions that put the environment, health, safety or wellbeing of Woodside employees or operations at risk go beyond those boundaries.

Woodside accepts feedback and engages in consultation in order to achieve the aims set out in Section 5.2. Woodside recognises that there are persons and organisations that take a view that Woodside's operations and/or growth projects should be stopped or at least delayed as far as possible. Whilst Woodside assesses the merits of objections or claims received, it acknowledges NOPSEMA's guidance in its brochure entitled Consultation on offshore petroleum environment plans information for the community, which states that relevant persons are free to respond on any matter and raise any concern, however this may not be able to be considered if it is outside the scope or purpose of the environment plan and approval process, for example, statements of fundamental objection to offshore petroleum activities or information containing personal threats or profanities.

Feedback from relevant persons is reviewed and an assessment of the merits is made of information provided as well as objections or claims about the adverse impact of each activity to which the EP relates. This might, for instance, be done through a review of data and literature and for relevance to the nature and scale of the activity outlined in the EP. Consistent with the aim of consultation in **Section 5.2**, Woodside will consider information received when reviewing and designing measures to put in place to minimise harm to relevant persons and where reasonable or practical to further manage impacts and risks to ALARP and acceptable levels.

Woodside considers feedback during consultation from relevant persons and other persons Woodside chose to contact (see **Section 5.3.4**). This information is summarised in Appendix F, Table 1 and Table 2 of the EP and includes a statement of Woodside’s response, or proposed response, if any, to each objection and claim.

In accordance with regulation 9(8) of the Environment Regulations, sensitive information (if any) in an EP, and the full text of any response by a relevant person to consultation under regulation 11A, must be contained in the sensitive information part of the plan and not anywhere else in the plan.

5.7 Ongoing Consultation

Consultation can continue to occur during the life of an EP, including after an EP has been accepted by NOPSEMA.

As per Woodside’s ongoing consultation approach (refer to **Section 7.10.2.1**), feedback and comments received from relevant persons continue to be assessed and responded to, as required, throughout the life of an EP, including during its assessment and once accepted, in accordance with the intended outcome of consultation (as set out in **Section 5.2**).

Should consultation feedback be received following the acceptance of an EP that identifies a measure or control that requires implementation or updates to meet the intended outcome of consultation (see **Section 5.2**), Woodside will apply its Management of Change and Review process as appropriate (see **Section 7.8**).

5.8 Woodside’s Methodology to Identify Relevant Persons

5.8.1 Identification of Relevant Persons Under Regulation 11A(1)(a), (b) and (c)

Woodside’s methodology for identifying relevant persons under regulations 11A(1)(a), (b) and (c) is as follows:

- Woodside considers the defined responsibilities of each of the departments and agencies to which the activities in the EMBA to be carried out under the EP may be relevant. This list of relevant department and agencies is formulated by reference to the responsibilities of the government departments as set out on their websites, in NOPSEMA’s *GL1887 – Consultation with Commonwealth agencies with responsibilities in the marine area guideline* (January 2023), which describes where the Department is a relevant agency under the Environment Regulations, as well as experience and knowledge that Woodside has gained from years of operating in relation to the departments and agencies which Woodside has historically consulted over the years. This list is revised from time to time, for example, for the purposes of to accommodating government restructures, renaming of departments, shifting portfolios and/or to account for new agencies that might arise.
- Woodside has categorised government department or agency groups as follows:

Government departments / agencies – marine	Agencies with legislated responsibilities for use of the marine environment.
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Government departments / agencies – environment	Agencies with legislated responsibilities for the protection of the marine environment.
Government departments / agencies – industry	The legislated Department of the responsible Commonwealth, State or Northern Territory Minister for Industry.

- Woodside considers each of the responsibilities of the departments and agencies and determines whether those responsibilities overlap with potential risks and impacts specific to the proposed petroleum activity in the EMBA. The assessment is both activity and location based.
- Woodside acknowledges the roles and responsibilities of government departments and agencies acting on behalf of various industry participants. For example, AMSA – Marine Safety is responsible for the safety of vessels and the seafarers who are operating in the domestic commercial shipping industry and AHO is responsible for maritime safety and Notices to Mariners. To undertake the Petroleum Activities Program in a manner that prevents a substantially adverse effect on the potential displacement of marine users, Woodside therefore consults AMSA – Marine Safety and AHO on its proposed activities. Woodside considers each of the responsibilities of the departments and agencies and determines those that would either be involved in the incident response itself or in relation to the regulatory or decision-making capacity with respect to planning for the unlikely event of a worst-case hydrocarbon release incident response specific to the Petroleum Activities Program. Feedback received, if any, is assessed in accordance with the intended outcome of consultation (as set out in **Section 5.2**).
- The list of those government departments and agencies assessed as relevant is set out in **Table 5-3**.

Feedback received, if any, is assessed in accordance with the intended outcome of consultation (as set out in **Section 5.2** and summarised at **Appendix F**, Table 1 and Table 2 as appropriate to the relevance assessment.

Woodside does not consult with departments or agencies with interests that do not overlap with risks and impacts specific to the proposed petroleum activity in the EMBA or would not be involved in incident response planning. For instance, in this EP, Woodside has not consulted with the department for the Minister of the Northern Territory because there is no overlap given that the proposed activities are in Commonwealth waters offshore of Western Australia.

5.8.2 Identification of Relevant Persons Under Regulation 11A(1)(d)

Relevant persons under regulation 11A (1)(d) are defined as a person or organisation whose functions, interests or activities may be affected by the activities to be carried out under the EP, or a revision of the EP. In identifying relevant persons, Woodside considers:

- the planned activities to be carried out under this EP (described in **Section 3**); and
- the EMBA by unplanned activities (identified in Section 4 and assessed in **Section 6.8**).

To identify relevant persons who fall within regulation 11A(1)(d), Woodside adopts the following methodology, and then undertakes consultation with relevant persons which is set out further in **Section 5.8**.

- As a general proposition, Woodside assesses whether a person or organisation is a relevant person having regard to:
 - whether a person or organisation has functions interests or activities or that overlap with the PAA and EMBA; and
 - whether a person or organisation's functions, interests or activities may be affected by Woodside's proposed planned or unplanned activities.

- This assessment will include applying professional judgement, knowledge and current literature.
- Further, to assist in identifying the full range of relevant persons, Woodside considers the impacts and risks associated with its proposed activities and considers the broad categories of relevant persons who may be affected by the activities. For this EP, the broad categories are identified in **Table 5-1** below and identification methodology applied as set out in **Table 5-2**.
- The list of those persons or organisations assessed as relevant and persons or organisations Woodside chose to contact is set out in **Table 5-3**.
- Feedback received, if any, is assessed in accordance with the intended outcome of consultation (as set out in **Section 5.2**) and applying the categories of relevant persons methodology outlined in **Table 5-2**, as appropriate.
- Feedback from relevant persons is summarised at **Appendix F**, Table 1. Feedback from persons assessed as not relevant but whom Woodside chooses to contact or self-identified and Woodside assessed as not relevant are summarised at **Appendix F**, Table 2.

Table 5-1: Categories of relevant persons

Category	Explanation
Commercial fisheries and peak representative bodies	Commonwealth or State Commercial Fishery with a fishery management plan recognised under the Commonwealth <i>Fisheries Management Act 1991</i> (Cth) and Western Australian <i>Fish Resources Management Act 1994</i> (WA), which may be amended from time to time. Commonwealth peak fishery representative bodies are identified by AFMA. WAFIC is the peak representative body for state fishers in Western Australia.
Recreational marine users and peak representative bodies	Charter boat, tourism and dive operators identified by DPIRD specific to the location of the proposed activity. Representative bodies are the recognised peak organisation(s) for recreational marine users.
Titleholders and Operators	Registered holder of an offshore petroleum title or GHG title governed by the <i>OPGGS Act</i> and associated regulations.
Peak industry representative bodies	Recognised peak organisation(s) for the oil and gas sector.
Traditional Custodians (individuals and/or groups/entity)	Traditional Custodians are First Nations Australians who hold cultural rights and interests, or have cultural functions or perform cultural activities over particular lands and waters. Where a First Nations person, group or entity self-identifies and/or asserts cultural rights, interests, functions or activities they will be included in the definition of Traditional Custodian for the purpose of this Environment Plan.
Nominated Representative Corporations	Nominated representative corporations are Traditional Custodians' nominated representative institutions such as Prescribed Body Corporates (PBC). PBCs are established under the Native Title Act 1993 by Traditional Custodians to represent their entire Traditional Custodian group (defined broadly by reference to descents from an ancestor set who were known to be the Traditional Custodians at the time of European colonisation) and their interests including, among other things, management and protection of cultural values.
Native Title Representative Bodies	A Representative Aboriginal/Torres Strait Islander Bodies (RATSIB) is a regional organisation appointed under the Native Title Act 1993 (NTA) with prescribed functions, set out in Part 11 of the Native Title Act 1993, which relate to: facilitation and assistance; certification; dispute resolution;

Category	Explanation
	notifications; agreement making. They are also known, and referred to here, as Native Title Representative Bodies.
Historical heritage groups or organisations	Legislated or government enlisted groups or organisations responsible for the management of marine heritage.
Local government and recognised local community reference/liaison groups or organisations	Local government governed by the <i>Local Government Act 1995</i> (WA) which is responsible for representing the local community. Recognised local community reference/liaison group or organisation in relation to oil and gas matters.
Other non-government groups or organisations	Non-government organisation with public website material targeting the proposed activity.
Research Institutes and local conservation groups or organisations	Research institutes are government or private institutions that conduct marine or terrestrial research. Local conservation groups are local non-government organisation that regularly conduct conservation activities focused on the local environment or wildlife.

Table 5-2: Methodology for identifying relevant persons within the EMBA undertaken under subcategory 11A(1)(d) – by category

Category	Relevant person identification methodology
Commercial fisheries (Commonwealth and State) and peak representative bodies	<p>Woodside assesses relevance for commercial fisheries (Commonwealth and State) and their representative bodies using the following next steps in its methodology:</p> <ul style="list-style-type: none"> Defining the parameters having regard to timing, location and duration of the proposed petroleum activity. Confirming whether the EMBA overlaps with the fisheries management area (i.e. the spatial area the fishery is legally permitted to fish in) (see Section 4.9.2). Woodside acknowledges WAFIC’s consultation guidance¹⁷ (accessed on 2 February 2023), that titleholders develop separate consultation strategies for significant unplanned events (for example oil spill) where titleholders can demonstrate the likelihood of such events occurring is extremely low. WAFIC’s guidance is that consultation on unplanned events resulting in an emergency scenario should only be undertaken if an incident occurs (see Appendix H). For Commonwealth and State commercial fisheries, Woodside assesses the potential spatial and temporal extent for interaction with the fishery by reviewing AFMA ABARES and DPIRD Fishcube data within the Operational Area and EMBA (see Section 4.9.2). <p>Assessment of relevance:</p> <ul style="list-style-type: none"> State commercial fisheries that have been assessed as having a potential for interaction within the Operational Area or EMBA (see Section 4.9.2) are assessed as relevant to the proposed activity. Woodside acknowledges WAFIC’s consultation guidance (see above) and applies this by: <ul style="list-style-type: none"> directly consulting fishery licence holders that are assessed as having a potential for interaction in the Operational Area; and consulting fisheries that are assessed as having a potential for interaction in the EMBA via WAFIC. Commonwealth commercial fisheries that have been assessed as having a potential for interaction within the Operational Area or EMBA (see Section 4.9.2) are assessed as relevant to the proposed activity. If Woodside has identified that a Commonwealth or State fishery is a relevant person, then Woodside also consults the fisheries relevant representative body. For example, WAFIC represents the interests of State fisheries in Western Australia. If a state fishery is identified as relevant, Woodside would also identify WAFIC as relevant. Recognised Commonwealth fishery representative bodies are identified

¹⁷ [Consultation Approach for Unplanned Events - WAFIC](#)

Category	Relevant person identification methodology
	by AFMA via its website. WAFIC is the only recognised state fishery representative body.
Recreational marine users and peak representative bodies	<p>Woodside assesses relevance for recreational marine users and peak representative bodies using the following next steps in its methodology:</p> <ul style="list-style-type: none"> • From Woodside knowledge and operating experience, knowledge of recreational marine users in the area. This assessment is both activity and location based. • Defining the parameters having regard to timing, location and duration of the proposed petroleum activity. • Assessing the potential spatial and temporal extent for interaction with recreational marine users by reviewing DPIRD Fishcube data to assess whether there has been activity within the EMBA in the past 5 years. <p>Assessment of relevance:</p> <ul style="list-style-type: none"> • Recreational marine users that have been active in the past 5 years within the EMBA are assessed as relevant to the proposed activity. Woodside is provided with the contact details of charter, boat tourism and dive operators specific to the region of the EMBA by DPIRD to consult with the relevant persons. • If Woodside has identified recreational marine users as relevant persons, then Woodside also consults identified peak recreational marine user representative bodies. For example, Recfishwest represents the interests of recreational fishers. These representative bodies are identified via Woodside’s existing consultation list, which is updated as appropriate via advice from known groups and DPIRD.
Titleholders and Operators	<p>Woodside assesses relevance for other titleholders and operators using the following next steps in its methodology:</p> <ul style="list-style-type: none"> • Using WA Petroleum Titles (DMIRS-011) to determine overlap with other Titleholders or Operators permit areas within the EMBA. • From Woodside knowledge and operating experience, knowledge of other operators in the area. • Woodside produces a map showing the outcome of this assessment. <p>Assessment of relevance:</p> <ul style="list-style-type: none"> • Titleholders and Operators whose permit areas are identified as having an overlap within the EMBA are assessed as relevant.
Peak industry representative bodies	<p>Woodside assesses relevance for peak industry representative bodies using the following next steps in its methodology:</p> <ul style="list-style-type: none"> • Review of peak industry representative bodies responsibilities that Woodside actively participates in, with consideration of overlap between industry focus area and Woodside’s proposed activities within the EMBA. • Review of Woodside’s existing consultation list. • Website search to identify whether any additional peak industry representative bodies have been created whose responsibilities may overlap with Woodside’s proposed activities within the EMBA. <p>Assessment of relevance:</p> <ul style="list-style-type: none"> • Peak industry representative bodies whose responsibilities are identified as having an overlap with Woodside’s proposed activities within the EMBA are assessed as relevant.
Traditional Custodians (individuals and/or groups/entity) and Nominated Representative Corporations	<p>Consistent with its understanding of the matters discussed in Section 4.9.1 and 5.5 to identify Traditional Custodian groups or individuals, Woodside:</p> <ul style="list-style-type: none"> • Uses existing systems of recognition to identify First Nations groups who overlap or are coastally adjacent to the EMBA (for example, recognition provided under native title or cultural heritage legislation, or marine park management plans, or identification by other First Nations groups or entities) (Section 4.9.1). • Notifies and invites consultation with First Nations people through their nominated representative corporation (for example PBCs); or, in the case of native title, and where appropriate, the Native Title Representative Body (Section 5.5.2.1).

Category	Relevant person identification methodology
	<ul style="list-style-type: none"> • Requests the nominated representative body to forward the notifications and invitations to consult to their members (members are individual communal rights holders) (Section 5.5.2.1) • Requests advice as to other First Nations groups or individuals that should be consulted (Section 5.5.2.1) • Requests the nominated representative body to provide consultation materials to its members (Section 5.5.2.2) • Advertises widely so as to invite self-identification and consultation by First Nations groups and/or individuals (Section 5.5.2.2) <p>Further detail to Woodside’s methodology is as follows.</p> <p>Woodside uses the databases of the National Native Title Tribunal (Section 4.9.1):</p> <ul style="list-style-type: none"> • to understand whether there are any Native Title Claims (historical or current) or determinations overlapping or coastally adjacent to the EMBA; • to understand whether there are any relevant Indigenous Land Use Agreements (ILUA), registered with the National Native Title Tribunal that overlap or are adjacent to the EMBA that may identify Traditional Custodians or representative bodies to contact regarding potential cultural values. <p>Where there is a positive determination of native title, contacting the PBC or, where their representative is a Native Title Representative Body contacting the Native Title Representative Body.</p> <p>Where appropriate, contacting the relevant Native Title Representative Body to request a list of any First Nations groups asserting Traditional Custodianship over an area of coastline adjacent to the EMBA.</p> <p>Review of Commonwealth and State Marine Park Management Plans that overlap the EMBA which may identify Traditional Custodians or representative bodies to contact regarding potential cultural values.</p> <p>In the WA context, any Aboriginal Corporation appointed as a Local Aboriginal Cultural Heritage Service (LACHS) under the Aboriginal Cultural Heritage Act 2021 for an area that overlaps the EMBA.</p> <p>First Nations groups or individuals identified by a Traditional Custodian, nominated representative corporation, Native Title Representative Body.</p> <p>Request to the PBC to distribute Woodside consultation materials through its membership. Woodside is unable to contact this membership through any other means.</p> <p>Woodside has a number of public notification and information sharing processes by which individual Traditional Custodians can become aware of the proposed activity, its risks and impacts, and self identify.</p> <p>Individuals that consider their functions, interests or activities may be affected by a proposed activity must self-identify for each Environment Plan. Woodside does not presume that self-identification for an activity, covered by another Environment Plan, automatically means that an individual/s functions, interest and activities may be affected by other activities where EMBA’s overlap. This decision is for the individual to make. The public notification, information sharing, and consultation processes Woodside puts in place enables Traditional Custodians to become aware of proposed activities, assess any risks and impacts to their values, and enable individuals to self-identify.</p> <p>Assessment of relevance:</p> <ul style="list-style-type: none"> • Traditional Custodian groups, entities or individuals and Nominated Representative Corporations who are identified through the above methodology and overlap or are coastally adjacent to the EMBA are assessed as relevant.
Native Title Representative Bodies	<p>Woodside assesses relevance for Native Title Representative Bodies using the following steps in its methodology (Section 4.9.1):</p> <ul style="list-style-type: none"> • A Representative Aboriginal/Torres Strait Islander Bodies (RATSIB) is a regional organisation appointed under the Native Title Act 1993 (NTA) with prescribed functions set out in Part 11 of the Native Title Act 1993, which relate to: facilitation and assistance; certification; dispute resolution; notifications; agreement making. They are also known, and referred to here, as Native Title Representative Bodies.

Category	Relevant person identification methodology
	<ul style="list-style-type: none"> Review of National Native Title Tribunal RATSIB areas that overlap or are coastally adjacent to the EMBA. <p>Assessment of relevance:</p> <ul style="list-style-type: none"> Where the area for which a Native Title Representative Body is recognised under the Native Title Act 1993, overlaps with the EMBA or is coastally adjacent to the EMBA, Woodside will assess the Native Title Representative Body as relevant.
<p>Historical heritage groups or organisations</p>	<p>Woodside assesses relevance for groups or organisations whose responsibilities are focused on historical heritage using the following next steps in its methodology:</p> <ul style="list-style-type: none"> Using the Australasian Underwater Cultural Heritage Database to assess any known records Maritime Cultural Heritage sites (shipwrecks, aircraft and relics) within the EMBA (Section 4.9.1). <p>Assessment of relevance:</p> <ul style="list-style-type: none"> Where there is a known underwater heritage site (shipwrecks, aircraft and relics) within the EMBA, the relevant group or organisation that manages the site will be assessed as relevant.
<p>Local government and recognised local community reference/liaison groups or organisations</p>	<p>Woodside assesses relevance for local government and recognised local community reference/liaison groups or organisations using the following next steps in its methodology:</p> <ul style="list-style-type: none"> Review of Woodside maps (developed based on data from the WA Local Government, Sport and Cultural Industries My Council database and WA Local Government Association (WALGA) Local Government Directory maps) to assess any overlap between the local government's defined area of responsibility and the EMBA. Woodside hosts regular community reference/liaison group meetings. Members represent a cross-section of the community and local towns interests. Representatives are from community and industry and generally include, Woodside, State Government (for instance relevant Regional Development Commissions), Local Government, Indigenous Groups, Industry representative bodies, Community and industry organisations. Woodside considers these reference/liaison groups to be the appropriate recognised representatives of the local community for the oil and gas sector. Woodside reviews the community reference/liaison group's terms of reference to determine its area of responsibility and any overlap with the EMBA. For example, the Exmouth Community Liaison Group's area of responsibility in relation to Woodside's operational, development and planning activities, is defined in the terms of reference as the Exmouth sub-basin. Comparatively, the Karratha Community Liaison Group's area of responsibility is the Pilbara region (i.e. onshore). <p>Assessment of relevance:</p> <ul style="list-style-type: none"> The local government whose defined area of responsibility overlaps the EMBA is assessed as relevant. The community reference/liaison group whose defined area of responsibility overlaps the EMBA is assessed as relevant and consulted collectively via the relevant reference/liaison group.
<p>Other non-government groups or organisations</p>	<p>Woodside assesses relevance for other non-government groups or organisations using the following next steps in its methodology:</p> <ul style="list-style-type: none"> Review of Woodside's existing consultation list. Website search of registered non-government groups or organisations (i.e. registered with an Australian Business Number (ABN) and publicly available contact information) that may have public website material specific to the proposed activity at the time of development of the EP. Organisation has a publicly available mission statement (or purpose) that clearly describes their collective functions, interests or activities.

Category	Relevant person identification methodology
	<ul style="list-style-type: none"> • Review of current website material to identify targeted information which demonstrates functions, interests or activities relevant to the potential risks and impacts associated with planned activities. <p>Assessment of relevance:</p> <ul style="list-style-type: none"> • Registered non-government groups or organisations with current targeted public website material specific to the proposed activity at the time of developing the EP and who have demonstrated functions, interests or activities relevant to the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2) will be assessed as relevant.
<p>Research institutes and local conservation groups or organisations</p>	<p>Woodside assesses relevance for research institutes and local conservation groups or organisations using the following next steps in its methodology:</p> <ul style="list-style-type: none"> • Review of Woodside’s existing consultation list. • Website search for research institutes that may operate within the EMBA. This assessment is both activity and location based. • Website search for local conservation groups or organisations that regularly conduct conservation activities within the EMBA. <p>Assessment of relevance:</p> <ul style="list-style-type: none"> • Where there is known research being undertaken by a research institute within the EMBA, the research institute that is conducting the research will be assessed as relevant. • Local environmental conservation groups who regularly conduct conservation activities or have demonstrated conservation functions, interests or activities within the EMBA are assessed as relevant. This assessment is both activity and location based.

5.8.3 Identification of Relevant Persons Under Regulation 11A(1)(e)

Woodside adopts a case-by-case approach for each EP to assess relevance under regulation 11A(1)(e).

5.8.4 Assessment of Relevant Persons for the Proposed Activity

The result of Woodside’s assessment of relevant persons in accordance with regulation 11A(1) is outlined at **Table 5-3** and **Appendix F**, Table 1.

Persons or organisations that Woodside assessed as not relevant but nonetheless chose to contact at its discretion in accordance with **Section 5.3.4** or self-identified and Woodside assessed as not relevant are summarised at **Table 5-3** and **Appendix F**, Table 2.

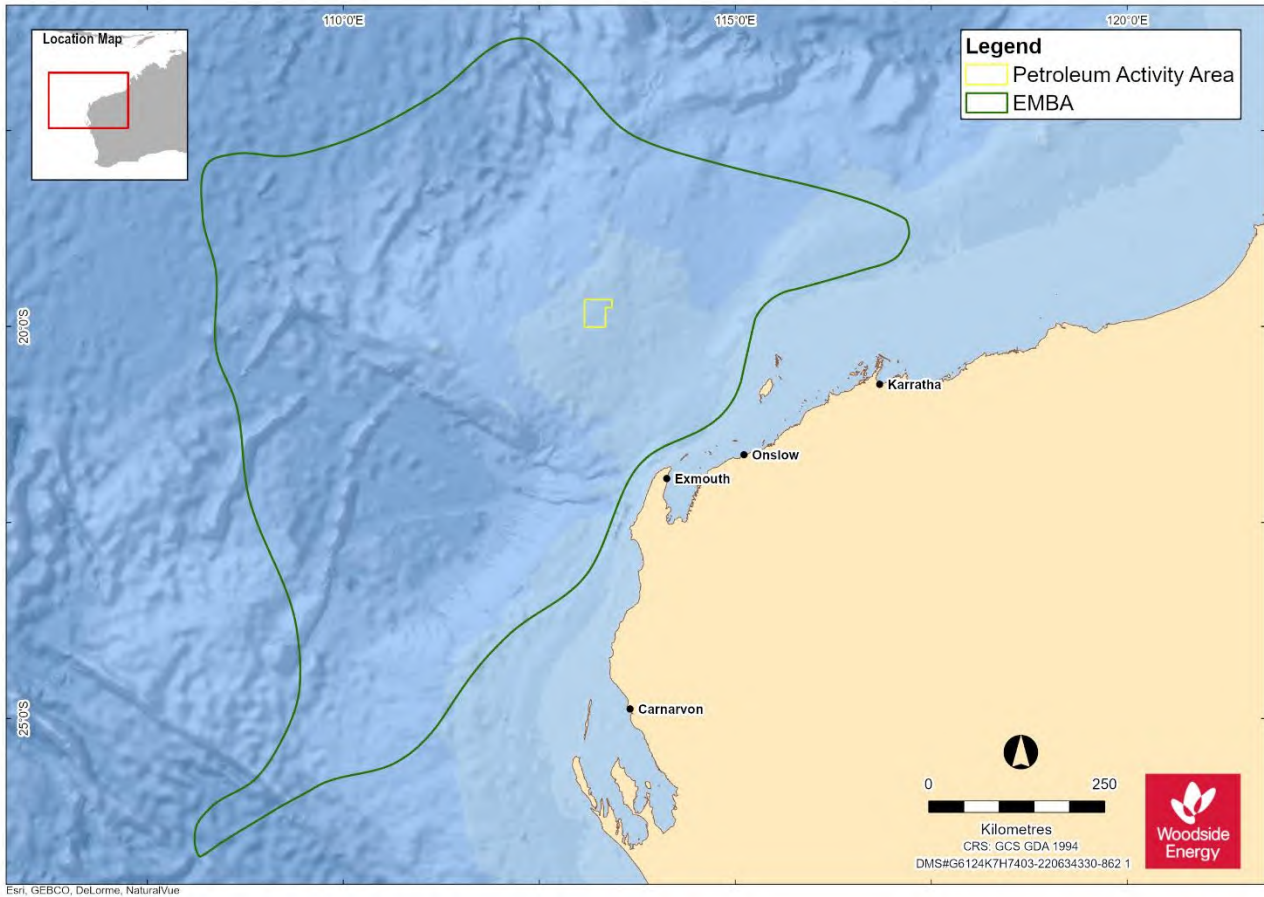


Figure 5-3: PAA and EMBA for this EP

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Table 5-3: Assessment of relevance

Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
Commonwealth and WA State Government Departments or Agencies – Marine			
Australian Border Force (ABF)	Responsible for coordinating maritime security	Woodside has applied its methodology for ‘Government departments / agencies – marine’ under regulation 11A(1)(a). ABF’s responsibilities may be relevant to the activity as there are proposed vessel activities.	Yes
Australian Fisheries Management Authority (AFMA)	Responsible for managing Commonwealth fisheries	Woodside has applied its methodology for ‘Government departments / agencies – marine’ under regulation 11A(1)(a). The North West Slope and Trawl Fishery, Western Deepwater Trawl Fishery and Western Tuna and Billfish Fishery are active in the EMBA. AFMA’s responsibilities may be relevant to the activity as the North West Slope and Trawl Fishery, Western Deepwater Trawl Fishery and Western Tuna and Billfish Fishery are active in the EMBA.	Yes
Australian Hydrographic Office (AHO)	Responsible for maritime safety and Notices to Mariners	Woodside has applied its methodology for ‘Government departments / agencies – marine’ under regulation 11A(1)(a). AHO’s responsibilities may be relevant to the activity as there are proposed vessel activities.	Yes
Australian Maritime Safety Authority (AMSA) – Marine Safety	Statutory agency for vessel safety and navigation	Woodside has applied its methodology for ‘Government departments / agencies – marine’ under regulation 11A(1)(a). AMSA – Marine Safety’s responsibilities may be relevant to the activity as there are proposed vessel activities.	Yes
Australian Maritime Safety Authority (AMSA) – Marine Pollution	Legislated responsibility for oil pollution response in Commonwealth waters	Woodside has applied its methodology for ‘Government departments / agencies – marine’ under regulation 11A(1)(a). AMSA – Marine Pollution’s responsibilities may be relevant to the activity as the proposed activity has a hydrocarbon spill risk which may require AMSA response in Commonwealth waters.	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
Department of Agriculture, Fisheries and Forestry (DAFF) – Fisheries (formerly DAWE)	Responsible for implementing Commonwealth policies and programs to support agriculture, fishery, food and forestry industries	Woodside has applied its methodology for ‘Government departments / agencies – marine’ under regulation 11A(1)(a). The North West Slope and Trawl Fishery, Western Deepwater Trawl Fishery and Western Tuna and Billfish Fishery are active in the EMBA. DAFF – Fisheries’ (formerly DAWE) responsibilities may be relevant to the activity as the North West Slope and Trawl Fishery, Western Deepwater Trawl Fishery and Western Tuna and Billfish Fishery are active in the EMBA.	Yes
Department of Defence (DoD)	Responsible for defending Australia and its national interests.	Woodside has applied its methodology for ‘Government departments / agencies – marine’ under regulation 11A(1)(a). DoD’s responsibilities may be relevant to the activity as defence training areas lie within the EMBA.	Yes
Department of Primary Industries and Regional Development (DPIRD)	Responsible for managing State fisheries	Woodside has applied its methodology for ‘Government departments / agencies – environment’ under regulation 11A(1)(b). No State fisheries are active in the PAA. The Marine Aquarium Managed Fishery, Mackerel Managed Fishery (Area 2 and 3), Nickol Bay Managed Fishery, Onslow Prawn Managed Fishery, Gascoyne Demersal Scalefish Fishery, Pilbara Trawl Fishery, Pilbara Trap Fishery, Specimen Shell Managed Fishery, West Coast Deep Sea Crustacean Managed Fishery, Western Australian Sea Cucumber Fishery and Pilbara Line Fishery are active in the EMBA. DPIRD’s responsibilities may be relevant to the activity as the government department responsible for State fisheries.	Yes
Department of Transport (DoT)	Legislated responsibility for oil pollution response in State waters	Woodside has applied its methodology for ‘Government departments / agencies – environment’ under regulation 11A(1)(b). The proposed activity has a hydrocarbon spill risk, which may require DoT response in State waters.	Yes
Department of Planning, Lands and Heritage (DPLH)	Responsible for state level land use planning and management, and oversight of Aboriginal	Woodside has applied its methodology for ‘Government departments / agencies – environment’ under regulation 11A(1)(b). There is known Maritime Cultural Heritage overlapping the EMBA.	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
	cultural heritage and built heritage matters.		
Pilbara Ports Authority	Responsible for the operation of the Port of Dampier.	Woodside has applied its methodology for 'Government departments / agencies – environment' under regulation 11A(1)(b). The proposed activity does not have the potential to impact Pilbara Ports Authority's responsibilities as the EMBA does not overlap the Pilbara Ports Authority's area of responsibility.	No
Commonwealth and WA State Government Departments or Agencies – Environment			
Department of Agriculture, Fisheries and Forestry (DAFF) – Biosecurity (marine pests, vessels, aircraft and personnel) (formerly DAWE)	DAFF administers, implements and enforces the Biosecurity Act 2015. The Department requests to be consulted where an activity has the potential to transfer marine pests. DAFF also has inspection and reporting requirements to ensure that all conveyances (vessels, installations and aircraft) arriving in Australian territory comply with international health regulations and that any biosecurity risk is managed. The Department requests to be consulted where an activity involves the movement of aircraft or vessels between Australia	Woodside has applied its methodology for 'Government departments / agencies – environment' under regulation 11A(1)(a). DAFF – Biosecurity's (formerly DAWE) responsibilities may be relevant to the proposed activities in the EMBA in the prevention of introduced marine species.	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
	and offshore petroleum activities either inside or outside Australian territory.		
Department of Climate Change, Energy, the Environment and Water (DCCEEW) (formerly DAWE)	Responsible for implementing Commonwealth policies and programs to support climate change, sustainable energy use, water resources, the environment and our heritage. Administers the Underwater Cultural Heritage Act 2018 in collaboration with the States, Northern Territory and Norfolk Island, which is responsible for the protection of shipwrecks, sunken aircraft and other types of underwater heritage and their associated artefacts in Commonwealth waters.	Woodside has applied its methodology for 'Government departments / agencies – environment' under regulation 11A(1)(a). DCCEEW's (formerly DAWE) responsibilities may be relevant to the proposed activities in the EMBA as there are potential environmental impacts from the proposed activity. There are known Maritime Cultural Heritage overlapping the EMBA.	Yes
Director of National Parks (DNP)	Responsible for the management of Commonwealth parks and conservation zones.	Woodside has applied its methodology for 'Government departments / agencies – environment' under regulation 11A(1)(a). DNP's responsibilities may be relevant to the activity as DNP requires an awareness of activities that occur within AMPs, and an understanding of potential impacts and risks to the values of parks (NOPSEMA guidance note: N-04750-GN1785 A620236, June 2020). Titleholders are required to consult DNP on offshore petroleum and greenhouse gas exploration activities if they occur in, or may impact on the values of	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
		marine parks, including where potential spill response activities may occur in the event of a spill (i.e. scientific monitoring).	
Ningaloo Coast World Heritage Advisory Committee (NCWHAC)	Supports the DBCA to manage the Ningaloo Coast World Heritage Area.	Woodside has applied its methodology for 'Government departments / agencies – environment' under regulation 11A(1)(a). The proposed activity does not have the potential to impact NCWHAC's responsibilities as the EMBA does not overlap the Ningaloo Marine Park.	No
Department of Biodiversity, Conservation and Attractions (DBCA)	Responsible for managing WA's parks, forests and reserves to achieve wildlife conservation and provide sustainable recreation and tourism opportunities.	Woodside has applied its methodology for 'Government departments / agencies – environment' under regulation 11A(1)(b). The proposed activity does not overlap WA parks, forests or reserves. Activities have the potential to impact marine tourism in the EMBA.	Yes
Commonwealth and State Government Departments or Agencies – Industry			
Department of Industry, Science and Resources (DISR) (formerly DISER)	Department of relevant Commonwealth Minister.	Required to be consulted under regulation 11A(1)(a).	Yes
Department of Mines, Industry Regulation and Safety (DMIRS)	Department of relevant State Minister	Required to be consulted under regulation 11A(1)(c).	Yes
Commonwealth Commercial fisheries and representative bodies			
North West Slope and Trawl Fishery	Commonwealth commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). The fishery does not overlap the PAA. The fishery overlaps the EMBA and has been active in the EMBA within the last 5 years.	Yes
Southern Bluefin Tuna Fishery	Commonwealth commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). Although the fishery overlaps the PAA and EMBA it has not been active in the PAA or EMBA within the last 5 years.	No

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
		Woodside does not consider that the proposed activity will present a risk to licence holders, given since 1992, the majority of Australian catch has concentrated in south-eastern Australia. (Patterson et al., 2022). In addition, given fishing methods by licence holders for species fished in this fishery (Australia has a 35% share of total global allowable catch of Southern Bluefin Tuna, which is value-added through tuna ranching near Port Lincoln (South Australia), or fishing effort in New South Wales (Australian Southern Bluefin Tuna Industry Association)).	
Western Deepwater Trawl Fishery	Commonwealth commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). Although the fishery overlaps the PAA, it has not been active in the PAA within the last 5 years. The fishery has been active in the EMBA within the last 5 years.	Yes
Western Skipjack Fishery	Commonwealth commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). Although the fishery overlaps the PAA and EMBA it has not been active in the PAA or EMBA within the last 5 years. Woodside does not consider that the activity will present a risk to licence holders, given the fishery spans the Australian Fishing Zone west of Victoria and the Torres Strait. The Fishery is not currently active and no fishing has occurred since 2009 (Patterson et al., 2022). In addition, interactions are not expected given the species' pelagic distribution fishing methods for species fished by licence holders.	No
Western Tuna and Billfish Fishery	Commonwealth commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). Although the fishery overlaps the PAA, it has not been active in the PAA within the last 5 years. The fishery has been active in the EMBA within the last 5 years.	Yes
Commonwealth Fisheries Association (CFA)	Represents the interests of commercial fishers with licences in Commonwealth waters	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). The North West Slope and Trawl Fishery, Western Deepwater Trawl Fishery and Western Tuna and Billfish Fishery are active in the EMBA.	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
		CFA's functions may be relevant to the activity as the North West Slope and Trawl Fishery, Western Deepwater Trawl Fishery and Western Tuna and Billfish Fishery are active in the EMBA.	
Australian Southern Bluefin Tuna Industry Association (ASBTIA)	Represents the interests of the Southern Bluefin Tuna Fishery and Western Skipjack Fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). The Southern Bluefin Tuna Fishery has been assessed as not relevant to the proposed activity. As the peak representative body for the Southern Bluefin Tuna Fishery, the ASBTIA has also been assessed as not relevant. Woodside has provided information to the ASBTIA at its discretion in line with Section 5.3.4 on AFMA advice that it expects all Commonwealth fishers who have entitlements to fish within the proposed area to be consulted, which can be through the relevant fishing industry associations.	No
Tuna Australia	Represents the interests of the Western Tuna and Billfish Fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). The Western Tuna and Billfish Fishery is active in the EMBA. Tuna Australia's functions, interests or activities may be relevant to the activity as the Western Tuna and Billfish Fishery is active in the EMBA.	Yes
Pearl Producers Association (PPA)	Peak representative organisation of The Australian South Sea Pearling Industry, with members in Western Australia and the Northern Territory	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). The Pearl Oyster Managed Fishery has been assessed as not relevant to the proposed activity. As the peak representative body for the Pearl Oyster Managed Fishery, the PPA has also been assessed as not relevant.	No
State Commercial fisheries and representative bodies			
Marine Aquarium Managed Fishery	State commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). Although the fishery overlaps the PAA it has not been active in the PAA within the last 5 years. Woodside does not consider that the activity will present a risk to licence	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
		holders from planned activities, given the fishery generally collects fish in water depths less than 30 m. The fishery has been active in the EMBA in the last 5 years.	
South West Coast Salmon Managed Fishery	State commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). Although the fishery overlaps the PAA and EMBA, the fishery has not been active in the PAA or EMBA within the last 5 years. Woodside does not consider that the activity will present a risk to licence holders, given fishers are active south of Perth and from the beach (previous WAFIC advice).	No
Mackerel Managed Fishery (Area 2 and 3)	State commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). Although Area 3 of the fishery overlaps the PAA, it has not been active in the PAA within the last 5 years. Area 2 and Area 3 of the fishery has been active in the EMBA in the last 5 years.	Yes
Pilbara Crab Managed Fishery	State commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). Although the fishery overlaps the PAA and EMBA, the fishery has not been active in the PAA or EMBA within the last 5 years. Woodside does not consider that the activity will present a risk to licence holders given all waters of the fishery north of 23° 34' S and west of 115° 06.50' E (inclusive of the PAA) have been closed to fishing since the formation of the fishery.	No
West Coast Deep Sea Crustacean Managed Fishery	State commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). Although the fishery overlaps the PAA, the fishery has not been active in the PAA within the last 5 years. The fishery has been active in the EMBA in the last 5 years.	Yes
Specimen Shell Managed Fishery	State commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d).	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
		The fishery does not overlap the PAA. The fishery has been active in the EMBA within the last 5 years.	
Onslow Prawn Managed Fishery	State commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). The fishery does not overlap the PAA. The fishery has been active in the EMBA within the last 5 years.	Yes
Pearl Oyster Managed Fishery	State commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). The fishery does not overlap the PAA. The fishery overlaps the EMBA but has not been active in the EMBA within the last 5 years. Woodside does not consider that the activity will present a risk to licence holders given fishing methods and location for species fished by licence holders (fishing effort is mostly focussed in shallow coastal waters of 10-15 m depth, with a maximum depth of 35 m) (Lulofs et al. 2002).	No
Nickol Bay Prawn Managed Fishery	State commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). The fishery does not overlap the PAA. The fishery overlaps the EMBA but has not been active in the EMBA within the last 5 years.	Yes
Western Australian Sea Cucumber Fishery	State commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). Although the fishery overlaps the PAA, the fishery has not been active in the PAA within the last 5 years. Due to water depth, distance offshore, and distance from popular fishing spots, fishers do not collect sea cucumber within the PAA. The fishery has not been active in the EMBA within the last 5 years.	Yes
Gascoyne Demersal Scalefish Fishery	State commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). The fishery does not overlap the PAA. The fishery has been active in the EMBA within the last 5 years.	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
West Coast Rock Lobster Managed Fishery	State commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). The fishery does not overlap the PAA. The fishery overlaps the EMBA but has not been active in the EMBA in the last 5 years.	No
Abalone Managed Fishery	State commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). The fishery does not overlap the PAA. The fishery overlaps the EMBA but has not been active in the EMBA in the last 5 years.	No
West Coast Demersal Gillnet & Demersal Longline Interim Managed Fishery	State commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). The fishery does not overlap the PAA. The fishery overlaps the EMBA but has not been active in the EMBA in the last 5 years.	No
Demersal Scalefish Fishery: Pilbara Trawl Fishery	State commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). The fishery does not overlap the PAA. The fishery has been active in the EMBA within the last five years.	Yes
Pilbara Trap Fishery	State commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). The fishery does not overlap the PAA. The fishery has been active in the EMBA within the last five years.	Yes
Pilbara Line Fishery	State commercial fishery	Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d). Although the fishery overlaps the PAA, it has not been active in the PAA within the last 5 years. The fishery has been active in the EMBA in the last 5 years.	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
Western Australian Fishing Industry Council (WAFIC)	Represents the interests of commercial fishers with licences in State waters.	<p>Woodside has applied its methodology for 'Commercial fisheries (Commonwealth and State) and peak representative bodies' under regulation 11A(1)(d).</p> <p>No State fisheries are active in the PAA. The Marine Aquarium Managed Fishery, Mackerel Managed Fishery (Area 2 and 3), Nickol Bay Managed Fishery, Onslow Prawn Managed Fishery, Gascoyne Demersal Scalefish Fishery, Pilbara Trawl Fishery, Pilbara Trap Fishery, Specimen Shell Managed Fishery, West Coast Deep Sea Crustacean Managed Fishery, Western Australian Sea Cucumber Fishery and Pilbara Line Fishery are active in the EMBA.</p> <p>WAFIC's functions may be relevant to the activity as the peak representative body for State fisheries.</p>	Yes
Recreational marine users and representative bodies			
Karratha recreational marine users <ul style="list-style-type: none"> • Nickol Bay Sport Fishing Club • Archipelago Adventures • Hampton Harbour Boat & Sailing Club • King Bay Game Fishing Club • Marine Rescue Dampier • Port Walcott Volunteer Marine Rescue • Port Walcott Yacht Club • Reef Seeker Charters • West Pilbara Volunteer Sea Search and Rescue Group 	Karratha-based dive, tourism and charter operators	<p>Woodside has applied its methodology for 'Recreational marine users and representative bodies' under regulation 11A(1)(d).</p> <p>Activities have the potential to impact Karratha-based dive, tourism and charter operator's functions, interests or activities due to the location of activities and there has been recorded charter effort in the EMBA in the past 5 years.</p>	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
<p>Exmouth recreational marine users</p> <ul style="list-style-type: none"> • Andro Maritime Services • Australia • Aquatic Adventure Exmouth • Birds Eye View • Blue Horizon Charters • Blue Lightning Charters • Cape Immersion Tours • Coastal Adventure Tours • Coral Bay Ecotours • Cruise Ningaloo • Dampier Island Tourism • Dive Ningaloo • Evolution Fishing Charters • Exmouth Adventure Co. • Exmouth Dive Centre • Exmouth Fly Fishing • Exmouth Game Fishing Club • Indian Chief Charters • Innkeeper Sport Fishing Charter • Kings Ningaloo Reef Tours • Live Ningaloo • Mahi Fishing Charters • Montebello Island Safaris • Ningaloo Aviation 	<p>Exmouth-based dive, tourism and charter operators</p>	<p>Woodside has applied its methodology for 'Recreational marine users and representative bodies' under regulation 11A(1)(d).</p> <p>Activities have the potential to impact Exmouth-based dive, tourism and charter operator's functions, interests or activities due to the location of activities and there has been recorded charter effort in the EMBA in the past 5 years.</p>	<p>Yes</p>

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
<ul style="list-style-type: none"> • Ningaloo Blue • Ningaloo Coral Bay Boats • Ningaloo Discovery • Ningaloo Ecology Cruises • Ningaloo Fly Fishing • Ningaloo Marine Interaction • Ningaloo Reef Dive • Ningaloo Reef to Range Tours • Ningaloo Safari Tours • Ningaloo Sportfishing • Charters • Ningaloo Whaleshark n Dive • Ningaloo Whaleshark Swim • Ocean Eco Adventures • On Strike Charters • Peak Sportfishing Charters • Pelican Charters • Sail Ningaloo • Sea Force Charters • Set the Hook • The Mobile Observatory • Three Islands • Top Gun Charters • Ultimate WaterSports • Venture Ningaloo • View Ningaloo 			

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
<ul style="list-style-type: none"> • Warrior Princess Charters • Yardi Creek Boat Tours 			
<p>Gascoyne Recreational Marine Users</p> <ul style="list-style-type: none"> • Silverado Charters Pty Ltd • Reel Force Charters Pty Ltd • D & N Nominees Pty Ltd • Lyons Family Super Pty Ltd • Seafresh Holdings Pty Ltd • Eco-Abrolhos Pty Ltd • C Emery Fishing Pty Ltd • On Strike Charters (Wa) Pty Ltd • Melkit Pty Ltd • Maritime Engineering Services Pty Ltd • G. C. Bass Nominees Pty Ltd • Brefjen Nominees Pty Ltd • W.A Maritime Investments Pty Ltd • Blue Juice Tours Pty Ltd • Surefire Marine Services Pty Ltd • Makalee Pty Ltd • L & S Family Holdings Pty Ltd • Bondall Pty Ltd • Kw Marine Pty Ltd • Sharkbay Charters Pty Ltd • Bluecity Enterprises Pty Ltd 	<p>Gascoyne-based dive, tourism and charter operators</p>	<p>Woodside has applied its methodology for 'Recreational marine users and representative bodies' under regulation 11A(1)(d). Activities have the potential to impact Gascoyne-based dive, tourism and charter operator's functions, interests or activities due to the location of activities and there has been recorded charter effort in the EMBA in the past 5 years.</p>	<p>Yes</p>

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
<ul style="list-style-type: none"> • Jostan Holdings Pty Ltd • Monkey Mia Yacht Charters Pty Ltd • On Strike Charters (Wa) Pty Ltd • Rainfield Pty Ltd • Monster Sportfishing • Adventures Pty Ltd • Lulamanzi Investments Pty Ltd • Millennial Charters Pty Ltd • Chapel Nominees Pty Ltd • Regalchoice Holdings Pty Ltd • Fawesome Expeditions Pty Ltd • On Strike Charters (Wa) Pty Ltd • The Great Escape Charter • Company Pty Ltd • Aoa International Pty Ltd • Fire Tiger Pty Ltd 			
<p>Pilbara / Kimberley Recreational Marine Users</p> <ul style="list-style-type: none"> • Willie Creek Pearl Farm Pty Ltd • Super Yachts Perth Pty Ltd • Silverado Charters Pty Ltd • Bloor Street Investments Pty Ltd • Lugger Enterprises Pty Ltd • Eco-Abrolhos Pty Ltd • C Emery Fishing Pty Ltd 	<p>Pilbara/Kimberley-based dive, tourism and charter operators</p>	<p>Woodside has applied its methodology for 'Recreational marine users and representative bodies' under regulation 11A(1)(d). Activities have the potential to impact Pilbara/Kimberley-based dive, tourism and charter operator's functions, interests or activities due to the location of activities and there has been recorded charter effort in the EMBA in the past 5 years.</p>	<p>Yes</p>

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
<ul style="list-style-type: none"> • Discovery Holiday Parks Pty Limited • Kimberley Marine Pty Ltd • Coral Princess Cruises (Nq) Pty Ltd • Marine Agents Australia Pty Ltd • Maritime Engineering Services Pty Ltd • G. C. Bass Nominees Pty Ltd • Coastway Investments Pty Ltd • Kcc Group Pty Ltd • Cm Ventures Pty Ltd • Lombadina Aboriginal Corporation • Australian Port And Marine Services Pty Ltd • Hartley Motorcycles Pty Ltd • Humbug Fishing Pty Ltd • Brefjen Nominees Pty Ltd • Melkit Pty Ltd • W.A Maritime Investments Pty Ltd • Blue Juice Tours Pty Ltd • Kw Marine Pty Ltd • L & S Family Holdings Pty Ltd • Bondall Pty Ltd 			

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
<ul style="list-style-type: none"> • Lake Argyle Cruises Pty Ltd • Sealife Charters Pty Ltd • Mal Miles Adventures Pty Ltd • Mackerel Islands Pty Ltd • Diversity Charter Company • Wa Pty Ltd • Split Tide Pty Ltd • Broome Tours Pty Ltd • North Star Cruises Australia Pty Ltd • Charter Express Pty Ltd • Sea 2 Pty Ltd • Hotel And Resort • Investments Pty Ltd • L & S Family Holdings Pty Ltd • Down The Line Charters Pty Ltd • Kingfisher Island Resort Pty Ltd • Rstg Pty Limited • Sealife Charters Pty Ltd • Coral Princess Cruises (Nq) Pty Ltd • Kimberley Quest Adventures Pty Ltd • Monster Sportfishing • Adventures Pty Ltd • Ocean Charters Pty Ltd 			

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
<ul style="list-style-type: none"> • Lulamanzi Investments Pty Ltd • Millennial Charters Pty Ltd • Chapel Nominees Pty Ltd • Fawesome Expeditions Pty Ltd • The Great Escape Charter • Company Pty Ltd • Aoa International Pty Ltd • Kimberley Getaway Cruises Pty Ltd • King Sound Resort Hotel Pty Ltd 			
Recfishwest	Represents the interests of recreational fishers in WA.	Woodside has applied its methodology for 'Recreational marine users and representative bodies' under regulation 11A(1)(d). Activities have the potential to impact recreational fishers' functions, interests or activities due to the location offshore and there has been recorded charter effort in the EMBA in the past 5 years.	Yes
Marine Tourism WA	Represents the interests of marine tourism in WA.	Woodside has applied its methodology for 'Recreational marine users and representative bodies' under regulation 11A(1)(d). Activities have the potential to impact recreational fishers' functions, interests or activities due to the location offshore and there has been recorded charter effort in the EMBA in the past 5 years.	Yes
WA Game Fishing Association	Represents the interests of game fishers in WA.	Woodside has applied its methodology for 'Recreational marine users and representative bodies' under regulation 11A(1)(d). Activities have the potential to impact game fishers' functions, interests or activities due to the location offshore and there has been recorded charter effort in the EMBA in the past 5 years.	Yes
Titleholders and Operators			

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
Chevron Australia	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
Western Gas	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
Exxon Mobil Australia Resources Company	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
Shell Australia	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
INPEX Alpha Ltd	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
Carnarvon Energy Ltd	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
BP Developments Australia	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
Osaka Gas Gorgon	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
Tokyo Gas Gorgon	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d).	Yes

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		Titleholder or Operator's permit areas overlaps the EMBA.	
JERA Gorgon	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
PE Wheatstone	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
Kyushu Electric Wheatstone	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
Eni Australia	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
Fugro Exploration	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
Finder No 9/10 / 17	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
KUFPEC	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
Santos NA Energy Holdings / Santos Ltd / Santos WA Northwest / Santos Offshore / Santos WA Southwest / Santos (BOL) / Santos WA PVG	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
OMV Australia / Sapura OMV Upstream	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
Lightmark Enterprises	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
JX Nippon O&G Exploration (Australia)	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). Titleholder or Operator's permit areas overlaps the EMBA.	Yes
National Energy Resource Australia (NERA) Collaborative Seismic Environment Plan Project (CSEP) acting for a consortium of operators	Titleholder or Operator	Woodside has applied its methodology for 'Titleholders and Operators' under regulation 11A(1)(d). During the course of preparing the EP, NERA CSEP self-identified and requested to be consulted. Titleholder or Operator's permit areas overlaps the EMBA.	Yes
Peak Industry Representative bodies			
APPEA	Represents the interests of oil and gas explorers and producers in Australia.	Woodside has applied its methodology for 'Peak Industry Representative bodies' under regulation 11A(1)(d). APPEA's responsibilities are identified as having an intersect with Woodside's planned activities in the EMBA.	Yes
Traditional Custodians			
Murujuga Aboriginal Corporation (MAC)	Representative Aboriginal Corporation	Woodside has applied its methodology for 'Traditional Custodians' under regulation 11A(1)(d). The EMBA does not overlap and is not coastally adjacent to a native title claim, determination or ILUA held by MAC. The EMBA does not overlap the Murujuga National Park. Woodside has consulted with MAC with regards to the Scarborough project area generally since 2018 and MAC has been involved in ethnographic surveys that included the planned activities of this EP. MAC is the approved body corporate under	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
		<p>the Burrup and Maitland Industrial Estates Agreement (BMIEA) which underpins land access for the onshore component of the Scarborough project. MAC also owns and co-manages the Murujuga National Park, is responsible for the Dampier Archipelago National Heritage Place and is progressing the World Heritage nomination of the Murujuga Cultural Landscape. MAC was established to represent the members of competing Native Title claims over Murujuga, collectively known as the Ngarda Ngarli and comprising Mardudhunera, Ngarluma, Yaburara, Yindjibarndi and Wong-Goo-Tt-Oo people. The determination of the competing Native Title claims resulted in no native title being found over the lands subject to the BMIEA or below the low water mark.</p> <p>Further, Woodside has applied the principles of self-determination by ensuring we consult through the Representative Aboriginal Corporation.</p> <p>As a further step, Woodside engaged YMAC as the Native Title Representative Body for the Yamatji and Pilbara regions of Western Australia, to confirm the best approach to confirm additional cultural values (if any) for the broader Scarborough Project, the scope of which included the proposed activity for this EP. YMAC advised that the most appropriate stakeholders for the Scarborough project generally are MAC and NAC, who are not represented by YMAC (refer to Section 7.8.2.1).</p>	
Ngarluma Aboriginal Corporation (NAC)	Representative Aboriginal Corporation	<p>Woodside has applied its methodology for 'Traditional Custodians' under regulation 11A(1)(d).</p> <p>The Ngarluma People native title claim does not overlap the EMBA. The claim, for which NAC is the Registered Native Title Body Corporate, is coastally adjacent to the EMBA.</p> <p>The Ngarluma/Yindjibarndi native title claim does not overlap the EMBA. The claim, for which NAC and the Yindjibarndi Aboriginal Corporation are the Registered Native Title Bodies Corporate, is coastally adjacent to the EMBA.</p> <p>NAC is party to the RTIO Ngarluma Indigenous Land Use Agreement (Body Corporate Agreement) and Anketell Port, Infrastructure Corridor and Industrial Estates Agreement which are coastally adjacent to the EMBA.</p> <p>As an additional measure, Woodside, at its discretion, chose to seek guidance from YMAC, as the Native Title Representative Body for the Yamatji and Pilbara regions of Western Australia to confirm the best approach to confirm additional cultural values (if</p>	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
		any) for the broader Scarborough Project, the scope of which included the proposed activity for this EP. YMAC advised that the most appropriate stakeholders for the Scarborough project generally are MAC and NAC, who are not represented by YMAC (refer to Section 7.8.2.1).	
Wirrawandi Aboriginal Corporation (WAC)	Representative Aboriginal Corporation	Woodside has applied its methodology for 'Traditional Custodians' under regulation 11A(1)(d). The Yaburara & Mardudhunera People claim does not overlap the EMBA. The claim, for which WAC is the Registered Native Title Body Corporate, is coastally adjacent to the EMBA. WAC is party to the Cape Preston Project Deed (YM Mardie ILUA), Cape Preston West Export Facility ILUA , and KM & YM ILUA, which are coastally adjacent to the EMBA.	Yes
Nganhurra Thanardi Garrbu Aboriginal Corporation (NTGAC)	Representative Aboriginal Corporation	Woodside has applied its methodology for 'Traditional Custodians' under regulation 11A(1)(d). The Gnulli, Gnulli #2 and Gnulli #3 - Yinggarda, Baiyungu and Thalanyji People native title claim does not overlap the EMBA. The claim, for which NTGAC and YAC are the Registered Native Title Bodies Corporate, is coastally adjacent to the EMBA. The NTGAC is also party, with the WA State Government, to the Ningaloo Conservation Estate Indigenous Land Use Agreement (the ILUA) which is coastally adjacent to the EMBA. The NTGAC is also party to the Gnarloo ILUA, which is coastally adjacent to the EMBA. The NTGAC's nominated representative is the YMAC and the NTGAC executive officer and contact officer pursuant to the Corporations (Aboriginal and Torres Strait Islander) Act 2006 is employed by YMAC. Woodside has therefore consulted the NTGAC, via YMAC.	Yes
Yinggarda Aboriginal Corporation (YAC)	Representative Aboriginal Corporation	Woodside has applied its methodology for 'Traditional Custodians' under regulation 11A(1)(d). The Gnulli, Gnulli #2 and Gnulli #3 - Yinggarda, Baiyungu and Thalanyji People native title claim does not overlap the EMBA. The claim, for which NTGAC and YAC are the Registered Native Title Bodies Corporate, is coastally adjacent to the EMBA, which the Baiyungu, Thalanyji and Yinggarda people are party to.	Yes

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		<p>YAC is party to the Brickhouse and Yinggarda Aboriginal Corporation ILUA and Quobba – Yinggarda Pastoral ILUA, which are coastally adjacent to the EMBA.</p> <p>The YAC nominated representative was the YMAC and the YAC executive officer and contact officer pursuant to the Corporations (Aboriginal and Torres Strait Islander) Act 2006 is employed by YMAC. Woodside therefore consulted YAC, via YMAC. Woodside was advised that as of late April 2023, the nominated representative for YAC was now Gumala Aboriginal Corporation.</p>	
Robe River Kuruma Aboriginal Corporation	Representative Aboriginal Corporation	<p>Woodside has applied its methodology for ‘Traditional Custodians’ under regulation 11A(1)(d).</p> <p>There are no native title claims that the Robe River Kuruma Aboriginal Corporation is party to overlapping the EMBA or coastally adjacent to the EMBA.</p> <p>The Robe River Kuruma Aboriginal Corporation is party to the RTIO Kuruma Marthudunera People ILUA and KM & YM ILUA, which are coastally adjacent to the EMBA.</p>	Yes
Yindjibarndi Aboriginal Corporation	Representative Aboriginal Corporation	<p>Woodside has applied its methodology for ‘Traditional Custodians’ under regulation 11A(1)(d).</p> <p>The Ngarluma/Yindjibarndi native title claim does not overlap the EMBA. The claim, for which NAC and the Yindjibarndi Aboriginal Corporation are the Registered Native Title Bodies Corporate, is coastally adjacent to the EMBA.</p>	Yes
Buurabalayji Thalanyji Aboriginal Corporation (BTAC)	Representative Aboriginal Corporation	<p>Woodside has applied its methodology for ‘Traditional Custodians’ under regulation 11A(1)(d).</p> <p>The Thalanyji native title claim does not overlap the EMBA. The claim, for which BTAC is the Registered Native Title Body Corporate, is coastally adjacent to the EMBA.</p> <p>BTAC is also party to the Macedon ILUA which is coastally adjacent to the EMBA.</p>	Yes
Malgana Aboriginal Corporation	Representative Aboriginal Corporation	<p>Woodside has applied its methodology for ‘Traditional Custodians’ under regulation 11A(1)(d).</p> <p>The Malgana Part A native title claim does not overlap the EMBA. The claim, for which the Malgana Aboriginal Corporation is the Registered Native Title Body Corporate, is adjacent to the EMBA.</p>	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
		<p>The Nanda People Part B, Malgana 2 and Malgana 3 native title claim does not overlap the EMBA. The claim, for which the Malgana Aboriginal Corporation and Nanda Aboriginal Corporation are the Registered Native Title Bodies Corporate, is coastally adjacent to the EMBA.</p> <p>The Malgana Aboriginal Corporation is party to the Malgana Woodleigh Carbla Pastoral Lease Agreement, Malgana Wooramel Pastoral Lease Agreement and Malgana Tamala Pastoral Lease Agreement, which are coastally adjacent to the EMBA.</p>	
Nanda Aboriginal Corporation	Representative Aboriginal Corporation	<p>Woodside has applied its methodology for 'Traditional Custodians' under regulation 11A(1)(d).</p> <p>The Nanda People and Nanda #2 native title claim does not overlap the EMBA. The claim, for which the Nanda Aboriginal Corporation is the Registered Native Title Body Corporate, is coastally adjacent to the EMBA.</p> <p>The Nanda People Part B, Malgana 2 and Malgana 3 native title claim does not overlap the EMBA. The claim, for which the Malgana Aboriginal Corporation and Nanda Aboriginal Corporation are the Registered Native Title Bodies Corporate, is coastally adjacent to the EMBA.</p>	Yes
Self-identified First Nations Groups			
Ngarluma Yindjibarndi Foundation Ltd (NYFL)	Traditional Custodian - entity	<p>Woodside has applied its methodology for 'Traditional Custodians' under regulation 11 A 1 (d).</p> <p>Prior to the resolution of the Ngarluma and Yindjibarndi native title claim, the Ngarluma and Yindjibarndi registered native title claimants, the NWS JVs and Woodside entered into the Northwest Shelf Agreement 1998. In 1999 the Ngarluma and Yindjibarndi native title claim was settled with the Court appointing, at the request of the common law native title holders, the Ngarluma Aboriginal Corporation (NAC) as PBC to represent the Ngarluma people and the Yindjibarndi Aboriginal Corporation (YAC) as PBC to appoint Yindjibarndi people.</p> <p>Both NAC and YAC are relevant people.</p>	Yes

Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
		<p>NYFL was subsequently created to act as Trustee for the Trust under the Agreement and to carry on the business of enterprise development, investment and social welfare.</p> <p>NYFL self-identified and has advised it is relevant for this EP.</p>	
Native Title Representative Bodies			
Yamatji Marlpa Aboriginal Corporation (YMAC)	Native Title Representative Body	<p>Woodside has applied its methodology for 'Native Title Representative Bodies' under regulation 11A(1)(d).</p> <p>YMAC is the Native Title Representative Body for the Yamatji and Pilbara regions of Western Australia. As such, they are not a Prescribed or Registered Native Title Body Corporate but exist to assist native title claimants and holders.</p> <p>The NTGAC and Nanda Aboriginal Corporation's nominated representative is YMAC. Woodside has therefore consulted the NTGAC and Nanda Aboriginal Corporation via YMAC.</p> <p>YMAC was also the nominated representative for YAC. Woodside was advised that as of late April 2023, the nominated representative for YAC is now Gumala Aboriginal Corporation.</p> <p>Woodside contacted YMAC to seek guidance with respect to the appropriate Traditional Custodian group(s) to engage with respect to the proposed activity where this was not clear.</p> <p>YMAC's functions may be relevant to the proposed activity in relation to its facilitation and coordination function as a Native Title Representative Body under applicable federal legislation.</p>	Yes
Historical cultural heritage groups or organisations			
Western Australian Museum	Manages 200 shipwreck sites of the 1,500 known to be located off the Western Australian coast.	<p>Woodside has applied its methodology for 'Historical cultural heritage groups or organisations' under regulation 11A(1)(d).</p> <p>There are known shipwrecks overlapping the EMBA which the Western Australian Museum may be responsible for.</p>	Yes
Local government and community representative groups or organisations			

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Shire of Exmouth	Local government governed by the Local Government Act 1995 representing the suburbs and localities of Exmouth, Learmonth and North West Cape.	Woodside has applied its methodology for 'Local government and community representative groups or organisations' under regulation 11A(1)(d). The Shire of Exmouth's area of responsibility does not overlap the EMBA. The Shire of Exmouth was consulted as a member of the Exmouth Community Reference Group. Under regulation 11 A 1 (e), Woodside, at its discretion, chose to assess the Shire of Exmouth as a relevant person.	Yes
City of Karratha	Local government governed by the Local Government Act 1995 representing the suburbs and localities of Baynton, Baynton West, Bulgarra, Cossack, Dampier, Gap Ridge, Karratha, Karratha Industrial Estate, Jingarri, Madigan, Millars Well, Nickol, Pegs Creek, Point Samson, Roebourne, Whim Creek and Wickham.	Woodside has applied its methodology for 'Local government and community representative groups or organisations' under regulation 11A(1)(d). The City of Karratha's area of responsibility does not overlap the EMBA. The City of Karratha was consulted as a member of the Karratha Community Liaison Group. Under regulation 11 A 1 (e), Woodside, at its discretion, chose to assess the City of Karratha as a relevant person.	Yes
Exmouth Community Reference Group (CRG) Base Marine Bgahwan Marine Cape Conservation Group Inc. DBCA Department of Defence Department of Transport Exmouth Bus Charter	The Exmouth CRG represents the interests of a range of local government, industry and community organisations in relation to oil and gas matters in the Exmouth region.	Woodside has applied its methodology for 'Local government and community representative groups or organisations' under regulation 11A(1)(d). The Exmouth CRG's area of responsibility under its terms of reference overlaps the EMBA.	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
<p>Exmouth Chamber of Commerce and Industry Exmouth District High School Exmouth Freight and Logistics Exmouth Game Fishing Club Exmouth Tackle and Camping Supplies Exmouth Visitors Centre Exmouth Volunteer Marine Rescue Fat Marine Gascoyne Development Commission Gun Marine Services Ningaloo Lodge Offshore Unlimited Shire of Exmouth BHP Petroleum Santos Community Member</p>			
<p>Karratha Community Liaison Group (KLG) WA Police Karratha Health Care Development WA Ngarluma Yindjibarndi Foundation Ltd (NYFL) * Department of Education Pilbara Ports Authority</p>	<p>The KLG is the recognised community group that represents the interests of a range of local government, industry and community organisations in relation to oil and gas matters in the Pilbara region.</p>	<p>Woodside has applied its methodology for 'Local government and community representative groups or organisations' under regulation 11A(1)(d). The KLG's area of responsibility under its terms of reference does not overlap the EMBA. Under regulation 11 A 1 (e), Woodside, at its discretion, chose to assess the KLG as a relevant person.</p>	<p>Yes</p>

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
Regional Development Australia Pilbara Development Commission Dampier Community Association City of Karratha Karratha & Districts Chamber of Commerce and Industry Horizon Power Murujuga Aboriginal Corporation (MAC)* Department of Local Government, Sport and Cultural Industries *MAC and NYFL were consulted directly as described above.			
Other non-government groups or organisations			
350 Australia (350A)	Non-government organisation	During the course of preparing the EP, 350A self-identified, provided comment on the broader Scarborough Project and requested to be consulted on Scarborough EPs. Woodside has applied its methodology for 'Other non-government groups or organisations' under regulation 11A(1)(d). Woodside has assessed that 350A's public website material demonstrates an interest with the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2).	Yes
Australasian Centre for Corporate Responsibility (ACCR)	Non-government organisation	Woodside has applied its methodology for 'Other non-government groups or organisations' under regulation 11A(1)(d) to determine ACCR's relevance for the proposed activity. Woodside has assessed that ACCR's public website material does not demonstrate an interest with the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2). Woodside chose to contact ACCR at its discretion in line with Section 5.3.4.	No

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
Australian Conservation Foundation (ACF)	Non-government organisation	<p>During the course of preparing the EP, ACF self-identified, provided comment on the broader Scarborough Project and requested to be consulted on Scarborough EPs. Woodside has applied its methodology for 'Other non-government groups or organisations' under regulation 11A(1)(d).</p> <p>Woodside has assessed that ACF's public website material and feedback demonstrates an interest with the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2).</p>	Yes
Australian Marine Conservation Society (AMCS)	Non-government organisation	<p>Woodside has applied its methodology for 'Other non-government groups or organisations' under regulation 11A(1)(d) to determine AMCS's relevance for the proposed activity.</p> <p>Woodside has assessed that AMCS's public website material demonstrates an interest with the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2).</p>	Yes
Climate Council	Non-government organisation	<p>Woodside has applied its methodology for 'Other non-government groups or organisations' under regulation 11A(1)(d) to determine Climate Council's relevance for the proposed activity.</p> <p>Woodside has assessed that Climate Council's public website material does not demonstrate an interest with the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2).</p> <p>Woodside chose to contact Climate Council at its discretion in line with Section 5.3.4.</p>	No
Conservation Council of Western Australia (CCWA)	Non-government organisation	<p>During the course of preparing the EP, CCWA self-identified, provided comment on the broader Scarborough Project and requested to be consulted on Scarborough EPs. Woodside has applied its methodology for 'Other non-government groups or organisations' under regulation 11A(1)(d).</p> <p>Woodside has assessed that CCWA's public website material demonstrates an interest with the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2).</p>	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
Doctors for the Environment (DEA)	Non-government organisation	<p>During the course of preparing the EP, DEA self-identified, provided comment on the broader Scarborough Project and requested to be consulted on Scarborough EPs. Woodside has applied its methodology for 'Other non-government groups or organisations' under regulation 11A(1)(d).</p> <p>Woodside has assessed that DEA's public website material and feedback does not demonstrate an interest with the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2).</p> <p>Woodside chose to contact DEA at its discretion in line with Section 5.3.4.</p>	No
Extinction Rebellion WA (XRWA)	Non-government organisation	<p>Woodside has applied its methodology for 'Other non-government groups or organisations' under regulation 11A(1)(d) to determine XRWA's relevance for the proposed activity.</p> <p>Woodside has assessed that XRWA's public website material does not demonstrate an interest with the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2).</p> <p>Woodside chose to contact XRWA at its discretion in line with Section 5.3.4.</p>	No
Friends of Australian Rock Art. Inc (FARA)	Non-government organisation	<p>During the course of preparing the EP, FARA self-identified, provided comment on the broader Scarborough Project and requested to be consulted on Scarborough EPs. Woodside has applied its methodology for 'Other non-government groups or organisations' under regulation 11A(1)(d).</p> <p>Woodside has assessed that FARA's public website material and feedback does not demonstrate an interest with the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2).</p> <p>Woodside chose to contact FARA at its discretion in line with Section 5.3.4.</p>	No
Greenpeace Australia Pacific (GAP)	Non-government organisation	<p>During the course of preparing the EP, GAP self-identified, provided comment on the broader Scarborough Project and requested to be consulted on Scarborough EPs. Woodside has applied its methodology for 'Other non-government groups or organisations' under regulation 11A(1)(d).</p>	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
		Woodside has assessed that GAP's public website material and feedback demonstrates an interest with the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2).	
International Fund for Animal Welfare (IFAW)	Non-government organisation	Woodside has applied its methodology for 'Other non-government groups or organisations' under regulation 11A(1)(d) to determine IFAW's relevance for the proposed activity. Woodside has assessed that IFAW's public website material does not demonstrate an interest with the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2). Woodside chose to contact IFAW at its discretion in line with Section 5.3.4.	No
Lock The Gate Alliance (LTGA)	Non-government organisation	During the course of preparing the EP, LTGA self-identified, provided comment on the broader Scarborough Project and requested to be consulted on Scarborough EPs. Woodside has applied its methodology for 'Other non-government groups or organisations' under regulation 11A(1)(d). Woodside has assessed that LTGA's public website material and feedback does not demonstrate an interest with the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2). Woodside chose to contact LTGA at its discretion in line with Section 5.3.4.	No
Market Forces	Non-government organisation	Woodside has applied its methodology for 'Other non-government groups or organisations' under regulation 11A(1)(d) to determine Market Force's relevance for the proposed activity. Woodside has assessed that Market Force's public website material does not demonstrate an interest with the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2). Woodside chose to contact Market Force at its discretion in line with Section 5.3.4.	No

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
Say No to Scarborough Gas (SNTSG)	Non-government organisation	Woodside has applied its methodology for 'Other non-government groups or organisations' under regulation 11A(1)(d) to determine SNTSG's relevance for the proposed activity. Woodside has assessed that SNTSG's public website material and feedback demonstrates an interest with the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2).	Yes
Sea Shepherd Australia (SSA)	Non-government organisation	Woodside has applied its methodology for 'Other non-government groups or organisations' under regulation 11A(1)(d) to determine SSA's relevance for the proposed activity. Woodside has assessed that SSA's public website material demonstrates an interest with the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2).	Yes
The Wilderness Society (TWS)	Non-government organisation	Woodside has applied its methodology for 'Other non-government groups or organisations' under regulation 11A(1)(d) to determine TWS's relevance for the proposed activity. Woodside has assessed TWS's public website material and feedback, with the latter demonstrating an interest with the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2).	Yes
World Wildlife Fund (WWF) Australia	Non-government organisation	Woodside has applied its methodology for 'Other non-government groups or organisations' under regulation 11A(1)(d) to determine WWF's relevance for the proposed activity. Woodside has assessed that WWF's public website material does not demonstrate an interest with the potential risks and impacts associated with planned activities in accordance with the intended outcome of consultation (as set out in Section 5.2). Woodside chose to contact WWF at its discretion in line with Section 5.3.4.	No
Research institutes and local conservation groups or organisations			

Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
University of Western Australia (UWA)	Research institute	<p>Woodside has applied its methodology for 'Research institutes and local conservation groups or organisations' under regulation 11A(1)(d) to determine UWA's relevance for the proposed activity.</p> <p>There is no known research being undertaken by the UWA that intersects within the EMBA.</p> <p>Woodside chose to contact UWA at its discretion in line with Section 5.3.4.</p>	No
Western Australian Marine Science Institution (WAMSI)	Research institute	<p>Woodside has applied its methodology for 'Research institutes and local conservation groups or organisations' under regulation 11A(1)(d) to determine WAMSI's relevance for the proposed activity.</p> <p>There is no known research being undertaken by WAMSI that intersects within the EMBA</p> <p>Woodside chose to contact WAMSI at its discretion in line with Section 5.3.4.</p>	No
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Research institute	<p>Woodside has applied its methodology for 'Research institutes and local conservation groups or organisations' under regulation 11A(1)(d) to determine CSIRO's relevance for the proposed activity.</p> <p>There is no known research being undertaken by CSIRO that intersects within the EMBA.</p> <p>Woodside chose to contact CSIRO at its discretion in line with Section 5.3.4.</p>	No
Australian Institute of Marine Science (AIMS)	Research institute	<p>Woodside has applied its methodology for 'Research institutes and local conservation groups or organisations' under regulation 11A(1)(d) to determine AIMS's relevance for the proposed activity.</p> <p>There is no known research being undertaken by AIMS that intersects within the EMBA.</p> <p>Woodside chose to contact AIMS at its discretion in line with Section 5.3.4.</p>	No
Other			
Save Our Songlines (SOS)	Representatives of Non-Government Organisation Save Our Songlines and/	<p>Woodside has applied its methodology for 'Traditional Custodians and nominated representative corporations' and 'Other non-government groups or organisations' under regulation 11A(1)(d) to determine Save Our Songlines (SOS) and/ or ██████████ and/ or ██████████ relevance for the proposed activity.</p>	Yes

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Person or Organisation	Summary of responsibilities and/or functions, interests or activities	Assessment of relevance	Relevant person
	or individuals ██████████ and/ or ██████████	During the course of preparing the EP, Save Our Songlines and/ or ██████████ and/ or ██████████ self-identified and requested to be consulted on Scarborough EPs. Woodside has assessed that SOS and/ or ██████████ and/ or ██████████ feedback demonstrates an interest with the proposed activity.	
Woodside Come Clean	Campaign website	Woodside Come Clean is not a registered organisation (i.e. no Australian Business Number (ABN)) and has no contact details publicly available. As this is not a group or organisation, but rather a campaign website, it would not be reasonable for Woodside to consider relevance for the proposed activity, nor attempt to consult. Irrespective, Woodside has reviewed the Woodside Come Clean public website material and determined that the material does not demonstrate any intersect with potential direct impacts specific to the proposed petroleum activity, while remaining in accordance with the intended outcome of consultation (as set out in Section 5.2). Woodside notes that the Woodside Come Clean campaign website links to Say No to Scarborough Gas, which Woodside has consulted for the proposed activity.	No

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5.9 Consultation activities and additional engagement for the Subsea Infrastructure Installation Environment Plan

Woodside has been conducting extensive consultation on the Scarborough Project since February 2018, when preliminary consultation for the Scarborough OPP commenced with interested and affected stakeholders.

Consultation aims to be inclusive, transparent, voluntary, respectful and two-way. Consultation for this Environment Plan was undertaken via advertising, emails, letters, information sheets, presentations, information sessions, phone calls and meetings.

- Woodside advertised the planned activities proposed for this EP in the national, state and relevant local newspapers including The Australian, The West Australian, Pilbara News (October 2022 and January 2023), Midwest Times, North West Telegraph and Geraldton Guardian (January 2023) (see **Appendix F**, reference 2.1). Regional newspapers do not require subscription and are available and in some cases delivered directly to households. All communities within or adjacent to the EMBA had access to this information via this media. No direct comments or feedback were received from the advertisements.
- A Consultation Information Sheet was provided to relevant persons and persons Woodside chose to contact (see **Section 5.3.4**), which included details such as an activity overview, maps, a summary of key risks and/or impacts and management measures (**Appendix F**, reference 1.1).
- An activity update Consultation Information Sheet was provided to relevant persons and persons Woodside chose to contact (see **Section 5.3.4**), which included an update regarding planned activities, information regarding the EMBA's for this EP and additional information relating to mitigation and managements measures for this EP (**Appendix F**, reference 1.106).
- Since the commencement of the initial consultation period (September 2022), the Stakeholder Consultation Information Sheet has been available on the Woodside website and the activity update Consultation Information Sheet since September 2022 (**Appendix F**, reference 1.1). The Woodside Consultation Information Sheets include a toll-free 1800 phone number and Woodside's feedback email address (feedback@woodside.com.au).
- Additional targeted information was provided to relevant marine users including AHO and AMSA – Marine Safety (**Appendix F**, reference 1.5 and 1.6). The targeted information included maps and additional information relevant to the specific category of persons. The relevant persons had a 30-day period in which to provide feedback.
- Where appropriate, Woodside conducted phone calls and meetings with relevant persons.
- Where appropriate, targeted follow-up emails were sent to relevant persons who had not provided a response prior to the close of the target feedback period.
- From 3 May 2023, Woodside commenced a geotargeted sponsored social media campaign (**Appendix F**, reference 2.2) to various local government authorities that are within or coastally adjacent to the EMBA for the proposed activities. The campaign brought the proposed activity to the attention of persons who may be interested and advised persons or organisations on how they can find out about Woodside's proposed activities by visiting Woodside's website.

Community Information Sessions

- Community Information Sessions were held in Roebourne on 5, 10, 19 and 24 May, 22 June 2023 and 19 July 2023 respectively; Exmouth on 17 June 2023; and Broome, Derby and Kununurra on 12, 13 and 15 June respectively. Ahead of the events, Woodside advertised the sessions via the means below which provided the opportunity for local individuals to become aware of the event and have access to experts and information about the activity. The methods used to promote these consultation opportunities were developed with input from Indigenous

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representatives and were adapted to incorporate culturally appropriate and accessible language to encourage engagement and understanding of Woodside's proposed activities:

- Advertising in the Broome Advertiser and Kimberley Echo on 1 and 8 June 2023 (**Appendix F**, reference 2.3.1) and for the Karratha Community Session in the Pilbara News on 28 June 2023 (**Appendix F**, reference 2.4.3).
- From 8 June 2023, Woodside commenced a geotargeted social media campaign along the coastline from Geraldton to Derby (**Appendix F**, reference 2.2) advertising the community information sessions. A Facebook information campaign was targeted in Exmouth to ensure it reached communities where the Exmouth Consultation Information Session was planned to be held. (**Appendix F**, reference 2.5.1) A Karratha Community Information Session was advertised via a Facebook post on 28 June 2023 (**Appendix F**, reference 2.4.3) and a geotargeted social media campaign from 16 June to 29 June 2023 (**Appendix F**, reference 2.4.3).
- Directly contacting local Traditional Custodian groups to invite representatives to attend the Community Information Sessions and providing the event information (see **Appendix F**, Table 1).
- Advertising in Roebourne with posters on four community boards and dropped posters to community locations; and put information and posters on the Roebourne Community Calendar (**Appendix F**, reference 2.4.1 and 2.4.2).
- Representatives from Woodside, including project and environment personnel equipped to answer technical questions, attended the event. Copies of the Consultation Information Sheets and bespoke targeted Summary Consultation Information Sheets were available to attendees. Community members were able to engage with Woodside representatives to understand the proposed activity and how it may affect them, ask questions and provide their feedback.
- Community Information Sessions were held in Karratha on 28 and 29 June 2023. Woodside advertised the sessions (see below) providing the opportunity for individuals to become aware of the event and have access to information as well as people who can answer questions and provide information about the activity. The methods used to promote these consultation opportunities were developed with input from Indigenous representatives and were adapted to incorporate culturally appropriate and accessible language to encourage engagement and understanding of Woodside's proposed activities:
- Ahead of the 28 June 2023 event, a story was posted on Woodside's Facebook page (**Appendix F**, reference 2.4.3) sharing details of its shopping centre stand where Consultation Information Sheets regarding planned and proposed activities were available, including the activities proposed under this Environment Plan.
- Ahead of the 29 June 2023 event, the Community Information Session was advertised in the Pilbara News 2.4.3), via a geotargeted social media campaign in Karratha and surrounding areas and by posting the event details on Woodside's Facebook page (**Appendix F**, reference 2.4.3).
- Representatives from Woodside, including project and environment personnel equipped to answer technical questions, attended the event. Copies of the Consultation Information Sheets and bespoke targeted Summary Consultation Information Sheets were available to attendees. Community members were able to engage with Woodside representatives to understand the proposed activity and how it may affect them, ask questions and provide their feedback.
- Woodside had a stand at the annual FeNaCING Festival in Karratha on 5 and 6 August 2023. Members of Woodside's Corporate Affairs and Operations teams actively engaged with the community to discuss proposed Environment Plan activities. Consultation Information Sheets for a number of Woodside Environment Plans including this Environment Plan were available.

Approximately 2,000 people visited the Woodside stand (based on the number of completed consultation forms and questionnaires). This consultation opportunity was promoted in the Pilbara News on 2 August 2023, and a story appeared on the Woodside North West Facebook page on 2 August 2023. (**Appendix F**, reference 2.4.4).

- Woodside had a stand at the Passion of the Pilbara festival in Onslow on 18 August 2023. Members of Woodside’s Corporate Affairs team actively engaged with the community to discuss proposed Environment Plan activities. Consultation Information Sheets for a number of Environment Plans including this Environment Plan were available. Approximately 100 people visited the Woodside stand (**Appendix F**, reference 2.4.5)
- This consultation opportunity was promoted in a story on the Woodside North West Facebook page on 17 August 2023. (**Appendix F**, reference 2.4.5).
- Woodside consulted the Karratha, Port Hedland and Roebourne communities on Environment Plan activities during 18–20 September 2023. Members of Woodside’s Corporate Affairs, First Nations, Environment and Scarborough Project teams actively engaged the community to discuss proposed Environment Plans, including the Scarborough and Browse projects.
 1. **18 September 2023:** Karratha Shopping Centre 8am–12pm; Red Earth Arts Precinct 3–6pm. Estimated number of people consulted: 20.
 2. **19 September 2023:** Port Hedland, South Hedland Square 10am–5pm. Estimated number of people consulted: 20.
 3. **20 September 2023:** Roebourne, Woodside Office 10am–4pm. Estimated number of people consulted: no attendance at the session due to Sorry Business and multiple Aboriginal corporation meetings which were unknown at the time of scheduling/planning engagements.

These consultation opportunities were promoted in the Pilbara News on 13 September 2023, and via Facebook and Instagram social media campaigns from 6 to 16 September 2023. (**Appendix F**, reference 2.4.6).

5.9.1 Traditional Custodian Specific Consultation

In addition to the approaches above including community information sessions, additional activities were undertaken with relevant Traditional Custodians, which were specifically designed to provide for effective engagement with Traditional Custodians and so that information was provided in a form that was readily accessible and appropriate (**Section 5.5**). Consultation undertaken specifically with Traditional Custodians for this Environment Plan includes:

- Direct engagement with nominated representative corporations via the contact listed on the ORIC website, requesting advice on how they would like to be engaged and asking whether other members and/or individuals should be consulted. This has resulted in:
 - Meetings with directors, elders and any nominated representatives, on country or in Perth;
 - Requests and offers of resourcing to enable and support consultation;
 - Exchange of written feedback and correspondence;
 - A Summary Consultation Information Sheet, developed and reviewed by Indigenous representatives in collaboration with technical experts to ensure content is appropriate to the intended recipients, was provided to relevant Traditional Custodian groups (**Appendix F**, reference 1.107). and phone calls to provide context to the consultation made.
- Ongoing efforts were made to engage and develop relationships with these bodies via a variety of means such as email, phone calls, alternative contacts, texts, social media and in some cases physical visits.

- Consultation meetings with attendees decided by Traditional Custodian groups, supported by senior Woodside representatives, subject matter experts, First Nations Relations advisers with skills and experience in community engagement. Meetings are developed through a two-way consultation process to ensure effective information sharing via:
 - Mutually agreed agenda avoiding time pressure;
 - Encouraging Traditional Custodian attendees to control the pace of the meeting and pause at any time to ask questions, seek clarification or provide feedback;
 - Visual aids such as posters, presentations, simplified technical videos and real-world pictures and footage;
 - Emphasis on potential planned and unplanned risks and impacts of the activity;
 - Ample opportunity for questions and feedback;
 - Discussion about ongoing relationship development and opportunities;
 - Distribution of hard-copy Consultation Information Sheets (**Appendix F**, reference 1.106) and Summary Consultation Information Sheets (**Appendix F** reference 1.107.)
 - Meeting all costs such as sitting fees, travel, legal support and executive support and other support required.
- Woodside has a geotargeted sponsored social media campaign (**Appendix F**, reference 2.2) to various communities that are coastally adjacent to the EMBA for the proposed activities.
 - The wide-reaching campaign brought the proposed activity to the attention of persons who may be interested and advised persons or organisations how they can find out about Woodside's proposed activities by visiting Woodside's website, which details the intent of consultation with relevant persons under the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (Cth). The reach of this campaign is shown in Appendix F, reference 2.2 providing the opportunity to consult via over 139,000 views to date across various regions.
 - These social media posts were developed with input from Indigenous representatives. Social media is a highly effective means to engage Indigenous audiences as outlined in Indigenous Digital Life (Professor Carlson, 2021). Advertisements used language and information appropriate to Indigenous audiences. Feedback from community engagements indicates a high level of penetration for this technique.

Woodside has employed a diverse range of techniques to allow relevant persons to become aware of the proposed activity and how it may affect their functions activities or interests, and understand their ability to provide feedback. The combination of engagement meetings, traditional print media, social media and face-to face community interaction was designed with input from Indigenous representatives and adapted to the audience, so that it provides a wide-ranging opportunity to consult.

6 ENVIRONMENTAL RISK ASSESSMENT, PERFORMANCE OUTCOMES, STANDARDS AND MEASUREMENT CRITERIA

6.1 Overview

This section presents the impact and risk analysis, evaluation and Environment Performance Outcomes (EPOs), Environmental Performance Standards (EPS) and Measurement Criteria (MC) for the Petroleum Activities Program, using the methodology described in **Section 2** of this EP.

6.2 Impact and Risk Analysis and Evaluation

As required by Regulations 13(5) and 13(6) of the Environment Regulations, the following analysis and evaluation demonstrates that the identified impacts and risks associated with the Petroleum Activities Program are reduced to ALARP, are of an acceptable level and consider all operations of the activity, including potential emergency conditions. The impact assessment for planned activities has been based on the size of the PAA.

The impacts and risks identified during the ENVID workshops (including decision type, current risk level, acceptability of impacts and risks, and tools used to demonstrate acceptability and ALARP) have been divided into two broad categories:

- Planned activities (routine and non-routine) that have the potential for inherent environmental impacts; and
- Unplanned events (accidents, incidents or emergency situations) with an environmental consequence, termed risks.

Within these categories, impact and risk assessment groupings are based on environmental aspects such as emissions and physical presence. In all cases, the worst-case risk was assumed.

The ENVID (performed in accordance with the methodology described in **Section 2**) identified 14 sources of environmental impacts and risks. A summary of the ENVID is provided in **Table 6-3**.

The WA-61-L and WA-62-L Subsea Infrastructure Installation specific ENVID workshop was conducted on 28 April 2022. Attendees included: Environmental Advisers, Environmental Scientists, Environmental Engineers, Hydrocarbon Spill Adviser, Environmental Consultants, Installation Engineers and Managers, and Survey Operations Managers. The participants' breadth of knowledge, training and experience was sufficient to reasonably assure that the hazards that may arise in connection with the petroleum activity in this EP were identified.

The impact and risk analysis and evaluation for the Petroleum Activities Program indicates that all current environmental risks and impacts associated with the individual activities are reduced to ALARP and are of an acceptable level, as discussed further in **Sections 6.7** and **6.8**.

Woodside recognises the potential for marine ecosystems to include cultural features as well as environmental values, as described in **Section 4.9.1**. The potential impacts and risks to environmental receptors are to be managed to ALARP and an acceptable level as described Sections 6.7 and 6.8. Therefore, potential impacts and risks to cultural features associated with marine species and associated ecosystems are also reduced to ALARP and an acceptable level.

Consultation with Indigenous Groups has not resulted in any advice which contradicts this approach in regards to cultural, spiritual or environmental values. Where ongoing consultation identifies a need for additional mitigations beyond those established to manage environmental values, this will be managed through the processes described in **Section 7.8**.

6.2.1 Concurrent operations and cumulative impacts

The Scarborough OPP (SA0006AF0000002, Rev 5; Section 8) assesses the potential cumulative impact of the Scarborough Project and other activities / developments. In addition, Woodside has

assessed the cumulative impacts of the Petroleum Activities Program in relation to other Scarborough activities that could realistically result in overlapping temporal and spatial extents.

Table 6-1 shows the proposed sequence of activities within this Petroleum Activities Program and opportunities for concurrent activities in permit areas WA-61-L and WA-62-L. This illustrates that the highest density of vessel activity is expected to occur in about April 2024, with mooring pre-lay (HCV and support vessel), part of subsea installation campaign 1 (LCV), D&C (MODU and support vessel), and trunkline installation (PV, B-type and support vessel). Although unplanned and highly unlikely, IMMR may also occur across April 2024, adding an OCV to the field. This worst-case scenario has been assessed, at any time throughout the life of the EP, as acceptable and ALARP with the controls implemented.

In this EP, cumulative impact assessment has been carried out for routine acoustic emissions. It was determined that cumulative impact from activities within the Petroleum Activities Program, as well as between the Petroleum Activities Program, D&C and SI&TI activities, was not credible for light emissions and vessel discharges.

Other facilities located in proximity to the PAA were identified within **Section 4.9.6**. Given the distance between the location of the PAA and other nearby petroleum facilities and activities, no cumulative risks or impacts will credibly occur.

Table 6-1: Indicative concurrent Woodside operations in WA-61-L, including activities within this EP Petroleum Activities Program and the Scarborough D&C and SI&TI EPs

Activity	Vessel(s)	Approx. Duration	Sep 23	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24	Aug 24	Sep 24	Oct 24	Nov 24	Dec 24	Jan 25	Feb 25	Mar 25	Apr 25	May 25	Jun 25	
Activities covered by this EP																									
Concrete pad installation & mooring pre-lay survey *inc. WA-62-L	LCV	2 months			1	1																			
Gravimetry baseline survey *inc. WA-62-L	Survey vessel / LCV	2 months															1	1							
Subsea installation campaign 1	PV, LCV, intermittent support vessel (could include PSV) + LCV	3 months + 2 months			3	3	3		1	1															
Subsea installation campaign 2	LCV, HCV, intermittent support vessel (could include PSV)	3 months															3	3	3						
Mooring pre-lay	HCV, intermittent support vessel (could include HLV)	3 months						2	2	2															

Activity	Vessel(s)	Approx. Duration	Sep 23	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24	Aug 24	Sep 24	Oct 24	Nov 24	Dec 24	Jan 25	Feb 25	Mar 25	Apr 25	May 25	Jun 25
IMMR	OCV (or similar)	TBC ¹⁸																						
Activities covered by other approvals																								
D&C	MODU, support vessel	13 months			2	2	2	2	2	2	2	2	2	2	2	2	2	2						
Trunkline install ¹⁹	PV, B-type, intermittent support vessel	6 months (~1 month in Permit Area)							3	3														
Trunkline pre-commissioning ²⁰	CV	1–3 months								1	1													
Trunkline surveys ⁸	Survey vessel	2 months (~4 days in Permit Area) per survey	1									1												

Note: Planned execution windows and vessel numbers are shown in dark blue; potential execution windows are shown in light blue. All schedules are indicative only and subject to change based on project schedule requirements, vessel availability, unforeseen circumstances, and weather.

¹⁸ Potential for IMMR to occur throughout the life of the EP, post-installation of any infrastructure
¹⁹ Within WA-61-L
²⁰ Trunkline pre-commissioning will not occur until trunkline installation is complete, so no overlap will occur

6.3 Environmental Performance Outcomes, Standards and Measurement Criteria

Regulation 13(7) of the Environment Regulations requires that an EP includes Environmental Performance Outcomes (EPOs), Environmental Performance Standards (EPSs) and Measurement Criteria (MC) that address legislative and other controls to manage the environmental risks of the activity to ALARP and acceptable levels.

The EPOs, EPSs and MC specified are consistent with legislative requirements and Woodside's standards and procedures. They have been developed based on the Codes and Standards, Good Industry Practices and Professional Judgement outlined in **Sections 2.3.1** and **2.3.3** as part of the acceptability and ALARP justification process.

During consultation, a summary of the controls adopted to manage the impacts and risks from the activity is included in the Consultation Information Sheet (**Appendix F**, 1.1) which is provided directly to relevant persons and available on the Woodside website.

In addition, during face-to-face consultation with Traditional Custodians, the particular controls adopted to manage interests raised are typically discussed by appropriate SMEs at the meeting to seek feedback. These controls may also be jointly adopted to protect the ecological value of a receptor. If additional controls are considered, to manage the risk to identified cultural values, these are discussed with the relevant persons who have raised the value.

Controls which have been adopted to manage the risk to a cultural value identified from literature or which are adaptive in nature may not have not been routinely tested during consultation with traditional custodians, unless the values has been identified by the relevant person themselves. It is not considered appropriate to broadly canvass Traditional Custodian relevant persons to validate cultural values identified from literature (not raised by the relevant person themselves) or associated controls. Instead, Woodside's in-house heritage and First Nations experts have been involved in developing and screening such controls.

The EPOs, EPSs and MC are presented throughout this section and in **Appendix D** (Oil Spill Preparedness and Response). A breach of these EPOs or standards constitutes a 'Recordable Incident' under the Environment Regulations (refer to **Section 7.10.4**).

The Scarborough OPP identified the impacts and risks associated with the proposed development and defined suitable high-level EPOs. The OPP EPOs have been cascaded to the relevant project activities under this EP and the relationship between OPP EPOs and those developed in this EP is summarised in **Table 6-2**.

For the physical and biological receptors within the EMBA, Woodside has set EPOs that are consistent with the *Matters of National Environmental Significance – Significant impact guidelines 1.1* (DoE, 2013). For social receptors, including fishing and other commercial activities, the EPOs that have been set reflect the requirements in the OPGGS Act Section 280(2), in that the activities undertaken as a part of the development of Scarborough should not interfere with other marine users, to a greater extent than is necessary for the exercise of right conferred by the titles granted.

The EPOs for all environmental impacts/risks are identified and summarised in **Table 6-2**.

Table 6-2: Comparison of EP EPOs to the relevant OPP EPOs

Aspect	EPOs in this EP	Relevant EPOs from the Scarborough OPP	Comparison
Planned Activities			
Section 6.7.1 Physical Presence – Disturbance to Benthic Habitat from subsea infrastructure activities	EPO 1 Undertake the Petroleum Activities Program in a manner that will not modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity results.	EPO 1.1; EPO 4.1; EPO 6.4; EPO 6.8; EPO 12.4; EPO 15.6; EPO 16.2; EPO 17.2; EPO 18.2:	The EPOs adopted in the EP for the disturbance to benthic habitat are consistent with the EPOs in the OPP.
	EPO 2 Undertake the Petroleum Activities Program in a manner that prevents a substantial change to water quality that may adversely impact on biodiversity, ecological integrity, social amenity or human health.	EPO 6.1; EPO 7.1; EPO 8.1; EPO 9.1; EPO 10.1; EPO 12.1; EPO 15.2	
	EPO 27 No adverse impact to unexpected finds of Underwater Cultural Heritage without a permit ²¹ .	New EPO	
Section 6.7.2 Physical Presence – Interaction with other marine users and values	EPO 3 Undertake the Petroleum Activities Program in a manner that prevents a substantial adverse effect on the sustainability of commercial fishing.	EPO 5.1	The EPOs adopted in the EP for interaction with other marine users are consistent with the EPOs in the OPP.
	EPO 4 Undertake the Petroleum Activities Program in a manner that does not interfere with other marine users to a greater extent than is necessary for the exercise of right conferred by the titles granted.	EPO 5.2	
Section 6.7.3 Routine Acoustic Emissions – Generation of Noise from Project Vessels	EPO 5 Undertake the Petroleum Activities Program in a manner that will not seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	EPO 1.4; EPO 4.3; EPO 10.6; EPO 15.9; EPO 18.5	The EPOs adopted in the EP for routine noise emissions are consistent with the EPOs in the OPP.
	EPO 6 Undertake the Petroleum Activities Program in a manner that prevents a substantial adverse effect on a population of fishes, marine mammals, marine reptiles, or the spatial distribution of a population.	EPO 4.2; EPO 15.7; EPO 18.4:	

²¹Permit for Entry into a Protected Zone or to Impact Underwater Cultural Heritage would be acquired under the UCH Act.

Aspect	EPOs in this EP	Relevant EPOs from the Scarborough OPP	Comparison
	<p>EPO 7 Undertake the Petroleum Activities Program in a manner that will not substantially modify, destroy or isolate an area of important habitat for a migratory species.</p>	<p>EPO 1.3; EPO 10.5; EPO 15.8</p>	
	<p>EPO 1 Undertake the Petroleum Activities Program in a manner that will not modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity results.</p>	<p>EPO 1.1; EPO 4.1; EPO 6.4; EPO 6.8; EPO 12.4; EPO 15.6; EPO 16.2; EPO 17.2; EPO 18.2:</p>	
	<p>EPO 25 Undertake the Petroleum Activities Program in a manner that prevents injury to blue whales or biologically significant behavioural disturbance.</p>	<p>New EPO</p>	
<p>Section 6.7.4 Routine Light Emissions: External Lighting on Project Vessels</p>	<p>EPO 1 Undertake the Petroleum Activities Program in a manner that will not modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity results.</p>	<p>EPO 1.1; EPO 4.1; EPO 6.4; EPO 6.8; EPO 12.4; EPO 15.6; EPO 16.2; EPO 17.2; EPO 18.2:</p>	<p>The EPOs adopted in the EP for routine light emissions are consistent with the EPOs in the OPP.</p>
<p>EPO 8 Undertake the Petroleum Activities Program in a manner that will not have a substantial adverse effect on a population of seabirds or shorebirds, or the spatial distribution of the population.</p>	<p>EPO 1.2; EPO 15.3</p>		
<p>EPO 5 Undertake the Petroleum Activities Program in a manner that will not seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.</p>	<p>EPO 1.4; EPO 4.3; EPO 10.6; EPO 15.9; EPO 18.5</p>		
<p>EPO 6 Undertake the Petroleum Activities Program in a manner that prevents a substantial adverse effect on a population of fishes, marine mammals, marine reptiles, or the spatial distribution of a population.</p>	<p>EPO 4.2; EPO 15.7; EPO 18.4</p>		
<p>EPO 7</p>	<p>EPO 1.3; EPO 10.5; EPO 15.8</p>		

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Aspect	EPOs in this EP	Relevant EPOs from the Scarborough OPP	Comparison
	Undertake the Petroleum Activities Program in a manner that will not substantially modify, destroy or isolate an area of important habitat for a migratory species.		
Section 6.7.5 Routine Atmospheric and Greenhouse Gas Emissions	EPO 9 Undertake the Petroleum Activities Program in a manner that will not result in a substantial change in air quality which may adversely impact on biodiversity, ecological integrity social amenity or human health.	EPO 2.1	New EPO – EPO 6 relating to Atmospheric and GHG emissions to be inclusive of all emissions relevant to this Petroleum Activities Program.
	EPO 10 Assess opportunities to improve energy efficiency and reduce GHG emissions from the Petroleum Activities Program.	New EPO	
Section 6.7.6 Routine and Non-Routine Discharges: Subsea Infrastructure Installation	EPO 11 Undertake the Petroleum Activities Program in a manner that does not result in a substantial change in water quality which may adversely impact on biodiversity, ecological integrity, social amenity or human health.	EPO 6.1; EPO 7.1; EPO 8.1; EPO 9.1; EPO 10.1; EPO 12.1; EPO 14.1; EPO 15.2	The EPOs adopted in the EP for project vessel discharges are consistent with the EPOs in the OPP.
	EPO 1 Undertake the Petroleum Activities Program in a manner that will not modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity results.	EPO 1.1; EPO 4.1; EPO 6.4; EPO 6.8; EPO 12.4; EPO 15.6; EPO 16.2; EPO 17.2; EPO 18.2:	
	EPO 12 Undertake the Petroleum Activities Program in a manner that prevents a substantial adverse effect on a population of plankton including its life cycle and spatial distribution.	EPO 10.2; EPO 12.3	
	EPO 13 Undertake the Petroleum Activities Program in a manner which does not modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity an area defined as a KEF.	EPO 10.8; EPO 12.5; EPO 16.3	
	EPO 14 Undertake Petroleum Activities Program in a manner that prevents substantial change in sediment quality, which may adversely impact biodiversity, ecological integrity, social amenity or human health.	EPO 12.2	

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Aspect	EPOs in this EP	Relevant EPOs from the Scarborough OPP	Comparison
	<p>EPO 15 Undertake Petroleum Activities Program in a manner that prevents significant impacts on the values of the Exmouth Plateau KEF.</p>	<p>EPO 10.3</p>	
<p>Section 6.7.7 Routine and Non-Routine Discharges: Project Vessels</p>	<p>EPO 11 Undertake the Petroleum Activities Program activities in a manner that does not result in a substantial change in water quality which may adversely impact on biodiversity, ecological integrity, social amenity or human health</p>	<p>EPO 6.1; EPO 7.1; EPO 8.1; EPO 9.1; EPO 10.1; EPO 12.1; EPO 14.1; EPO 15.2</p>	
	<p>EPO 12 Undertake the Petroleum Activities Program in a manner that prevents a substantial adverse effect on a population of plankton including its life cycle and spatial distribution.</p>	<p>EPO 10.2; EPO 12.3</p>	
<p>Unplanned Activities</p>			
<p>Section 6.8.2 Unplanned Hydrocarbon Release: Vessel Collision</p>	<p>EPO 17 No release of hydrocarbons to the marine environment due to a vessel collision associated with the Petroleum Activities Program.</p>	<p>EPO 19.1</p>	<p>The EPOs adopted in the EP for an unplanned hydrocarbon release from a vessel collision are consistent with the EPOs in the OPP.</p>
<p>Section 6.8.2 Unplanned Hydrocarbon Release: Bunkering</p>	<p>EPO 18 Undertake the Petroleum Activities Program in a manner that will prevent an unplanned release of non-process/reservoir hydrocarbons to the marine environment resulting in a substantial change in water quality which may adversely impact on biodiversity, ecological integrity, social amenity or human health.</p>	<p>EPO 14.1</p>	<p>This EPO has been adapted from EPO 14.1 in the Scarborough OPP which pertains to chemical releases; and made relevant to non-Process/reservoir hydrocarbons such as vessel marine fuel.</p>
<p>Section 6.8.4 Unplanned Discharge: Chemicals and Minor Hydrocarbon Spills (Deck and Subsea spills)</p>	<p>EPO 19 Undertake the Petroleum Activities Program in a manner that will prevent an unplanned release of chemicals or non-process hydrocarbons to the marine environment resulting in a substantial change in water quality which may adversely impact on biodiversity, ecological integrity, social amenity or human health.</p>	<p>EPO 14.1</p>	<p>The EPOs adopted in the EP for an unplanned hydrocarbon release from bunkering are consistent with the EPOs in the OPP.</p>
<p>Section 6.8.5</p>	<p>EPO 20</p>	<p>EPO 15.1</p>	

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Aspect	EPOs in this EP	Relevant EPOs from the Scarborough OPP	Comparison
Unplanned Discharge: Hazardous and Non – Hazardous Solid Waste	Undertake Petroleum Activities Program in a manner that will prevent an unplanned release of solid waste to the marine environment resulting in a significant impact		The EPOs adopted in the EP for an unplanned discharge of hazardous and non-hazardous solid wastes are consistent with the EPOs in the OPP.
	EPO 8 Undertake Petroleum Activities Program in a manner that will prevent a substantial adverse effect on a population of seabirds or shorebirds, or the spatial distribution of the population	EPO 1.2; EPO 15.3	
	EPO 5 Undertake Petroleum Activities Program in a manner that will not seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	EPO 1.4; EPO 4.3; EPO 10.6; EPO 15.9; EPO 18.5	
	EPO 6 Undertake the Petroleum Activities Program in a manner that prevents a substantial adverse effect on a population of fishes, marine mammals, marine reptiles, or the spatial distribution of a population.	EPO 4.2; EPO 15.7; EPO 18.4	
	EPO 7 Undertake Petroleum Activities Program in a manner that will not substantially modify, destroy or isolate an area of important habitat for a migratory species.	EPO 1.3; EPO 10.5; EPO 15.8	
	EPO 2 Undertake Petroleum Activities Program in a manner that will prevent a substantial change in water quality which may adversely impact on biodiversity, ecological integrity, social amenity or human health.	EPO 6.1; EPO 7.1; EPO 8.1; EPO 9.1; EPO 10.1; EPO12.1; EPO 14.1; EPO 15.2	
	EPO 6 Undertake Petroleum Activities Program in a manner that will prevent a substantial adverse effect on a population of fish, or the spatial distribution of the population.	EPO 10.4; EPO 15.4	
	EPO 21 Undertake Petroleum Activities Program in a manner that will prevent a substantial adverse effect on a population of marine mammals or the spatial distribution of the population.	EPO 10.7; EPO 15.5; EPO 18.3	
Section 6.8.6	EPO 13	EPO 10.8; EPO 12.5; EPO 16.3	The EPOs adopted in the EP for unplanned seabed

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Aspect	EPOs in this EP	Relevant EPOs from the Scarborough OPP	Comparison
Physical Presence (Unplanned): Seabed Disturbance	Undertake the Petroleum Activities Program in a manner which does not modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity in an area defined as a KEF.		disturbance are consistent with the EPOs in the OPP.
	EPO 22 Undertake the Petroleum Activities Program in a manner which prevents unplanned seabed disturbance.	EPO 16.1	
Section 6.8.7 Physical Presence (Unplanned): Invasive Marine Species	EPO 13 Undertake the Petroleum Activities Program in a manner which does not modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity in an area defined as a KEF.	EPO 10.8; EPO 12.5; EPO 16.3	OPP EPOs 17.1, 17.3 and 17.4 have been combined to form one EPO which encompasses the intent and outcome of all three.
	EPO 23 Undertake the Petroleum Activities Program in a manner which prevents a known or potential pest species (IMS) becoming established.	EPO 17.1, EPO 17.3, EPO 17.4	
Section 6.8.8 Physical Presence (Unplanned): Collision with Marine Fauna	EPO 24 Undertake the Petroleum Activities Program in a manner which prevents a vessel strike with protected marine fauna during project activities.	EPO 18.1	The EPOs adopted in the EP for the unplanned collision with marine fauna are consistent with the EPOs in the OPP.
Section 6.10 Cultural Features and Heritage Values Assessment	EPO 26 Woodside will actively support Traditional Custodians' capacity for ongoing engagement and consultation on environment plans for the purpose of avoiding impacts to cultural heritage values.	New EPO	New 'Cultural Features and Heritage Values' EPO's have been developed for this EP to ensure reduction in impact potential to ALARP and Acceptable levels.
	EPO 28 New cultural values identified through the Program (EPO26) will be managed to ALARP and an Acceptable level of impact.		
	EPO 29 No impact to cultural features and heritage values, as stated in Table 4-21, greater than a consequence level of F ₅₉ from the Petroleum Activities Program.		
	EPO 5		

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Aspect	EPOs in this EP	Relevant EPOs from the Scarborough OPP	Comparison
	Undertake the Petroleum Activities Program in a manner that will not seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.		consistent with the EPOs in the OPP.
	EPO 6 Undertake the Petroleum Activities Program in a manner that prevents a substantial adverse effect on a population of fishes, marine mammals, marine reptiles, or the spatial distribution of a population.	EPO 4.2; EPO 15.7; EPO 18.4:	
	EPO 7 Undertake the Petroleum Activities Program in a manner that will not substantially modify, destroy or isolate an area of important habitat for a migratory species.	EPO 1.3; EPO 10.5; EPO 15.8	
	EPO 8 Undertake the Petroleum Activities Program in a manner that will not have a substantial adverse effect on a population of seabirds or shorebirds, or the spatial distribution of the population.	EPO 1.2; EPO 15.3	

6.4 Presentation

The environmental impact and risk analysis and evaluation (ALARP and acceptability), EPOs, standards and MC are presented in the following tabular form throughout this section. Italicised text in the following example denotes the purpose of each part of the table with reference to the relevant sections of the Environment Regulations and/or this EP.

Scarborough OPP – Relevant Impact Assessment Section														
<i><Reference to section number in the Scarborough Project OPP></i>														
Context <Description of the context for the impact/risk. Regulation 13(1, 13(2) and 13(3)>														
Relevant Activities Source of Aspect – Section reference <i>Description of the Activity – Regulation 13(1)</i>				Existing Environment Relevant environment – Section reference <i>Description of the Environment – Regulations 13(2)(3)</i>				Stakeholder consultation Consultation – Section reference <i>Consultation – Regulation 11A</i>						
Impact/Risk Evaluation Summary														
Source of Impact/Risk Regulation 13(1)	Environmental Value Potentially Impacted Regulations 13(2)(3)							Evaluation						
	Soil and Groundwater	Marine Sediment	Water Quality	Air Quality (inc. odour)	Ecosystems / Habitat	Species	Socio-economic	Decision Type	Impact/Consequence	Likelihood	Current Risk Rating	ALARP Tools	Acceptability	Outcome
Summary of source of risk/impact														
Description of Source of Impact/Risk														
<i>Description of the identified impact/risk including sources or threats that may lead to the risk or identified event. Regulation 13(1).</i>														
Detailed Impact Assessment														
Assessment of Potential Impacts														
Receptor Impact / risk Assessment of potential impact <i>Discussion and assessment of the potential impacts to the identified environment value(s). Regulations 13(5)(6). Potential impacts to environmental values have been assigned and discussed based on Woodside’s Environmental Consequence Definitions for Use in Environmental Risk Assessments (Error! Reference source not found.).</i>														
Cumulative Impacts														
<i>Description of any cumulative impacts specific to the Petroleum Activities Program (cumulative impact assessment of Scarborough project as a whole is covered in the OPP)</i>														

Summary of Assessment Outcomes				
Receptor	Impact	Receptor Sensitivity Level	Magnitude	Impact Significance Level / Risk Consequence
<p>Overall Impact Significance Level/ Risk consequence: Roll up to Impact/consequence rating (in impact/risk evaluation summary at top of this table) but need to look at individual receptors as being equal to or less than level of acceptability in the OPP.</p>				

Demonstration of ALARP				
Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/Risk Reduction	Proportionality	Control Adopted
ALARP Tool Used – Section 2.3.4				
Summary of control considered to ensure the impacts and risks are continuously reduced to ALARP. Regulation 13(5)(c).	Technical/logistical feasibility of the control. Cost/sacrifice required to implement the control (qualitative measure).	Quantum of impact/risk that could be averted (measured in terms of reduction of likelihood, consequence and current risk rating) if the cost/sacrifice is made and the control is adopted.	Proportionality of cost/sacrifice vs environmental benefit. If proportionate (benefits outweigh costs) the control will be adopted. If disproportionate (costs outweigh benefits) the control will not be adopted.	If control is adopted: Reference to Control # provided.
<p>ALARP Statement: Made on the basis of the environmental risk assessment outcomes, use of the relevant tools appropriate to the decision type (Section 2.3.3 and Figure 2-3) and a proportionality assessment. Regulation 10A(b).</p>				
Demonstration of Acceptability				
Acceptability Criteria and Assessment				
<p>Impact Significance Level / Risk Consequence levels for receptors are within acceptable bounds of the OPP:</p> <p>Adoption of relevant OPP EPOs and controls:</p> <p>Internal/external context and other requirements specific to this EP Petroleum Activities Program:</p>				
<p>Acceptability Statement: Outcomes of the impact assessment in comparison to OPP and ALARP demonstration.</p>				

Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
<p>EPO# S: Specific performance which addresses the legislative and other controls that manage the activity and against which performance by Woodside in</p>	<p>C# Identified control adopted to ensure the impacts and risks are continuously reduced to ALARP.</p>	<p>PS# Statement of the performance required of a control measure. Regulation 13(7)(a)</p>	<p>MC# Measurement criteria for determining whether the outcomes and</p>

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Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
<p><i>protecting the environment will be measured.</i></p> <p><i>M: Performance against the outcome will be measured by measuring implementation of the controls via the measurement criteria.</i></p> <p><i>A: Achievability/feasibility of the outcome demonstrated via discussion of feasibility of controls in ALARP demonstration. Controls are directly linked to the outcome.</i></p> <p><i>R: The outcome will be relevant to the source of risk and the potentially impacted environmental value.</i></p> <p><i>T: The outcome will state the timeframe during which the outcome will apply or by which it will be achieved.</i></p>	<p>Regulation 13(5)(c).</p>		<p>standards have been met.</p> <p>Regulation 13(7)(c)</p>

6.5 Potential Environment Risks Not Included Within the Scope of this Environment Plan

The ENVID identified environmental risks that were assessed as not being applicable within or outside the PAA as a result of the Petroleum Activities Program and, therefore, were determined to not form part of this EP. These are described in the next sections for information only.

6.5.1 Shallow/Near-shore Activities

The Petroleum Activities Program is located in water depths greater than 100 m and at a significant distance from nearest landfall. Consequently, risks associated with shallow/ nearshore activities such as vessel anchoring, and risks of grounding were assessed as not credible.

6.5.2 Dewatering of Subsea Infrastructure

Planned discharges associated with FCG, hydrotest and leak testing of the flowlines and risers etc. during subsea installation activities are outlined in **Table 3-7** and **Table 3-8** and assessed in **Section 6.7.6**. Dewatering will be required prior to commissioning of the infrastructure, but will be conducted under a Scarborough Project Offshore Facility and Trunkline (Operation) EP. Dewatering discharges are therefore excluded from the scope of this EP.

6.5.3 Generation of Noise from Helicopters and ROV

It is not credible that airborne noise from helicopter transfers would add to levels of underwater noise emanating from project vessels and positioning equipment to any extent. Similarly, it is not credible that noise from ROV operations at the seabed in approximately 900–1000 m water depth would add to levels of noise emanating from project vessels just below the sea surface, or noise emissions from transponders on the seabed, to any extent. Noise emissions from these other sources would not add to cumulative sound fields from project vessel and transponders to any discernible extent. As such noise emissions from these sources have not been considered in **Section 6.7.3**.

6.5.4 Loss of Containment of Existing Subsea Infrastructure

As described in **Section 4.9.6**, existing subsea infrastructure may be present in the PAA during installation of subsea infrastructure (i.e. Xmas trees installed during the Scarborough drilling and completions program). There is therefore a risk (albeit low likelihood) of dropped objects resulting in damage to a Xmas tree and loss of containment. Loss of containment from a Scarborough well during drilling is assessed in Section 6.8.3 of the Scarborough Drilling and Completions EP. This is considered a worst-case loss of containment scenario and is greater than the credible spill volume from a completed well. The assessment in the Drilling and Completions EP details the control measures associated with an unplanned release from a well. This risk is therefore not assessed again as part of this EP. However, relevant control measures and performance outcomes, standards and measurement criteria that apply to the prevention of dropped objects for this Petroleum Activities Program are identified in **Section 6.8.6**. Additional controls for operating the project vessels are provided throughout **Sections 6.7** and **6.8** of this EP.

6.6 Indirect Impacts

For the proposed Petroleum Activities Program, the potential 'indirect' environmental impacts and risks evaluated are those associated with mobilisation/demobilisation of project vessels to the PAA, which have been considered in the environmental impact assessment in **Sections 6.7** and **6.8**.

Due to the nature and scale of these potential indirect environmental impacts and risks (such as fuel usage, interaction with other marine users and usual vessel discharges), and the regulatory frameworks and applicable maritime regulations in place to manage them, Woodside considers the potential impacts and risks from mobilisation and demobilisation of project vessels to be inherently ALARP in its current state. Therefore, Woodside considers that standard vessel operations are appropriate to manage the potential impacts and risks from mobilisation and demobilisation of project vessels to a level that is acceptable.

The extraction of Scarborough gas for onshore processing is not included in this Petroleum Activities Program. Subsequent and future petroleum activities must first be authorised under the OPGGS(E)R and implemented before Scarborough gas is able to be extracted for onshore processing. Therefore, any indirect impacts and risks arising from the onshore processing of Scarborough gas are not considered indirect impacts/risks of this Petroleum Activities Program, but will be evaluated in future Scarborough EPs as appropriate. **Section 1.10.2.1** outlines the list of broader Scarborough Development activities, which will be addressed in EPs submitted to NOPSEMA for assessment.

Table 6-3: Environmental Risk analysis and summary

Aspect	EP Section	Risk Rating			Acceptability	
		Impact/ Consequence	Potential Impact/Consequence Level	Likelihood		Current Risk Rating
Planned Activities (Routine and Non-routine)						
Physical Presence – Disturbance to Benthic Habitat from subsea infrastructure activities	6.7.1	D	Environment – Slight, short-term impact (less than one year) on species, habitat (but not affecting ecosystems function), physical or biological attributes.	-	-	Broadly Acceptable Has been shown to meet requirements listed in Section 2.3.5
Physical Presence – Interaction with other marine users	6.7.2	E	Slight, short-term impact (<1 year) to a community or area/item of cultural significance.	-	-	Broadly Acceptable Has been shown to meet requirements listed in Section 2.3.5
Routine Acoustic Emissions – Generation of Noise from Project Vessels	6.7.3	E	Environment – Slight, short-term impact (less than one year) on species, habitat (but not affecting ecosystems function), physical or biological attributes.	-	-	Broadly Acceptable Has been shown to meet requirements listed in Section 2.3.5
Routine Light Emissions: External Lighting on Project Vessels	6.7.4	E	Environment – Slight, short-term impact (less than one year) on species, habitat (but not affecting ecosystems function), physical or biological attributes.	-	-	Broadly Acceptable Has been shown to meet requirements listed in Section 2.3.5
Routine Atmospheric and Greenhouse Gas Emissions	6.7.5	F	Environment – No lasting effect (less than one month); localised impact not significant to environmental receptors.	-	-	Broadly Acceptable Has been shown to meet requirements listed in Section 2.3.5
Routine and Non-Routine Discharges: Subsea Infrastructure Installation	6.7.6	E	Environment – Slight, short-term impact (less than one year) on species, habitat (but not affecting ecosystems function), physical or biological attributes.	-	-	Broadly Acceptable Has been shown to meet requirements listed in Section 2.3.5
Routine and Non-Routine Discharges: Project Vessels	6.7.7	E	Environment – Slight, short-term impact (less than one year) on species, habitat (but not affecting ecosystems function), physical or biological attributes.	-	-	Broadly Acceptable Has been shown to meet requirements listed in Section 2.3.5

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Aspect	EP Section	Risk Rating				Acceptability
		Impact/Consequence	Potential Impact/Consequence Level	Likelihood	Current Risk Rating	
Unplanned Activities (Accidents, Incidents, Emergency Situations)						
Unplanned Hydrocarbon Release: Vessel Collision	6.8.2	D	Moderate, medium-term impact (2–10 years) on ecosystems, species, habitat or physical or biological attributes	1	M	Broadly Acceptable Has been shown to meet requirements listed in Section 2.3.5
Unplanned Hydrocarbon Release: Bunkering	6.8.3	D	Minor, short-term impact (1–2 years) on species, habitat (but not affecting ecosystem function), physical or biological attribute.	1	M	Broadly Acceptable Has been shown to meet requirements listed in Section 2.3.5
Unplanned Discharge: Chemicals and Minor Hydrocarbon Spills (Deck and Subsea spills)	6.8.4	E	Environment – Slight, short-term impact (less than one year) on species, habitat (but not affecting ecosystems function), physical or biological attributes.	1	L	Broadly Acceptable Has been shown to meet requirements listed in Section 2.3.5
Unplanned Discharge: Hazardous and Non – Hazardous Solid Waste	6.8.5	D	Minor, short-term impact (1–2 years) on species, habitat (but not affecting ecosystem function), physical or biological attribute.	0	L	Broadly Acceptable Has been shown to meet requirements listed in Section 2.3.5
Physical Presence (Unplanned): Seabed Disturbance	6.8.6	D	Minor, short-term impact (1–2 years) on species, habitat (but not affecting ecosystem function), physical or biological attribute.	1	M	Broadly Acceptable Has been shown to meet requirements listed in Section 2.3.5
Physical Presence (Unplanned): Invasive Marine Species	6.8.7	E	Environment – Slight, short-term impact (less than one year) on species, habitat (but not affecting ecosystems function), physical or biological attributes.	0	L	Broadly Acceptable Has been shown to meet requirements listed in Section 2.3.5
Physical Presence (Unplanned): Collision with Marine Fauna	6.8.8	E	Environment – Slight, short-term impact (less than one year) on species, habitat (but not affecting ecosystems function), physical or biological attributes.	1	L	Broadly Acceptable Has been shown to meet requirements listed in Section 2.3.5

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6.7 Planned Activities (Routine and Non-Routine)

6.7.1 Physical Presence – Seabed Disturbance

Scarborough OPP – Relevant Impact Assessment Section														
Section 7.1.6 –Physical Presence – Seabed Disturbance														
Context														
Relevant Activities Gravimetry – Section 3.9 Subsea Infrastructure Installation – Section 3.10 FPU Mooring Pre-Lay – Section 3.10.3 ROV Operations – Section 3.8.3 Underwater positioning – Section 3.8.5 Marine Growth Removal – Section 3.8.6 Contingency Activities – Section 3.11			Existing Environment Marine Regional Characteristics – Section 4.2 Physical Environment – Section 4.3 Habitats and Biological Communities – Section 4.5				Stakeholder consultation Consultation – Section 5							
Impact/Risk Evaluation Summary														
Source of Impact/Risk	Environmental Value Potentially Impacted						Evaluation							
	Soil and Groundwater	Marine Sediment	Water Quality	Air Quality (inc. odour)	Ecosystems / Habitat	Species	Socio-economic	Decision Type	Impact/Consequence	Likelihood	Current Risk Rating	ALARP Tools	Acceptability	Outcome
Installation of concrete pads for gravimetry surveys		✓	✓		✓			A	D	-	-	GP PJ	Broadly Acceptable	EPO 1, 2, 27
Installation of subsea infrastructure		✓	✓		✓									
Pre-lay of FPU mooring		✓	✓		✓									
ROV operations near the seabed (including localised sediment relocation)		✓	✓		✓									
Placement and retrieval of seabed transponders (DP vessels)		✓	✓		✓									
Removal of marine growth from infrastructure.		✓	✓		✓									
Contingency cut and removal of flowline section in the event of a wet buckle		✓	✓		✓									

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Span rectification		✓	✓		✓	✓	✓	A	E	-	-			
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Description of Source of Impact/Risk

Gravimetry

Approximately 220 concrete pads (up to a maximum of 265) will be installed on the seabed in preparation for conducting gravimetry surveys. The pads are conical frustum-shaped, approximately 1.6 m in diameter, and will be placed approximately 2 km apart, having a cumulative seabed footprint of approximately 530 m². The pads will remain on the seabed for the operating life of the Scarborough field. The baseline gravimetry survey will involve the temporary placement of a passive gravity meter, sequentially on each concrete pad by ROV, and temporary deployment of tide gauges on the seabed. The ROV will stand off during the measurements and will land on the seabed. Approximately 39 tide gauges will be deployed at 13 locations, the footprint at each of the 13 locations will be approximately 1 m². The tide gauges will be recovered after the baseline survey is complete.

Installation of Subsea Infrastructure

Subsea infrastructure for the Scarborough field development will be installed across two campaigns as described in **Section 3.10**. In campaign 1 the following infrastructure is planned to be installed over a period of about three months:

- Thirteen mud mats (approximately 16 m x 9 m x 0.3 m) – to form base for six FLETs and seven ILTs.
- Up to twelve mud mats (approximately 8 m x 4 m x 3 m) – to form base for SDUs and UTAs.
- Seven flowline sleepers (approximately 30 m x 2.5 m x 1 m).
- Three lengths of flowline (16" diameter, 12,000–17,200 m long)
- Riser base manifold foundation (four suction piles with a rigid frame with dimensions of approximately 28 m x 15 m x 6 m).

In campaign 2 the following infrastructure is planned to be installed over a period of about 3 months:

- RBM (onto pre-installed foundation).
- Six risers and one dynamic umbilical (14" diameter, 2,200–2,900 m long) – using a clump weight for initiation and pick-up rigging to facilitate future connection.
- Nine flexible jumpers (8" diameter, 100–1000 m long).
- Eight static umbilicals (108–212 mm diameter, a total of approximately 42,000 m long).
- Two SDUs and an SDA (onto pre-laid mud mats).
- One rigid spool (32" diameter, spread across area of approximately 51 m x 16 m x 3.6 m).

Pre-lay of FPU mooring

Twenty mooring legs for the FPU will be installed over a period of about 3 months. Each of the 20 legs will be composed of both wire and chain components, and are anchored with 23 m high by 8 m diameter suction piles, buried with only the top exposed above seabed. These piles and wire/chain will be wet stored on the seabed with attached recovery assistance, until connection to the FPU, which will be addressed by a future Environment Plan. This will result in disturbance of approximately 0.008 km² of seabed, contained within a 11 km² area.

ROV Operations

Pre- and post-lay surveys will be conducted by ROV to assess seabed condition pre-installation and confirm infrastructure location post-installation. The use of an ROV may result in temporary seabed disturbance and suspension of sediment as a result of working close to, or occasionally on, the seabed. ROV use close to or on the seabed is limited to that required for effective and safe subsea activities. The footprint of a typical ROV is about 2.5 m x 1.7 m (4.25 m²).

Underwater Acoustic Positioning

Accurate positioning of infrastructure on the seabed is required, and therefore long base line (LBL) and/or ultra short baseline (USBL) acoustic positioning may be required in some instances (see **Section 3.8.5**). LBL transponders may be moored to the seabed by a clump weight (approximate footprint of <1 m²), which are recovered by means of a hydrostatic release. If clump weights are used, they will be recovered.

Marine Growth Removal

Excess marine growth may need to be removed from subsea infrastructure using an ROV if accumulated between installation phases. Removing marine growth is undertaken via a high-pressure water and/or brushes or acid, by ROV.

Contingency Activities

In the event of a wet buckle during flowline installation, the damaged section of the flowline will need to be removed by localised excavation with an ROV (to allow the cutting tool to get into place), cutting from the remainder of the flowline, and moving out of the flowline route. Upon completion of this activity, the remaining flowline will be recovered to the installation vessel and the damaged section of the flowline will be recovered by a pipeline recovery tool.

Span Rectification

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In the event span rectification is required, grout bags would be placed under the span section; the empty bag moved into position using ROV, then filled with grout supplied from a mixing and pumping spread on the vessel via a downline. Small, prefilled bags may be installed using ROV or lowered to the seabed using a vessel crane. Typical grout volumes depend on the size of the span and may vary in weight from about 200–2000 kg per span.

Detailed Impact Assessment

Assessment of Potential Impacts

Water quality

Elevations in turbidity will be intermittent and temporary in nature depending on the phase of the activity (e.g., during installation, and/or ROV use etc.), and are not expected to occur throughout the two campaigns. Further the sediment dispersed during these activities is naturally occurring and will settle under existing hydrodynamic conditions.

Epifauna and Infauna

The PAA is located in water depths of approximately 900–1000 m (refer to **Section 3.5**). Marine life, such as deep water benthic communities epifauna and infauna (living on and in the sediment dominated habitat), may be impacted from the permanent placement of infrastructure, or placement of temporary infrastructure on the seabed. Permanent infrastructure will be present for the duration of field life and will result in the displacement and/or permanent loss of epifauna and infauna within the physical footprint. Permanent infrastructure includes gravimetry pads; flowlines, umbilicals and associated structures (including mud mats); RBM and foundation; and FPU mooring legs; and span rectification structures. Temporary infrastructure and equipment will be removed from the field upon completion of installation activities and includes the initiation suction pile and leader wire for flowline lay initiation; installation aids (i.e. transponder arrays, frames); wet-storing of dynamic umbilicals and risers; and ROV operations) on the seabed.

Disturbance to the seabed can alter the physical seabed habitat conditions, resulting in epifauna and infauna community changes (Newell et al., 1998). The seabed of the PAA is characterised by sparse marine life dominated by mobile organisms (ERM, 2013). The benthic biota are predominantly deposit feeders such as epifauna (living on the seabed): shrimp (crustaceans) and sea cucumbers (echinoderms), and infauna (living within the surface sediments) small, burrowing worms (polychaetes) and crustaceans (ERM, 2013) (**Section 4.5**). The PAA is not located within or adjacent to an AMP.

Habitat modification as a result of loss of habitat within the direct footprint of infrastructure, or localised seabed disturbance in proximity to infrastructure during installation activities. Benthic communities may be reduced or altered, leading to a highly localised impact to any epifauna and infauna benthic communities present. Potential impacts include; burial or smothering of benthic biota from localised sediment deposition, particularly to sessile epifauna such as sea pens and infauna (polychaetes), and sediment coating resulting from elevated turbidity/TSS potentially causing clogging or damage to the physiological functioning of certain biota (sea pens, polychaetes) reliant on external respiratory and feeding structures. The deep-water environment is not oxygen saturated and oxygen levels in the water column at depth are substantially reduced as compared to the upper surface layers. Deep water benthic biota are adapted to such conditions which also include zero light and reduced temperature. Changes in oxygen levels resulting from the seabed infrastructure installation will be of short duration and temporary. Furthermore, sediment quality sampling indicated low organic content (**Section 4.4**) and further depletion of oxygen levels due to organically rich sediment disturbance is not predicted. The seabed sediments of the PAA contain low levels of contaminants such as metals and no hydrocarbons (**Section 4.4**) so no toxicological impacts to benthic biota from disturbed sediments is predicted. The scale and magnitude of potential impacts will be limited to the offshore seabed infrastructure physical footprint area, representing a relatively small proportion of the total area of deep water habitat and associated benthic communities of the PAA, that are known to be present in the wider region.

No threatened or migratory species, or ecological communities (as defined under the EPBC Act), were identified in the benthic communities during studies completed in the PAA (ERM, 2013). The epifauna and infauna benthic communities known to exist in the PAA are likely to be well represented elsewhere in the region, with impacts restricted to a highly localised proportion of benthic communities. The magnitude of potential impacts to epifauna and infauna from seabed disturbance during activities associated with the Petroleum Activities Program is Slight.

KEFs

The Exmouth Plateau KEF overlaps the PAA and seabed disturbance may lead to a highly localised change in habitat and water quality. Loss of habitat within the direct footprint of infrastructure represents a small area relative to the large extent of the KEF and additional disturbance during installation activities will be short-term, associated with the temporal extent of installation activities. These potential impacts are unlikely to impact on the ecological value of the KEF, which include enhanced productivity along the northern and southern boundaries of the Plateau that attract small pelagic species and nekton, as well as larger predators such as billfishes, sharks and dolphins (Brewer et al. 2007).

Summary of Assessment Outcomes				
Receptor	Impact	Receptor Sensitivity Level	Magnitude	Impact Significance Level
Water Quality	Change in water quality	Low value	Slight	Negligible (F)
Epifauna and Infauna	Injury/mortality to fauna	Low value	Slight	Negligible (F)
KEFs	Change in habitat	High value habitat	Slight	Minor (D)

Overall Impact Significance Level: The overall impact significance level for disturbance to benthic habitat from subsea infrastructure installation activities is D based on a minor impact to the high value receptor (KEFs). The impact significance levels for individual receptors are consistent with the level in the OPP.

Demonstration of ALARP				
Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit Impact/Risk Reduction	Proportionality	Control Adopted
Legislation, Codes and Standards				
An ROV inspection will be undertaken, post installation, to confirm all installation aids have been removed.	F: Yes CS: ROV inspections post installation standard practice	In accordance with OPGGS Act Section 572 all equipment is removed when no longer in use.	Legislative requirement	Yes C 1.1
Activities under the Petroleum Activities Program will be carried out in accordance with any protection declarations relevant to the Operational Area, under Sections 9,10,12 of the ATSIHP Act	F: Yes CS: Costs associated with the implementation	Implementation of the control ensures any impacts to significant Aboriginal areas and significant Aboriginal objects protected by Ministerial declaration, are acceptable under the standards of the ATSIHP Act.	Control based on legislative requirements – must be adopted.	Yes C 1.3
Good Practice				
Infrastructure will be placed on the seabed within the design footprint using positioning technology	F: Yes. CS: Standard practice.	Positioning infrastructure within the design footprint will reduce the potential magnitude of impact.	Benefits outweigh cost/sacrifice.	Yes C 1.2
Environmental monitoring of the seabed prior to, and following the Petroleum Activities Program to assess any impacts to seabed.	F: Yes. CS: Significant. Monitoring of the seabed, particularly the deep waters of the PAA, would have significant additional costs to obtain and analyse data with the spatial	Existing understanding of the benthic habitat within the PAA (based on previous surveys) confirm that the benthic habitat is sparse and well represented across the region. Impacts	Control grossly disproportionate. Monitoring will not reduce the consequence or likelihood of any impacts to the seabed, and the cost associated with the level of monitoring	No

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	resolution to accurately assess changes to the seabed habitat.	to benthic habitat from the Petroleum Activities Program are expected to be limited.	required to accurately assess any impacts greatly outweighs the benefits gained.	
Reduce the number of gravimetry pads.	F: No. CS: Gravimetry pads are essential as they ensure that gravimetry measurements are acquired at the same position on the seabed in consecutive surveys. The number of pads is already limited to only that required to conduct the work effectively and safely. CS: Not assessed, control not feasible.	Not assessed, control not feasible.	Not assessed, control not feasible.	No
Unexpected finds of potential Underwater Cultural Heritage ²² sites / features, including first nations UCH are managed in accordance with an Unexpected Finds Procedure set out in Section 7.5	F: Yes CS: Costs of implementation	Allows management of new finds in accordance with legislative requirements (including <i>Underwater Cultural Heritage Guidance for Offshore Developments</i> and the <i>DRAFT Guidelines to Protect Underwater Cultural Heritage</i> under the <i>UCH Act</i>), expert advice and community expectations.	Benefits outweigh cost/sacrifice.	Yes C 1.4
Relevant vessel crew and ROV operators will be advised in an induction of the potential to encounter UCH and requirement to follow the Unexpected Finds Procedure (C1.4)	F: Yes CS: Minimal	Ensures workforce are suitably aware of legal and process requirements for managing cultural features and heritage values. And is in line with recommendation from Mott (2019).	Benefits outweigh cost/sacrifice.	Yes C 1.5

²² Underwater Cultural Heritage is defined as any trace of human existence that has a cultural, historical or archaeological character and is located under water, in accordance with the UCH Act.

Report any potential UCH finds to relevant stakeholders and authorities in accordance with the Unexpected Finds Procedure, <i>Underwater Cultural Heritage Act 2018</i> and the ATSIHP Act	F: Yes CS: Minimal	Meets legislative requirements and community expectations.	Benefits outweigh cost/sacrifice.	Yes C 1.6
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Professional Judgement – Eliminate

Do not use ROV close to, or on, the seabed.	F: No. The use of ROVs (including work close to or occasionally landed on the seabed) is critical as the ROV is the main tool used to guide and manipulate equipment during drilling. ROV usage is already limited to only that required to conduct the work effectively and safely. Due to visibility and operational issues ROV work on or close to the seabed is avoided unless necessary. CS: Not assessed, control not feasible.	Not assessed, control not feasible.	Not assessed, control not feasible.	No
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Professional Judgement – Substitute

No additional controls identified.

Professional Judgement – Engineered Solution

No additional controls identified.

ALARP Statement:

On the basis of the environmental impact assessment outcomes and use of the relevant tools appropriate to the decision type (i.e. Decision Type A, **Section 2.3.3**), Woodside considers the adopted controls appropriate to manage the impacts of seabed disturbance from activities associated with the Petroleum Activities Program. As no reasonable additional/alternative controls were identified that would further reduce the impacts without grossly disproportionate sacrifice, the impacts are considered ALARP.

Demonstration of Acceptability

Acceptability Criteria and Assessment

Demonstration of acceptability for the sources of aspect and associated impacts assessed in this section are provided in Section 7.1.6.3 of the Scarborough OPP (SA0006AF0000002, rev 5). The Petroleum Activities Program meets the acceptability criteria (**Section 2.3.5**):

- Overall impact significance levels for individual receptors are consistent with the levels rated in the OPP.
- EPOs and controls in the OPP that are relevant to disturbance to benthic habitats have been adopted.
- There are no changes to internal/external context specific to this risk from the OPP. Feedback raised during consultation, including any specific updates to the EP in response, has been considered in Appendix F, Table 1.

Acceptability Statement:

The impact assessment has determined that, given the adopted controls, the Petroleum Activities Program is unlikely to result in an impact significance level greater than Minor. Further opportunities to reduce the impacts have been

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investigated above. The adopted controls are considered consistent with industry good practice and meet the requirements of Woodside relevant systems and procedures.

The potential impacts are considered broadly acceptable if the adopted controls are implemented. Therefore, Woodside considers the adopted controls appropriate to manage the impacts of disturbance to benthic habitat to a level that is broadly acceptable.

Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
<p>EPO 1 Undertake the Petroleum Activities Program in a manner that will not modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity results.</p> <p>EPO 2 Undertake the Petroleum Activities Program in a manner that prevents a substantial change to water quality that may adversely impact on biodiversity, ecological integrity, social amenity or human health.</p> <p>EPO 27 No adverse impact to unexpected finds of Underwater Cultural Heritage without a permit²³.</p>	<p>C 1.1 An ROV inspection will be undertaken, post installation, to confirm all installation aids have been removed.</p>	<p>PS 1.1.1 All installation aids are removed.</p>	<p>MC 1.1.1 As-built report confirms wet storage of all installation aids are removed.</p>
	<p>C 1.2 Infrastructure will be placed on the seabed within the design footprint using positioning technology</p>	<p>PS 1.2.1 Infrastructure will be positioned in the planned location²⁴ where impacts have been assessed.</p>	<p>MC 1.2.1 As-built surveys verify installation of equipment within acceptable tolerance³.</p>
		<p>PS 1.1.2 Transponder equipment, including clump weights/frames, will be removed at the end of the Petroleum Activity Program.</p>	<p>MC 1.1.2 Records demonstrate removal of transponder equipment.</p>
	<p>C 1.3 Activities under the Petroleum Activities Program will be carried out in accordance with any protection declarations relevant to the Operational Area, under Sections 9,10,12 of the ATSIHP Act</p>	<p>PS 1.3.1 Where an object or Significant Aboriginal Area is protected by a declaration under Section 12 or Sections 9/10 respectively of the ATSIHP Act, no work inconsistent with that declaration will be conducted for the duration of that declaration.</p>	<p>MC 1.3.1 No non-compliances with any protection declarations relevant to the Operational Area, under Sections 9,10,12 of the ATSIHP Act</p>
	<p>C 1.4 Unexpected finds of potential Underwater Cultural Heritage²⁵ sites / features, including first nations UCH are managed in accordance with the Unexpected Finds Procedure set out in Section 7.5</p>	<p>PS 1.4.1 In the event that an underwater cultural heritage site or feature is identified implement the Unexpected Finds Procedure set out in Section 7.5</p>	<p>MC 1.4.1 No non-compliance with the Unexpected Finds Procedure.</p>
	<p>C 1.5 Relevant vessel crew and ROV operators will be advised in an induction of the potential to encounter</p>	<p>PS 1.5.1 Relevant vessel crew (including ROV operators) are made aware of the requirements of the</p>	<p>MC 1.5.1 Records demonstrate vessel crew are made</p>

²³Permit for Entry into a Protected Zone or to Impact Underwater Cultural Heritage would be acquired under the UCH Act.

²⁴ Acceptable tolerance is considered to be ±200 m, given the homogenous and low sensitivity habitat.

²⁵ Underwater Cultural Heritage is defined as any trace of human existence that has a cultural, historical or archaeological character and is located under water, in accordance with the UCH Act

Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
	UCH, and of their requirement to follow the Unexpected Finds Procedure (C1.4)	Unexpected Finds Procedure (C1.4) through an induction.	aware of potential to encounter UCH.
	<p>C 1.6</p> <p>Report any potential UCH finds to relevant stakeholders and authorities in accordance with the Unexpected Finds Procedure, <i>Underwater Cultural Heritage Act 2018</i> and the ATSIHP Act</p>	<p>PS 1.6.1</p> <p>Report any finds of potential UCH in accordance with the Unexpected Finds Procedure (Section 7.7) including to:</p> <ul style="list-style-type: none"> • WA Museum as requested during EP consultation • Australasian Underwater Cultural Heritage Database 	<p>MC 1.6.1</p> <p>Records of potential UCH finds reported to relevant authorities and stakeholders.</p>

6.7.2 Physical Presence – Interactions with Other Marine Users

Scarborough OPP – Relevant Impact Assessment Section														
Section 7.1.5 – Physical Presence – Interactions with Other Marine Users														
Context														
Relevant Activities Vessel Operations – Section 3.7 Support Operations – Section 3.8 Subsea Infrastructure Installation – Section 3.10 FPU Mooring Pre-Lay – Section 3.10.3				Existing Environment Socio-economic Values – Section 4.9				Stakeholder consultation Consultation – Section 5						
Impact/Risk Evaluation Summary														
Source of Impact/Risk	Environmental Value Potentially Impacted							Evaluation						
	Soil and Groundwater	Marine Sediment	Water Quality	Air Quality (inc. odour)	Ecosystems / Habitat	Species	Socio-economic	Decision Type	Impact/Consequence	Likelihood	Current Risk Rating	ALARP Tools	Acceptability	Outcome
Interaction with other marine users – Project vessels and ROV interfering with or displacing third party vessels and/or aircraft (commercial fishing and commercial shipping, defence)							✓	A	E	-	-	LC SGP	Broadly Acceptable	EPO .3, 4
Presence of subsea infrastructure interfering with or displacing third party vessels (commercial fishing)							✓							
Description of Source of Impact/Risk														
<p>Vessel Operations</p> <p>Several vessel types will be required to complete the activities associated with the Petroleum Activities Program (refer to Section 3.7). Vessels do not plan to anchor within the PAA during activities and instead maintain positioning using DP. The physical presence and movement of project vessels within the PAA has the potential to displace other marine users. All vessels will display navigational lighting and external lighting on a 24-hour basis, as required for safe operations. The Petroleum Activities Program will not be executed as a single campaign and may not be executed in a consecutive sequence, therefore the presence of vessels may occur at any time during the five-year period of the EP. Temporary Petroleum Safety Zones will be established around operating vessels. These will be confirmed during Safety Case development and notifications to mariners will be issued at the time of the activity.</p> <p>Physical presence of subsea infrastructure</p> <p>Subsea infrastructure installed as part of the Petroleum Activities Program will be located within the PAA as described in Sections 3.9 to 3.10.3. The physical presence of this infrastructure will remain for the duration of field life. The infrastructure will be installed on the seabed and in some cases extend up to several metres above the seabed (e.g. 6 m for the RBM). The 20 suction piles will extend approximately 1.5 m above the seabed and be connected to wire and chain that will be wet-stored on the seabed until connection to the FPU.</p>														

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Detailed Impact Assessment

Assessment of Potential Impacts

Commonwealth and State Managed Fisheries

Five Commonwealth managed fisheries and eight State managed fisheries overlap the PAA (refer to **Section 4.9.2**). Potential impacts to commercial fishers depend on the use of the area by fishers, in addition to the temporal and spatial extent of the presence of vessels and facilities/infrastructure.

Potential impacts to commercial fisheries include damage to fishing and loss of commercial catch due to displacement from fishing grounds. Damage to trawl nets could occur if they catch or snag on subsea infrastructure. One trawl fishery, the Western Deepwater Fishery overlaps the PAA. However, trawl frequency assessment has shown that fishing activity occurs further south of the PAA, on the western edge of the 200 m isobath between Shark Bay and Ningaloo. Therefore, trawl activity within the PAA is not expected.

The presence of vessels in the PAA will present a surface hazard to fishing vessels. However, given there is no recorded effort within the PAA in the last 5 years (**Table 4-22**) and the distance offshore, Woodside considers a possibility of interaction with commercial fisheries within the PAA unlikely. As such, any displacement of commercial fisheries due to activities in the PAA are not expected to impact commercial fishing activities or the economic viability of the fisheries. In addition, the concrete pads to be used for gravimetry have been designed to be minimise snag or catching of trawl nets for any possible future interactions.

Tourism and Recreation

Tourism and recreation within the PAA are expected to be limited by the distance offshore and water depths. Consultation did not identify any key recreational fishing activity within the PAA. Given the location, and the temporary nature of activities, impacts to tourism and recreational activities are not expected, and have not been evaluated further.

Shipping

The closest major shipping channel is approximately 35km from the PAA. Shipping activity is expected to be low. Vessel traffic data shows that the majority of vessel movements occur to the south-east of the PAA. Given the temporary nature of the activities and the low level of shipping activity within the PAA, impacts to shipping are unlikely.

Industry

The NWS is an area of active oil and gas exploration and production. The closest facility to the PAA is the Woodside Pluto facility (approximately 160 km to the east). Displacement of, or interference with, other oil and gas activities are not expected within the PAA. Impacts to industry are therefore unlikely.

Defence

Defence activities in the vicinity of the PAA may include Naval vessel traffic and Air Force training exercises. Neither of these types of activities are expected to be a consistent presence in the area. The PAA is on the outer extent of the training area associated with the Learmonth Air Force Base. Defence stakeholders were notified, and no known defence activities are planned (**Section 5**). Any potential interaction is expected to be minimal and not significantly different from interaction with other facilities within the northwest region.

Summary of Assessment Outcomes

Receptor	Impact	Receptor Sensitivity Level	Magnitude	Impact Significance Level
Commonwealth Managed Fisheries	Changes to the function interests or activities of others	High value marine user	No Lasting Effect	Slight (E)
State Managed Fisheries		High value marine user	No Lasting Effect	Slight (E)
Commercial shipping		High value marine user	No Lasting Effect	Slight (E)
Industry		Medium value marine user	No Lasting Effect	Negligible (F)
Defence		High value marine user	No Lasting Effect	Slight (E)

Overall Impact Significance Level: The overall impact significance level for Interaction with other marine users and values is slight based on no lasting effect to high value socio-economic receptors. The impact significance levels for individual receptors are consistent with the levels in the OPP.

Demonstration of ALARP				
Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit Impact/Risk Reduction	in Proportionality	Control Adopted
Legislation, Codes and Standards				
Vessels to adhere to the navigation safety requirements including the Navigation Act 2012 and any subsequent Marine Orders.	F: Yes. CS: Minimal cost. Standard practice.	The act regulates ship related activities and invokes certain requirements of MARPOL. Vessels (relevant to class) will adhere to requirements.	Benefits outweigh cost/sacrifice. Control is also Standard Practice	Yes C 2.1
Establishment of temporary exclusion zones by relevant vessels which are communicated to marine users.	F: Yes. CS: Minimal cost. Standard practice.	Establishment of temporary exclusion zones around vessels reduces the likelihood of interaction with other marine users.	Benefits outweigh cost/sacrifice. Control is also Standard Practice	Yes C 2.2
Good Practice				
Australian Hydrographic Office (AHO) will be notified of activities and movements no less than four working weeks prior to commencement of the Petroleum Activities Program.	F: Yes. CS: Minimal cost. Standard practice.	Notification of AHO will enable them to update maritime charts thereby reducing the likelihood of interaction with other marine users.	Benefits outweigh cost/sacrifice. Control is also Standard Practice.	Yes C 2.3
Notify relevant government departments, fishing industry representative bodies, fishery licence holders, and other oil and gas operators (if agreed during consultation) of activities prior to commencement and upon completion of activities.	F: Yes. CS: Minimal cost. Standard practice.	Communication of the Petroleum Activities Programme to other marine users ensures they are informed and aware, thereby reducing the likelihood of interference with other marine users.	Benefits outweigh cost/sacrifice. Control is also Standard Practice.	Yes C 2.4
Notify AMSA Joint Rescue Coordination Centre (JRCC) of activities and movements 24–48 hours before operations commence.	F: Yes. CS: Minimal cost. Standard practice.	Communication of the Petroleum Activities Programme to other marine users ensures they are informed and aware, thereby reducing the likelihood of interference with other marine users.	Benefits outweigh cost/sacrifice. Control is also Standard Practice.	Yes C 2.5
Undertake consultation with relevant stakeholders for activities and movements that commence more than a year after EP acceptance	F: Yes CS: Minimal cost. Standard Practice	Communicating the Petroleum Activities Program to other marine users ensures they are informed and aware, thereby reducing the likelihood of interfering with other marine users.	Benefits outweigh cost/sacrifice. Control is also Standard Practice	Yes C 2.6

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Demonstration of ALARP				
Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit Impact/Risk Reduction	Proportionality	Control Adopted
Notify Defence of activities no less than five weeks before the scheduled activity commencement date	F: Yes CS: Minimal cost. Standard Practice	Communicating the Petroleum Activities Program to other marine users ensures they are informed and aware, thereby reducing the likelihood of interfering with other marine users.	Benefits outweigh cost/sacrifice.	Yes C 2.7
Professional Judgement – Eliminate				
Limit subsea installation activities to avoid peak shipping and commercial fishing activities.	F: No. Shipping occurs year-round and cannot be avoided. SIMOPS with fishing seasons cannot be eliminated as exact timings for all activities are not confirmed. CS: Not considered – control not feasible	Not considered – control not feasible.	Not considered – control not feasible.	No
Professional Judgement – Substitute				
No additional controls identified.				
Professional Judgement – Engineered Solution				
No additional controls identified.				
ALARP Statement: On the basis of the environmental impact assessment outcomes and use of the relevant tools appropriate to the decision type (i.e. Decision Type A; Section 2.3.3), Woodside considers the adopted controls appropriate to manage the impacts of the physical presence of the Petroleum Activities Program on other users. As no reasonable additional/alternative controls were identified that would further reduce the impacts without grossly disproportionate sacrifice, the impacts are considered ALARP.				

Demonstration of Acceptability
Acceptability Criteria and Assessment
Demonstration of acceptability for the sources of aspect and associated impacts assessed in this section are provided in Section 7.1.5.3 of the Scarborough OPP (SA0006AF0000002, rev 5). The Petroleum Activities Program meets the acceptability criteria (Section 2.3.5):
<ul style="list-style-type: none"> Overall impact significance levels for individual receptors are less than the significant impact level defined in the OPP. EPOs and controls in the OPP that are relevant to the interaction with other users have been adopted. There are no changes to internal/external context specific to this risk from the OPP. Feedback raised during consultation, including any specific updates to the EP in response, has been considered in Appendix F, Table 1
Acceptability Statement:
The impact assessment has determined that, given the adopted controls, the Petroleum Activities Program is unlikely to result in an impact significance level greater than Slight.
The adopted controls are considered consistent with industry good practice and professional judgement and meet the requirements and expectations of Australian Marine Orders, AMSA, DPIRD, DOD and AHO identified during impact assessment and stakeholder consultation. Further opportunities to reduce the impacts have been investigated above.

Demonstration of Acceptability

The potential impacts are considered broadly acceptable if the adopted controls are implemented. Therefore, Woodside considers the adopted controls appropriate to manage the impacts from the physical of the Petroleum Activities Program to a level that is broadly acceptable.

Environmental Performance Outcomes, Standards and Measurement Criteria

EPO	Adopted Control(s)	EPS	MC
<p>EPO 3 Undertake the Petroleum Activities Program in a manner that prevents a substantial adverse effect on the sustainability of commercial fishing.</p> <p>EPO 4 Undertake the Petroleum Activities Program in a manner that does not interfere with other marine users to a greater extent than is necessary for the exercise of right conferred by the titles granted.</p>	<p>C 2.1 Vessels to adhere to the navigation safety requirements including the <i>Navigation Act 2012</i> and any subsequent Marine Orders.</p>	<p>PS 2.1.1 Activity support vessels compliant with Navigation Act and Marine Order 21 (Safety of navigation and emergency procedures) 2012</p>	<p>MC 2.1.1 Marine assurance inspection records demonstrate compliance with standard maritime safety procedures</p>
	<p>C 2.2 Establishment of temporary exclusion zones by relevant vessels which are communicated to marine users.</p>	<p>PS 2.2.1 No entry of unauthorised vessels within temporary exclusion zones</p>	<p>MC 2.2.1 Records demonstrate breaches by unauthorised vessels within the temporary exclusion zone are recorded.</p> <p>MC 2.2.2 Consultation records demonstrate that AHO has been notified prior to commencement of the activity to allow generation of navigation warnings (Maritime Safety Information Notifications (MSIN) and Notice to Mariners (NTM) (including AUSCOAST warnings where relevant)), which communicate safety exclusion zones to marine users.</p>
	<p>C 2.3 Notify AHO of activities and movements no less than four working weeks prior to commencement of the Petroleum Activities Program.</p>	<p>PS 2.3.1 Notification to AHO of activities and movements to allow generation of navigation warnings (Maritime Safety Information Notifications (MSIN) and Notice to Mariners (NTM) (including AUSCOAST warnings where relevant)).</p>	<p>MC 2.2.2 See above</p>
	<p>C 2.4 Notify relevant government departments, fishing industry representative bodies, fishery licence holders and other oil and gas operators (if agreed during consultation) of activities prior to commencement and</p>	<p>PS 2.4.1 Notification to AFMA, CFA, DAFF (fisheries), WAFIC, DPIRD, Recfishwest, individual fishery licence holders and other oil and gas operators (if agreed during consultation) ten days before activity commences, and following</p>	<p>MC 2.4.1 Consultation records demonstrate that stakeholders have been notified prior to commencement and following completion of activities.</p>

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Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
	following completion of activities.	completion of activities, as per Table 7-7 .	
	<p>C 2.5 Notify AMSA JRCC of activities and movements 24–48 hours before operations commence.</p>	<p>PS 2.5.1 Notification to AMSA JRCC to prevent activities interfering with other marine users. AMSA's JRCC will require the vessel's details (including name, callsign and Maritime Mobile Service Identity (MMSI)), satellite communications details (including INMARSAT-C and satellite telephone), area of operation, requested clearance from other vessels and need to be advised when operations start and end.</p>	<p>MC 2.5.1 Consultation records demonstrate that AMSA JRCC has been notified prior to commencement of the activity within required timeframes.</p>
	<p>C 2.6 Notify relevant stakeholders for activities within the Petroleum Activities Program that commence more than a year after EP acceptance.</p>	<p>PS 2.6.1 Stakeholders will be notified no less than four working weeks prior to scheduled activity commencement date.</p>	<p>MC 2.6.1 Records demonstrate relevant stakeholders have been consulted.</p>
	<p>C 2.7 Notify Defence of activities no less than five weeks before the scheduled activity commencement date.</p>	<p>PS 2.7.1 Notification to Defence five weeks prior to the scheduled commencement date.</p>	<p>MC 2.7 Records demonstrate that Defence has been notified prior to commencement of the Petroleum Activities Program within the required timeframes.</p>

6.7.3 Routine Acoustic Emissions

Scarborough OPP – Relevant Impact Assessment Section														
Section 7.1.4 – Routine Acoustic Emissions														
Context														
Relevant Activities Vessel Operations – Section 3.7 Support Operations – Section 3.8				Existing Environment Marine Regional Characteristics – Section 4.2 Marine Fauna of Conservation Significance – Section 4.6				Stakeholder consultation Consultation – Section 5						
Impact/Risk Evaluation Summary														
Source of Impact/Risk	Environmental Value Potentially Impacted							Evaluation						
	Soil and Groundwater	Marine Sediment	Water Quality	Air Quality (inc. odour)	Ecosystems / Habitat	Species	Socio-economic	Decision Type	Impact/Consequence	Likelihood	Current Risk Rating	ALARP Tools	Acceptability	Outcome
Generation of acoustic signals from vessels during normal operations						✓		A	E	-	-	PJ	Broadly Acceptable	EPO 1, 5,6,7, 25
Generation of acoustic signals from positioning equipment (transponders)						✓								
Generation of acoustic signals from geophysical sources during surveys						✓								
Generation of acoustic signals during subsea installation activities i.e. marine growth removal, sediment relocation for wet buckle recovery tool etc.						✓								
Description of Source of Impact/Risk														
<p>The Petroleum Activities Program may not be executed as a single campaign or in a consecutive sequence, therefore acoustic emissions may occur within the PAA at any time during the period of the EP. Table 6-1 shows likely sequencing of survey and installation activities. This has been used to inform the worst-case credible noise propagation scenario for modelling, as well as cumulative impact assessment as a result of concurrent operations, discussed below.</p> <p>Project vessels and operation of DP</p> <p>The project vessels will generate noise both in the air and underwater, due to the operation of thrusters, engines, propeller cavitation, etc. Vessels may use Dynamic Positioning (DP) where propellers and thrusters are used to hold position, rather than anchoring. These noises will contribute to and have the potential to exceed ambient noise levels which range from around 90 dB re 1 µPa (root square mean sound pressure level [rms SPL]) under very calm, low wind conditions, to 150 dB re 1µPa (rms SPL) under windy conditions (McCauley, 2005, Warren, 2023).</p> <p>Vessels used for the Petroleum Activities Program are detailed in Table 3-5. The sound levels and frequencies generated by vessels varies with the size of the vessel, speed, engine type and the activity being undertaken. Large vessels typically produce higher sound levels at lower frequencies than small vessels, although significant variation may be found among vessels within the same group (Jiménez-Arranz et al., 2020). Sound levels tend to be greatest when engaging the throttle or thrusters, such as use of DP or when vessels are operating under load, compared with slow moving or idling vessels (Salgado Kent et al. 2016). The greatest sound levels are likely to be associated with vessels using DP thrusters to maintain position on station.</p>														

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Vessels produce low frequency sound (i.e. below 1 kHz) from the operation of machinery, hydrodynamic flow sound around the hull and from propeller cavitation, which is typically the dominant source of sound (Ross, 1987, 1993). Vessels in the 50–100 m size class (e.g. supply ships, crew boats, research vessels) produce broadband source levels in the 165–180 dB re 1 µPa SPL range (Gotz et al., 2009). In comparison, underwater sound levels generated by large ships can produce levels exceeding 190 dB re 1 µPa (Gotz et al., 2009). McCauley (1998) measured underwater broadband noise equivalent to approximately 182 dB re 1 µPa at 1 m (rms SPL) from a support vessel holding station using DP in the Timor Sea; it is expected that similar noise levels will be generated by vessels used for this Petroleum Activities Program. Similarly, Hannay et al. (2004) and McCauley (2005) have measured source level for support vessel with DP of 186 dB re 1 µPa at 1 m.

The loudest single activity covered under this EP is expected to be the mooring pre-lay, which involves an HCV with the potential for an HLV alongside intermittently for support. Concrete pad installation / mooring pre-lay survey, gravimetry baseline survey and part of subsea campaign 1 will be executed with single vessels, which are smaller than the HCV and HLV. Subsea installation campaign 2 and part of campaign 1 will be executed with two vessels plus intermittent support vessels.

Underwater positioning equipment

An array of long baseline (LBL) and/or ultra-short baseline (USBL) transponders may be installed on structures or the seabed for positioning.

Transponders typically emit pulses (impulsive noise) of medium frequency sound, generally within the range 21–31 kHz. The estimated SPL would be 180 to 206 dB re 1 µPa at 1 m (Jiménez-Arranz et al., 2017). Transmissions are not continuous but consist of short ‘chirps’ with a duration that ranges from 3 to 40 milliseconds. Transponders will not emit any sound when on standby. Austin et al. (2012) calculated the distances to SPL isopleths for the typical and widely used Sonardyne Ranger USBL in open water and found the distance to 160 dB re 1 µPa (SPL) to be 36 m range from the source.

Geophysical survey activities

The noise emitted during geophysical survey activities is generated by a combination of the survey equipment and the survey vessel. Geophysical survey activities may occur within the PAA during pre- and post-lay surveys. A range of geophysical sources can emit pulses (impulsive noise) with frequency outputs ranging from 10 Hz (low end of refraction system) to 900 kHz (side scan sonar). The survey methods may include multibeam echo sounders (MBES), side scan sonar (SSS), pipe trackers, and magnetometer.

Sound pressure levels (SPL) for MBES typically range from 210 to 245 dB re 1 µPa @ 1 m, and SSS typically range from 200–235 dB re 1µPa SPL (Jiménez-Arranz et al., 2020). The frequencies range from about 75 to 900 kHz (Jiménez-Arranz et al., 2020). Martin et al. (2012), measured a maximum SPL of 162 dB re 1 µPa at 4 m with the R2Sonic 2024 MBES.

For SSS, Austin et al. (2013) recorded measurements during an operational program, reporting an SPL of less than 170 dB re 1 µPa at 39 m, with the distance from pulses to an SPL of 160 dB re 1 µPa calculated to be 130 m. The directional nature of the sonar is dependent on how the transducers are configured. This produces a concentrated energy beam, resulting in much greater sound levels within the beam compared to outside. When using a Towfish SSS, it is usually towed at a low height above the seafloor, usually around 10 to 20 meters, limiting the beam this area close to the seabed.

Operating at 200-400 kHz and 100 to 450 kHz, respectively, MBES and SSS acoustic emissions are only relevant for fauna with sensitivity to signals of these high frequencies, which excludes low-frequency cetaceans, fish, and turtles.

Cumulative noise sources

A number of vessels may be operating concurrently during the Petroleum Activities Program, as described in **Table 6-4**. Planned to occur at the same time are execution of concrete pad installation / mooring pre-lay survey and subsea infrastructure installation campaign 1, as are the gravimetry baseline survey and subsea infrastructure installation campaign 2 at a separate time. Intermittent visits from support vessels to transport equipment and materials between the activity vessels and port will also occur throughout each of the activities. Additional concurrent operations in the PAA (covered under separate EPs) include drilling and completions, and trunkline installation.

Table 6-4: Concurrent activities contributing to cumulative underwater vessel noise

Scenario	Planned Concurrent Activities	Vessels	Approximate Timing & Duration***
1	Concrete pad installation & mooring pre-lay survey Subsea installation campaign 1 Drilling and completions*	LCV PV + LCV + intermittent support vessel DP MODU + supply vessel	Nov - Dec 2023 • 2 months
2a	Subsea installation campaign 1 Mooring pre-lay Drilling and completions*	LCV HCV + intermittent support vessel (HLV)	Feb - Apr 2024 • 1 - 3 months

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	Trunkline installation**	DP MODU + supply vessel PV + B-type + intermittent support vessel	
2b	Mooring pre-lay Drilling and completions* Trunkline installation**	HCV + intermittent support vessel DP MODU + supply vessel PV + B-type + intermittent support vessel	Feb - Apr 2024 • Up to 3 months
3	Gravimetry baseline survey Subsea installation campaign 2 Drilling and completions*	Survey vessel or LCV LCV + HLV + intermittent support vessel DP MODU + supply vessel	Nov 2024 – Jan 2025 • 2 months (gravimetry baseline survey)

*Covered under Scarborough Drilling & Completions EP

**Covered under Seabed Intervention & Trunkline Installation EP

***Duration of concurrent activities overlap only, not indicative of timing of the whole activity

As such, the modelled worst-case credible scenario is considered to be during concurrent execution of the mooring pre-lay with an HCV and supporting HLV, subsea installation campaign 1 with an LCV, drilling with MODU and support vessel, and trunkline installation with a PV undertaking pipelay operations and a B-Type vessel and OSV alongside the PV (i.e. Scenario 2a in **Table 6-4**). This is the case used for the following cumulative assessment of potential impacts. If any changes are made to the vessel arrays, the change to impacts of acoustic emissions will be assessed as per Woodside’s Management of Change process (**Section 7.8**).

It should be noted that there are multiple variations of the 'worst-case' scenario, based on vessel location and activity duration. The chosen scenario considers the largest vessels, within the closest possible proximity, during the busiest period in-field. As such, the modelling scenario presented is sufficient to inform a thorough impact assessment of the activities. Scenarios 1, Scenario 2b and 3 in **Table 6-4** are considered to be represented by the modelled worst-case, as they involve fewer vessels.

Further, the Scarborough Seabed Intervention and Trunkline Installation EP and the Scarborough Drilling and Completions EP include justification of the worst-case credible scenario associated with trunkline installation and drilling and completions, which have been utilised in this cumulative assessment.

Equipment related noise sources, including underwater positioning equipment and geophysical survey equipment, are not typically included in noise modelling, as the relatively small footprint of noise emissions from these sources would not add to cumulative sound fields from project vessels to any discernible extent. The studies quoted in the previous 'underwater positioning equipment' and 'geophysical survey activities' sections demonstrate the insignificant acoustic emissions from this equipment.

Detailed Impact Assessment

Assessment of Potential Impacts

Receptors

The PAA is located in water depths of approximately 900–1000 m (refer to **Section 3.5**). The fauna associated with this area will be predominantly pelagic species of fish, with migratory species such as cetaceans and marine turtles potentially occurring in the area seasonally (**Section 4.6**). Noise interference is a key threat to a number of migratory and threatened cetaceans and marine turtles identified as potentially occurring within the PAA, including the pygmy blue whale. Relevant actions included in recovery plans for these species are outlined in **Section 6.9**.

A pygmy blue whale (PBW) migration BIA is located about 35 km east of the PAA (**Section 4.6.3**). A broader distribution BIA overlaps the PAA. As described in **Section 4.6.3**, the migration BIA represents the area in which migrating whales are predominantly expected to occur. However, based on satellite tagging data occasional whales may occur further west and could overlap the PAA. Individual pygmy blue whales may therefore occasionally transit the PAA during April to July and October to January during their seasonal migrations.

A humpback whale migration BIA is located about 156 km south-east of the PAA, and migrating whales may be present between May and November. Given the distance from the migration BIA, humpback whales are expected to be a rare occurrence in the waters of the PAA.

The nearest marine turtle internesting buffer BIA for the flatback turtle is located about 165 km east of the PAA at the Montebello Islands. Given the water depths and distance from shore, the PAA does not represent suitable foraging or internesting habitat and therefore, marine turtle presence within the PAA is expected to be infrequent.

Animal movement and exposure modelling (animat modelling)

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In addition to the acoustic modelling outlined above, Woodside commissioned JASCO to also perform an acoustic exposure analysis study for PBW within and beyond the migration BIA to investigate any potential effects on PBW migration from the Petroleum Activities Program, using the JASCO Animal Simulation Model Including Noise Exposure (JASMINE). This animal modelling was based on Scenario 2b.

Sound exposure distribution estimates were determined by moving large numbers of simulated animals (animats) through a modelled time-evolving sound field, computed using the predicted sound source levels and sound propagation modelling outputs. This approach provides the most realistic prediction of the maximum expected root-mean-square SPL and the temporal accumulation of SEL that are considered the most relevant sound metrics for impact assessment. For the moving receivers (the animats) were set to simulate the real-world movements of migrating pygmy blue whales, both within the Migration BIA (restricted seeding) and beyond (unrestricted seeding). The behaviour of migrating pygmy blue whales was modelled to reflect animats transiting through the modelling area on a 230° track. This represents individuals migrating south, but exposure during northbound migration may be expected to be similar if individuals were to transit through the modelling area. Forecasted diving behaviours were predicted from a range of satellite tagging data sources for both north and south-bound migrations (noting that more data was available during the northbound migration). The distribution of distances of animats predicted to be exposed to sound levels above threshold was used to calculate the 95th percentile exposure range (ER95%), and noise effect metrics included SEL24h and SPL (Stroot et al., 2023)

Marine Mammals/Cetaceans

Eight cetacean species may be present within the PAA, including LF cetaceans such as pygmy blue whales, and HF cetaceans such as sperm whales and orcas (Section 4.6.3). No species have BIAs (Section 4.6.3 and Figure 4-8, Figure 4-9) that intersect the PAA; the distribution range to the west of the pygmy blue whale migration BIA, and recent satellite tracking data from Thums et. al (2022) is the primary consideration for potential noise emissions impacts.

Species Sensitivity and Thresholds

Marine mammals and especially cetaceans rely on sound for important life functions including individual recognition, socialising, detecting predators and prey, navigation and reproduction (Weilgart, 2007; Erbe et al., 2015; Erbe et al., 2018). Underwater noise can affect marine mammals in various ways including interfering with communication (masking), behavioural changes, a shift in the hearing threshold (PTS and TTS), physical damage and stress (Erbe, 2012; Rolland et al., 2012). There is little information available regarding call masking in whales (Richardson et al., 1995), although it has been suggested that an observed lengthening of calls in response to low-frequency noise in humpback whales and orcas may be a response to auditory masking (Fristrup et al., 2003; Foote et al., 2004). Exposure to intense impulsive noise may be more hazardous to hearing than continuous noise.

The thresholds that could result in a behavioural response, temporary threshold shift (TTS) and permanent threshold shift (PTS) for cetaceans as a result of continuous noise sources are presented in Table 6-5. These thresholds have been adopted by the United States National Oceanic and Atmospheric Administration (NOAA) (National Marine Fisheries Service [NMFS], 2014, 2018; Southall et al., 2019; NOAA, 2019). The adopted thresholds are based on best data available and published in peer-reviewed literature and represent conservative internationally accepted and applied impact evaluation thresholds for impulsive and continuous (non-impulsive sound sources).

It is important to note that for non-impulsive sound sources the defined thresholds are as follows:

Frequency-weighted accumulated sound exposure levels (SEL; LE,24h) from Southall et al. (2019) for the onset of permanent threshold shift (PTS) - 199 (LF cetaceans) and 198 (HF cetaceans) SEL24h (dB re 1 µPa².s) and temporary threshold shift (TTS) – 179 (LF cetaceans) and 178 (HF cetaceans) SEL24h (dB re 1 µPa².s) apply to marine mammals for non-impulsive sound sources.

Marine mammal behavioural threshold based on the current interim US National Oceanic and Atmospheric Administration (NOAA) (2019) criterion for marine mammals (LF and HF) of 120 dB re 1 µPa (SPL; Lp) for non-impulsive sound sources.

Table 6-5: Thresholds for PTS, TTS and behavioural response onset for low-frequency (LF) and high-frequency (HF) cetaceans for impulsive and continuous noise

Hearing group	Impulsive			Continuous		
	PTS onset thresholds: SEL24h (dB re 1 µPa².s)	TTS onset thresholds: SEL24h (dB re 1 µPa².s)	Behavioural response (dB re 1 µPa)	PTS onset thresholds: SEL24h (dB re 1 µPa².s)	TTS onset thresholds: SEL24h (dB re 1 µPa².s)	Behavioural response (dB re 1 µPa)
LF cetaceans	183	168	160	199	179	120
HF cetaceans	185	170		198	178	

Source: NMFS (2014, 2018; Southall et al., 2019; NOAA, 2019).

Results – Acoustic Modelling

Modelling of sound propagation loss for the HCV and HLV on DP (i.e. mooring pre-lay), in Operational Area, predicted that noise levels would drop below 120 dB re 1 µPa (behavioural response threshold for continuous noise sources) within 18.3 km. The modelling also estimated propagation of combined noise from the four concurrent activities (refer to Scenario 2a, **Table 6-4**), and predicted combined noise levels would drop below 120 dB within 29.8 km (**Table 6-6**).

Considering the NMFS (2018) SEL24h TTS threshold criteria for LF cetaceans (179 dB re 1 µPa².s), TTS onset could occur within 3.7 km from the HCV and HLV on DP or 7.0 km from the combination of vessels (Stroot et al., 2023). For LF cetaceans, the maximum distance to the PTS onset threshold was 190 m for the HLV and HCV, and 210 m for the combined scenario (**Table 6-6**).

However, as demonstrated by the animat movement modelling results below, PTS and TTS criteria exceedances are based upon exposure for 24-hours by a stationary receptor, which is not a realistic scenario with reference to known pygmy blue whale behaviour. The SEL24h criterion is a cumulative metric that reflects the dosimetric impact of sound energy accumulated over a 24-hour period and assumes that an animal is consistently exposed to such noise levels at a fixed location. The radii that correspond to SEL24h therefore represent an unlikely worst-case scenario for SEL-based exposure since, more realistically, marine fauna would not stay in the same location or at the same range for 24-hours (Stroot et al., 2023). It is highly unlikely that PTS and TTS thresholds would be exceeded and furthermore it is highly unlikely given the known movement behaviour of cetaceans, including key migrating LF whale species such as the pygmy blue whale transiting through the PAA.

For HF cetaceans, TTS onset could occur within 130 m for both scenarios, and PTS threshold for HF cetaceans was not reached within the limits of the modelled resolution (20 m) for any scenario modelled.

Table 6-6: Maximum predicted horizontal distances (R_{max}) to PTS, TTS and behavioural response thresholds in cetaceans

Hearing group	Sound exposure threshold	R _{max} distance (km)		
		Mooring pre-lay activity	Concurrent activities (Scenario 2a, Table 6-4)	Concurrent activities (Scenario 2b, Table 6-4)
PTS				
LF cetaceans	199 dB re 1 µPa ² .s (SEL24h)	0.19	0.21	0.21
HF cetaceans	198 dB re 1 µPa ² .s (SEL24h)	-	-	-
TTS				
LF cetaceans	179 dB re 1 µPa ² .s (SEL24h)	3.70	7.05	7.03
HF cetaceans	178 dB re 1 µPa ² .s (SEL24h)	0.13	0.13	0.13
Behavioural response				
LF cetaceans	120 dB re 1 µPa (SPL)	18.3	29.8	29.6
HF cetaceans				

A dash indicates the level was not reached within the limits of the modelled resolution (20 m).

Results – animat modelling

Table 6-7 presents the animat modelling (JASMINE) results for concurrent activity Scenario 2b, including three concurrent activities (mooring pre-lay, drilling and completions, and trunkline installation). For animals restricted to the Migratory BIA (restricted seeding) PTS, TTS and behavioural thresholds for pygmy blue whales were not reached within the limits of the modelled resolution. For animats not restricted to the Migratory BIA (unrestricted seeding), TTS onset probability of exposure of 46% within the 95th percentile exposure range (ER95%) only occurs if a pygmy blue whale remains within 0.03 km of the source for a 24 hr period. PTS onset probability of exposure of 7% within the 95th percentile exposure range (ER95%) only occurs if a pygmy blue whale remains within 0.01 km of the source for a 24 hr period. Single-exposure metrics, such as SPL, are not sensitive to changes in dwell time, but rather the distribution of noise within the water column and the use of the water column by the animat, and therefore ER95% tends to be comparable to that predicted by acoustic propagation modelling. The ER95% to the behavioural response SPL threshold was 22.5 km (Stroot et al., 2023).

Table 6-7: Summary of animat simulation results for migrating pygmy blue whales indicating the maximum of the 95th percentile exposure ranges (in km). The maximum probability of animats being exposed above threshold within the ER_{95%} is also provided.

Threshold		Unrestricted Seeding ER _{95%}		Restricted Seeding ER _{95%}		
Description		Threshold level (dB)	Distance (km)	Probability of exposure (%)	Distance (km)	Probability of exposure (%)
PTS	SEL24h	199 ¹	0.01	7	-	-
TTS	SEL24h	179 ¹	0.03	46	-	-
Behavioural response		120 ²	22.5	96	-	-

¹ LF-weighted SEL_{24h} (LE, 24h; dB re 1 µPa²·s)

² SPL (L_p; dB re 1 µPa)

Note, Scenario 2b differs from 2a only due to the presence of a single additional vessel, which is significantly quieter than other vessels in the scenario and modelling shows this additional vessel did not meaningfully contribute to the increase in ambient noise. Animat modelling of Scenario 2b is considered to adequately represent potential impacts that may occur during vessel operations described in Scenario 2a, supported by the following rationale:

- Noise modelling results for Scenario 2a and 2b indicated that the R95% distance at which PTS exposure to LF cetaceans could occur (0.21 km) was identical between these scenarios.
- Noise modelling results for Scenario 2a and 2b indicated that the R95% distance at which TTS exposure to LF cetaceans could occur differed by only 0.02km (0.2%) and 1.1 km² difference in ensonified area.
- A key input into animat simulation modelling is the 3-dimensional area which is ensonified above the relevant noise thresholds. There was a less than 2% increase to the ensonified area in Scenario 2a, as compared with 2b and therefore any delta to the probability of individual animate exposure to TTS/PTS is expected to be within this magnitude.
- The negligible difference in noise (as demonstrated through modelling) generated between Scenario 2a and 2b means that the animat results are equally applicable for informing the impact assessment and the application of controls for these two scenarios.
- The animat results for Scenario 2a indicated that 95% of animats exposed to TTS travelled within 30 m of the centroid of the sound field, and that 46% of animats that travelled within 30 m (i.e., their closest point of approach is located within 30 m of at least one sound source) were exposed above TTS threshold. The other 54% of animats that travelled within the 30 m of a sound source were not exposed above TTS.
- Animat results indicated that 95% of animats exposed to PTS travelled within 10 m of the centroid of the sound field, and of the animats passing within this radius, only 7% were exposed to sufficient noise for PTS to occur. Noting the noise modelling presented showed the sound fields in Scenarios 2a and 2b were highly comparable, Woodside considers there is no reason to suggest the TTS/PTS risk is different between these scenarios.
- Furthermore, animat simulations do not provide significantly different understanding of impacts as compared to noise modelling when assessing the potential for behavioural responses, as a possible behavioural response thresholds are assumed to apply instantaneously, so any whale exposed to noise above 120db is considered as potentially displaying a behavioural response. For Scenario 2a, the distance at which behavioural responses may occur was only 0.2 km greater than for Scenario 2b, with this exposure level not occurring in waters where migrating whales are most likely to be present (migration BIA). This is evidenced in **Figure 6-1** below which show identical maximum-over-depth sound fields. Animat modelling would therefore be consistent between these scenarios, to within the margin of error of the modelling itself.

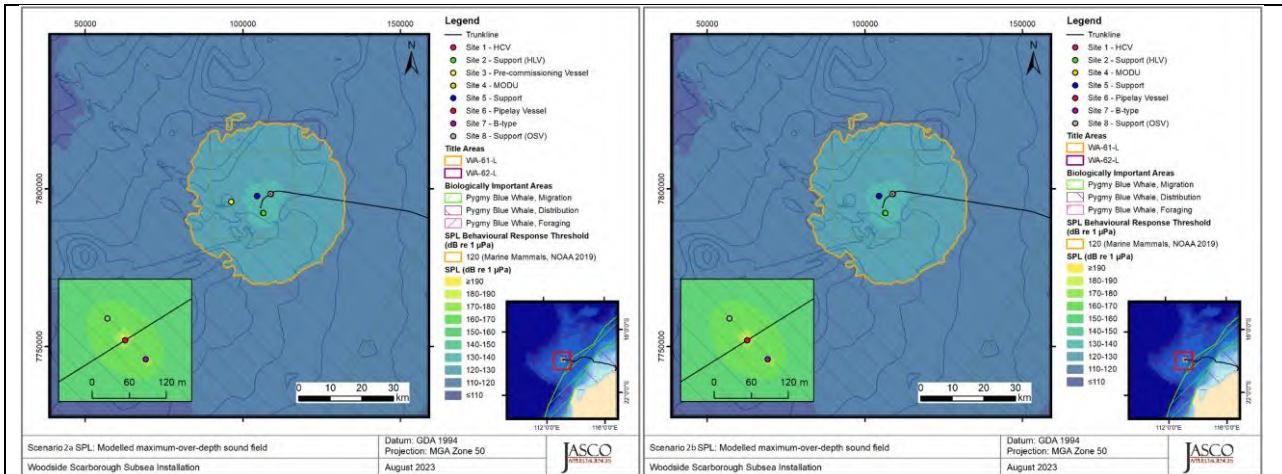


Figure 6-1: Sound level contour maps showing the unweighted maximum-over-depth sound fields, and the isopleths for behavioural response threshold for marine mammals, for vessel Scenarios 2a (left) and 2b (right).

Impact Assessment

As described in **Section 4.6.3**, the PBW migration BIA (about 35 km from the PAA) represents the area of core migratory routes for pygmy blue whales. The acoustic modelling demonstrates that there is no potential for injury (PTS or TTS) or behavioural disturbance to Pygmy Blue Whales within the migratory BIA. Additionally, the animat modelling supports that Pygmy Blue Whales will not encounter PTS, TTS or behavioural response thresholds within the Migration BIA on their northbound and southbound migrations. This aligns with The Blue Whale Conservation Management Plan (Action Area 2), which states that anthropogenic noise in BIAs should be managed such that any blue whale continues to utilise the area without injury (Commonwealth of Australia, 2015a).

As demonstrated by the acoustic modelling, it is reasonable to expect that cetaceans may demonstrate avoidance or attraction behaviour to the noise generated by the Petroleum Activities Program. With respect to the western extent of the pygmy blue whale distribution range, as described in **Section 4.6.3**, the likelihood of encountering migrating or foraging pygmy blue whales is considered low. There is likely to be occasional individual or small groups transiting through the distribution range during the northbound or southbound migration seasons. Further, the PAA is surrounded by open water, with no restrictions (e.g. shallow waters, embayments) to an animal’s ability to avoid the activities. Consequently, any pygmy blue whales transiting through the area, may deviate slightly from their migration route, but can continue on their migration pathway without any likely biologically significant impacts. Potential behavioural disturbance to pygmy blue whales within the distribution range only has the potential to occur during migratory periods, with the highest likelihood of impacts occurring during the peak northbound (April to July (peak: May and June)) and southbound (October to January (peak: November)) migratory seasons.

The acoustic modelling showed maximum horizontal distances to PTS thresholds for LF cetaceans was 210 m from the source, and TTS thresholds could be reached at up to 7.05 km from the source. As demonstrated by the animat movement modelling, it is highly unlikely that PTS and TTS thresholds would be exceeded given the small onset PTS and TTS range, 10 and 30 m respectively. The predicted distances for PTS and TTS criteria exceedance are based upon exposure for 24-hours. An individual whale would have to stay within very close proximity of the installation and drilling vessels for an extended duration for TTS or PTS to be potentially experienced. Given the known movement behaviour of pygmy blue whales, this is considered highly unlikely. PTS and TTS thresholds are therefore not expected to be exceeded for cetaceans transiting through the PAA. It is noted that the animat modelling is based on behaviours recorded during the southbound migration therefore, it is not credible that PTS and TTS thresholds would be exceeded for pygmy blue whales transiting through the Operational Area in the northbound and southbound migration seasons as a result of installation and drilling activities.

To account for the potential presence of pygmy blue whales within the distribution range (and possibly west of the migratory BIA) in the peak northbound migratory season, adaptive management procedures will be implemented to manage potential impacts to pygmy blue whales (refer to ALARP table below) and to ensure the activity is not inconsistent with the BWCMP (Action Area 2 and 3 see **Section 6.9.3**).

Transponders used for positioning have the potential to cause some temporary behavioural disturbance to marine fauna; however, noise levels will be well below injury thresholds. Based on empirical spreading loss estimates measured by Warner and McCrodan (2011), received levels from USBL transponders are expected to exceed the cetacean behavioural response threshold for impulsive sources out to about 42 m. Austin et al. (2012) calculated the distances to SPL isopleths for the typical and widely used Sonardyne Ranger USBL in open water and found the distance to 160 dB re 1 µPa (SPL) (the threshold of impulsive noise for behavioural effects of marine mammals) to be 36 m range from the source.

Given the short-duration chirps and the mid frequencies used by positioning equipment, the acoustic noise from a single transponder is unlikely to have any substantial effect on the behavioural patterns of marine fauna. Therefore, potential impacts from transponder noise are likely to be restricted to temporary and localised avoidance behaviour of individuals transiting through the PAA, and therefore are considered localised with no lasting effect.

Marine Reptiles

Five species of marine turtle may occur in the PAA: flatback, green, hawksbill, loggerhead and leatherback turtles. The PAA does not overlap interesting Habitat Critical to survival or interesting buffer BIAs (**Section 4.6.2**).

Species Sensitivity and Thresholds

There is a paucity of data regarding responses of marine turtles to underwater noise. However, turtles have been shown to respond to low frequency sound, with indications that they have the highest hearing sensitivity in the frequency range 100–700 Hz (Bartol and Musick, 2003). Lenhardt (1994) observed marine turtles avoiding low-frequency sound.

Acute noise, or temporary exposure to loud noise, may result in the avoidance of important habitats and in some situations physical damage to marine turtles. McCauley et al. (2000) observed the behavioural response of caged sea turtles—green (*Chelonia mydas*) and loggerhead (*Caretta caretta*)—to an approaching seismic airgun. For received levels above 166 dB re 1 µPa (SPL), the turtles increased their swimming activity and above 175 dB re 1 µPa (SPL) they began to behave erratically, which was interpreted as an agitated state.

Sound exposure thresholds and criteria for continuous sound sources (e.g. vessel noise) and impulsive sources (e.g. transponders) applicable to marine turtles are summarised in **Table 6-8**.

Table 6-8: Thresholds for PTS, TTS and behavioural response onset in marine turtles for impulsive and continuous noise

Hearing group	Impulsive			Continuous		
	PTS onset thresholds: SEL _{24h} (dB re 1 µPa ² .s)	TTS onset thresholds: SEL _{24h} (dB re 1 µPa ² .s)	Behavioural response (dB re 1 µPa)	PTS onset thresholds: SEL _{24h} (dB re 1 µPa ² .s)	TTS onset thresholds: SEL _{24h} (dB re 1 µPa ² .s)	Behavioural response (dB re 1 µPa)
Marine turtles	204	189	166* 175+	220	200	(N) High (I) Moderate (F) Low#

Source: PTS and TTS thresholds (Finneran et al., 2017), * behavioural response threshold (impulsive) (NSF 2011), + behavioural disturbance threshold (impulsive) (McCauley et al. 2000), # behavioural response threshold (continuous) (Popper et al. 2014),

Note: The sound units provided in the table above for continuous noise include: relative risk (high, medium and low) is given for marine turtles at three distances from the source defined in relative terms as near (N – tens of metres), intermediate (I – hundreds of metres) and far (F – thousands of metres) (after Popper et al. 2014).

Results - Acoustic Modelling

As described in the acoustic modelling, based on the application of the multiple SEL_{24h} thresholds (Finneran et al., 2017), PTS for turtles was not predicted to occur within the modelling resolution (20 m), and turtles could potentially experience TTS within 160 m (**Table 6-9**). However, marine turtles within the PAA are expected to be transient, and unlikely to remain with 160 m of the vessels for 24-hours, and therefore PTS and TTS thresholds are not expected to be reached. Behavioural impacts to marine turtles from continuous noise sources generated by the Petroleum Activities Program are expected to be short-term and localised.

Table 6-9: Maximum predicted horizontal distances (R_{max}) to PTS and TTS thresholds in marine turtles

Hearing group	Sound exposure threshold	R _{max} distance (km)*
Marine turtles	PTS	
	220 dB re 1 µPa ² .s (SEL _{24h})	-
	TTS	
	200 dB re 1 µPa ² .s (SEL _{24h})	0.16

N.B. A dash indicates the threshold was not reached within the limits of the modelling resolution (20 m).

Impact Assessment

The Recovery Plan for Marine Turtles (Commonwealth of Australia, 2017) notes there is limited information available on the impact of noise on marine turtles and that the impact of noise on turtle stocks may vary depending on whether exposure is short (acute) or long-term (chronic). However, given the thresholds outlined in **Table 6-9**, it is reasonable

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to expect that marine turtles may demonstrate avoidance or attraction behaviour to the noise generated by the Petroleum Activities Program. Potential impacts from routine acoustic emissions on marine turtles are expected to be limited to behavioural impacts within a localised area around the project vessels, with no lasting effect.

Helicopter noise when on the sea surface may impact turtles (e.g. when basking or breathing). Typical startle responses occur at relatively short ranges (tens of metres) (Hazel et al., 2007) and as such, startle responses during typical helicopter flight profiles are considered to be remote. In the event of a behavioural response to the presence of a helicopter, turtles are expected to exhibit diving behaviour, which is of no lasting effect.

The sound levels of acoustic positioning equipment are below those associated with the PK criteria for injury in turtles beyond a few metres and are low enough that SEL criteria will not be reached (Warner and McCrodon 2011). Further, the frequency range of acoustic positioning devices are well above the currently understood hearing sensitivity range for turtles (Popper et al. 2014). Recoverable injury and TTS could occur in turtles within tens of metres of acoustic positioning equipment, applying the relative risk criteria from Popper et al., (2014). Behavioural changes, e.g., avoidance and diving, are also predicted for individuals near the source.

There are no marine turtle BIAs or Habitat Critical within 160 km of the PAA, and given the water depths and distance from shore, the PAA does not represent suitable foraging or internesting habitat. Marine turtle presence is expected to be infrequent, and potential impacts from predicted noise levels from the project vessels and transponders are not considered to be ecologically significant at a population level.

Fish, Sharks and Rays

A number of demersal and pelagic fish species will be present within the PAA. However, given species richness has been shown to correlate with habitat complexity (Gratwicke and Speight, 2005), it is unlikely that the sand/silt sediments that comprise the largest proportion of the PAA will support a wide diversity of species. Migratory species such as whale sharks may also be occasionally present within the PAA, although given the whale shark BIA is 165 km to the east, occurrence is likely to be rare.

Species Sensitivity and Thresholds

Fish perceive sound through the ears and the lateral line, which are sensitive to vibration. Some species of teleost or bony fish (e.g. herring) have a structure linking the gas-filled swim bladder and ear, and these species usually have increased hearing sensitivity. These species are considered to be more sensitive to anthropogenic underwater noise sources than species such as cod (*Gadus sp.*), which do not possess a structure linking the swim bladder and inner ear. Fish species that either do not have a swim bladder (e.g. elasmobranchs (sharks and rays) and scombrid fish (mackerel and tunas)) or have a much-reduced swim bladder (e.g. flat fish) tend to have a relatively low auditory sensitivity.

Considering these differences in fish physiology, Popper et al. (2014) developed sound exposure guidelines for fish; these are presented in **Table 6-10** and are considered appropriate to assess continuous acoustic discharges to fish from the Petroleum Activities Program.

Table 6-10: Impact thresholds to fish, sharks and rays for continuous noise

Receptor	Mortality and potential mortal injury	PTS	TTS	Masking	Behaviour
Fish: no swim bladder	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Fish: swim bladder not involved in hearing	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Fish: swim bladder involving hearing	(N) Low (I) Low (F) Low	170 dB rms SPL for 48-hours	158 dB rms SPL for 12-hours	(N) High (I) High (F) High	(N) High (I) Moderate (F) Low

*Note: The sound units provided in the table above include:
rms SPL: root mean square of time-series pressure level, useful for quantifying continuous noise sources.
Relative risk (high, medium and low) is given for fish (all types) at three distances from the source defined in relative terms as near (N – tens of metres), intermediate (I – hundreds of metres) and far (F – thousands of metres)
Source: Popper et al. (2014).*

Impact Assessment

Sound produced by the vessels on DP has the potential to cause recoverable injury to some fish species with a swim bladder involved in hearing. However, this is not considered credible as fish would have to remain in very close proximity to the sound source, within 20 m, for 48-hours for this level of sound exposure to occur. Similarly, TTS

effects could occur within 100 m of the vessels if the fish remained within this distance for 12-hours, however this is highly unlikely given the mobility of fish species and known behaviours that would reduce long exposure periods required to cause TTS.

Impulsive noises from the equipment could result in physiological impacts to fish located within a few metres of the equipment, however the likelihood of fish being close enough for period of time to the sound source for physiological impacts to occur is considered remote. Behavioural impacts to fish from positioning equipment noise will be limited to behavioural responses within tens of metres of the noise source based on the qualitative guidelines from Popper et al (2014). Moreover, positioning equipment operates at higher frequencies than are able to be heard by most fish, which further reduces the risk of impact (Ladich and Fay 2013).

Potential impacts to demersal and pelagic fish and sharks/rays are expected to be limited to a behavioural response. Behavioural responses are expected to be short-lived, with duration of effect less than or equal to the duration of exposure. While fish may initially be startled and move away from the sound source, once the source moves on fish would be expected to move back into the area. Potential impacts from predicted noise levels from the project vessels and transponders are not considered to be ecologically significant at a population level.

Cumulative impacts

Cumulative impacts have been assessed above.

Summary of Assessment Outcomes

Receptor	Impact	Receptor Sensitivity Level	Magnitude	Impact Significance Level
Ambient noise	Change in ambient noise	Low value (open water)	No lasting effect	Negligible (F)
Marine mammals	Change in fauna behaviour	High value species (i.e. pygmy blue whale)	No lasting effect	Slight (E)
Marine reptiles	Change in fauna behaviour	High value species (i.e. flatback, green, hawksbill or loggerhead turtles)	No lasting effect	Slight (E)
Fish	Change in fauna behaviour Hearing impairment to fauna	High value species	No lasting effect	Slight (E)

Overall Impact Significance Level: The overall impact significance level for routine acoustic emissions is Slight (E) based on no lasting effect to the high value receptors (marine mammals, reptiles and fish). The impact significance levels for individual receptors are consistent with the level in the OPP.

Based on the assessment above, the implementation of controls and the absence of any TTS effects within the pygmy blue whale migration BIA, and no impact to the foraging BIA, the potential impacts of noise emissions from the activity on cetaceans are considered to be slight and short-term. Impacts to cetaceans are likely to be restricted to temporary behavioural changes (avoidance) in individuals moving through the Operational Area, with predicted noise not considered likely to cause injury effects. This is not inconsistent with the BWCMP (Section 6.9.3).

Demonstration of ALARP

Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/Risk Reduction	Proportionality	Control Adopted
Legislation Codes and Standards				
EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with cetaceans, including the following measures ²⁶ :	F: Yes. CS: Minimal cost. Standard practice.	Implementation of controls for reduced vessel speed around cetaceans can potentially reduce	Controls based on legislative requirements – must be adopted.	Yes C 3.1

²⁶ For safety reasons, the distance requirements are not applied for a vessel holding station or with limited manoeuvrability e.g. lifting, loading, back-loading, bunkering, close standby cover for overside working and emergency situations.

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<ul style="list-style-type: none"> Project vessels will not travel greater than 6 knots within 300 m of a cetacean (caution zone) and not approach closer than 100 m from a whale. Project vessels will not approach closer than 50 m for a dolphin and/or 100 m for a whale (with the exception of animals bow riding). If the cetacean shows signs of being disturbed, project vessels will immediately withdraw from the caution zone at a constant speed of less than 6 knots. 		<p>the underwater noise footprint of a vessel and lower the likelihood of interaction above significant thresholds</p>		
Good Practice				
<p>Project vessels will not travel greater than 6 knots within 250 m of a whale shark and not allow the vessel to approach closer than 30 m of a whale shark.²⁷</p>	<p>F: Yes. CS: Minimal cost. Standard practice.</p>	<p>Implementation of controls for reduced vessel speed around whale sharks can potentially reduce the underwater noise footprint of a vessel</p>	<p>Legislative control for State waters, Whale Shark Interaction Protocol, being adopted for the Petroleum Activities Program.</p>	<p>Yes C 3.2</p>
<p>Vessels will not travel greater than 6 knots within 300m of a turtle (caution zone). If the turtle shows signs of being disturbed, vessels will immediately withdraw from the caution zone at a constant speed of less than 6 knots.¹⁰</p>	<p>F: Yes CS: Minimal cost. Standard practice.</p>	<p>Implementation of controls for reduced vessel speed around turtles can potentially reduce the underwater noise footprint of a vessel</p>	<p>Benefits outweigh cost / sacrifice. Good Practice.</p>	<p>Yes C 3.3</p>
<p>Use trained vessel crew on project vessels (PV, LCV, HCV) to watch for cetaceans when vessels in the Operational Area and record presence / activity to the limit of visibility.</p>	<p>F: Yes CS: Time / cost associated with training and implementation.</p>	<p>Vessel crew trained in fauna observation and identification can increase sighting ability and accuracy, with sightings about to inform management actions if required, and contribute to understanding of</p>	<p>Benefits outweigh cost / sacrifice.</p>	<p>Yes C 3.4</p>

²⁷ For safety reasons, the distance requirements are not applied for a vessel holding station or with limited manoeuvrability e.g. lifting, loading, back-loading, bunkering, close standby cover for overside working and emergency situations.

		cetacean presence in the area.		
Communicate known or possible sightings of Pygmy Blue Whales and Humpback Whales to other Scarborough Project vessels in the area.	F: Yes CS: Time / Cost associated with persons used for communications	Sharing information on PBW presence and behaviour may assist in reducing risks associated with Scarborough Project vessels. By making crews aware of PBWs in the area, management actions can be effectively implemented.	Benefits outweigh cost/sacrifice.	Yes C 3.5
For any sightings of known or possible PBWs or Humpback Whales: <ul style="list-style-type: none"> A dedicated watch²⁸ will be maintained by an MFO²⁹; If the vessel (PV, LCV, HCV) is in transit, will reduce speed to <6 knots; and No new support vessels will enter the Operational Area; until the whale(s) is observed to move out of visible range from the project vessel (~3-5 km) or is not observed for a period of 30 mins	F: Yes CS: Time / cost in delay or interruption to activity execution.	Adjusting operations to limit increases in cumulative vessel noise and preventing sudden changes in movement may help reduce likelihood of underwater noise impacts to cetaceans, by providing adequate time and space for cetaceans to move away if disturbed by the noise.	Benefits outweigh cost/sacrifice.	Yes C 3.6
The SIMOPs management plan (as per C 8.6) will consider the scheduling of and distances between Scarborough activities, to reduce the potential for injury to cetaceans.	F: Yes CS: Time / cost in delay or interruption to activity execution,	Consideration of project schedule to reduce concurrent activities within the PAA can help reduce likelihood of underwater noise impacts to cetaceans from cumulative noise.	Benefits outweigh cost / sacrifice.	Yes C 3.7
Use of aircraft to carry out visual observations for pygmy blue whale foraging activity (aerial survey).	F: Yes. Increases potential likelihood of environmental impacts, health and safety impacts to personnel due to aircraft in the field. Unacceptable risk to personnel in	Aerial surveys could assist in identifying pygmy blue whale foraging activity over a larger monitoring zone.	Cost/sacrifice outweighs benefit. Due to distance of PAA from pygmy blue whale migration and foraging BIAs, presence of PBWs carrying out	No

²⁸ Dedicated watch - A period of time during which the dedicated MFO actively and exclusively looks for cetaceans.

²⁹ MFO - A dedicated and suitably trained person (can be vessel crew) who must not have any other duties that impede their ability to engage in visual observations for marine fauna.

	operating aircraft so far offshore. CS: Significant cost of aircraft and personnel. Aircraft range limits observation time at WA-61-L requiring multiple aircraft/crew to cover daylight periods.		opportunistic foraging activities in the area is expected to be low.	
Professional Judgement – Eliminate				
Eliminate generation of noise from vessels or equipment.	F: No. The generation of noise from these sources cannot be eliminated due to operating requirements. Note that vessels operating on DP may be a safety critical requirement. CS: Inability to conduct the Petroleum Activities Program. Loss of project.	Not considered – control not feasible.	Not considered – control not feasible.	No
Stop DP operations if a PBW is sighted.	F: This may be possible for vessels transiting between activity locations, but when undertaking installation activities, the generation of noise from these sources cannot be eliminated due to operating requirements. Note that vessels operating on DP may be a safety critical requirement. CS: Time / Cost associated with interrupting construction activities.	Ceasing project vessel DP operations will reduce the potential for TTS effects to occur if a PBW stays within range of vessels for an extended period.	Grossly disproportionate. Implementation of the control requires considerable cost with minimal environmental benefit, given that PTS and TTS are not credible. Evidence suggests that the likelihood of encountering a migrating or foraging PBW within the Operational Area is considered low, and it is highly unlikely that PBW would spend sufficient time within range of vessel operations to encounter PTS or TTS. The cost/sacrifice outweigh the benefit gained.	No
Implement an observation and shut-down zone around geophysical survey equipment and implement start-up delay	F: Yes CS: Time / cost in delay or interruption to activity execution.	Implementing shut-down zones and procedures may reduce the risk of TTS, PTS and behavioural	Cost/sacrifice outweighs benefit. PTS, TTS and behavioural disturbance are not expected to occur	No

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and shutdown procedures for fauna sightings.		disturbance for marine fauna in close proximity to the sound source.	as a result of geophysical survey activities, due to the small areas the acoustic emissions are expected to reach.	
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Professional Judgement – Substitute

Management of vessel noise by varying the timing of the Petroleum Activities Program to avoid migration periods.	<p>F: Yes. It is possible to vary the timing of the Petroleum Activities Program to avoid migration periods, however the risk of potential impacts from routine acoustic emissions is considered to be low, and limited to a behavioural response.</p> <p>CS: Significant cost and schedule impacts due to delays in securing vessels for specific timeframes. A variation in timing to avoid migration periods would result in significant delays to the project. Ideal (calm) sea states for subsea installation occur over the summer months.</p>	Given the potential impacts to migrating fauna during this activity is low, implementation of this control would not result in a reduction in consequence.	<p>Grossly disproportionate. Implementation of the control requires considerable cost with minimal environmental benefit.</p> <p>While activities may result in a behavioural disturbance to PBWs, this is likely to affect a small portion of individuals travelling outside of the Migration and Foraging BIAs and will not have a population level impact on the species.</p> <p>The cost/sacrifice outweigh the benefit gained.</p>	No
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Professional Judgement – Engineered Solution

Reduce vessel speed in the Operational Area to reduce vessel noise propagation	<p>F: Yes.</p> <p>CS: Increased vessel transit times, potential schedule delays and impact to subsequent activities</p>	Operational Area does not overlap with any cetacean BIAs or critical habitat and the presence of marine fauna is likely to be limited to infrequent occurrences of individuals or small groups. Therefore, there is no further risk reduction from the application of this control.	Given the slow speeds at which vessels operate, the likely presence of marine fauna in the Operational Area and the controls currently in place the adoption of this control offers no further reduction in risk.	No
Passive Acoustic Monitoring (PAM)	F: No. PAM has limited ability to detect calls from baleen whales such as the pygmy blue Whale, particularly with added	Not considered – control not feasible.	Not considered – control not feasible.	No

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	<p>background noise from vessel activities and known reliability and practicality limitations of the technology.</p> <p>CS: Costs associated with PAM technology acquisition and implementation.</p>			
<p>Use of thermal imaging equipment at night or periods of low visibility to identify cetacean presence.</p>	<p>F: Yes. Some technology may be feasible to install on support vessel, other technology such as hand-held thermal imaging binoculars are not feasible for use.</p> <p>CS: Costs associated with infrared technology acquisition and implementation.</p>	<p>Some thermal imaging equipment if effective, can increase likelihood of identifying cetacean presence - however limitations on detection distance/depth, interpretation of data (identification of cetacean type for example) and practicality exist.</p> <p>The open ocean sea states and conditions (i.e., high winds and rough seas) of the PAA may decrease the rate of marine mammal detection. This is in addition to the already low numbers, cryptic nature, and often solitary and distribution of PBW.</p>	<p>Cost/sacrifice outweighs benefit.</p> <p>Lack of proven application in detection of cetaceans in deep water environment and limitations of the technology reduce potential benefit gained when compared with low likelihood of expected cetacean activity and low likelihood of vessel movement at night.</p>	No
<p>Use of Autonomous Underwater Vehicle (AUV) to monitor for presence of pygmy blue whales using detection of their vocalisations.</p>	<p>F: Yes. Could be deployed from support vessel</p> <p>CS: Costs associated with obtaining and operating the technology.</p> <p>Schedule delays while data is collected and interpreted (not real time monitoring)</p>	<p>Limited benefit as the technology relies on pygmy blue whale vocalisation, which is currently not well understood, particularly during foraging activities.</p> <p>Technology and applications still under development and not widely tested in field.</p> <p>Application limited due to lack of real time capability.</p>	<p>Cost/sacrifice outweighs benefit.</p> <p>Due to distance of PAA from pygmy blue whale migration and foraging BIAs, presence of PBWs carrying out opportunistic foraging activities in the area is expected to be low. It is not expected that an AUV would add significantly more value than opportunistic observations, to warrant deployment.</p>	No

ALARP Statement:

On the basis of the environmental impact assessment outcomes and use of the relevant tools appropriate to the decision type (i.e. Decision Type A, **Section 2.3.3**), Woodside considers the adopted controls appropriate to manage the potential impacts from noise emissions. As no reasonable additional/alternative controls were identified that would further reduce the impacts without grossly disproportionate sacrifice, the impacts are considered ALARP.

Demonstration of Acceptability

Acceptability Criteria and Assessment

Demonstration of acceptability for the sources of aspect and associated impacts assessed in this section are provided in Section 7.1.4.3 of the Scarborough OPP (SA0006AF0000002, Rev 5). The Petroleum Activities Program meets the acceptability criteria (**Section 2.3.5**):

- Overall impact significance levels for individual receptors are less than the significant impact level defined in the OPP.
- EPOs and controls in the OPP that are relevant to routine acoustic emissions have been adopted.
- Additional guidance on key terms within the CMP was issued in September 2021 and these were considered in the assessment against relevant actions in the CMP. The Petroleum Activities Program is not considered to be inconsistent with the relevant actions of this plan.
- There are no additional changes to internal/external context specific to this risk from the OPP. Feedback raised during consultation, including any specific updates to the EP in response, has been considered in **Appendix F**, Table 1

Acceptability Statement:

The impact assessment has determined that the generation of noise from project vessels and positioning equipment is unlikely to result in an impact significance level greater than slight. There are no BIAs for any EPBC Act listed Threatened or Migratory species overlapping or adjacent to the PAA. The pygmy blue whale (PBW) migration BIA is located about 35 km east of the PAA (**Section 4.6.3**). Relevant recovery plans and conservation advice have been considered during the impact assessment, and the Petroleum Activities Program is not considered to be inconsistent with the overall recovery objectives and actions of these recovery plans and conservation advice (**Section 6.9**).

The impact assessment has determined that the generation of noise from project vessels and positioning equipment will not result in a potential impact greater than localised and temporary impacts, with no lasting effect. Relevant recovery plans and conservation advice have been considered during the impact assessment. The Conservation Management Plan for the Blue Whale (Commonwealth of Australia, 2015a) Interim Recovery Objective is that 'Anthropogenic threats are demonstrably minimised' with the following Action Area A.2.3: "Anthropogenic noise in biologically important areas will be managed such that any blue whale continues to utilise the area without injury, and is not displaced from a foraging area". The associated Guidance on Key Terms within the Blue whale Conservation Management Plan (DAWE, 2021) provides further clarification that where it can be reasonably predicted that blue whale foraging is probable, known or whale presence is detected, adaptive management should be used during industry activities to prevent unacceptable impacts. While this Petroleum Activities Program occurs outside of any pygmy blue whale BIA, the impact assessment determined it is considered highly unlikely that individual PBW that may pass through the PAA during the Petroleum Activities Program would experience PTS or TTS, given individuals would need to remain within 0.21 km (PTS) and 7.05 km (TTS) of the conservative worst-case credible vessel spread for a period of 24 hours. This is considered highly unlikely given the understanding of behaviour of pygmy blue whales (**Section 4.6.3**). The PTS and TTS ranges for individual activities are smaller (e.g. for the mooring pre-lay activity 0.19 km for PTS, 3.7 km for TTS), thereby further reducing the risk of injury to an individual pygmy blue whale, should the cumulative scenario(s) not eventuate. In addition, with the adoption of adaptive management controls the activity will be managed to reduce anthropogenic noise on pygmy blue whales and is therefore not inconsistent with The Conservation Management Plan for the Blue Whale (**Section 6.9.3**).

The potential impacts are considered broadly acceptable if the adopted controls are implemented.

Environmental Performance Outcomes, Standards and Measurement Criteria

EPO	Adopted Control(s)	EPS	MC
EPO 1 Undertake the Petroleum Activities Program in a manner that will not modify, destroy, fragment, isolate or disturb an important or substantial area of habitat	C 3.1 EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with	PS 3.1.1 Compliance with EPBC Regulations 2000 – Part 8 Division 8.1 (Regulation 8.05 and 8.06) Interacting with cetaceans	MC 3.1.1 Records demonstrate no breaches with EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with cetaceans.

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Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
<p>such that an adverse impact on marine ecosystem functioning or integrity results.</p> <p>EPO 5 Undertake the Petroleum Activities Program in a manner that will not seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.</p> <p>EPO 6 Undertake the Petroleum Activities Program in a manner that prevents a substantial adverse effect on a population of fishes, marine mammals, marine reptiles, or the spatial distribution of a population.</p> <p>EPO 7 Undertake the Petroleum Activities Program in a manner that will not substantially modify, destroy or isolate an area of important habitat for a migratory species.</p> <p>EPO 25 Undertake the Petroleum Activities Program in a manner that prevents injury to blue whales or biologically significant behavioural disturbance.</p>	<p>cetaceans, including the following measures³⁰:</p> <ul style="list-style-type: none"> Project vessels will not travel greater than 6 knots within 300 m of a cetacean (caution zone) and not approach closer than 100 m from a whale. Project vessels will not approach closer than 50 m for a dolphin and/or 100 m for a whale (with the exception of animals bow riding). If the cetacean shows signs of being disturbed, project vessels will immediately withdraw from the caution zone at a constant speed of less than 6 knots. 	<p>PS 3.1.2 All vessel strike incidents with cetaceans will be reported in the National Ship Strike Database (as outlined in the Conservation Management Plan for the Blue Whale – A Recovery Plan under the EPBC Act 1999, Commonwealth of Australia, 2015a).</p>	<p>MC 3.1.2 Records demonstrate reporting cetacean ship strike incidents to the National Ship Strike Database.</p>
	<p>C 3.2 Vessels will not travel greater than 6 knots within 250 m of a whale shark and not allow the vessel to approach closer than 30 m of a whale shark.³¹</p>	<p>PS 3.2.1 When within 250 m of a whale shark vessels will not travel greater than 6 knots and vessels will not approach closer than 30 m to a whale shark</p>	<p>MC 3.2.1 Records demonstrate no breaches of speed requirements when within 250 m of a whale shark</p>
	<p>C 3.3 Vessels will not travel greater than 6 knots within 300m of a turtle (caution zone). If the turtle shows signs of being disturbed, vessels will immediately withdraw from the caution zone at a constant speed of less than 6 knots.¹²</p>	<p>PS 3.3.1 When within 300 m of a turtle, vessels will not travel greater than 6 knots.</p>	<p>MC 3.3.1 Records demonstrate no breaches of speed requirements when within 300 m of a turtle</p>
	<p>C 3.4</p>	<p>PS 3.4.1 Trained vessel crew²² on PV, LCV and HCV observe and record cetacean</p>	<p>MC 3.4.1 Records of sightings and locations of cetaceans.</p>

³⁰ For safety reasons, the distance requirements are not applied for a vessel holding station or with limited manoeuvrability e.g. lifting, loading, back-loading, bunkering, close standby cover for overside working and emergency situations.

³¹ For safety reasons, the distance requirements are not applied for a vessel holding station or with limited manoeuvrability e.g. lifting, loading, back-loading, bunkering, close standby cover for overside working and emergency situations.

Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
	Use trained vessel crew ³² on project vessels (PV, LCV, HCV) to watch for cetaceans when vessels in the Operational Area and record presence / activity to the limit of visibility.	presence/activity when vessels in the Operational Area.	
	C 3.5 Communicate known or possible sightings of PBWs and Humpback Whales to other Scarborough Project vessels in the area.	PS 3.5.1 Sightings of known or possible PBWs and Humpback Whales communicated to other Scarborough Project vessels in the area.	MC 3.5.1 Records of communications kept in bridge log.
	C 3.6 For any sightings of known or possible PBWs or Humpback Whales (as per C 3.4): <ul style="list-style-type: none"> • A dedicated watch³³ will be maintained by an MFO³⁴; • If the vessel (PV, LCV, HCV) is in transit, reduce speed to <6 knots; and • No new support vessels will enter the Operational Area until the whale(s) is observed to move out of visible range from the project vessel (~3-5 km) or is not observed for a period of 30 mins. 	PS 3.6.1 For any sightings of known or possible PBWs or Humpback Whales apply C 3.6 .	MC 3.6.1 Records show C 3.6 implemented as required.
	C 3.7 The SIMOPs management plan (as per C 8.6) will consider the scheduling of and distances between Scarborough activities, to reduce the	PS 3.7.1 To reduce the potential for injury to cetaceans, the SIMOPs management plan (as per C 8.6) considered the scheduling of and distances between Scarborough activities.	MC 3.7.1 Records the SIMOPS management plan considered scheduling and distances between Scarborough activities.

³² Trained Vessel Crew - A suitably trained person who can make observations of fauna as part of their usual vessel activities (i.e. captain, first officer, bridge crew).

³³ Dedicated watch - A period of time during which the dedicated MFO actively and exclusively looks for cetaceans.

³⁴ MFO - A dedicated and suitably trained person (can be vessel crew) who must not have any other duties that impede their ability to engage in visual observations for marine fauna.

Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
	potential for injury to cetaceans.		

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Detailed Impact Assessment

The area of operation is at a significant distance from coastal sources of light emissions. However, there are existing activities in the region which also generate light including offshore facilities and supporting activities, as well as shipping traffic.

The contribution of light emissions from the Petroleum Activities Program will be comparable with existing vessels and facilities on the North West Shelf and will not result in a notable increase.

Given the distance from shore, low sensitivity of receptors offshore (i.e. no presence of nesting turtles and low likelihood of hatchling turtles in the offshore environment), and the negligible contribution of light emissions to the environment from the Petroleum Activities Program, the habitat or ecosystem function or integrity of the marine area will not be impacted. Potential impacts of changes to ambient light are included in a number of recovery plans and conservation advice, including the Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia, 2017) and the Wildlife Conservation for Migratory Shorebirds (DoE, 2015e).

The National Light Pollution Guidelines for Wildlife (NLPG) addresses potential impacts to marine turtles, seabirds and migratory shorebirds from artificial light (Commonwealth of Australia, 2020). The guidelines recommend a specific artificial light impact assessment process where there is important habitat for listed species that are known to be affected by artificial light within 20 km of a project. The 20 km threshold provides a precautionary limit based on observed effects of sky glow on marine turtle hatchlings demonstrated to occur at 15–18 km (Kamrowski, et al., 2014; Hodge et al., 2007) and fledgling seabirds grounded in response to artificial light 15 km away (Rodríguez et al., 2014). The PAA is about 226 km offshore and outside known BIAs for turtles and seabirds/migratory shorebirds, therefore a specific assessment of potential impacts of artificial lighting is not required under the NLPG.

Seabirds

High levels of marine lighting can attract and disorient seabird species resulting in species behavioural changes (e.g. circling light sources or disrupted foraging), injury or mortality near the light source (e.g. Longcore and Rich, 2004; Gaston et al., 2014; Rich and Longcore, 2006). As the PAA is offshore and away from islands or other emergent features, any presence of seabirds or shorebirds is considered likely to be of a transient nature only. The nearest BIA for birds within the EMBA is a breeding and foraging BIA for the wedge-tailed shearwater, located 127 km to the south-east of the PAA. Impacts to shearwaters within the BIA are therefore not expected.

Behavioural disturbance to birds from light is expected to be localised to within the vicinity of the vessels within the permit areas. The light source from the vessels within the PAA will be temporary and only when operations are occurring. Interactions with seabirds are therefore expected to be unlikely. Any impacts are predicted to be at an individual level and not a population level. The temporary behavioural disturbance of birds will be localised around the light sources, and not result in a substantial adverse effect on a population of species or its lifecycle. Additionally, light emissions will not seriously disrupt the lifecycle of an ecologically significant proportion of any migratory birds.

Based on the detailed evaluation, the magnitude of impacts to birds from light emissions during activities associated with the Petroleum Activities Program is expected to have no lasting effect.

Marine Reptiles

Exposure of marine turtles to artificial light can result in changes to their natural behaviour. Witherington and Martin (2003) state that light pollution on nesting beaches is detrimental to marine turtles because it alters critical nocturnal behaviours, namely, how turtles choose nesting sites, how they return to the sea after nesting, and how hatchlings find the sea after emerging from their nests. However, there are no sensitive marine turtle habitats near the PAA. The closest known turtle nesting beaches are at the North West Cape and Montebello Islands; the BIA located approximately 165 km from the PAA (flatback turtles). Marine turtles generally have a pelagic life stage as juveniles, before returning to nearshore coastal habitats as adults to forage and breed. At the PAA, marine turtles are unlikely to occur due to the deep waters (>900 m) however, they may occur offshore in small numbers. Leatherback turtles are an oceanic, pelagic species known to regularly forage within continental shelf waters. While leatherback turtles may occur in the PAA in small numbers, their distribution is widespread in Australia and their presence is unlikely. No turtles were observed during the winter or summer offshore marine surveys in the PAA (ERM, 2013).

While artificial lighting may be visible up to tens of kilometres away from the vessels, the light intensity will be low beyond several hundred metres from the light sources as described above. Although individuals undertaking behaviours such as migration or foraging (adults and pelagic juveniles) may occur within the PAA, marine turtles do not use light cues to guide these behaviours. Furthermore, there is no evidence, published or anecdotal, to suggest that foraging or migrating turtles are impacted by light from offshore vessels. As such, light emissions from the project vessels are unlikely to result in displacement of, or behavioural changes to individuals in these life stages.

Due to the distance offshore, the density of any hatchlings is expected to be very low and limited to individuals. Lighting may temporarily alter their normal behaviour if attracted to the light spill from vessel operations. For any isolated individuals potentially attracted to light spill from project vessels, following sunrise, any effect of these light sources on hatchlings will be eliminated allowing dispersal behaviour to resume.

As described above, behavioural disturbance to turtles from light in the PAA is expected to be localised to within the vicinity of the vessels within the PAA. The light source from vessels within the PAA will be temporary and interaction with turtles is expected to be low. Therefore, any impacts are predicted to be at an individual level and not a

Detailed Impact Assessment				
<p>population level. Impacts will not occur to significant proportions of the populations of the species, nor result in a decrease of the quality of the habitat such that the extent of these species is likely to decline.</p> <p>Based on the detailed evaluation, the magnitude of impacts to marine turtles from light emissions during activities associated with the Petroleum Activities Program is evaluated to have no lasting effect.</p>				
Cumulative Impacts				
<p>Due to spatial and temporal separation, and relatively short duration of Petroleum Activities Program installation and survey activities (see Table 6-1), there is minimal opportunity for concurrent operations within the PAA that would result in cumulative light emissions. The location of concurrent activities in permit areas WA-61-L and WA-62-L and the existing environment with low presence of light sensitive receptors, means that cumulative impact from light on sensitive receptors, as a result of concurrent operations, is not considered credible.</p>				
Summary of Assessment Outcomes				
Receptor	Impact	Receptor Sensitivity Level	Magnitude	Impact Significance Level
Ambient Light	Change in ambient light	Low value (open water)	Slight	Negligible (F)
Seabirds and migratory shorebirds	Change in fauna behaviour	High value species (e.g. wedge-tailed shearwater)	No lasting effect	Slight (E)
Marine reptiles		High value species (e.g. flatback turtle)	No lasting effect	Slight (E)
<p>Overall Impact Significance Level: The overall impact significance level for routine light emissions is E based on no lasting effect to the high value receptors (seabirds, migratory shorebirds and marine turtles). The impact significance levels for individual receptors are consistent with the level in the OPP.</p>				

Demonstration of ALARP				
Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/Risk Reduction	Proportionality	Control Adopted
Legislation, Codes and Standards				
No additional controls identified.				
Good Practice				
Minimum lighting required for navigational, safety and operational requirements, with the exception of emergency events.	F: Yes. Lighting is typically appropriate for navigation and safety. CS: Significant cost sacrifice. The retrofitting of external lighting on the vessels, etc., would result in considerable cost and time expenditure. Considerable logistical	Given the potential impacts to turtles during this activity is insignificant, implementation of this control would not result in a reduction in consequence.	While the control does not result in significant reduction of impacts, it is good practice and not at significant cost.	Yes C 4.1
Professional Judgement – Eliminate				
Substitute external lighting with “turtle friendly” light sources (reduced emissions in turtle visible spectrum).	F: Yes. Replacement of external lighting with turtle friendly lighting is technically feasible, although is not considered to be practicable. CS: Significant cost sacrifice. The retrofitting of external lighting on the vessels, etc., would result in considerable cost and time expenditure. Considerable logistical	Given the potential impacts to turtles during this activity is insignificant, implementation of this control would not result in a reduction in consequence.	Grossly disproportionate. Implementation of the control requires considerable cost sacrifice and provides minimal environmental benefit. The costs/sacrifices	No

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Demonstration of ALARP				
Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/Risk Reduction	Proportionality	Control Adopted
	effort to source sufficient inventory of the range of light types onboard the vessels.		outweigh the benefit gained.	
Variation of the timing of the Petroleum Activities Program to avoid peak turtle interesting periods (December to January).	F: Yes. It is possible to avoid peak turtle hatchling emergence periods, through scheduling. CS: Significant cost and schedule impacts due to delays in securing vessels for specific timeframes.	Implementation of this control would not result in a reduction in consequence due to the distance of the PAA from turtle nesting beaches and the small area impacted by vessel light glow.	The cost/sacrifice outweighs benefit gained.	No
Professional Judgement – Substitute				
No additional controls identified.				
Professional Judgement – Engineered Solution				
No additional controls identified.				
ALARP Statement: On the basis of the environmental impact assessment outcomes and use of the relevant tools appropriate to the decision type (i.e. Decision Type A, Section 2.3.3), Woodside considers the potential impacts from routine light emissions from the vessels to be ALARP. As no reasonable additional/alternative controls were identified that would further reduce the impacts without grossly disproportionate sacrifice, the impacts are considered ALARP.				
Demonstration of Acceptability				
Acceptability Criteria and Assessment				
Demonstration of acceptability for the sources of aspect and associated impacts assessed in this section are provided in Section 7.1.1.3 of the Scarborough OPP (SA0006AF0000002, rev 5). The Petroleum Activities Program meets the EP acceptability criteria (Section 2.3.5):				
<ul style="list-style-type: none"> • Overall impact significance levels for individual receptors are less than the significant impact level defined in the OPP. • EPOs and controls in the OPP that are relevant to routine light emissions have been adopted. • There are no changes to internal/external context specific to this risk from the OPP. Feedback raised during consultation, including any specific updates to the EP in response, has been considered in Appendix F, Table 1 				
Acceptability Statement: The impact assessment has determined that, given the adopted controls, routine light emissions from external lighting on the project vessels is unlikely to result in an impact significance level greater than slight. There are no BIAs for any EPBC Act listed Threatened or Migratory species overlapping or adjacent to the PAA. Regard has been given to relevant conservation advice and wildlife conservation plans during the assessment of potential impacts and the NLPG were taken into consideration during the impact evaluation. The Petroleum Activities Program is not considered to be inconsistent with the overall recovery objectives and actions of these recovery plans and conservation advice (Section 6.9).				

Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
<p>EPO 1 Undertake the Petroleum Activities Program in a manner that will not modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity results.</p> <p>EPO 8 Undertake the Petroleum Activities Program in a manner that will not have a substantial adverse effect on a population of seabirds or shorebirds, or the spatial distribution of the population.</p> <p>EPO 5 Undertake the Petroleum Activities Program in a manner that will not seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.</p> <p>EPO 6 Undertake the Petroleum Activities Program in a manner that prevents a substantial adverse effect on a population of fishes, marine mammals, marine reptiles, or the spatial distribution of a population.</p> <p>EPO 7 Undertake the Petroleum Activities Program in a manner that will not substantially modify, destroy or isolate an area of important habitat for a migratory species.</p>	<p>C 4.1 Minimum lighting required for navigational, safety and operational requirements, with the exception of emergency events.</p>	<p>EPS 4.1.1 Lighting will be limited to that required for safe work/navigation.</p>	<p>MC 4.1.1 Inspection verifies no excessive light being used beyond that required for safe work/ navigation.</p>

6.7.5 Routine Atmospheric and Greenhouse Gas Emissions

Scarborough OPP – Relevant Impact Assessment Section														
Section 7.1.2 – Routine Atmospheric and Greenhouse Gas Emissions														
Context														
Relevant Activities Vessel Operations – Section 3.7				Existing Environment Marine Regional Characteristics – Section 4.2 Protected Species – Section 4.6				Stakeholder consultation Consultation – Section 5						
Impact/Risk Evaluation Summary														
Source of Impact/Risk	Environmental Value Potentially Impacted							Evaluation						
	Soil and Groundwater	Marine Sediment	Water Quality	Air Quality (inc. odour)	Ecosystems / Habitat	Species	Socio-economic	Decision Type	Impact/Consequence	Likelihood	Current Risk Rating	ALARP Tools	Acceptability	Outcome
Internal combustion engines and incinerators on vessels				✓				A	F	-	-	LC SP PJ	Broadly Acceptable	EPO 9, 10
Description of Source of Impact														
<p>Atmospheric emissions assessed in this EP have been classified into two categories:</p> <ul style="list-style-type: none"> Atmospheric pollutants (non-greenhouse gas emissions) are gases and particulates from an activity, or piece of machinery, which have a recognised adverse effect on human health and/or flora and fauna. The main emissions responsible for these effects include carbon monoxide (CO), oxides of nitrogen (NOx), sulphur dioxide (SO₂), particulate matter less than 10 microns (PM10), non-methane volatile organic compounds (VOCs), BTEX (benzene, toluene, ethylbenzene and xylenes), which are specific VOCs of interest Greenhouse gas (GHG) emissions are those gasses within the atmosphere that absorb long-wave radiation, and thus trap heat reflected from the Earth's surface. The main gases responsible for this effect include carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). Other greenhouse gases include perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulphur hexafluoride (SF₆). <p>Vessels are powered via the use of on-board generators (diesel-powered and/or LNG). Vessel operations require the use of marine diesel to undertake daily activities functions such as crane movements, desalination, sewage treatment, etc. Atmospheric emissions will be generated by the project vessels from internal combustion engines (including all equipment and generators) and incineration activities (including onboard incinerators).</p> <p>The Petroleum Activities Program is estimated to be completed in 18 months and when underway, activities will be 24 hours per day, seven days per week. Vessels may mobilise from an Australian port or directly from international waters to the PAA.</p> <p>Atmospheric emissions generated during the Petroleum Activities Program will include SO_x, NO_x, particulates and Volatile Organic Compounds (VOCs). SO_x and particulate matter emissions are heavily influenced by the fuel used and its relative sulphur content, Marine Gas Oil (MGO) usually having a lower sulphite content than marine diesel oil or heavy fuel oil (HFO).</p> <p>Greenhouse gases will be emitted from vessels involved in the activity consuming marine diesel fuel, and by helicopters transferring personnel. Using vessel fuel consumption rates estimated by contractors, internal helicopter fuel consumption data and emission factors from the National Greenhouse and Energy Reporting Scheme (NGERS), GHG emissions have been estimated and are presented below:</p>														

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- Vessel fuel combustion: 68,000 tCO_{2e}
- Helicopter fuel combustion: 2,000 tCO_{2e}

These figures are estimates only. The actual consumption of fuel varies based on factors such as the nature of activity being undertaken by vessels, metocean conditions etc. While Woodside may influence via contracting approaches, in-field day to day operations, and therefore fuel consumption, are under the control of vessel masters.

Based on the estimates provided above, the total GHG emissions over the course of the entire activity are estimated to be 70,000 tCO_{2e}. This is approximately 0.01% of the Scarborough project lifecycle GHG emissions as presented in the OPP, which were assessed as having a negligible impact significance level.

These figures are estimates only. The actual consumption of fuel varies based on factors such as the nature of activity being undertaken by vessels, metocean conditions etc. While Woodside may influence via contracting approaches, in-field day to day operations, and therefore fuel consumption, are under the control of vessel masters.

Detailed Impact Assessment

Assessment of Potential Impacts

Air Quality (atmospheric pollutants)

Atmospheric emissions may result in a decline in local air quality, within the immediate vicinity of the emissions source. As described above, produced emissions throughout the project will include SO₂, NO_x, ozone depleting substances, CO₂, particulates and VOCs. Emissions from engines, generators and deck equipment may be toxic, odouriferous or aesthetically displeasing, and will result in a reduction in air quality.

The air quality within the PAA is typical of an unpolluted tropical offshore environment and the ambient air quality in the offshore NWMR will be of high quality. Atmospheric emissions from the fuel combustion and incineration on project vessels (including generation of dark smoke) have the potential to result in a localised reduction in air quality in the immediate vicinity of the release point, with no lasting effect.

Given the offshore location of the PAA, and the low volumes of atmospheric emission which will be generated, biodiversity, ecological integrity, social amenities and human health will not be impacted and any potential impact to air quality is slight.

Marine Fauna

Atmospheric emissions can cause direct impacts to fauna, if they are present in the immediate vicinity of significant releases. Birds, for example, have been shown to suffer respiratory distress and illness when subjected to extended duration exposure to air pollutants (Sanderfoot and Holloway, 2017). Given that fauna numbers will be low at the point of discharge, injury or mortality to fauna as a result of atmospheric discharges is negligible.

Aesthetic Value

Atmospheric emissions have the potential to introduce odour and visual amenity issues which can result in changes to the aesthetic value of an area.

Given the distance from shore of the PAA (216 km), the potential for a change in air quality from atmospheric emissions resulting in a change to aesthetic value for tourism/recreation or settlements is not considered to be credible. As the PAA is not directly visible from the nearest landfall, the potential smoke resulting from emissions will not impact visual amenity, and no impacts to visual amenity for settlements are expected. Therefore, a change in aesthetic value from atmospheric emissions associated with Petroleum Activities Program is negligible.

GHG Emissions

GHG emissions attributed to the vessels and helicopters contribute to global concentrations of GHG emissions. Cumulative increases in net global atmospheric GHG concentrations are considered to contribute to climate change. It is important to acknowledge that climate change impacts cannot be directly attributed to any one activity, as they are instead the result of global GHG, minus global GHG sinks, that have accumulated in the atmosphere since the industrial revolution.

The impact assessment of the potential impacts of climate change on sensitive receptors, within Australian jurisdictions is described in Section 7.1.3.8 of the Scarborough OPP (SA0006AF0000002, rev 5). More recent climate change reports have been published with updated projections of climate change, including the IPCC's Sixth Assessment Report (AR6) and the CSIRO and Bureau of Meteorology's State of the Climate 2020, which outlines the projected changes to Australia's climate. AR6 projects a slight increase in warming for similar emissions scenarios to AR5 (as presented in the Scarborough OPP), with a narrower range of uncertainty of these projections (higher confidence rates). The slight increase in warming is a result of a range of factors including the higher estimate of historical warming in AR6 and updated estimates of climate sensitivity (IPCC, 2021). The impact or risk evaluation described in Section 7.1.3.8 of the OPP does not change. Other construction, installation and decommissioning GHG emissions will be addressed in relevant EP for those activities.

Summary of Assessment Outcomes				
Receptor	Impact	Receptor Sensitivity Level	Magnitude	Impact Significance Level
Air quality	Change in air quality	Low value (open water)	Slight	Negligible (F)
	Climate Change	Low value	Slight	Negligible (F)
Overall Impact Significance Level: The overall impact significance level for routine atmospheric and GHG emissions is F based on a slight effect to air quality of the regional airshed and a low value receptor. The impact significance levels for individual receptors are consistent with the level in the OPP.				

Demonstration of ALARP				
Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/Risk Reduction	Proportionality	Control Adopted
Legislation, Codes and Standards				
Marine Order 97 (Marine pollution prevention – Air pollution).	F: Yes. CS: Minimal cost. Standard practice	Legislative requirements to be followed may slightly reduce the likelihood of air pollution.	Control based on legislative requirements – must be adopted.	Yes C 5.1
Reporting of GHG emissions as required by regulatory requirements	F: Yes. CS: Minimal cost. Standard practice for Woodside activities.	Emissions reporting can increase transparency and accountability	Control based on legislative requirements – must be adopted	Yes C 5.2
Good Practice				
Vessel operations planned such that fuel consumption and therefore subsequent emissions are minimised. Examples may include such aspects as vessel speeds, cleaning of biofouling, preventative maintenance on equipment such as thrusters, or turning off equipment when not in use.	F: Yes CS: Schedule delays	Managing use of project vessels can reduce fuel usage and subsequent GHG / air emissions	Potential benefit outweighs cost/sacrifice.	Yes C 5.3
Track and review GHG emissions during the Petroleum Activities Program with the objective to identify further opportunities to improve efficiencies if possible	F: Yes CS: Minimal cost. Good Practice	Development and implementation of processes to track emissions throughout Petroleum Activities Program execution facilitates interrogation of emissions data, enabling efficiencies to be identified more readily.	Potential benefit outweighs cost/sacrifice.	Yes C 5.4
Professional Judgement – Eliminate				
Do not combust fuel.	F: No. There are no vessels that do not use internal combustion engines. CS: Not considered – control not feasible.	Not considered – control not feasible.	Not considered – control not feasible.	No

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- Feedback raised during consultation, including any specific updates to the EP in response, has been considered in Appendix F, Table 1

Acceptability Statement:

The impact assessment has determined that, given the adopted controls, routine atmospheric emissions from fuel combustion and incineration are unlikely to result in an impact significance greater than negligible. The adopted controls are considered consistent with industry legislation, codes and standards, and professional judgement and meet the requirements of Australian Marine Orders.

The potential impacts are considered broadly acceptable if the adopted controls are implemented. Therefore, Woodside considers the adopted controls appropriate to manage the impacts of atmospheric emissions to a level that is broadly acceptable.

Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
<p>EPO 9 Undertake the Petroleum Activities Program in a manner that will not result in a substantial change in air quality which may adversely impact on biodiversity, ecological integrity, social amenity or human health.</p> <p>EPO 10 Assess opportunities to improve energy efficiency and reduce GHG emissions from the Petroleum Activities Program.</p>	<p>C 5.1 Marine Order 97 (Marine Pollution Prevention – Air Pollution) which detail requirements for:</p> <ul style="list-style-type: none"> • International Air Pollution Prevention (IAPP) Certificate, required by vessel class • use of low sulphur fuel when available • Ship Energy Efficiency Management Plan (SEEMP), where required by vessel class • onboard incinerator complies with Marine Order 97. 	<p>PS 5.1.1 Vessels compliant with Marine Order 97 (Marine Pollution Prevention – Air Pollution) to restrict emissions to those necessary to perform the activity. Vessel marine assurance process conducted prior to contracting vessels, to ensure suitability and compliance with vessel combustion certification/marine order requirements.</p>	<p>MC 5.1.1 Marine Assurance inspection records demonstrate compliance with Marine Order 97.</p>
	<p>C 5.2 Reporting of GHG emissions as required by regulatory requirements</p>	<p>PS 5.2.1 GHG emission regulatory reporting undertaken as required</p>	<p>MC 5.2.1 GHG emissions records demonstrate reporting undertaken as per regulatory requirements</p>
	<p>C 5.3 Vessel operations will be planned such that fuel consumption is minimised where practicable. Examples may include such aspects as vessel speeds, cleaning of biofouling, preventative maintenance on equipment such as thrusters, or turning off equipment when not in use.</p>	<p>PS 5.3.1 Vessel operations planned, where practicable, to minimise fuel consumption and associated GHG/air emissions</p>	<p>MC 5.3.1 Plan/records show fuel use/emissions have been considered in vessel operations</p>
		<p>C 5.4 Track and review GHG emissions during the Petroleum Activities Program with the objective to identify further</p>	<p>PS 5.4.1 GHG emissions tracking process developed which facilitates identification of further reduction opportunities during installation / Petroleum Activities Program execution</p>
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Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
	opportunities to improve efficiencies if possible	to understand and influence emission sensitivities	
	C 5.5 Fuel types selected to reduce expected GHG emissions.	PS 5.5.1 Project vessels will not use heavy fuel oil (HFO) or intermediate fuel oil (IFO)	MC 5.5.1 Records show project vessels use alternative fuels to HFO / IFO

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6.7.6 Routine and Non-Routine Discharges: Subsea Infrastructure Installation

Scarborough OPP – Relevant Impact Assessment Section															
Section 7.1.12 - Routine and Non-Routine Discharges: Subsea Installation and Commissioning															
Context															
Relevant Activities Subsea Infrastructure Installation – Section 3.10			Existing Environment Physical Environment – Section 4.4 Habitats and Biological Communities – Section 4.5					Stakeholder consultation Consultation – Section 5							
Impact/Risk Evaluation Summary															
Source of Impact/Risk	Environmental Value Potentially Impacted							Evaluation							
	Soil and Groundwater	Marine Sediment	Water Quality	Air Quality (inc. odour)	Ecosystems / Habitat	Species	Socio-economic	Decision Type	Impact/Consequence	Likelihood	Current Risk Rating	ALARP Tools	Acceptability	Outcome	
Discharge of small volumes of preservation fluid during installation of pre-filled risers, jumpers and spool.		✓	✓		✓	✓		A	F	-	-		Broadly Acceptable	EPO 1, 11, 12, 13, 14, 15	
FCG and leak testing of flowlines, production risers, gas export system and jumpers.		✓	✓		✓	✓		A	E	-	-				
Unplanned contingent discharges i.e. wet buckle of flowline		✓	✓		✓	✓		A	E	-	-				
Description of Source of Impact/Risk															
<p>Installation</p> <p>Installation of the pre-filled risers, jumpers and spool may result in small volumes of preservation fluid being discharged to the environment. This will occur during activities such as cap removal and connector tie-in. Discharges will comprise of negligible volumes of filtered and treated water in risers and spool, and dyed MEG in jumpers.</p> <p>FCG and leak testing</p> <p>Following installation, various leak tests will be performed on the installed infrastructure. Flood, Clean, Gauging (FCG) will be conducted on the flowlines, replacing the air contents with treated seawater. Flexible risers and jumpers, pre-filled with treated freshwater, will be leak tested from the FLETs with an ROV based hydrotesting skid, and all subsea tie-ins will be visually inspected during the leak test hold period for leak detection. The gas export system will also be leak tested using an ROV based hydrotesting skid, by injecting treated freshwater into the RBM against closed valves on the PLET and high pressure (HP) caps on flexible risers. The concentration of injected hydrotest chemical (which typically contains corrosion inhibitor, oxygen scavenger, biocide and leak-detection dye) will be monitored to ensure levels average approximately 600 ppm for flowlines, risers, gas export system, and jumpers. A summary of the discharges associated with FCG and leak testing are in Table 3-7 and Table 3-8. Discharges will comprise of filtered and treated water from the flowlines, risers and gas export system (volumes ranging from 5 m³ to 31.4 m³), and 60/40</p>															
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MEG/water from the jumpers (~1 m³). **Table 3-8** also includes contingency volumes of filtered and treated water from the flowlines, ranging from 272 m³ to 373 m³, in the event there is no clear indication of pigs' arrival.

Unplanned contingency - wet buckle of flowlines

The flowlines will be installed empty, therefore in the event of a wet buckle (**Section 3.11.1**), no immediate discharge will occur. As part of the flowline recovery process post-wet buckle, raw seawater ingress will be displaced by pigging with treated and filtered sea water, pumped using an ROV subsea skid via the associated FLET. The treated seawater would be discharged during FCG of the fully installed flowline, and replaced with new treated seawater for ongoing preservation. Depending on how far into the installation process the wet buckle occurs, the installation could be completed before FCG to replace raw seawater with treated seawater for preservation, or if the wet buckle occurs early in the process, the whole section may be removed and the process re-started, if appropriate. A conservative estimate of the treated seawater discharge volume is 1592/1673/2113 m³ for each flowline, although this represents the full flowline volumes and the worst-case scenario.

Detailed Impact Assessment

Assessment of Potential Impacts

Due to the proposed chemical additives within the discharged fluids (i.e., biocides, corrosion inhibitors, oxygen scavenger, dyes), the discharges have the potential to impact sensitive receptors within the discharge area of influence, primarily through toxicological effects ranging from the inhibition of key biological processes (e.g., reproduction) to mortality.

Water and Sediment Quality

Background water quality in the NWMR is influenced by large tidal regimes and strong oceanographic currents. Water quality in the PAA is likely to be unpolluted tropical offshore environment, nutrient poor and reflects the offshore oceanic conditions of the wider Western Australian region. Similarly, marine sediments are typical of the continental slope in the Northwest Transition bioregion, consisting of soft sandy clay/silt (**Section 4.5**).

The presence of chemical additives in discharged fluids are expected to degrade, decay, dilute and disperse once released through both dynamic mixing in the nearfield and by prevailing currents in the farfield, due to the open oceanic waters of the PAA. The discharges are expected to remain close to the seabed which means the temporary change in water quality will be restricted to deep waters. As such, the discharges are expected to result in a temporary decline in water quality around the discharge locations, with no lasting effect on water quality is predicted.

As the discharge plumes are expected to remain close to the seabed, a temporary change in sediment quality may occur. However, due to rapid dispersion of the discharge fluids, the chemical additives will degrade and dilute rapidly following discharge with no predicted accumulation within seabed sediments and as such no lasting effect on sediment quality is predicted.

Injury/mortality to Marine Fauna

Plankton

A change in water quality has the potential to result in the injury or mortality of planktonic species in the water column due to toxicity. Ichthyoplankton (eggs, larvae) are the most susceptible organisms to chemical exposure, as they have limited mobility and thus likely to be exposed to discharge plumes if present. These organisms however, have a high natural mortality and rapid replacement rate and are therefore likely to recover after activity ceases.

Discharges from installed infrastructure will occur close to the seafloor in water depths of approximately 900–1000 m. Given phytoplankton and zooplankton are generally limited to near-surface waters (i.e., the photic and meso-photic zones) no lasting effect on plankton is expected.

Epifauna and infauna

As a result of a change in sediment or water quality, impacts to benthic habitat receptors may occur. This may include sub-lethal effects or mortality to benthic epifauna and infauna resulting from the increased (water) or accumulation of (sediment) potential contaminants and toxins. Epifauna and infauna sensitivity to discharged fluids is expected to be similar to pelagic invertebrate species such as plankton. Benthic infauna and epifauna communities in the PAA are primarily soft sediment communities featuring burrowing organisms. No primary producer communities (hard corals, seagrass, macroalgae) are present due to the lack of light.

There is potential for a localised area of epifauna to be exposed to lethal and sub-lethal concentrations in the immediate vicinity of release locations. However, due to rapid dispersion of the discharged fluids, uptake and bioaccumulation of contaminants is not expected to occur in sediments or benthic organisms beyond the point of release. The extent of seabed exposure at levels where impacts could occur will be very small, and potential impacts are expected to be localised, temporary and negligible. Impacts from discharged fluids will have no lasting effect on epifauna and infauna. There are no variations in seasonal sensitivity in relation to epifauna and infauna that would influence the effect of the discharges.

Marine Fauna

The PAA does not overlap any BIAs for protected marine fauna and given the water depth (approximately 900–1000 m) and temporary nature of the discharges, impacts to protected species are not expected. The deep water and predominantly featureless, flat soft sediment seabed in the PAA is of low complexity and low productivity (see

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Section 4.5) and reduces the species diversity and richness of pelagic and demersal fish assemblages. Potential impacts to pelagic or demersal fish species from discharged fluids are expected to be confined to the vicinity of discharge point. Fish are likely to be transient within the receiving environment adjacent to the discharge location, and as such are unlikely to be exposed to sufficient concentrations or durations of the discharge constituents to elicit a response. Furthermore, fish and other marine fauna have the capacity to adapt their behaviour in response to changes in environmental conditions and can be expected to move away from the discharge if exposed. Given the low likelihood of pelagic species being exposed to the discharge; and the ability of fish to move away from the discharge plume, the potential for toxic impacts to occur from the temporary and small volumes of discharged fluids are considered to be localised, short-term and no lasting effect at the population or bioregional scale.

KEFs

The PAA is located within the Exmouth Plateau KEF. The Exmouth Plateau is defined as a KEF as it is a unique seafloor feature with ecological properties of regional significance, which apply to both the benthic and pelagic habitats within the feature. Therefore, as a result of a change in sediment quality and/or water quality, potential impacts to this KEF may occur. Values of the Exmouth Plateau with the potential to be affected by discharged fluids is limited to impacts to benthic environments containing low habitat heterogeneity within the plume. There is no solids component in the discharge, and therefore no smothering or alteration of the seabed is expected to occur.

The seafloor composition within the area of discharge is expected to primarily be mud and clay material. Survey of the plume area identified the seafloor to contain sparse marine life dominated by motile taxa typical of deep-water soft substrates (ERM, 2013; DEWHA, 2008a). Impacts from the temporary and small volumes of discharged fluids will have no lasting effect on KEFs.

Summary of Assessment Outcomes

Receptor	Impact	Receptor Sensitivity Level	Magnitude	Impact Significance Level / Risk Consequence
Water quality	Change in water quality	Low value (open water)	Slight	Negligible (F)
Sediment quality	Change in sediment quality	Low value (open water)	Slight	Negligible (F)
Plankton	Injury / mortality to fauna	Low value (open water)	No Lasting Effect	Negligible (F)
Epifauna and Infauna	Injury / mortality to fauna	Low value (open water)	No Lasting Effect	Negligible (F)
Fish	Injury / mortality or behavioural changes to marine fauna	High value species	No lasting effect	Slight (E)
Marine Mammals		High value species	No lasting effect	Slight (E)
Marine Reptiles		High value species	No lasting effect	Slight (E)
KEFs	Change in habitat	High value habitat	No lasting effect	Slight (E)

Overall Impact Significance Level: The overall impact significance level for routine and non-routine discharges from subsea infrastructure installation activities is slight (E) based on slight effect to high value receptors (marine fauna). The impact significance level for water quality is consistent with the level rated in the Scarborough OPP. Potential impacts to marine fauna have been additionally assessed in this EP. There is no change in magnitude of impact (no lasting effect).

Demonstration of ALARP

Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/Risk Reduction	Proportionality	Control Adopted
Legislation, Codes and Standards				
No additional controls identified				
Good Practice				
Chemicals will be selected with the lowest practicable environmental impacts and	F: Yes. CS: Minimal cost. Standard practice.	Environmental assessment of chemicals in	Benefits outweigh cost/sacrifice.	Yes C 6.1

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<p>risks subject to technical constraints as identified in Section 7.2.1.</p>		<p>discharges will reduce the consequence of impacts resulting from discharges to the marine environment by ensuring chemicals have been assessed for environmental acceptability. Planned discharges are required for the safe execution of activities and therefore no reduction in likelihood can occur.</p>		
<p>Pre-commissioning procedures developed and followed including:</p> <ul style="list-style-type: none"> The volumes and concentrations of all inhibitor chemicals injected will be monitored and total chemical use will be measured. 	<p>F: Yes CS: Minimal cost, standard practice</p>	<p>Monitoring of chemical concentrations and volumes during pre-commissioning will reduce the likelihood of prolonged undetected leaks and reduce the likelihood of over supply subsequently reducing associated toxicological effects in the receiving environment.</p>	<p>Benefits outweigh cost/sacrifice</p>	<p>Yes C 6.2</p>
<p>A flowline installation procedure will be in use which includes:</p> <ul style="list-style-type: none"> Alarm systems for dynamic positioning to indicate loss of vessel position. Lay system outputs monitored and adjusted to ensure flowline catenary is maintained. Flowline touch down position via ROV monitoring. 	<p>F: Yes. CS: Minimal cost. Standard practice.</p>	<p>Flowline installation procedures will reduce the likelihood of a wet buckle occurring that would require contingency dewatering.</p>	<p>Benefits outweigh cost/sacrifice.</p>	<p>Yes C 6.3</p>
<p>Professional Judgement - Eliminate</p>				
<p>No subsea discharges to be released to the marine environment</p>	<p>F: Not feasible. FCG and leak testing is required to ensure verification of structural integrity is achieved. CS: Not considered, control not feasible.</p>	<p>Not considered – control not feasible.</p>	<p>Not considered – control not feasible</p>	<p>No</p>

Professional Judgement – Substitute
No additional controls identified
Professional Judgement – Engineered Solutions
No additional controls identified.
ALARP Statement: On the basis of the environmental impact assessment outcomes and use of the relevant tools appropriate to the decision type (i.e. Decision Type A, Section 2.3.3), Woodside considers the adopted controls appropriate to manage the impacts of discharged fluids from the installation of subsea infrastructure. As no reasonable additional/alternative controls were identified that would further reduce the impacts without grossly disproportionate sacrifice, the impacts and risks are considered ALARP.
Demonstration of Acceptability
Acceptability Criteria and Assessment
The Petroleum Activities Program meets the acceptability criteria (Section 2.3.5): <ul style="list-style-type: none"> Overall impact significance level for water quality is consistent with the level rated in the Scarborough OPP. As discussed above, potential impacts to marine fauna have been additionally assessed in this EP. There is no change in magnitude of impact (no lasting effect); however, the impact significance level is slightly higher due to the higher receptor sensitivity level. This is not considered a significant change to the overall environmental impact and risk assessed in the Scarborough OPP. EPOs and controls in the Scarborough OPP that are relevant to routine and non-routine discharges have been adopted. There are no changes to internal/external context specific to this risk from the Scarborough OPP. Feedback raised during consultation, including any specific updates to the EP in response, has been considered in Appendix F, Table 1.
Acceptability Statement: The impact assessment has determined that, given the adopted controls, discharges from the installation of subsea infrastructure are unlikely to result in an impact significance level greater than Slight. The adopted controls are considered consistent with industry legislation, codes and standards, and professional judgement and meet the requirements of Australian Marine Orders. The potential impacts are considered broadly acceptable if the adopted controls are implemented. Therefore, Woodside considers the adopted controls appropriate to manage the impacts of these discharges to a level that is broadly acceptable.

Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
EPO 11 Undertake the Petroleum Activities Program in a manner that does not result in a substantial change in water quality which may adversely impact on biodiversity, ecological integrity, social amenity or human health. EPO 1 Undertake the Petroleum Activities Program in a manner that will not modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse	C 6.1 Chemicals will be selected with the lowest practicable environmental impacts and risks subject to technical constraints.	PS 6.1.1 Reduces to ALARP the impact potential of all chemicals intended or likely to be discharged into the marine environment.	MC 6.1.1 Records demonstrate chemical selection, assessment and approval process for selected chemicals is followed.
	C 6.2 Pre-commissioning procedures developed and followed including <ul style="list-style-type: none"> The volumes and concentrations of all inhibitor chemicals injected will be monitored and total chemical use will be measured. 	PS 6.2.1 Monitoring of chemicals injected confirms average concentrations of approximately 600 ppm for flowlines, risers gas export system, and jumpers.	MC 6.2.1 Records of inhibitor chemicals injected and total chemical use.

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Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
<p>impact on marine ecosystem functioning or integrity results.</p> <p>EPO 12 Undertake the Petroleum Activities Program in a manner that prevents a substantial adverse effect on a population of plankton including its life cycle and spatial distribution.</p> <p>EPO 13 Undertake the Petroleum Activities Program in a manner which does not modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity an area defined as a KEF.</p> <p>EPO 14 Undertake Petroleum Activities Program in a manner that prevents substantial change in sediment quality, which may adversely impact biodiversity, ecological integrity, social amenity or human.</p> <p>EPO 15 Undertake Petroleum Activities Program in a manner that prevents significant impacts on the values of the Exmouth Plateau KEF.</p>	<p>C 6.3 A flowline installation procedure will be in use which includes:</p> <ul style="list-style-type: none"> • Alarm systems for dynamic positioning to indicate loss of vessel position. • Lay system outputs monitored and adjusted to ensure flowline catenary is maintained. • Flowline touch down position via ROV monitoring. 	<p>PS 6.3.1 Flowline installation procedure is in use during pipelay activities.</p>	<p>MC 6.3.1 Records of flowline installation procedure</p>

6.7.7 Routine and Non-Routine Discharges: Project Vessels and Installation

Scarborough OPP – Relevant Impact Assessment Section														
Section 7.1.7–7.1.10 – Routine and Non-Routine Discharges														
Context														
Relevant Activities Vessel Operations – Section 3.7 Cement / grout from seabed installation activities – Section 3.11.4			Existing Environment Marine Regional Characteristics – Section 4.2 Habitats and Biological Communities – Section 4.5 Protected Species – Section 4.6					Stakeholder consultation Consultation – Section 5						
Impact/Risk Evaluation Summary														
Source of Impact/Risk	Environmental Value Potentially Impacted						Evaluation							
	Soil and Groundwater	Marine Sediment	Water Quality	Air Quality (inc. odour)	Ecosystems / Habitat	Species	Socio-economic	Decision Type	Impact/Consequence	Likelihood	Current Risk Rating	ALARP Tools	Acceptability	Outcome
Routine discharge of sewage, grey water and putrescible wastes to marine environment			✓			✓		A	E	-	-	LCS GP PJ	Broadly Acceptable	EPO 11, 12
Routine discharge of deck and bilge water to marine environment			✓			✓		A	E	-	-			
Routine discharge of brine or cooling water to the marine environment			✓			✓		A	F	-	-			
Cement and grout from seabed intervention activities		✓	✓			✓		A	E	-	-			
Description of Source of Impact/Risk														
Accommodation is provided for approximately 220 people on vessels, based on manning for PV and LCV. Project vessels routinely generate/discharge: <ul style="list-style-type: none"> • Sewage and Greywater: Small volumes of treated sewage, putrescible wastes and grey water will be routinely generated/discharged to the marine environment (impact assessment based on approximate discharge of 5-15 m³ per vessel per day). Using a rate of 0.375 m³/person/day as a guide (NERA, 2017), it is expected that vessel discharges will range from ~83 m³/day from the largest vessel (~220 people onboard) to ~9.5 m³/day from a support vessel. • Food waste: Vessel crew and passengers will generate food waste, estimated to be in the order of 1–2 kg per person per day, which will be discharged to the marine environment under controlled conditions. • Deck and Bilge Water: Routine/periodic discharge of relatively small volumes of bilge water will occur from vessels. Bilge tanks receive fluids from many parts of the vessels. Bilge water can contain water, oil, detergents, solvents, chemicals, particles and other liquids, solids or chemicals. There is also variable water discharge from 														

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vessel decks directly overboard or via deck drainage systems. Potential sources include rainfall events and/or deck activities such as cleaning/wash-down of equipment/decks.

- Brine and Cooling Water: Cooling water from machinery engines and brine water produced during the desalination process of reverse osmosis to produce potable water on board the vessels will be routinely discharged. Depending on vessel, seawater used for cooling purposes will be routinely discharged at a temperature expected to be less than 70 °C and rates of approximately 50 m³/d.
- Cement and Grout: During span rectification works, cement discharges may occur from overflow whilst filling/filtering of cement through cement bags for span rectification, line washout (down line cleaning); or cement until washout from on board vessel.

Project vessels are predominantly transient through the PAA whilst discharging, with the greatest risk associated with vessels with low transit speed during activities. The Petroleum Activities Program may not be executed as a single campaign or in a consecutive sequence, therefore the routine and non-routine vessel discharges may occur at any time during the approval period of the EP.

Detailed Impact Assessment

Assessment of Potential Impacts

Water Quality

Monitoring of vessel sewage discharges has demonstrated that a 10 m³ sewage discharge over 24 hours from a stationary source in shallow water, reduced to about 1% of its original concentration within 50 m of the discharge location (Woodside, 2008). Monitoring stations confirmed that discharges were rapidly diluted or nutrients rapidly metabolised and no elevations in water quality parameters (e.g. total nitrogen, total phosphorous and selected metals) were recorded above background levels at any station.

Discharge of food waste has the potential to change the local water quality for a short period through the addition of a temporary nutrient source, however this nutrient loading would rapidly return to background conditions following dispersion in the water.

Deck drainage and treated bilge water may contain a range of chemicals, oil, grease and solid material; however these discharges are expected to rapidly dilute in the water column (Shell, 2010). In addition, vessels are typically moving during discharges of treated bilge water, which promotes mixing and dilution.

The key physicochemical stressors that are associated with reject brine and cooling water discharge include salinity, pH, temperature and chemical toxicity. Water quality of the surrounding environment may be altered through the addition of chemicals and an increase in salinity. Scale inhibitors and biocides are commonly used within the systems described above to prevent fouling. Scale inhibitors are typically low molecular weight phosphorous compounds that are water-soluble, and only have acute toxicity to marine organisms about two orders of magnitude higher than typically used in the water phase (Black et al., 1994). The biocides typically used in the industry are highly reactive and degrade rapidly (Black et al., 1994).

The potential impacts on water quality due to cooling water discharge include chlorine toxicity and increased water temperatures. Discharges will disperse and dilute rapidly, with impacts to water quality localised to the discharge point.

Reject brine water is typically 20–50% higher in salinity to the surrounding water and based on models developed by the US EPA (Frick et al., 2001), discharges of brine water will sink through the water column where it will be rapidly mixed with receiving waters and dispersed by ocean currents, decreasing in salinity rapidly as distance from source increases.

Generally, reject brine and cooling water containing chemical additives are inherently safe at the low dosages used. They are usually consumed in the inhibition process, so there is little or no residual chemical concentration remaining upon discharge.

Cement discharges may occur, from overflow, and can result in an increase in turbidity in the water column. Reduction in water quality will be temporary (limited to the cement operation discharges) and due to small volumes, are likely to rapidly disperse and dilute in prevailing currents.

Impacts from routine and non-routine discharges from vessels on water quality will have no lasting effect due to the transient nature of vessels, with little continuous discharge in a stationary location. Furthermore, routine and non-routine vessel discharges occur in a localised mixing zone, with a high level of dilution into the open water marine environment of the PAA.

Marine Sediment

Cement discharges at the seabed are likely to be minimal and once cement has hardened, chemical additives are locked into the cement (Terrens et al., 1998) and are not expected to pose any toxicological risk to benthic biota from leaching or direct contact. The physical sediment properties of the area directly adjacent to the discharge location will be permanently altered however it will be highly localised physical footprint and is not expected to affect the overall diversity or ecosystem function of the benthic communities in the area.

The potential impacts to benthic communities caused by smothering from a surface release of cement are expected to be minimal due to small volumes, intermittent nature of these discharges, and high potential for dispersal by ocean

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currents. This impact on soft sediment communities is not expected to affect the diversity or ecosystem function in the area, and is considered to be a localised impact.

Marine Fauna

It is possible that marine fauna transiting the localised area may come into contact with these discharges (e.g. marine turtles, humpback whales, whale sharks; **Section 4.6**) as they traverse the PAA. However, given the localised extent of cumulative impacts from multiple vessel discharges and limited exposure within the PAA, significant impacts to marine fauna are not expected. No BIA's for marine fauna overlap the PAA

Plankton

Routine and non-routine discharges may affect the ecophysiology of marine organisms as a result in changes of salinity. Studies indicate that effects from increased salinity on planktonic communities in areas of high mixing and dispersion are generally limited to the point of discharge only (Azis et al., 2003). Research has demonstrated that zooplankton are not affected in areas of sewerage or greywater discharge for transient vessels (Mearns et al., 2003; Ytreberg et al., 2020). Plankton communities are expected to rapidly recover from short term, localised impacts due to their naturally high mortality, and rapid replacement rates (UNEP, 1985).

Planktonic productivity in the NWMR is low. No significant impacts from the planned routine discharges are expected, because of the minor quantities involved, the expected localised mixing zone and high level of dilution into the open water marine environment of the PAA. Impacts to plankton from grey water, sewerage or brine and cooling water discharges is not expected.

Cumulative Impacts

The impacts from routine and non-routine discharges from vessels on water quality will have no lasting effect, due to the transient nature of vessels, with little continuous discharge in adjacent stationary locations. Furthermore, routine and non-routine vessel discharges occur in a localised mixing zone, with a high level of dilution into the open water marine environment of the PAA. As such, cumulative impacts from vessel discharges are not considered credible.

Summary of Assessment Outcomes

Receptor	Impact	Receptor Sensitivity Level	Magnitude	Impact Significance Level
Water Quality	Change in water quality	Low value (open water)	No Lasting Effect	Negligible (F)
Sediment quality	Change in sediment quality	Low value	No Lasting Effect	Negligible (F)
Migratory Shorebirds and Seabirds	Injury or behavioural changes to marine fauna	High value species	No Lasting Effect	Slight (E)
Fish		High value species	No Lasting Effect	Slight (E)
Marine Mammals		High value species	No Lasting Effect	Slight (E)
Marine Reptiles		High value species	No Lasting Effect	Slight (E)
Plankton		Low value (open water)	No Lasting Effect	Negligible (F)

Overall Impact Significance Level: The overall impact significance level for routine and non-routine discharges from vessels is E based on no lasting effect to marine fauna. The impact significance level for water quality is consistent with the level rated in the Scarborough OPP. Potential impacts to marine fauna have been additionally assessed in this EP. There is no change in magnitude of impact (no lasting effect); however, the impact significance level is slightly higher due to the higher receptor sensitivity level.

Demonstration of ALARP

Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/Risk Reduction	Proportionality	Control Adopted
Legislation, Codes and Standards				
Marine Order 95 – Pollution prevention –	F: Yes.	No reduction in likelihood or	Controls based on legislative	Yes

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<p>garbage (as appropriate to vessel class) which requires putrescible waste and food scraps are passed through a macerator so that it is capable of passing through a screen with no opening wider than 25 mm.</p>	<p>CS: Minimal cost. Standard practice.</p>	<p>consequence would result.</p>	<p>requirements – must be adopted.</p>	<p>C 7.1</p>
<p>Marine Order 96 – Pollution prevention – Sewage (as appropriate to vessel class) which include the following requirements:</p> <ul style="list-style-type: none"> • a sewage treatment plant approved by an issuing body that complies with Regulation 9 of Annex IV (of MARPOL) and other guidelines as required; or • a sewage comminuting and disinfecting system approved by an issuing body, that complies with Regulation 9 of Annex IV; or • a holding tank approved by an issuing body, that complies with Regulation 9 of Annex IV. 	<p>F: Yes. CS: Minimal cost. Standard practice.</p>	<p>No reduction in likelihood or consequence would result.</p>	<p>Controls based on legislative requirements – must be adopted.</p>	<p>Yes C 7.2</p>
<p>Marine Order 91 – Oil (as relevant to vessel class) requirements, which include mandatory measures for the processing of oily water prior to discharge:</p> <ul style="list-style-type: none"> • Oil Record Book Valid International Oil Pollution Prevention (IOPP) Certificate. • Vessel specific SOPEP. 	<p>F: Yes. CS: Minimal cost. Standard practice.</p>	<p>No reduction in likelihood or consequence would result.</p>	<p>Controls based on legislative requirements – must be adopted.</p>	<p>Yes C 7.3</p>
<p>Good Practice</p>				
<p>Chemicals will be selected with the lowest practicable environmental impacts and risks subject to technical constraints.</p>	<p>F: Yes. CS: Minimal cost. Standard practice.</p>	<p>Environmental assessment of chemicals in discharges will reduce the consequence of impacts resulting from discharges to the marine</p>	<p>Benefits outweigh cost/sacrifice.</p>	<p>Yes C 7.4</p>

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		environment by ensuring chemicals have been assessed for environmental acceptability. Planned discharges are required for the safe execution of activities and therefore no reduction in likelihood can occur.		
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Professional Judgement – Eliminate

No additional controls identified.

Professional Judgement – Substitute

Storage, transport and treatment/disposal onshore of routine discharges.	F: Not feasible. Would present additional safety and hygiene hazards resulting from the storage, loading and transport of the waste material. Distance of activity offshore also makes the implementation of this control not feasible. CS: Not considered – control not feasible.	Not considered – control not feasible.	Not considered – control not feasible.	No
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Professional Judgement – Engineered Solution

No additional controls identified.

ALARP Statement:

On the basis of the environmental impact assessment outcomes and use of the relevant tools appropriate to the decision type (i.e. Decision Type A, **Section 2.3.3**), Woodside considers the adopted controls appropriate to manage the impacts of planned routine and non-routine discharges from vessels. As no reasonable additional/alternative controls were identified that would further reduce the impacts without grossly disproportionate sacrifice, the impacts and risks are considered ALARP.

Demonstration of Acceptability

Acceptability Criteria and Assessment

The Petroleum Activities Program meets the acceptability criteria (**Section 2.3.5**):

- Overall impact significance level for water quality is consistent with the level rated in the Scarborough OPP. As discussed above, potential impacts to marine fauna have been additionally assessed in this EP. There is no change in magnitude of impact (no lasting effect); however, the impact significance level is slightly higher due to the higher receptor sensitivity level. This is not considered a significant change to the overall environmental impact and risk assessed in the Scarborough OPP.
- EPOs and controls in the Scarborough OPP that are relevant to routine discharges have been adopted.
- There are no changes to internal/external context specific to this risk from the Scarborough OPP. Feedback raised during consultation, including any specific updates to the EP in response, has been considered in Appendix F, Table 1.

Acceptability Statement:

The impact assessment has determined that, given the adopted controls, routine and non-routine discharges vessels are unlikely to result in an impact significance level greater than negligible. No BIAs for EPBC Act listed Threatened or Migratory species overlap the PAA (refer to **Section 4.6**). The adopted controls are considered consistent with industry legislation, codes and standards, and professional judgement and meet the requirements of Australian Marine Orders.

The potential impacts are considered broadly acceptable if the adopted controls are implemented. Therefore, Woodside considers the adopted controls appropriate to manage the impacts of these discharges to a level that is broadly acceptable.

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Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
<p>EPO 11 Undertake the Petroleum Activities Program in a manner that does not result in a substantial change in water quality which may adversely impact on biodiversity, ecological integrity, social amenity or human health.</p> <p>EPO 12 Undertake the Petroleum Activities Program in a manner that prevents a substantial adverse effect on a population of plankton including its life cycle and spatial distribution.</p>	<p>C 7.1 Marine Order 95 – Pollution prevention – garbage (as appropriate to vessel class) which requires putrescible waste and food scraps are passed through a macerator so that it is capable of passing through a screen with no opening wider than 25 mm.</p>	<p>PS 7.1.1 Vessels compliant with Marine Order 95 – Pollution prevention – garbage.</p>	<p>MC 7.1.1 Records demonstrate vessels are compliant with Marine Order 95 – Pollution prevention (as appropriate to vessel class).</p>
	<p>C 7.2 Marine Order 96 - pollution prevention – sewage (as appropriate to vessel class) which include the following requirements:</p> <ul style="list-style-type: none"> • a sewage treatment plant approved by an issuing body that complies with Regulation 9 of Annex IV (of MARPOL) and other guidelines as required; or • a sewage comminuting and disinfecting system approved by an issuing body, that complies with Regulation 9 of Annex IV; or • a holding tank approved by an issuing body, that complies with Regulation 9 of Annex IV. 	<p>PS 7.2.1 Vessels compliant with Marine Order 96 – Pollution prevention – Sewage (as appropriate to vessel class).</p>	<p>MC 7.2.1 Records demonstrate vessels are compliant with Marine Order 96 – Pollution prevention – Sewage (as appropriate to vessel class).</p>
	<p>C 7.3 Marine Order 91 – oil (as relevant to vessel class) requirements, which includes mandatory measures for the processing of oily water prior to discharge:</p> <ul style="list-style-type: none"> • Oil Record Book Valid International Oil Pollution Prevention (IOPP) Certificate. • Vessel specific SOPEP. 	<p>PS 7.3.1 Discharge of machinery space bilge/oily water will meet oil content standard of <15 ppm without dilution.</p>	<p>MC 7.3.1 Records demonstrate discharge specification met for vessels.</p>
	<p>C 7.4 Chemicals will be selected with the lowest practicable</p>	<p>PS 7.4.1 Chemicals intended or likely to be discharged into</p>	<p>MC 7.4.1 Records demonstrate chemical selection,</p>

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Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
	environmental impacts and risks subject to technical constraints and approved through the Woodside chemical assessment process as described in Section 7.2.1 .	the marine environment will be approved through the Woodside chemical assessment process.	assessment and approval process for selected chemicals is followed.

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6.8 Unplanned Activities (Accidents, Incidents, Emergency Situations)

6.8.1 Quantitative Spill Risk Assessment Methodology

6.8.1.1 Quantitative Hydrocarbon Spill Modelling

Quantitative hydrocarbon spill modelling was performed by RPS, on behalf of Woodside, using a three-dimensional hydrocarbon spill trajectory and weathering model, SIMAP (Spill Impact Mapping and Analysis Program). The model is designed to simulate the transport, spreading and weathering of specific hydrocarbon types under different environmental conditions (both meteorological and oceanographic). Near-field subsurface discharge modelling was performed using OILMAP, which predicts the droplet sizes that are generated by the turbulence of the discharge as well as the centreline velocity, buoyancy, width and trapping depth (if any) of the rising gas and oil plumes. The OILMAP output parameters were used as input into SIMAP.

The algorithms in the SIMAP model are based on the best available scientific knowledge and are updated when necessary in response to significant advances in knowledge. Recent improvements have been implemented to the entrainment algorithm, which have been adjusted to implement the findings of published data based on field research performed during the Macondo spill event in the Gulf of Mexico (Spaulding et al., 2017; Li et al., 2017; French McCay et al., 2018).

Stochastic modelling was conducted for this study, which compiled data from 100 hypothetical spills under different environmental conditions to determine the widest extent of possible oil dispersion. The environmental conditions for each of the hypothetical spills were selected randomly from an historic time-series of wind and current data representative of the study area. Results of the replicate simulations were then statistically analysed and mapped to define contours of percentage probability of contact at identified thresholds around the hydrocarbon release point. The simulations that show something unusual or unexpected make an important contribution to the overall outcomes and fate of the hydrocarbon.

The model simulates surface releases and uses the unique physical and chemical properties of a representative hydrocarbon type to calculate rates of evaporation and viscosity change, including the tendency to form oil-in-water emulsions. Moreover, the unique transport and dispersion of surface slicks and in-water components (entrained and dissolved) are modelled separately. Thus, the model can be used to understand the wider potential consequences of a spill, including direct contact of hydrocarbons due to surface slicks (floating hydrocarbon) and exposure of organisms to entrained and dissolved aromatic hydrocarbons in the water column. The model also calculates the accumulation of hydrocarbon mass that arrives on each section of shoreline over time, taking into account any mass that is lost to evaporation and/or subsequent removal by current and wind forces.

All hydrocarbons spill modelling assessments performed by RPS undergo initial sensitivity modelling to determine appropriate time to add to the simulation after the cessation of the spill. The amount of time following the spill is based on the time required for the modelled concentrations to practically drop below threshold concentrations anywhere in the model domain in the test cases.

6.8.1.2 Worst-case Scenario

In assessing the potential impacts of an unplanned hydrocarbon release, representative worst-case scenarios (in terms of volume and location) were assessed. A summary of the credible hydrocarbon spill scenarios that could occur during the Scarborough Petroleum Activities Program are provided in **Table 6-11**.

Table 6-11: Credible hydrocarbon spill scenarios

Scenario	Hydrocarbon type	Maximum credible volume	Location
Vessel collision resulting in rupture of a tank	MDO	1000 m ³	Within PAA
Loss of containment during bunkering	MDO	50 m ³	Within PAA

For the Petroleum Activities Program, the worst-case scenario was identified to be an instantaneous surface release of 1000 m³ of MDO, representing loss of vessel fuel tank integrity following a collision. As the worst-case scenario, the following assessment of impacts will also address the potential impacts of other credible lesser releases.

6.8.1.3 Environment that May Be Affected and Hydrocarbon Contact Thresholds

The outputs of the quantitative hydrocarbon spill modelling are used to assess the environmental risk, if a credible hydrocarbon spill scenario occurred, by delineating which areas of the marine environment could be exposed to hydrocarbon levels exceeding hydrocarbon threshold concentrations (outlined in **Table 6-12**). The summary of all the locations where hydrocarbon thresholds could be exceeded by any of the simulations modelled is defined as the ‘environment that may be affected’ (EMBA), which has been conservatively assessed based on the loss of 2000 m³ in the event of a vessel collision resulting in a fuel tank rupture.

As the weathering of different fates of hydrocarbons (surface, entrained and dissolved) differs due to the influence of the metocean mechanism of transportation, the EMBA combines the potential spatial extent of the different fates. Note, no shoreline accumulation of hydrocarbons above threshold concentrations resulted from the modelled worst-case credible spill.

The EMBA covers a larger area than the area that is likely to be affected during any single spill event, as the model was run for a variety of weather and metocean conditions. The EMBA therefore represents the total extent of all the locations where hydrocarbon thresholds could be exceeded from all modelling runs. Given the EMBA comprises the results of many individual simulations, the total area covered at the thresholds has been smoothed to create a continuous boundary for the purpose of describing the environment within it (**Figure 4-1**).

Surface and accumulated shoreline hydrocarbon concentrations are expressed as grams per square metre (g/m²), with entrained and dissolved aromatic hydrocarbon concentrations expressed as parts per billion (ppb). A conservative approach adopting accepted contact thresholds that are documented to impact the marine environment are used to define the EMBA. These hydrocarbon thresholds are presented in **Table 6-12** and described in the following subsections.

Woodside recognises that hydrocarbons may be present beyond the ecological impact EMBA at low concentrations that may be visible but are not expected to cause ecological impacts. The threshold for visible surface oil (1 g/m²) has therefore been used to define an additional boundary within which socio-cultural impacts to the visual amenity of the marine environment may occur. This area is referred to as the socio-cultural EMBA. Any ecological impacts from dissolved and entrained hydrocarbons above prescribed thresholds, as in **Table 6-12**, may also result in socio-cultural impacts. Potential impacts to socio-cultural values assessed within these EMBAs include:

- protected areas
- national and Commonwealth Heritage Listed places
- tourism and recreation
- fisheries.

Table 6-12: Summary of environmental impact thresholds applied to the quantitative hydrocarbon spill risk modelling results

Hydro-carbon Type	EMBA				Socio-cultural EMBA	Scientific Monitoring Plan EMBA
	Surface hydrocarbon (g/m ²)	Dissolved hydrocarbon (ppb)	Entrained hydrocarbon (ppb)	Accumulated hydrocarbon (g/m ²)	Surface hydrocarbon (g/m ²)	Accumulated hydrocarbon (g/m ²)
Marine Diesel	10	50	100	100	1	10

6.8.1.4 Surface Hydrocarbon Threshold Concentrations

The spill modelling outputs defined the EMBA for surface hydrocarbons resulting from a spill (contact on surface waters) using a threshold of ≥ 10 g/m² for marine diesel. This threshold is used to define an area within which ecological impacts to the marine environment may occur from surface hydrocarbons. It represents the minimum oil thickness (0.01 mm) at which ecological impacts (e.g. to birds and marine mammals) are expected to occur.

Thresholds for registering biological impacts resulting from contact of surface slicks have been estimated by different researchers at about 10–25 g/m² (French et al., 1999; Koops et al., 2004; National Oceanic and Atmospheric Administration, 1996). Potential impacts of surface slick concentrations in this range for floating hydrocarbons may include harm to seabirds through ingestion from preening of contaminated feathers, or the loss of the thermal protection of their feathers. The 10 g/m² threshold is the reported level of oiling to instigate impacts to seabirds and is also applied to other wildlife, though it is recognised that ‘unfurred’ animals, where hydrocarbon adherence is less, may be less vulnerable. ‘Oiling’ at this threshold is taken to be of a magnitude that can cause a response from the most vulnerable wildlife such as seabirds. Due to weathering processes, surface hydrocarbons will have a lower toxicity due to change in their composition over time. Potential impacts to shoreline sensitive receptors may be markedly reduced in instances where there is extended duration until shoreline contact.

A surface threshold of 10 g/m² represents a ‘dull metallic colour’ (Bonn Agreement, 2015) (**Table 6-13**). A lower concentration of 1 g/m² is used to define an area within which social-cultural impacts to the visual amenity of the marine environment may occur. The surface threshold of ≥ 1 g/m² is based on the relationship between film thickness and appearance (Bonn Agreement oil appearance code, 2015), and represents a ‘rainbow sheen’ appearance. This threshold is considered below levels which would cause ecological impacts, and instead represents potential for visual amenity impacts. This threshold area is referred to as the ‘socio-cultural EMBA’.

Table 6-13: The Bonn Agreement oil appearance code

Appearance (following Bonn visibility descriptors)	Mass per area (g/m ²)	Thickness (µm)	Volume per area (L/km ²)
Discontinuous true oil colours	50 to 200	50 to 200	50,000 to 200,000
Dull metallic colours	5 to 50	5 to 50	5000 to 50,000
Rainbow sheen	0.30 to 5.00	0.30 to 5.00	300 to 5000
Silver sheen	0.04 to 0.30	0.04 to 0.30	40 to 300

6.8.1.5 Accumulated Hydrocarbon Threshold Concentrations

Owens et al (1994) define accumulated hydrocarbon < 100 g/m² to have an appearance of a stain on shorelines. French-McCay (2009) defines accumulated hydrocarbons ≥ 100 g/m² to be the threshold that could impact the survival and reproductive capacity of benthic epifaunal invertebrates living in

intertidal habitat. A threshold of ≥ 100 g/m² has been adopted as the threshold for shoreline accumulation and has been included in the EMBA. Further, any ecological impacts at the shoreline accumulation threshold may also result in socio-cultural impacts.

6.8.1.6 Dissolved Aromatic Hydrocarbon Threshold Concentrations

Dissolved hydrocarbons present a narcotic effect resulting from uptake into the tissues of marine organisms. This effect is additive, increasing with exposure concentration or with time of exposure (French-McCay, 2002; NRC, 2005). The dissolved aromatic threshold of 50 ppb has been selected as a medium level threshold to approximate the potential toxic effects, particularly sublethal effects to sensitive species, as consistent with the NOPSEMA Oil Spill Modelling Guidance Bulletin (NOPSEMA, 2019).

6.8.1.7 Entrained Hydrocarbon Threshold Concentrations

This threshold is used to define an area within which ecological impacts to the marine environment may occur from entrained hydrocarbons. Therefore, it may also be associated with socio-cultural impacts.

Entrained hydrocarbons present a number of possible mechanisms for toxic exposure to marine organisms. The entrained hydrocarbon droplets may contain soluble compounds, hence have the potential for generating elevated concentrations of dissolved aromatic hydrocarbons (e.g. if mixed by breaking waves against a shoreline). Physical and chemical effects of the entrained hydrocarbon droplets have also been demonstrated through direct contact with organisms; for example, through physical coating of gills and body surfaces, and accidental ingestion (National Research Council, 2005).

The entrained threshold has been selected to be consistent with the NOPSEMA Oil Spill Modelling Guidance Bulletin (NOPSEMA, 2019). An entrained threshold of 100 ppb is considered to be appropriate given the oil characteristics for informing potential impacts to receptors.

6.8.1.8 Scientific Monitoring

A planning area for scientific monitoring is also described in Section 5.6 of the Oil Spill Preparedness and Response Mitigation Assessment (**Appendix D**). This planning area has been set with reference to the low exposure entrained value of 10 ppb detailed in NOPSEMA Bulletin #1 Oil Spill Modelling (2019). This low exposure threshold is based on the potential for exceeding water quality triggers.

A scientific monitoring program would be activated following a Level 2 or 3 unplanned hydrocarbon release, or any release event with the potential to contact sensitive environmental receptors. This would consider receptors at risk (ecological and socio-economic) for the entire predicted EMBA and in particular, any identified Pre-emptive Baseline Areas (PBAs) for the worst-case credible spill scenario or other identified unplanned hydrocarbon releases associated with the operational activities.

vessel alongside a wharf, causing it to sink. No reported pollution resulted from the sunken vessel. These incidents demonstrate the likelihood of only minor volumes of hydrocarbons being released during the highly unlikely event of a vessel collision.

From 2010 to 2011, the ATSB’s annual publication defines the individual safety action factors identified in marine accidents and incidents: 42% related to navigation action (2011). Of those, 15% related to poor communication and 42% related to poor monitoring, checking and documentation (ATSB, 2011). The majority of these related to the grounding instances.

Credible Scenario

For a vessel collision to result in the worst-case scenario of a hydrocarbon spill potentially impacting an environmental receptor, several factors must align as follows:

- The identified causes of vessel interaction must result in a collision.
- The collision must have enough force to penetrate the vessel hull.
- The collision must be in the exact location of the fuel tank.
- The fuel tank must be full, or at least of volume which is higher than the point of penetration.

The probability of the chain of events described above aligning, to result in a breach of fuel tanks resulting in a spill that could potentially affect the marine environment is considered highly unlikely.

The environmental risk analysis and evaluation identified and assessed a range of potential scenarios that could result in a loss of vessel structural integrity, resulting in damage to fuel storage tank(s) and a loss of marine diesel to the marine environment. The likelihood of a collision was assessed as being highly unlikely, given standard vessel operations and equipment in place to prevent collision at sea, and the construction and placement of storage tanks. The largest tank of the support vessel is unlikely to exceed 250 m³. For the purposes of this assessment a worst-case instantaneous loss of 1000 m³ from a diesel tank has been considered. The scenarios considered damage to single and multiple fuel storage tanks in a project vessel due to dropped objects and various combinations of vessel to vessel collisions. A summary of the credible spill scenario resulting from a vessel collision is outlined in **Table 6-14**.

Given the offshore location of the PAA, vessel grounding is not considered a credible risk.

Table 6-14: Summary of credible hydrocarbon spill scenario as a result of vessel collision

Scenario	Hydrocarbon Volumes	Preventative and Mitigation Controls	Credibility
Hydrocarbon release resulting from a collision with a third-party vessel (Loss of containment from the construction vessel fuel tank)	Marine Diesel Oil 1000 m ³ instantaneous	Typically double wall, tanks which are located mid-ship (not bow or stern). Vessels are not anchored and steam at low speeds when relocating within the PAA or providing stand-by cover. Normal maritime procedures would apply during such vessel movements.	Credible A vessel collision could potentially result in a release from a construction vessel fuel tank.
Hydrocarbon release caused by vessel collision (support vessel)	250 m ³ instantaneous	Typically double wall, tanks which are located mid-ship (not bow or stern). Vessels are not anchored and steam at low speeds when relocating within the PAA or providing stand-by cover. Normal maritime procedures would apply during such vessel movements.	Credible A vessel collision could potentially result in a release from a support vessel fuel tank.
Loss of containment due to collision of project vessels	Marine Diesel Oil 1000 m ³ instantaneous	Slow speeds, dynamic positioning redundancy, management of simultaneous operations, weather related operability controls and communications.	Not-credible Loss of containment due to collision of project vessels during concurrent activities is not considered credible.

Quantitative Hydrocarbon Risk Assessment

Modelling of an instantaneous surface release of 2000 m³ of marine diesel was conducted by RPS on behalf of Woodside as part of Woodside’s Scarborough project quantitative spill risk assessment at field location (RPS, 2019). While this volume is significantly larger than the 1000 m³ worst-case spill volume from a project vessel, the results of the modelling can be used to demonstrate that a much larger marine diesel spill in the vicinity of the PAA has an EMBA that is not predicted to include any surface slicks above threshold volumes resulting in any shoreline contact or accumulation.

Basing the impact assessment for a vessel collision scenario on this modelling is considered highly conservative and consequently, the EMBA for a 2000 m³ surface release of marine diesel within the PAA would be considerably smaller than the EMBA described in this EP.

The modelling assessed the extent of a marine diesel spill volume of 2000 m³ for all seasons, using an historic sample of wind and current data for the region (2006-2015, inclusive). A total of 100 simulations were modelled over an annual period, with each simulation tracked for 42-days. The coordinates of the modelled spill location are detailed in **Table 6-15**.

Table 6-15: Spill release locations for 2000 m³ MDO spill

Location	Coordinates
FPU location, within the PAA	19° 53' 54.72" S 113° 14' 19.56" E

Hydrocarbon Characteristics

MDO is a non-persistent fuel oil and contains a small proportion of heavy components (or low volatile components) that tend to physically entrain into the upper water column in the presence of moderate winds (i.e. >12 knots) and breaking waves but may re-float to the surface if these conditions abate. In the event of a substantial spill, the heavier components can remain entrained or remain on the sea surface for an extended period. The characteristics of the marine diesel are given in **Table 6-16**.

Marine diesel is a mixture of both volatile and persistent hydrocarbons. Predicted weathering of marine diesel, based on typical conditions in the region, indicates that about 6% of the oil mass should evaporate within the first 12 hours, and a further 35% is expected to evaporate within the first 24 hours (**Figure 6-2**) (RPS, 2019). After this time the majority of the remaining hydrocarbon is entrained into the upper water column. Seven days following the spill, approximately 35–40% would evaporate, 45% would entrain, 15% would decay and approximately 5% would be dissolved.

Given the environmental conditions experienced in the PAA, marine diesel is expected to undergo rapid spreading and this, together with evaporative loss, is likely to result in a rapid dissipation of the spill. Marine diesel distillates tend not to form emulsions at the temperatures found in the region.

Table 6-16: Characteristics of the marine diesel

Hydrocarbon type	Initial density (g/cm ³) at 25 °C	Viscosity (cP @ 25 °C)	Component BP (°C)	Volatiles %<180	Semi volatiles % 180–265	Low volatility (%) 265–380	Residual (%) >380
				Non-Persistent			Persistent
Marine diesel	0.829	4.0	% of total	6	34.6	54.4	5
			% aromatics	1.8	1.0	0.2	-

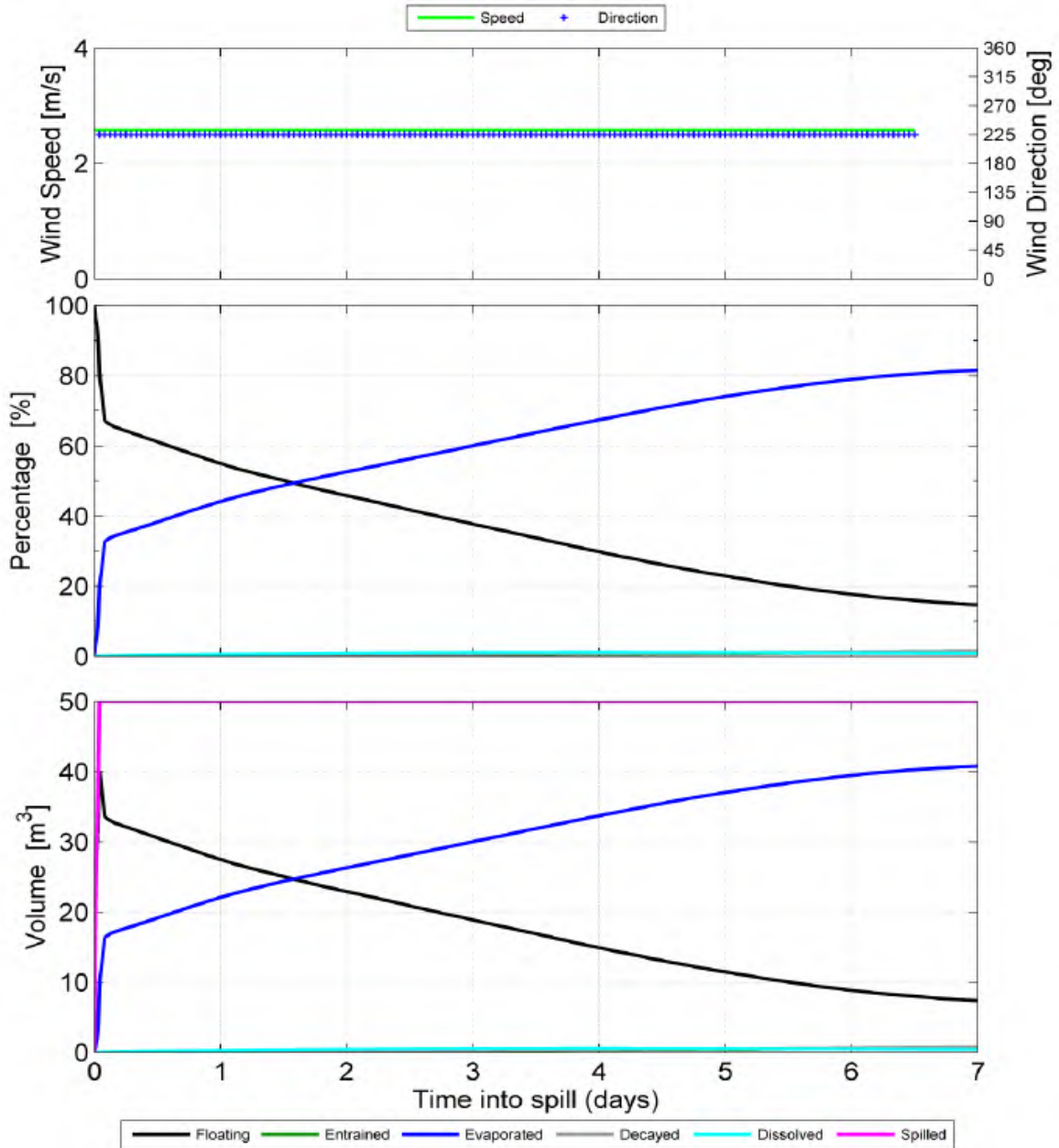


Figure 6-2: Mass balance plot representing, as proportion (middle panel) and volume (bottom panel), the weathering of marine diesel spilled onto the water surface as a one-off release (50 m³ over one hour) and subject to a constant 5 kn (2.6 m/s) wind at 27 °C water temperature and 25 °C air temperature

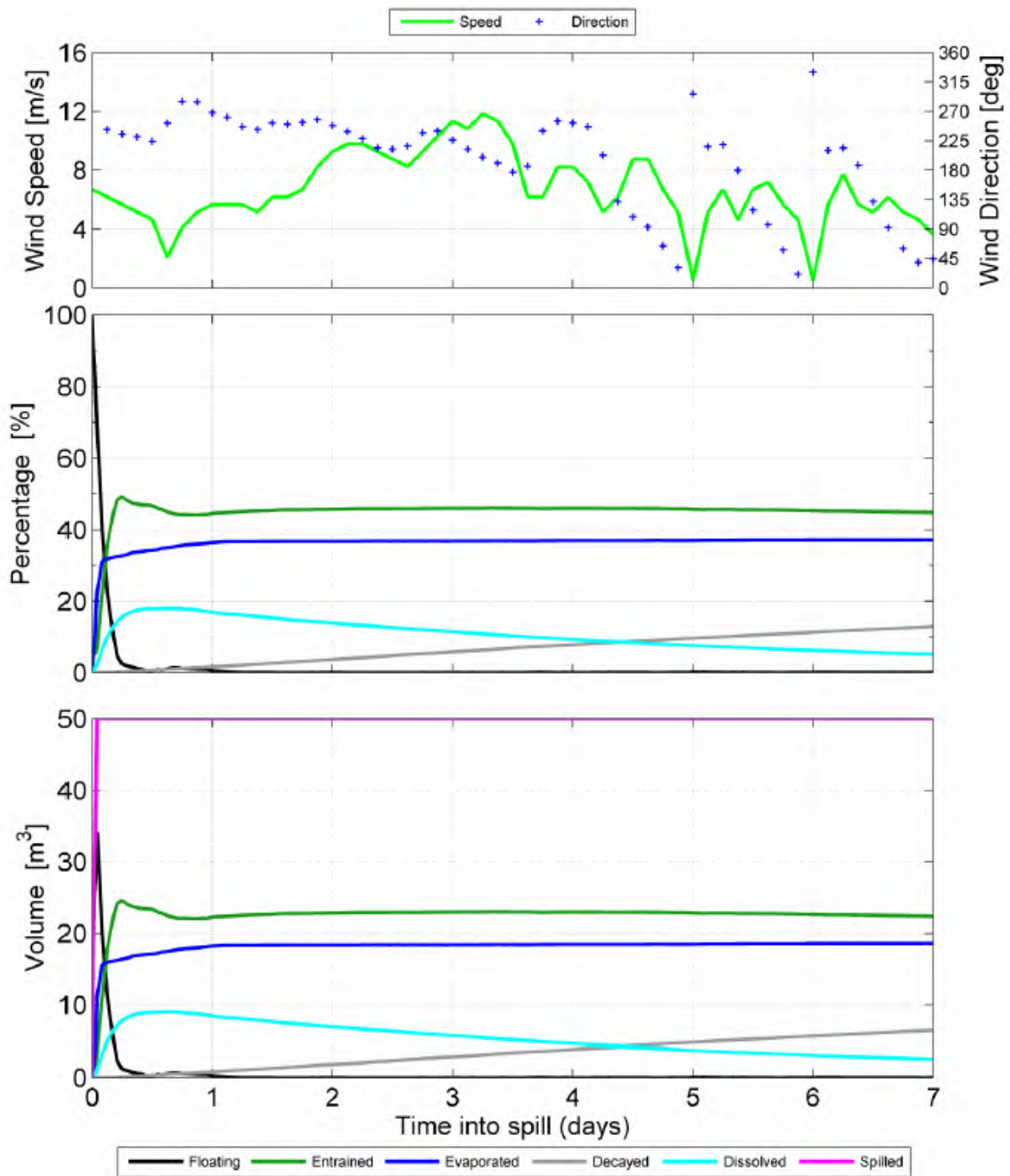


Figure 6-3: Proportional mass balance plot representing weathering of a surface spill of marine diesel as a one-off release (50 m³ over 1 hour) and subject to variable wind at 27 °C water temperature and 25 °C air temperature (RPS, 2019)

Detailed Impact Assessment

Assessment of Potential Impacts

Environment That May Be Affected

The overall EMBA for the Petroleum Activities Program is based on stochastic modelling, which compiles data from 100 hypothetical worst-case spills under a variety of weather and metocean conditions (as described in **Section 6.8.1**). Spill modelling was undertaken based on an instantaneous surface release of 2000 m³ of marine diesel, which is much greater than the assumed largest marine diesel tank volume of 1000 m³ for the largest project vessel (construction vessel). Therefore, the EMBA described in this EP is considered highly conservative. The worst-case distances and probabilities of contact to receptor locations have been chosen as a conservative approach.

As the weathering of different fates of hydrocarbons (surface, entrained and dissolved) differs due to the influence of the metocean transport mechanism, a different EMBA is discussed for each fate.

Surface Hydrocarbons: If this scenario occurred, a surface hydrocarbon slick would form downcurrent of the release location, with the trajectory dependent on prevailing wind and current conditions at the time. The modelling indicates that the EMBA would be confined to open water, with surface hydrocarbons extending up to about 113 km from the release location at or above the 10 g/m² impact threshold. There is a low probability (1%) of the Gascoyne AMP encountering surface hydrocarbons of 10 g/m²; no other contact with sensitive receptor locations is predicted.

A socio-cultural EMBA for surface hydrocarbons which includes the threshold for visible surface hydrocarbons of 1 g/m² may extend up to about 116 km from the release site. There is a low probability (1%) of the Gascoyne AMP encountering surface hydrocarbons of 1 g/m².

Entrained Hydrocarbons: Quantitative hydrocarbon spill modelling results are shown **Figure 6-2**. If this vessel collision scenario occurred, a plume of entrained hydrocarbons would form downcurrent of the release location, with the trajectory dependent on prevailing current conditions at the time. The modelling indicates that locations exposed to entrained hydrocarbons at or above the threshold concentration of 100 ppb are restricted to offshore areas up to about 921 km from the release site. Concentrations above 100 ppb are not expected to exceed depths of approximately 15 m below mean sea level (BMSL). The receptors predicted to be contacted by entrained oil concentrations at the 100 ppb threshold are the: Gascoyne AMP (10% probability), Abrolhos Islands AMP (1% probability), and Carnarvon Canyon AMP (1% probability; **Table 6-17**).

Dissolved Hydrocarbons: Dissolved aromatic hydrocarbons at concentrations equal to or greater than the 50 ppb threshold are predicted to be found up to 249 km from the spill site. Concentrations above 50 ppb are not expected to exceed depths of approximately 15 m BMSL. The modelling predicted a 3% probability of dissolved oil concentrations at ≥50 ppb contacting the Gascoyne AMP; no other receptors were predicted to be contacted at or above the dissolved oil threshold.

Accumulated Hydrocarbons: Accumulated hydrocarbons above threshold concentrations (≥100 g/m²) were not predicted by the modelling to occur at any location. Floating oil at concentrations equal to or greater than 1 g/m² are not predicted to contact any shoreline receptors.

Water Quality

The highly-mixed, open water location and characteristics of hydrocarbons released will result in rapid evaporation and dispersion. However, MDO contains a small proportion of heavy components (or low-volatile components) that tend to physically entrain into the upper water column in the presence of moderate winds (i.e. >12 knots) and breaking waves but may resurface if these conditions abate. If a substantial spill occurred, the heavier components could remain entrained or remain on the sea surface for an extended period and travel significant distances from the source, albeit at low concentrations.

As described above, predicted weathering of marine diesel, based on typical conditions in the region, indicates that about 6% of the oil mass should evaporate within the first 12 hours, and a further 35% is expected to evaporate within the first 24 hours (**Figure 6-2**) (RPS, 2019). After this time the majority of the remaining hydrocarbon is entrained into the upper water column.

The magnitude of potential impact of a change in water quality from unplanned release of MDO is assessed as slight. Receptor sensitivity of water quality is low (low value, open ocean), and therefore the consequence of a release of hydrocarbons on water quality is Negligible (F).

Plankton

Injury/mortality to planktonic species may occur due to a change in water quality following an unplanned hydrocarbon release.

Primary production by plankton (supported by sporadic upwelling events in the offshore waters of the NWS) is an important component of the primary marine food web. Planktonic communities are generally mixed, including phytoplankton (cyanobacteria and other microalgae) and secondary consuming zooplankton, such as crustaceans (e.g. copepods), and the eggs and larvae of fish and invertebrates (meroplankton).

Exposure to hydrocarbons in the water column (entrained or dissolved) can change species composition, with declines or increases in one or more species or taxonomic groups (Batten et al., 1998). Phytoplankton may also experience decreased rates of photosynthesis (Tomajka, 1985). For zooplankton, such as fish, coral and invertebrate eggs and larvae, direct effects of contamination may include toxicity, suffocation, changes in behaviour, or

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Detailed Impact Assessment

environmental changes that make them more susceptible to predation. Impacts on plankton communities are likely to occur in areas where entrained or dissolved aromatic hydrocarbon threshold concentrations are exceeded, but communities are expected to recover relatively quickly (within weeks or months). This is due to high population turnover, with copious production within short generation times that also buffers the potential for long-term (i.e. years) population declines (International Tanker Owners Pollution Federation, 2011a).

When first released, MDO has a higher toxicity due to the presence of the volatile components. Plankton making contact close to the spill source at the time of the spill may be impacted, however, due to low planktonic productivity within the NWMR it is unlikely that large populations of plankton will be affected at the sea surface above thresholds as this is only predicted for the first few days after the spill.

Given hydrocarbon characteristics, expected rapid weathering and then degradation of the entrained component to below impact thresholds, and relatively quick recovery times of plankton, unplanned releases from Scarborough are not expected to have a substantial adverse effect on plankton life cycle and spatial distribution.

There are no Management Plans, Recovery Plans or Conservation Advice related to plankton.

Based on the detailed risk evaluation, the magnitude of potential impact to plankton from unplanned release of MDO is assessed as slight. Receptor sensitivity of plankton is low (low value, open water), and therefore the consequence of a release of hydrocarbons on plankton is Negligible (F).

Fish

Injury/mortality to fish species may occur due to a change in water quality following an unplanned hydrocarbon release. Any surface and subsurface hydrocarbon release could impact fish, as they are widely dispersed throughout the water column.

Impacts to sharks and rays may occur through direct contact with hydrocarbons and contaminate the tissues and internal organs, either through direct contact or via the food chain (consumption of prey). As gill breathing organisms, sharks and rays may be vulnerable to toxic effects of dissolved hydrocarbons (entering the body via the gills) and entrained hydrocarbons (coating of the gills inhibiting gas exchange). In the offshore environment, it is probable that pelagic shark species are able to detect and avoid hydrocarbons by swimming into deeper water or away from the affected areas.

Fish mortalities are rarely observed to occur as a result of hydrocarbon spills (International Tanker Owners Pollution Federation, 2011b). This has generally been attributed to the possibility that pelagic fish are able to detect and avoid surface waters underneath hydrocarbon spills by swimming into deeper water or away from the affected areas. Fish that have been exposed to dissolved aromatic hydrocarbons are capable of eliminating the toxicants once placed in clean water; hence, individuals exposed to a spill are likely to recover (King et al., 1996). Where fish mortalities have been recorded, the spills (resulting from the groundings of the tankers Amoco Cadiz in 1978 and the Florida in 1969) have occurred in sheltered bays.

Laboratory studies have shown that adult fish can detect hydrocarbons in water at very low concentrations, and large numbers of dead fish have rarely been reported after hydrocarbon spills (Hjermann et al., 2007). This suggests that juvenile and adult fish can avoid water contaminated with high concentrations of hydrocarbons.

The effects of exposure to oil on the metabolism of fish appear to vary according to the organs involved, exposure concentrations and route of exposure (waterborne or food intake). Oil reduces the aerobic capacity of fish exposed to aromatics in the water, and to a lesser extent affects fish consuming contaminated food (Cohen et al., 2005). The liver, a major detoxification organ, appears to be where anaerobic activity is most impacted, probably increasing anaerobic activity to help eliminate ingested oil from the fish (Cohen et al., 2005).

Fish are perhaps most susceptible to the effects of spilled oil in their early life stages, particularly during egg and planktonic larval stages, which can become entrained in spilled oil. Contact with oil droplets can mechanically damage feeding and breathing apparatus of embryos and larvae (Fodrie and Heck, 2011). The toxic hydrocarbons in water can result in genetic damage, physical deformities and altered developmental timing for larvae and eggs exposed to even low concentrations over prolonged timeframes (days to weeks) (Fodrie and Heck, 2011). Subtler, chronic effects on the life history of fish because of exposure in early life stages to hydrocarbons include disruption to complex behaviour such as predator avoidance, reproductive and social behaviour (Hjermann et al., 2007). Prolonged exposure of eggs and larvae to weathered concentrations of hydrocarbons in water has also been shown to cause immunosuppression and allows expression of viral diseases (Hjermann et al., 2007).

Adult fish exposed to low hydrocarbon concentrations are likely to metabolise the hydrocarbons and excrete the derivatives, with studies showing that fish can metabolise petroleum hydrocarbons and that accumulated hydrocarbons are released from tissues when the fish is returned to hydrocarbon-free sea water. Several fish communities in these areas are demersal (i.e. living closer to the seabed) where concentrations of entrained hydrocarbons will be lower; any impacts are expected to be highly localised.

Marine fauna with gill-based respiratory systems are expected to have higher sensitivity to exposures of entrained contaminants. Therefore, the receptors most susceptible to dissolved hydrocarbons are fish and whale sharks. Whale sharks may be present in the EMBA in the Gascoyne AMP, which has a low probability (10%) of experiencing entrained hydrocarbon ≥ 100 ppb. Since MDO does not tend to have a high proportion that dissolves, the Gascoyne

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AMP has a very low probability (3%) of contacting dissolved hydrocarbons ≥ 50 ppb; no other receptors were predicted to be contacted above this threshold.

When first released, MDO has a higher toxicity due to the presence of the volatile components. Individual fish making contact close to the spill source at the time of the spill may be impacted. Fish presence is generally concentrated in waters closer to shore. Although fish presence may occur throughout the entire PAA and defined EMBA, it is unlikely that a large number of fish will be affected at the sea surface above thresholds. Mobile transient fauna are not expected to remain within entrained hydrocarbon plumes for an extended time. Therefore, no acute impacts or risks associated with entrained exposures from an unplanned MDO release are expected. Any impacts from this exposure are expected to result in localised short-term effects to limited small numbers of juvenile fish and prey species (larvae and planktonic organisms), which are not expected to affect population viability and recruitment of fish. Consequently, diverse fish assemblages are not expected to be significantly impacted.

Although potential impacts could include mortality or sub-lethal injury/illness of pelagic fish, this would be expected to comprise a small proportion of the resident and transitory population. Given hydrocarbon characteristics, expected rapid weathering to below impact thresholds and degradation of entrained fractions, and the mobile transient nature of fish, unplanned releases of MDO are not expected to have a substantial adverse effect on the population or spatial distribution of fish; or substantially modify, destroy or isolate an area of important habitat for migratory species. Additionally, unplanned releases will not seriously disrupt the lifecycle of an ecologically significant proportion of any migratory fish species.

There are specific conservation advices for some fish species which identify habitat degradation/modification as a key threat. While for some species there are specific requirements (e.g. sawfish), no specific requirements have been identified for relevant species (i.e. species identified as having potential to occur in the EMBA).

Based on the detailed risk evaluation, the magnitude of potential impacts to fish from unplanned hydrocarbon releases is assessed as slight. Receptor sensitivity of fish is high (high value fauna), and therefore the consequence of a release of hydrocarbons on fish is Minor (D).

Marine Mammals

A change in marine fauna behaviour or injury/mortality to marine mammals may occur due to a change in water quality after an unplanned hydrocarbon release.

Air-breathing fauna such as marine mammals are most at risk from surface exposures due to the high volatile components. Marine mammals that have direct physical contact with surface, entrained or dissolved aromatic hydrocarbons may suffer surface fouling, ingest hydrocarbons and inhale toxic vapours. This may result in the irritation of sensitive membranes such as the eyes, mouth, digestive and respiratory tracts and organs, impairment of the immune system or neurological damage (Helm et al., 2015). If prey (fish and plankton) are contaminated, this can result in the absorption of toxic components of the hydrocarbons (PAHs).

In a review of cetacean observations in relation to a number of large-scale hydrocarbon spills, Geraci (1988) found little evidence of mortality associated with hydrocarbon spills. However, behavioural disturbance (i.e. avoiding spilled hydrocarbons) was observed in some instances for several species of cetaceans. This suggests that cetaceans are able to detect and avoid surface slicks. While this reduces the potential for physiological impacts from contact with hydrocarbons, active avoidance of an area may disrupt behaviours such as migration, or displace individuals from important habitat, such as foraging, resting or breeding.

When first released, MDO has a higher toxicity due to the presence of the volatile components. Individual cetaceans making contact close to the spill source at the time of the spill may be impacted. Cetacean presence is generally more concentrated in waters closer to shore with the exception of false killer whales. Although cetacean presence may occur throughout the PAA and defined EMBA, it is unlikely that a large number of cetaceans will be affected at the sea surface above thresholds, as only the Gascoyne AMP will be contacted with surface oil and this is highly unlikely to occur (1% probability of 1 g/m²)

Although potential impacts could include mortality or sub-lethal injury/illness of marine mammals, this would be expected to comprise a small proportion of the resident and transitory population. Given hydrocarbon characteristics, expected rapid weathering of surface oil to below impact thresholds, and the mobile transient nature of marine mammals and potential avoidance behaviour, unplanned releases of MDO are not expected to have a substantial adverse effect on the population or spatial distribution of marine mammals; or substantially modify, destroy or isolate an area of important habitat for migratory species. Additionally, unplanned releases will not seriously disrupt the lifecycle of an ecologically significant proportion of any migratory species.

There are specific conservation advices for some species which identify noise interference and vessel disturbance as key threats. While hydrocarbon spills are not explicitly identified as a threat, the sei whale conservation advice does include the management of physical disturbance and development activities. No explicit management actions are identified relevant to hydrocarbon spills.

Potential impacts are unlikely to lead to mortality or sub-lethal injury/illness of an EPBC listed protected species.

Based on the detailed risk evaluation, the magnitude of potential impacts to marine mammals (focused on changes in behaviour) from unplanned MDO releases is assessed as slight. Receptor sensitivity of marine mammals is high (high value fauna), and therefore the consequence of a release of hydrocarbons on marine mammals is Minor (D).

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Marine Reptiles

A change in marine fauna behaviour or injury/mortality to marine reptiles may occur due to a change in water or sediment quality following an unplanned hydrocarbon release.

Marine reptiles can be impacted by surface exposure when they surface to breathe, and by shoreline accumulation of hydrocarbons when breeding and nesting.

Hydrocarbons in surface waters may impact turtles when they surface to breathe and inhale toxic vapours. Their breathing pattern, involving large 'tidal' volumes and rapid inhalation before diving, results in direct exposure to petroleum vapours which are the most toxic component of the hydrocarbon spill (Milton and Lutz, 2003). This can lead to lung damage and congestion, interstitial emphysema, inhalant pneumonia and neurological impairment (National Oceanic and Atmospheric Administration, 2010). Contact with entrained hydrocarbons can result in hydrocarbon adherence to body surfaces, irritating mucous membranes in the nose, throat and eyes, leading to inflammation and infection (Gagnon and Rawson, 2010).

Adult sea turtles exhibit no avoidance behaviour when they encounter hydrocarbon spills (National Oceanic and Atmospheric Administration, 2010). Oiling can also irritate and injure skin, which is most evident on pliable areas such as the neck and flippers (Lutcavage et al., 1995). A stress response associated with this exposure pathway includes an increase in the production of white blood cells, and even a short exposure to hydrocarbons may affect the functioning of their salt gland (Lutcavage et al., 1995).

When first released, MDO has a higher toxicity due to the presence of the volatile components. Individual turtles making contact close to the spill source at the time of the spill may be impacted. Turtle presence is generally more concentrated in waters closer to shore, with infrequent presence of turtles as far offshore as the PAA. Although turtle presence may occur throughout the PAA and defined EMBA, it is unlikely that a large number of turtles will be affected. With no shoreline accumulation, there is negligible potential for impacts to turtle nesting beaches.

Impacts to sea snakes from direct contact with hydrocarbons are likely to result in similar physical effects to those recorded for marine turtles.

Potential impacts are unlikely to lead to mortality or sub-lethal injury/illness of an EPBC listed protected species. Given hydrocarbon characteristics, expected rapid weathering to below impact thresholds, and the mobile transient nature of individuals, an unplanned release from a vessel collision is not expected to substantially modify, destroy or isolate an area of important habitat for migratory species. It is not expected that unplanned releases will have a substantial adverse effect on the population, or spatial distribution of marine reptiles; or seriously disrupt the lifecycle of an ecologically significant proportion of any migratory species.

Impacts to turtles from unplanned hydrocarbon releases are to be managed in accordance with the Recovery Plan for marine turtles in Australia (Commonwealth of Australia, 2017). The Recovery Plan identifies ensuring spill risk strategies and response programs include management for turtles and their habitats. In addition, there is in place approved Conservation Advice for the short-nosed sea snake (DSEWPaC, 2011), which includes ensuring there is no anthropogenic disturbance in areas where the species occurs, excluding necessary actions to manage the conservation of the species.

Based on the detailed risk evaluation, the magnitude of potential impacts to marine reptiles from unplanned hydrocarbon releases is assessed as no lasting effects (from change in fauna behaviour) and slight (from injury/mortality to fauna). Receptor sensitivity of marine reptiles is high (high value fauna), and therefore the overall consequence of a release of hydrocarbons on marine reptiles is Minor (D).

Seabirds and Migratory Shorebirds

A change in marine fauna behaviour or injury/mortality to seabirds and migratory shorebirds may occur due to a change in water or sediment quality following an unplanned hydrocarbon release.

Seabirds and migratory birds are particularly vulnerable to contact with floating hydrocarbons, which may mat feathers. This may lead to hypothermia from loss of insulation and ingestion of hydrocarbons when preening to remove hydrocarbons. Both impacts may result in mortality (Hassan and Javed, 2011). Pathways of biological exposure that can result in impact may occur through ingesting contaminated fish (nearshore waters) or invertebrates (intertidal foraging grounds such as beaches, mudflats and reefs). Ingestion can also lead to internal injury to sensitive membranes and organs (International Petroleum Industry Environmental Conservation Association, 2004). Whether the toxicity of ingested hydrocarbons is lethal or sub-lethal will depend on the weathering stage and its inherent toxicity. Exposure to hydrocarbons may have longer term effects, with impacts to population numbers due to decline in reproductive performance and malformed eggs and chicks, affecting survivorship and losing adult birds.

When first released, MDO has a higher toxicity due to the presence of the volatile components. Individual birds making contact close to the spill source at the time of the spill may be impacted. Bird presence within the NWMR is more concentrated in waters closer to shore with the potential for individual migratory birds within the PAA. Although bird presence may occur throughout the PAA and defined EMBA, it is unlikely that a large number of birds will be affected at the sea surface above thresholds as this is only predicted for the first five days.

No shoreline contact is predicted, therefore there is negligible likelihood of impact to significant nesting and / or roosting sites.

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Although potential impacts could include mortality or sub-lethal injury/illness of birds, this would be expected to comprise a small proportion of the resident and transitory population. Given hydrocarbon characteristics, expected rapid weathering to below impact thresholds, and the mobile transient nature of individuals, an unplanned release from a vessel collision is not expected to substantially modify, destroy or isolate an area of important habitat for migratory species.

There are specific conservation advices for some species which identify habitat degradation as the key threat, but generally no explicit management actions are identified relating to hydrocarbon spills.

Based on the detailed risk evaluation, the magnitude of potential impact to seabirds and migratory shorebirds from unplanned hydrocarbon releases is assessed as having no lasting effects (from change in fauna behaviour) and slight (from injury/mortality to fauna). Receptor sensitivity of seabirds and migratory shorebirds is high (high value fauna), and therefore the overall consequence of a release of hydrocarbons on seabirds and migratory shorebirds is Minor (D).

Key Ecological Features

A change in habitat may occur due to a change in water or sediment quality that could impact KEFs.

KEFs potentially impacted by a marine diesel spill from a vessel collision event are:

- Exmouth Plateau
- Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula
- Continental slope demersal fish communities
- Ancient coastline at 125 depth contour
- Wallaby Saddle
- Western demersal slope and associated fish communities

These KEFs are primarily defined by seabed geomorphological features and/or indicate a potential for increased biological productivity and, therefore, ecological significance.

The consequences of a marine diesel spill from a vessel collision may impact the values of the KEFs affected (for the values of each KEF see Woodside's Existing Environment (01)). Potential impacts to the above KEFs include impacts to demersal fish populations and reduced biodiversity. Impacts to benthic habitats are not predicted as hydrocarbons (surface, entrained and dissolved) will be limited to the upper layers of the water column. Most of the KEFs within the EMBA have relatively broad-scale distributions and are unlikely to be significantly impacted.

Given the weathering characteristics of MDO, exposure would be restricted to surface (including the upper water column); no interaction with benthic habitats in deep water areas is predicted. As such, there is unlikely to be adverse impact on marine ecosystem functioning or integrity.

Based on the assessment, the magnitude of a potential impact to KEFs associated with a release of hydrocarbons is no lasting effect. Receptor sensitivity of KEFs is high (high value), and therefore the consequence of a release of hydrocarbons on KEFs is slight (E).

AMPs

The quantitative spill risk assessment results indicate that the open water environment protected within the Gascoyne AMP, Abrolhos Islands AMP and Carnarvon Canyon AMP may be affected by the released hydrocarbons (refer to **Table 6-20**).

The Gascoyne AMP has the potential to be contacted by entrained hydrocarbons (10% probability), dissolved hydrocarbons (3% probability) and surface hydrocarbons (1% probability) at or above the defined ecological effect concentrations (100 ppb, 50 ppb and 10 g/m², respectively). Additionally, the Abrolhos Islands AMP and Carnarvon Canyon AMP have a 1% probability of being contacted by entrained hydrocarbons at or above the 100 ppb threshold concentration.

Potential impacts on the values of the AMPs (refer to Woodside's Existing Environment (01)) are discussed in the relevant sections above for ecological and physical values and below for socio-economic and cultural values. The AMPs contains marine fauna and biological communities, which are considered to be of important environmental value that the AMPs are intended to protect. A spill is unlikely to result in significant impacts based on the nature of the spilled hydrocarbons, including rapid weathering.

Based on the assessment, the magnitude of a potential impact to the above AMPs associated with a release of hydrocarbons is slight. Receptor sensitivity of the AMPs is high (high value), and therefore the consequence of a release of hydrocarbons on the AMPs is Minor (D).

Commonwealth and State Managed Fisheries

A change in marine fauna behaviour or injury or mortality to marine fauna – in particular to commercially targeted species, or their prey species (e.g. plankton) – can impact fisheries.

Fish exposure to hydrocarbon can result in 'tainting' of their tissues. Even very low levels of hydrocarbons can impart a taint or 'off' flavour or smell in seafood. Tainting is reversible through the process of depuration which removes hydrocarbons from tissues by metabolic processes, although it depends on the magnitude of the contamination. Fish

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have a high capacity to metabolise these hydrocarbons while crustaceans (such as prawns) have a reduced ability (Yender et al., 2002). Seafood safety is a major concern associated with spill incidents. Therefore, actual or potential contamination of seafood can affect commercial and recreational fishing and can impact seafood markets long after any actual risk to seafood from a spill has subsided (Yender et al., 2002).

A major spill could result in the establishment of an exclusion zone around the spill affected area. There would be a temporary prohibition on fishing activities for a period and subsequent potential for economic impacts to affected commercial fishing operators. Additionally, hydrocarbon can foul fishing equipment such as traps and trawl nets, requiring cleaning or replacement.

MDO presence in the water would be restricted to the surface and upper water column only. Dissolved aromatics (i.e. the form that is bioavailable) are in such small concentrations in MDO that their effect in the marine environment is negligible; i.e. tainting from an MDO exposure is not considered likely to occur. Any exclusion zone established would be limited to the immediate vicinity of the release point, and due to the rapid weathering of MDO would only be in place days after release, therefore physical displacement to vessels is unlikely to be a significant impact.

A number of Commonwealth and State fishery management areas are located within the PAA and EMBA. FishCube data were requested to analyse the potential for interaction of fisheries with the PAA, which was used to determine consultation with State Fisheries who may be impacted by proposed petroleum activities (Department of Primary Industries and Regional Development [DPIRD], 2021). **Table 4-22** provides an assessment of the potential interaction provides further detail on the fisheries that have been identified through desk-based assessment and consultation (**Section 5**). No fisheries were identified as having a potential interaction with the Petroleum Activities Program.

In the highly unlikely event of a release of marine diesel to the environment as a result of vessel collision there may be the presence of hydrocarbons in areas used by the fisheries that overlap the EMBA (**Table 4-22**). However, given the distance from the PAA where this event may occur, the type of hydrocarbon (with up to 41% evaporating within the first 24 hours) and duration of exposure, no significant impact from a marine diesel spill is predicted.

Although potential impacts from a worst case spill could include mortality or sub-lethal injury/illness of pelagic fish (described in the specific receptor evaluation), this would be expected to comprise a small proportion of the resident and transitory population. Given the hydrocarbon characteristics, expected rapid weathering to below impact thresholds, and the distance from the PAA and lack of fishing effort, an unplanned hydrocarbon spill from the Petroleum Activities Program is not expected to have an adverse effect on the sustainability of commercial fishing; or to interfere with other marine users.

Based on the detailed risk evaluation, the magnitude of potential impacts to Commonwealth and State managed fisheries from an unplanned hydrocarbon release is assessed as having no lasting effect. Receptor sensitivity of commonwealth and state managed fisheries is high (high value marine user), and therefore the consequence of a release of hydrocarbons on commonwealth and state managed fisheries is Slight (E).

Shipping

In the event of a spill, an exclusion zone may be established around the spill affected area. This could result in exclusion of other users such as shipping vessels or vessels used by the mining and petroleum industries. Any exclusion zone established would be limited to the immediate vicinity of the release point, and due to the rapid weathering of MDO would only be in place for days after release, therefore physical displacement to vessels is unlikely to be a significant impact.

Given hydrocarbon characteristics, expected rapid weathering to below impact thresholds, short duration of displacement, and the offshore location of the PAA, unplanned releases of MDO are not expected to interfere with shipping to a greater extent than necessary.

Based on the assessment, the magnitude of a potential impact to shipping associated with an unplanned release of hydrocarbons is slight. Receptor sensitivity of shipping is medium (medium value user), and therefore the consequence of a release of hydrocarbons on shipping is Slight (E).

Industry

The proposed Equus Development Project is located about 70 km east of the PAA. No other facilities are located within the EMBA. In the event of a major spill, an exclusion zone may be established around the spill affected area. This could result in exclusion of other users such as vessels used by the mining and petroleum industries.

Any exclusion zone established would be limited to the immediate vicinity of the release point, and due to the rapid weathering of MDO would only be in place days after release, therefore physical displacement to vessels is unlikely to be a significant impact.

Given hydrocarbon characteristics, expected rapid weathering to below impact thresholds, and the offshore location of the PAA and distance to relevant industries, unplanned releases from Scarborough are not expected to interfere with other marine users than a greater extent than necessary.

Based on the assessment, the magnitude of a potential impact to industry associated with an unplanned release of hydrocarbons is slight. Receptor sensitivity of industry is medium (medium value user), and therefore the consequence of a release of hydrocarbons on industry is Slight (E).

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Cultural Features and Heritage Values

No listed World Heritage Places, Indigenous Sites of Significance, Commonwealth Heritage Places or National Heritage Places were identified in the EMBA. A search of the Australasian Underwater Cultural Heritage Database (**Section 4.9.1**), which records all known Maritime Cultural Heritage (shipwrecks, aircraft, relics and other underwater cultural heritage) in Australian waters, indicated that there are seven Underwater Cultural Heritage sites within the EMBA. The closest Underwater Cultural Heritage site is the wreck of the Wild Wave, a Chinese sailing vessel which sank off the Montebello Islands, approximately 191 km east of the PAA. These heritage sites are located on the seabed, and will not be directly impacted by a marine diesel spill as hydrocarbons (surface, entrained and dissolved) are confined predominantly to the upper layers of the water column.

There is a slight overlap of the EMBA with the Ancient Landscape however no potential for a spill at surface to impact archaeological material. Woodside understands that there is no Indigenous archaeology known to exist anywhere within Commonwealth waters, and no declarations or prescriptions under the Aboriginal and Torres Strait Islander Heritage Protection Act 1984, Underwater Cultural Heritage Act 2018 or EPBC Act 1999 are located within the EMBA. For this EP, a search of DPLH's Aboriginal Heritage Inquiry System showed no registered Aboriginal sites in the EMBA (see **Appendix G**).

Receptor sensitivity is high, and the consequence of a potential impact to Cultural Values and Heritage associated with a release of hydrocarbons is assessed as Minor (D).

Summary of Assessment Outcomes					
Receptor	Impact	Receptor Sensitivity	Risk Consequence	Likelihood	Risk Rating
Water quality	Change in water quality	Low value (open water)	Negligible (F)	Highly Unlikely	Low
Plankton	Injury/ mortality to fauna	Low value (open water)	Negligible (F)	Highly Unlikely	Low
Fish	Change in fauna behaviour	High value species	Minor (D)	Highly Unlikely	Moderate
	Injury/mortality to fauna	High value species	Minor (D)	Highly Unlikely	Moderate
Marine mammals	Change in fauna behaviour	High value species	Minor (D)	Highly Unlikely	Moderate
	Injury/mortality to fauna	High value species	Minor (D)	Highly Unlikely	Moderate
Marine reptiles	Change in fauna behaviour	High value species	Slight (E)	Highly Unlikely	Low
	Injury/ mortality to fauna	High value species	Minor (D)	Highly Unlikely	Moderate
Seabirds and migratory shorebirds	Change in fauna behaviour	High value species	Slight (E)	Highly Unlikely	Low
	Injury/mortality to fauna	High value species	Minor (D)	Highly Unlikely	Moderate
AMPs	Change in habitat	High value habitat	Minor (D)	Highly Unlikely	Moderate
KEFs	Change in habitat	High value habitat	Slight (E)	Highly Unlikely	Low
Commonwealth and State managed fisheries	Changes to the functions, interests or activities of other users	High value marine user	Slight (E)	Highly Unlikely	Low
Shipping	Changes to the functions, interests or activities of other users	Medium value users	Slight (E)	Highly Unlikely	Low
Industry	Changes to the functions, interests or activities of other users	Medium value	Slight (E)	Highly Unlikely	Low
Cultural values and heritage	Interactions with cultural values	High value	Minor (D)	Highly Unlikely	Moderate

Overall Risk Consequence/Risk Rating: The overall risk rating for an unplanned hydrocarbon release resulting from a vessel collision is Moderate based on a Minor consequence, to the high value receptors (marine fauna, AMPs and KEFs), and a highly unlikely likelihood. The risk consequence/risk rating for individual receptors are consistent with the levels rated in the OPP.

Demonstration of ALARP				
Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/Risk Reduction	Proportionality	Control Adopted
Legislation, Codes and Standards				
Marine Order 30 (Prevention of Collisions) 2016, including: <ul style="list-style-type: none"> adherence to steering and sailing rules including maintaining 	F: Yes. CS: Minimal cost. Standard practice.	Legislative requirements to be followed reduce the likelihood of interference with	Controls based on legislative requirements – must be adopted.	Yes C 8.1

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<p>look-outs (e.g. visual, hearing, radar etc.), proceeding at safe speeds, assessing risk of collision and taking action to avoid collision (monitoring radar)</p> <ul style="list-style-type: none"> • adherence to navigation light display requirements, including visibility, light position/shape appropriate to activity • adherence to navigation noise signals as required. 		<p>other marine users resulting in a collision.</p>		
<p>Marine Order 21 (Safety and emergency arrangements) 2016, including:</p> <ul style="list-style-type: none"> • adherence to minimum safe manning levels • maintenance of navigation equipment in efficient working order (compass/radar). • navigational systems and equipment required are those specified in Regulation 19 of Chapter V of SOLAS • AIS that provides other users with information about the vessel's identity, type, position, course, speed, navigational status and other safety-related data. 	<p>F: Yes. CS: Minimal cost. Standard practice.</p>	<p>Legislative requirements to be followed reduce the likelihood of interference with other marine users resulting in a collision.</p>	<p>Controls based on legislative requirements – must be adopted.</p>	<p>Yes C 8.2</p>
<p>Marine Order 27 (safety of navigation and radio equipment) 2016:</p> <ul style="list-style-type: none"> • navigational systems and equipment mentioned in Regulations 7 to 11 of Chapter IV of SOLAS are installed on board vessels • maintenance of navigation equipment in efficient working order (compass/radar) • navigational system and equipment required are those specified in Regulation 19 and 20 of SOLAS for the vessel are type approved and installed on board vessels 	<p>F: Yes. CS: Minimal cost. Standard practice.</p>	<p>Legislative requirements to be followed reduce the likelihood of interference with other marine users resulting in a collision.</p>	<p>Controls based on legislative requirements – must be adopted.</p>	<p>Yes C 8.3</p>

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<ul style="list-style-type: none"> • navigational activities and incidents of importance to safety of navigation on the vessel are recorded • Automatic Identification System that provides other users with information about the vessel's identity, type, position, course, speed, navigational status and other safety-related data. 				
Establishment of temporary exclusion zones by relevant vessels which are communicated to marine users.	F: Yes. CS: Minimal cost. Standard practice.	Establishment of a temporary exclusion zones around vessels reduces the likelihood of interaction with other marine users.	Controls based on legislative requirements – must be adopted.	Yes C 2.2
In the event of a spill, emergency response activities implemented in accordance with the OPEP.	F: Yes CS: Costs associated with implementing response strategies vary dependent on nature and scale of spill event. Standard practice.	Potentially reduces consequence by implementing response to reduce impacts to the marine environment,	Control based on regulatory requirement – must be adopted.	Yes C 8.4
Arrangements supporting the activities in the OPEP (per Table 7) will be tested to ensure the OPEP can be implemented as planned.	F: Yes. CS: Minimal cost. Standard practice.	Legislative requirement based on vessel class. Unlikely to have a significant reduction in consequence.	Controls based on legislative requirements – must be adopted.	Yes C 8.5
Good Practice				
Have a support vessel on standby during all activities to communicate with third-party vessels and help maintain a safety exclusion zone.	F: Yes. CS: Additional costs.	Given the legislative controls in place and the duration of the activities, as well as the mobility of most project vessels; using a support vessel will provide only a small reduction in the likelihood of a collision with a third party vessel.	Grossly disproportionate.	No
Notify AHO of activities and movements will be notified no less than four working weeks prior to scheduled activity commencement date.	F: Yes. CS: Minimal cost. Standard practice.	Notification of AHO will enable them to update maritime charts thereby reducing the likelihood of a collision with a third-party vessel.	Benefits outweigh cost/sacrifice. Control is also Standard Practice.	Yes C 2.3
Notify AMSA JRCC of activities and movements of the activity 24 to 48 hours before operations commence.	F: Yes. CS: Minimal cost. Standard practice.	Communication of the Petroleum Activities Program to other marine users ensures they are informed and	Benefits outweigh cost/sacrifice. Control is also Standard Practice.	Yes C 2.5

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		aware, thereby reducing the likelihood of a collision with a third-party vessel occurring		
Develop SIMOPS management plan when working in vicinity of other Woodside operations / activities.	F: Yes. CS: Minimal cost. Standard practice.	SIMOPS management plans between Woodside operated vessels in the PAA will reduce the likelihood of a collision occurring.	Benefits outweigh cost/sacrifice. Control is also Standard Practice.	Yes C 8.6
Mitigation: Oil spill response	Refer to Appendix D.			
Professional Judgement – Eliminate				
Eliminate use of vessels.	F: No. The use of vessels is required to conduct the Petroleum Activities Program. CS: Not considered – control not feasible.	Not considered – control not feasible.	Not considered – control not feasible.	No
Professional Judgement – Substitute				
No additional controls identified.				
Professional Judgement – Engineered Solution				
No additional controls identified.				
Risk Based Analysis				
A quantitative spill risk assessment was undertaken (see detail above).				
ALARP Statement: On the basis of the environmental risk assessment outcomes and use of the relevant tools appropriate to the decision type (i.e. Decision Type A, Section 2.3.3), Woodside considers the adopted controls appropriate to manage the risks and consequences of an unplanned loss of hydrocarbon as a result of a vessel collision. As no reasonable additional/alternative controls were identified that would further reduce the risks and consequences without grossly disproportionate sacrifice, the risks and consequences are considered ALARP.				
Demonstration of Acceptability				
Acceptability Criteria and Assessment				
Demonstration of acceptability for the sources of risk and associated impacts assessed in this section are provided in Section 7.2.6.4 of the Scarborough OPP (SA0006AF0000002, rev 5). The Petroleum Activities Program meets the acceptability criteria (Section 2.3.5):				
<ul style="list-style-type: none"> • Overall risk consequence/risk ratings for individual receptors are less than the significant impact level defined in the OPP. • EPOs and controls in the OPP that are relevant to an unplanned hydrocarbon release from a vessel collision have been adopted. • There are no changes to internal/external context specific to this risk from the OPP. Feedback raised during consultation, including any specific updates to the EP in response, has been considered in Appendix F, Table 1 				
Acceptability Statement: The impact assessment has determined that an accidental hydrocarbon release as a result of a vessel collision represents a moderate current risk rating and is unlikely to result in a risk consequence greater than Minor. There are no BIAs for any EPBC Act listed Threatened or Migratory species overlapping or adjacent to the PAA. Relevant recovery plans and conservation advice have been considered during the impact assessment, and the Petroleum Activities Program is not considered to be inconsistent with the overall recovery objectives and actions of these recovery plans and conservation advice. The adopted controls are considered consistent with industry legislation, codes and standards, good practice and professional judgement and meet the requirements and expectations of Australian Marine Orders, AMSA and AHO identified during impact assessment and stakeholder consultation. The potential risks and consequences are considered acceptable if the adopted controls are implemented. Therefore,				

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Woodside considers the adopted controls appropriate to manage the risks and consequences of a loss of vessel structural integrity to a level that is broadly acceptable.

Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
EPO 17 No release of hydrocarbons to the marine environment due to a vessel collision associated with the Petroleum Activities Program.	C 8.1 Marine Order 30 – Prevention of collisions – 2016, including: <ul style="list-style-type: none"> adherence to steering and sailing rules including maintaining look-outs (e.g. visual, hearing, radar, etc), proceeding at safe speeds, assessing risk of collision and taking action to avoid collision (monitoring radar) adherence to navigation light display requirements, including visibility, light position/shape appropriate to activity adherence to navigation noise signals as required. 	PS 8.1.1 Project vessels compliant with Marine Orders 30 (Prevention of Collisions) 2016 (which requires vessels to be visible at all times) to prevent unplanned interaction with marine users.	MC 8.1.1 Marine Assurance inspection records demonstrate compliance with standard maritime safety procedures (Marine Orders 21, 27 and 30).
	C 8.2 Marine Orders 21 (Safety and emergency arrangements) 2016, including: <ul style="list-style-type: none"> adherence to minimum safe manning levels maintenance of navigation equipment in efficient working order (compass/radar) navigational systems and equipment required are those specified in Regulation 19 of Chapter V of SOLAS AIS that provides other users with information about the vessel's identity, type, position, course, speed, navigational status and other safety-related data. 	PS 8.2.1 Project vessels compliant with Marine Orders Marine Orders 21 (Safety and emergency arrangements) 2016 to prevent unplanned interaction with marine users.	
	C 8.3 Marine Order 27 (safety of navigation and radio equipment) 2016:	PS 8.3.1 Project vessels compliant with Marine Orders Marine Orders 27 (Safety of navigation and radio	

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Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
	<ul style="list-style-type: none"> • navigational systems and equipment mentioned in Regulations 19 and 20 of Chapter V of SOLAS for the vessel are type approved and installed on board vessels • navigational system and equipment required are those specified in Regulation 19 of Chapter V of Safety of Life at Sea • navigational systems and equipment are maintained in working order • navigational activities and incidents of importance to safety of navigation on the vessel are recorded. • AIS that provides other users with information about the vessel's identity, type, position, course, speed, navigational status and other safety-related data. 	equipment) 2016 to prevent unplanned interaction with marine users.	
	C 2.2 See Section 6.7.2	PS 2.2.1 See Section 6.7.2	MC 2.2.1 See Section 6.7.2
			MC 2.2.2 See Section 6.7.2
	C 8.4 In the event of a spill, emergency response activities implemented in accordance with the OPEP.	PS 8.4.1 In the event of a spill the OPEP requirements are implemented.	MC 8.4.1 Records of completed incident documentation.
	C 8.5 Arrangements supporting the activities in the OPEP (per Table 7) will be tested to ensure the OPEP can be implemented as planned.	PS 8.5.1 Exercises/tests will be conducted in alignment with the frequency identified in Table 7 .	MC 8.5.1 Testing of arrangement records confirm that emergency response capability has been maintained.
		PS 8.5.2 Testing of arrangement records confirm that emergency response capability has been maintained.	MC 8.5.2 Emergency Management dashboard confirms that minimum level of personnel trained for core OPEP roles are available.
	C 8.6 Develop SIMOPS management plan when	PS 8.6.1 SIMOPS management plan is in place when working in	MC 8.6.1

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Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
	working in vicinity of other Woodside operations / activities.	vicinity of other Woodside operations / activities.	Records indicate a SIMOPS management plan has been created.
	C 2.3 See Section 6.7.2	PS 2.3.1 See Section 6.7.2	MC 2.3.1 See Section 6.7.2
	C 2.5 See Section 6.7.2	PS 2.5 See Section 6.7.2	MC 2.5.1 See Section 6.7.2
Detailed preparedness and response performance outcomes, standards and measurement criteria for the Petroleum Activities Program are presented in Appendix D .			

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6.8.3 Unplanned Hydrocarbon Release: Bunkering

Scarborough OPP – Relevant Impact Assessment Section														
Section 7.2.6 – Unplanned Hydrocarbon Release														
Context														
Relevant Activities Vessel Operations – Section 3.7			Existing Environment Physical Environment – Section 4.4 Habitats and Biological Communities – Section 4.5 Protected Species – Section 4.6 Protected Places – Section 4.8 Socio-economic Environment – Section 4.9					Stakeholder consultation Consultation – Section 5						
Impact/Risk Evaluation Summary														
Source of Impact/Risk	Environmental Value Potentially Impacted							Evaluation						
	Soil and Groundwater	Marine Sediment	Water Quality	Air Quality (inc. odour)	Ecosystems / Habitat	Species	Socio-economic	Decision Type	Impact/Consequence	Likelihood	Current Risk Rating	ALARP Tools	Acceptability	Outcome
Loss of hydrocarbons (diesel/jet fuel) to marine environment from bunkering/refuelling			✓			✓		A	D	1	M	LCS GP PJ	Broadly Acceptable	EPO 18
Description of Source of Impact/Risk														
<p>Diesel LOC from bunkering</p> <p>Bunkering of marine diesel between vessels as well as the possible refuelling of cranes, helicopters and other equipment may take place.</p> <p>Three credible scenarios for the loss of containment of marine diesel during bunkering operations have been identified:</p> <ul style="list-style-type: none"> Partial or total failure of a bulk transfer hose or fittings during bunkering, due to operational stress or other integrity issues could spill marine diesel to the deck and/or into the marine environment. This would be in the order of less than 200 L, based on the likely volume of a bulk transfer hose (assuming a failure of the dry break and complete loss of hose volume). Partial or total failure of a bulk transfer hose or fittings during bunkering, combined with a delay to shutoff fuel pumps, for a period of up to fifteen minutes, resulting in approximately 50 m³ marine diesel lost to the deck and/or into the marine environment. Partial or total failure of a bulk transfer hose or fittings during helicopter refuelling could spill aviation jet fuel to the helicopter deck and/or into the marine environment. All helicopter refuelling activities are closely supervised and leaks on the helideck are considered to be easily detectable. In the event of a leak, transfer would cease immediately. The credible volume of such a release during helicopter refuelling would be in the order of <100 L. <p>Given the limited volume of the potential release and offshore location no modelling has been undertaken as it is within significantly less than the 2000 m³ of MDO in Section 6.8.2.</p>														

Detailed Impact Assessment					
Assessment of Potential Impacts					
<p>An unplanned hydrocarbon release during bunkering has the potential to result in the following impacts:</p> <ul style="list-style-type: none"> change in water quality change in fauna behaviour <p>A 55 m³ (55,000L) marine diesel surface release as a result of bunkering activities is expected to be confined to within several kilometres of the release site, and well within the EMBA identified for the vessel collision scenario detailed in Section 6.8.2.</p> <p>In the unlikely event of an unplanned hydrocarbon release from bunkering, the limited volume may lead to slight impacts to megafauna, plankton and fish populations (surface and water column biota) that are within the spill affected area. No impacts to commercial fisheries are expected.</p> <p>The potential biological and ecological impacts associated with much larger hydrocarbon spills (i.e. vessel collision) are presented in Section 6.8.2 and include behavioural changes to fish, marine mammals and marine reptiles. The extent of the EMBA associated with a marine diesel spill from bunkering will be much reduced in terms of spatial and temporal scales, and hence, potential risks from bunkering are considered Low.</p>					
Summary of Assessment Outcomes					
Receptor	Impact	Receptor Sensitivity	Risk Consequence	Likelihood	Risk rating
Water quality	Change in water quality	Low value (open water)	Negligible (F)	Highly Unlikely	Low
Migratory Shorebirds and Seabirds	Injury/mortality to fauna	High value species	Slight (E)	Highly Unlikely	Low
Fish		High value species	Slight (E)	Highly Unlikely	Low
Marine Mammals		High value species	Slight (E)	Highly Unlikely	Low
Marine Reptiles		High value species	Slight (E)	Highly Unlikely	Low
<p>Overall Risk Rating: The overall risk rating for unplanned discharge of hydrocarbons during bunkering is Moderate based on a Minor risk consequence to the high value receptors (marine fauna) and a highly unlikely likelihood. The risk consequence/risk rating for individual receptors are consistent with the levels rated in the OPP.</p>					

Demonstration of ALARP				
Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/Risk Reduction	Proportionality	Control Adopted
Legislation, Codes and Standards				
Marine Order 91 (marine pollution prevention – oil) 2014, requires Shipboard Oil Pollution Emergency Plan (SOPEP) /Spill Monitoring Programme Execution Plan (SMPEP) (as appropriate to vessel class).	F: Yes. CS: Minimal cost. Standard practice.	By ensuring a SOPEP / SMPEP is in place for the vessel, the likelihood of a spill entering the marine environment is reduced. Although no significant reduction in consequence could result, the overall risk is reduced.	Controls based on legislative requirements – must be adopted.	Yes C 7.3
The Australian Government Civil Aviation Safety Authority CAAP 92-4(0) 'Guidelines for	F: Yes.	Reduced the likelihood of an unplanned release	Controls based on legislative	Yes C 9.1

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the development and operation of off-shore helicopter landing sites, including vessels.	CS: Minimal cost. Standard practice.	during helicopter operations. The consequence is unchanged.	requirements – must be adopted.	
Good Practice				
<p>Bunkering equipment controls:</p> <ul style="list-style-type: none"> All hoses that have a potential environmental risk following damage or failure shall be linked to the vessel's preventative maintenance system. All bulk transfer hoses shall have current certification and be in good condition, and inspected as required. There shall be dry-break couplings and flotation on fuel hoses. There shall be an adequate number of appropriately stocked, located and maintained spill kits. 	F: Yes. CS: Minimal cost. Standard practice.	By ensuring the appropriate equipment is in place, tested and maintained appropriately, the likelihood of a spill occurring is reduced. Although no significant reduction in consequence could result, the overall risk is reduced.	Benefits outweigh cost/sacrifice	Yes C 9.2
<p>Contractor procedures include requirements to be implemented during bunkering/refuelling operations, including:</p> <ul style="list-style-type: none"> Implement a completed PTW and/or JSA for the hydrocarbon bunkering/refuelling operation. Visually monitor gauges, hoses, fittings and the sea surface during the operation. Check hoses prior to commencement. Commence bunkering/refuelling in daylight hours. If the transfer is to continue into darkness, the JSA risk assessment must consider lighting and the ability to determine if a spill has occurred. Do not transfer hydrocarbons in marginal weather conditions. 	F: Yes. CS: Minimal cost. Standard practice.	By ensuring the appropriate equipment is in place, tested and maintained appropriately, the likelihood of a spill occurring is reduced. Although no significant reduction in consequence could result, the overall risk is reduced.	Benefits outweigh cost/sacrifice.	Yes C 9.3
Mitigation: Oil spill response.	Refer to Appendix D .			
Professional Judgement - Eliminate				
Vessels brought into port to refuel.	F: No. It is not operationally practical to transit	Eliminates the risk in the PAA, However, moves risk to another	Disproportionate. The cost/sacrifice	No

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	vessels back to port for refuelling based on the frequency of the refuelling requirements and potential maximum distance from the nearest port. CS: Significant due to schedule delay and vessel transit costs / risks, increased emissions and day rates.	location. Therefore, no overall benefit.	outweighs the benefit gained.	
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Professional Judgement – Substitute

No additional controls identified

Professional Judgement – Engineered Solution

No additional controls identified

ALARP Statement:

On the basis of the environmental risk assessment outcomes and use of the relevant tools appropriate to the decision type (i.e. Decision Type A, **Section 2.3.3**), Woodside considers the adopted controls appropriate to manage the risks and consequences of an unplanned loss of hydrocarbon as a result of a bunkering incident. As no reasonable additional/alternative controls were identified that would further reduce the risks and consequences without grossly disproportionate sacrifice, the risks and consequences are considered ALARP.

Demonstration of Acceptability

Acceptability Criteria and Assessment

Demonstration of acceptability for the sources of aspect and associated impacts assessed in this section are provided in Section 7.2.1.3 of the Scarborough OPP (SA0006AF0000002, rev 5). The Petroleum Activities Program meets the acceptability criteria (**Section 2.3.5**):

- Overall risk consequence/risk ratings for individual receptors are less than the significant impact level defined in the OPP.
- EPOs and controls in the OPP that are relevant to an unplanned hydrocarbon release from bunkering have been adopted.
- There are no changes to internal/external context specific to this risk from the OPP. Feedback raised during consultation, including any specific updates to the EP in response, has been considered in Appendix F, Table 1

Acceptability Statement:

The impact assessment has determined that accidental discharge of hydrocarbons as a result of bunkering failure represents a moderate current risk rating and is unlikely to result in a risk consequence greater than Slight. There are no BIAs for any EPBC Act listed Threatened or Migratory species overlapping or adjacent to the PAA. Relevant recovery plans and conservation advice have been considered during the impact assessment, and the Petroleum Activities Program is not considered to be inconsistent with the overall recovery objectives and actions of these recovery plans and conservation advice. The adopted controls are considered consistent with industry legislation, codes and standards, good practice and professional judgement and meet the requirements and expectations of Australian Marine Orders.

The potential risks and consequences are considered acceptable if the adopted controls are implemented. Therefore, Woodside considers the adopted controls appropriate to manage the risks of a loss of hydrocarbons during bunkering / refuelling to a level that is broadly acceptable.

Environmental Performance Outcomes, Standards and Measurement Criteria

EPO	Adopted Control(s)	EPS	MC
EPO 18 Undertake the Petroleum Activities Program in a	C 7.3 See Section 6.7.7	PS 7.3 See Section 6.7.7	MC 7.3 See Section 6.7.7
	C 9.1	PS 9.1.1	MC 9.1.1

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Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
manner that will prevent an unplanned release of chemicals or non-process hydrocarbons to the marine environment resulting in a substantial change in water quality which may adversely impact on biodiversity, ecological integrity, social amenity or human health.	Helicopter fuel storage areas are bunded or secondarily contained when they are not being handled/moved temporarily in accordance with the Australian Government Civil Aviation Safety Authority CAAP 92-4(0) 'Guidelines for the development and operation of off-shore helicopter landing sites, including vessels.	Failure of primary containment in storage areas does not result in loss to the marine environment.	Records confirms all liquid chemicals and fuel are stored in bunded/secondarily contained areas when not being handled/moved temporarily.
	C 9.2 Bunkering equipment controls: <ul style="list-style-type: none"> All hoses that have a potential environmental risk following damage or failure shall be linked to the vessel's preventative maintenance system. All bulk transfer hoses shall have current certification and be in good condition, and inspected as required. There shall be dry-break couplings and flotation on fuel hoses. There shall be an adequate number of appropriately stocked, located and maintained spill kits. 	PS 9.2.1 To ensure damaged equipment is replaced prior to failure.	MC 9.2.1 Records confirm vessel bunkering equipment is subject to systematic integrity checks.
		PS 9.2.2 All diesel transfer hoses to have dry break couplings and pressure rating suitable for intended use.	MC 9.2.2 Records confirm presence of dry break of couplings and flotation on fuel hoses.
		PS 9.2.3 To ensure adequate resources are available to allow implementation of SOPEP.	MC 9.2.3 Records confirm presence of spill kits.
C 9.3 Contractor procedures include requirements to be implemented during bunkering/refuelling operations, including: <ul style="list-style-type: none"> Implement a completed PTW and/or JSA for the hydrocarbon bunkering/refuelling operation. Visually monitor gauges, hoses, fittings and the sea surface during the operation. Check hoses prior to commencement. Commence bunkering/refuelling in daylight hours. If the transfer is to continue into darkness, the JSA 	PS 9.3.1 Compliance with Contractor procedures for the management of bunkering/helicopter operations.	MC 9.3.1 Records demonstrate bunkering/refuelling undertaken in accordance with contractor bunkering procedures.	

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Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
	risk assessment must consider lighting and the ability to determine if a spill has occurred. <ul style="list-style-type: none"> Do not transfer hydrocarbons in marginal weather conditions. 		
Detailed oil spill preparedness and response performance outcomes, standards and measurement criteria for the Petroleum Activities Program are presented in Appendix D .			

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6.8.4 Unplanned Discharge: Chemicals and Minor Hydrocarbon Spills (Deck and Subsea Spills)

Scarborough OPP – Relevant Impact Assessment Section														
OPP Section 7.2.1 – Unplanned Discharge: Chemicals														
Context														
Relevant Activities Vessel Operations – Section 3.7 ROV Operations – Section 3.8.3				Existing Environment Marine Regional Characteristics – Section 4.2				Stakeholder consultation Consultation – Section 5						
Impact/Risk Evaluation Summary														
Source of Impact/Risk	Environmental Value Potentially Impacted							Evaluation						
	Soil and Groundwater	Marine Sediment	Water Quality	Air Quality (inc. odour)	Ecosystems / Habitat	Species	Socio-economic	Decision Type	Impact/Consequence	Likelihood	Current Risk Rating	ALARP Tools	Acceptability	Outcome
Accidental discharge of hydrocarbons/chemicals from project vessels, deck activities and equipment, and from subsea hydraulic leaks			✓			✓		A	E	1	L	LCS GP PJ	Broadly Acceptable	EPO 19
Description of Source of Impact/Risk														
<p>Vessel and ROV Operations</p> <p>Hydrocarbons/chemicals are used during vessel and ROV activities for a variety of purposes within the PAA. Spills may include:</p> <ul style="list-style-type: none"> Chemicals (maintenance and cleaning chemicals). Generally held onboard in low quantities (typically <50 L containers) however the maximum volume of chemical storage could be approximately 500 L. Spills of these chemicals may result from human error or damage to a chemical container during handling. In the event that a spill is not contained on deck or within a bunded area, there would be a release to the marine environment of up to 500 L. Hydraulic fluids used in machinery (including cranes, winches, ROVs, subsea pumps and passive heave compensators) and small volumes of fuel. Unplanned discharges are most likely to occur due to failure of hydraulic hoses, minor leaks from process components, or spills during periodic refuelling of hydraulic hoses. Volumes of hydraulic fluids contained in ROV hydraulic hoses to be used can be up to approximately 400 L, while hydraulic fluids contained in hoses of key equipment may be in the order of 2 m³. Operational experience demonstrates that spills are most likely to originate from ROV hydraulic hoses and have been less than 100 L, with a typical volume of <20 L (based on capacity of hydraulic hose). All equipment is subject to planned maintenance as preventative measures against unplanned spills. <p>Survey Equipment</p> <p>Survey vessels will place equipment on the seabed which may contain relatively small volumes of hydraulic fluid, about 5-10 L, depending on the system. The hydraulic fluid enables various mechanical functions to be performed. If a Boomer, Chirp or Sparker system is used, the receiver will consist of individual hydrophone elements located within neutrally buoyant, silicon oil filled tubing. The hydrophone cable has the potential to be punctured, resulting a leakage of fluid.</p>														

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Detailed Impact Assessment

Assessment of Potential Impacts

Water Quality

Unplanned discharges of non-process chemicals and hydrocarbons may decrease the water quality in the immediate vicinity of the release. Only small volumes (<20L) are anticipated, resulting in very short-term impacts to water quality, and limited to the immediate release location.

The open water location and relatively small unplanned volumes of hydrocarbons/chemicals released will result in rapid dilution close to the source of discharge.

Given the occasional nature of unplanned deck and subsea discharges, the small volumes, and the offshore location of the PAA, any changes to water quality are expected to have no lasting effects.

Marine Fauna

As a result of a change in water quality, further impacts to receptors may occur, which include injury or mortality to marine fauna resulting from exposure to toxins in the released chemicals/hydrocarbons. Physical coating of marine fauna and sub-lethal or lethal toxic effects from hydrocarbons/chemicals are considered unlikely given the low volumes of potential discharge, short exposure times and the rapid dilution and dispersion of discharges once entering the marine environment. Impacts to marine fauna are expected to be limited to temporary irritation of sensitive membranes to individuals and are considered negligible.

Summary of Assessment Outcomes

Receptor	Impact	Receptor Sensitivity	Risk Consequence	Likelihood	Risk rating
Water quality	Change in water quality	Low value (open water)	Negligible (F)	Highly Unlikely	Low
Migratory Shorebirds and Seabirds	Injury/mortality to fauna	High value species	Slight (E)	Highly Unlikely	Low
Fish		High value species	Slight (E)	Highly Unlikely	Low
Marine Mammals		High value species	Slight (E)	Highly Unlikely	Low
Marine Reptiles		High value species	Slight (E)	Highly Unlikely	Low

Overall Risk Consequence: The overall risk consequence/risk rating for an unplanned deck and subsea spills is Low based on no lasting effect to the high value receptors (marine fauna). The risk consequence/risk ratings for water quality is consistent with the levels rated in the Scarborough OPP. Potential impacts to marine fauna have been additionally assessed in this EP. There is no change in risk rating (low); however, the risk consequence is slightly higher due to the higher receptor sensitivity level.

Demonstration of ALARP

Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/Risk Reduction	Proportionality	Control Adopted
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Legislation, Codes and Standards

Marine Order 91 (Marine pollution prevention – oil) 2014, requires SOPEP/SMPEP (as appropriate to vessel class).	F: Yes. CS: Minimal cost. Standard practice.	By ensuring a SOPEP/SMPEP is in place for the vessel, the likelihood of a spill entering the marine environment is reduced. Although no significant reduction in consequence could result, the overall risk is reduced.	Controls based on legislative requirements – must be adopted.	Yes C 7.3
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Liquid chemical and fuel storage areas are bunded or secondarily contained when they are not being handled/moved temporarily.	F: Yes. CS: Minimal cost. Standard practice.	Implementation of procedures for chemical storage and handling on the vessels will reduce the consequence of impacts resulting from unplanned discharges to the marine environment by ensuring chemicals have been assessed for environmental acceptability.	Controls based on legislative requirements – must be adopted.	Yes C 10.1
Good Practice				
Spill kits positioned in high risk locations around the vessel (near potential spill points such as transfer stations).	F: Yes. CS: Minimal cost. Standard practice.	Spill kits would reduce the likelihood of a deck spill from entering the marine environment. The consequence is unchanged.	Benefits outweigh cost/sacrifice.	Yes C 10.2
Implementation of waste management procedures which provide for safe handling and transportation, segregation and storage and appropriate classification of all waste generated.	F: Yes. CS: Minimal cost. Standard practice.	Controls outlined in the management plan will reduce the likelihood of an unplanned release. The consequence is unchanged.	Benefits outweigh cost sacrifice.	Yes C 10.4
Chemicals will be selected with the lowest practicable environmental impacts and risks subject to technical constraints.	F: Yes. CS: Minimal cost. Standard practice.	Environmental assessment of chemicals in discharges will reduce the consequence of impacts resulting from discharges to the marine environment by ensuring chemicals have been assessed for environmental acceptability. Planned discharges are required for the safe execution of activities and therefore no reduction in likelihood can occur.	Benefits outweigh cost/sacrifice.	Yes C 7.4
Relevant machinery (including ROV) to undergo scheduled maintenance.	F: Yes. CS: Minimal cost. Standard practice.	Regular maintenance will reduce the likelihood of an unplanned release. The consequence is unchanged.	Benefits outweigh cost/sacrifice.	Yes C 10.5
ROV fluid levels to be monitored during use and set with alarms.	F: Yes. CS: Minimal cost. Standard practice.	Monitoring will reduce the likelihood of an unplanned release. The consequence is unchanged.	Benefits outweigh cost/sacrifice.	Yes C 10.6
Below-deck storage of all hydrocarbons and chemicals	F: Yes. CS: Minimal cost. Standard practice.	Below-deck storage will reduce the likelihood of a deck spill.	Benefits outweigh cost/sacrifice.	Yes C 10.7

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Mitigation: Oil spill response	Refer to Appendix D .			
Professional Judgement - Eliminate				
No additional controls identified				
Professional Judgement – Substitute				
No additional controls identified				
Professional Judgement – Engineered Solution				
Below-deck storage of all hydrocarbons and chemicals.	F: Yes. It is feasible to store some level of inventory for hydrocarbons and chemicals below-deck when not in use. CS: Time in double-handling of chemicals / hydrocarbons in moving below-deck and then back to upper deck for use. H&S risks associated with moving and handling chemicals / hydrocarbons.	Storage of chemicals and hydrocarbons below deck where practicable can reduce the likelihood of spills which may escalate overboard.	Benefits outweigh cost/sacrifice.	Yes C 10.7
A reduction in the volumes of chemicals and hydrocarbons stored onboard vessels.	F: Yes. Increases the risks associated with transportation and lifting operations. CS: Project delays if required chemicals not on board. Increases the risks associated with transportation and lifting operations.	No reduction in likelihood or consequence since chemicals will still be required to enable drilling activities to occur.	Disproportionate. The cost/ sacrifice outweighs the benefit gained.	No

ALARP Statement:

On the basis of the environmental risk assessment outcomes and use of the relevant tools appropriate to the decision type (i.e. Decision Type A, **Section 2.3.3**), Woodside considers the adopted controls appropriate to manage the risks and consequences of an unplanned release of chemicals. As no reasonable additional/alternative controls were identified that would further reduce the risks and consequences without grossly disproportionate sacrifice, the risks and consequences are considered ALARP.

Demonstration of Acceptability

Acceptability Criteria and Assessment

Demonstration of acceptability for the sources of aspect and associated impacts assessed in this section are provided in Section 7.2.1 of the Scarborough OPP (SA0006AF0000002, rev 5). The Petroleum Activities Program meets the acceptability criteria (**Section 2.3.5**):

- Overall risk consequence for individual receptors are less than the significant impact level defined in the OPP.
- EPOs and controls in the OPP that are relevant to an unplanned chemical and minor hydrocarbon spill have been adopted.
- There are no changes to internal/external context specific to this risk from the OPP. Feedback raised during consultation, including any specific updates to the EP in response, has been considered in Appendix F, Table 1

Acceptability Statement:

The impact assessment has determined that unplanned chemical and minor hydrocarbon spills represents a low current risk rating and is unlikely to result in a risk consequence greater than Slight. There are no BIAs for any EPBC Act listed Threatened or Migratory species overlapping or adjacent to the PAA. Relevant recovery plans and conservation advice have been considered during the impact assessment, and the Petroleum Activities Program is not considered to be inconsistent with the overall recovery objectives and actions of these recovery plans and conservation advice. The adopted controls are considered consistent with industry legislation, codes and standards, good practice and professional judgement and meet the requirements and expectations of Australian Marine Orders identified during impact assessment.

Further opportunities to reduce the impacts have been investigated above. The potential risks and consequences are considered acceptable if the adopted controls are implemented. Therefore, Woodside considers the adopted controls appropriate to manage the risks and consequences of an unplanned discharge of chemicals/ hydrocarbons to a level that is broadly acceptable.

Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
EPO 19 Undertake the Petroleum Activities Program in a manner that will prevent an unplanned release of chemicals or non-process hydrocarbons to the marine environment resulting in a substantial change in water quality which may adversely impact on biodiversity, ecological integrity, social amenity or human health.	C 7.3 See Section 6.7.7	PS 7.3.1 See Section 6.7.7	MC 7.3 See Section 6.7.7
	C 10.1 Liquid chemical and fuel storage areas are bunded or secondarily contained when they are not being handled/moved temporarily.	PS 10.1.1 Failure of primary containment in storage areas does not result in loss to the marine environment.	MC 10.1.1 Records confirms all liquid chemicals and fuel are stored in bunded/secondarily contained areas when not being handled/moved temporarily.
	C 10.2 Spill kits positioned in high risk locations around the vessel (near potential spill points such as transfer stations).	PS 10.2.1 Spill kits to be available for use to clean up deck spills.	MC 10.2.1 Records confirms that spill kits are present, maintained, and suitably stocked.
	C 10.4 Implementation of waste management procedures which provide for safe handling and transportation, segregation and storage and appropriate classification of all waste generated.	PS 10.4.1 Hazardous and non hazardous waste managed in accordance with the waste management procedure.	MC 10.4.1 Records demonstrate compliance with waste management procedure.
	C 7.4 See Section 6.7.7	PS 7.4.1 See Section 6.7.7	MC 7.4.1 See Section 6.7.7
	C 10.5 Relevant machinery (including ROVs, subsea pumps, passive heave compensators) to undergo maintenance.	PS 10.5.1 Planned maintenance of relevant machinery	MC 10.5.1 Maintenance records show maintenance of relevant machinery been undertaken.
	C 10.6 ROV fluid levels to be monitored during use and set with alarms.	PS 10.6.1 ROV fluid levels to be monitored during use.	MC 10.6.1 Records demonstrate monitoring of ROV fluids was undertaken,
	C 10.7	PS 10.7	MC 10.7.1

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Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
	Below-deck storage of all hydrocarbons and chemicals where practicable.	Hydrocarbons and chemicals stored below-deck where practicable.	Inspections show storage where practicable of hydrocarbons and chemicals below deck.

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6.8.5 Unplanned Discharge: Loss of Solid Hazardous and Non-hazardous Wastes/Equipment

Scarborough OPP – Relevant Impact Assessment Section														
OPP Section 7.2.2 – Unplanned Discharge: Solid Waste														
Context														
Relevant Activities Vessel Operations – Section 3.7				Existing Environment Marine Regional Characteristics – Section 4.2				Stakeholder consultation Consultation – Section 5						
Impact/Risk Evaluation Summary														
Source of Impact/Risk	Environmental Value Potentially Impacted							Evaluation						
	Soil and Groundwater	Marine Sediment	Water Quality	Air Quality (inc. odour)	Ecosystems / Habitat	Species	Socio-economic	Decision Type	Impact/Consequence	Likelihood	Current Risk Rating	ALARP Tools	Acceptability	Outcome
Accidental loss of hazardous or non-hazardous solid wastes / equipment to the marine environment			✓			✓		A	D	0	L	LCS GP PJ	Broadly Acceptable	EPO 2, 5, 6, 7, 8, 20, 21
Description of Source of Impact/Risk														
<p>The vessels will generate a variety of solid wastes, including packaging and domestic wastes such as aluminium cans, bottles, paper and cardboard. Hence, there is the potential for solid wastes to be lost overboard to the marine environment.</p> <p>Equipment may also be accidentally lost overboard. Equipment that has been recorded as being lost on previous campaigns has primarily been windblown or dropped overboard and has included things such as personal protective equipment and small tools or materials.</p> <p>These events have occurred during backloading activities, periods of adverse weather and incorrect waste storage.</p>														
Detailed Impact Assessment														
Assessment of Potential Impacts														
<p>The potential impacts of hazardous or non-hazardous solid waste / equipment accidentally discharged to the marine environment include contamination of the environment as well as secondary impacts relating to potential contact of marine fauna with wastes. This could result in entanglement or ingestion and lead to injury and death of individual animals and changes to aesthetic values. The temporary or permanent loss of waste materials into the marine environment is not likely to have a significant environmental impact, based on the location of the PAA, the types, size and frequency of wastes that could occur, and species present.</p> <p>Water Quality</p> <p>Hazardous solid wastes such as paint cans, oily rags, etc., can cause localised contamination of the water through a release of toxins and chemicals. Given likely small volumes of any unplanned solid waste discharge, and the occasional nature of the event, these would result in temporary and highly localised changes to the water quality.</p> <p>Seabirds and Migratory Shorebirds, Fish, Marine Reptiles and Marine Mammals</p> <p>The unplanned discharge of solid wastes can result in mortality to fauna, either through contamination or physical injury depending on the nature of the waste. Marine fauna, including fish, seabirds and shorebirds, marine mammals and marine reptiles may be impacted through ingestion or entanglement of waste or through exposure to toxic chemicals. Ingestion or entanglement of marine fauna has the potential for physical harm which may limit feeding/foraging behaviours and thus can result in mortalities. Injury and fatality to vertebrate marine life caused by ingestion of, or entanglement in, harmful marine debris was listed as a key threatening process under the EPBC Act in August 2003 (DoEE, 2018). The Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of</p>														
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Australia's coasts and oceans (DoEE, 2018) identifies EPBC Act-listed species for which there are scientifically documented adverse impacts resulting from marine debris. Marine turtles and seabirds in particular may be at risk from plastics which may cause entanglement or be mistaken for food (e.g. DoEE, 2018; Commonwealth of Australia, 2017) and ingested causing damage to internal tissues and potentially preventing feeding activities. In the worst instance this could have a lethal affect to an individual. Marine debris has been identified as threat in the Recovery Plan for Marine Turtles in Australia (2017–2027).

Impacts to species including fish, birds, marine mammals and marine reptiles from the unplanned discharge of solid waste is unlikely given low occurrence of unplanned discharges and the location of the activities at significant distance from sensitive habitats. Significant impacts are unlikely to occur at an individual level and will not occur at a population level, nor result in the decrease of the quality of the habitat such that the extent of these species is likely to decline.

While the threat abatement plan for impacts of marine debris on vertebrate marine life does not list explicit management actions for non-related industries (DEWHA, 2009b), management controls will reduce the risk of unplanned discharge of solid waste.

The temporary or permanent loss of waste materials into the marine environment is not likely to have a significant environmental impact, based on the types, size and frequency of wastes that could occur. The magnitude of potential impact to marine fauna is Slight, which results in a consequence of Minor (D) based on the high receptor sensitivity.

Summary of Assessment Outcomes

Receptor	Impact	Receptor Sensitivity	Risk Consequence	Likelihood	Risk Rating
Water Quality	Change in water quality	Low value (open water)	Negligible (F)	Remote	Low
Migratory Shorebirds and Seabirds	Injury/mortality to fauna	High value species	Minor (D)	Remote	Low
Fish		High value species	Minor (D)	Remote	Low
Marine Mammals		High value species	Minor (D)	Remote	Low
Marine Reptiles		High value species	Minor (D)	Remote	Low

Overall Risk Consequence: The overall risk rating for unplanned discharge of hazardous and non-hazardous solid waste is Low based on a Minor consequence, to the high value receptors (marine fauna), and a remote likelihood. The risk consequence levels/risk ratings for individual receptors are consistent with the levels rated in the OPP.

Demonstration of ALARP

Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/Risk Reduction	Proportionality	Control Adopted
Legislation, Codes and Standards				
Marine Order 95 – Pollution prevention – Garbage (as appropriate to vessel class), which requires putrescible waste and food scraps are passed through a macerator so that it is capable of passing through a screen with no opening wider than 25 mm.	F: Yes. CS: Minimal cost. Standard practice.	Legislative requirements to be followed reduce the likelihood of an unplanned release. The consequence is unchanged.	Controls based on legislative requirements – must be adopted.	Yes C 7.1
Good Practice				
Marine Order 94 – Packaged harmful substances, which requires: <ul style="list-style-type: none"> Vessels carrying harmful substances in packaged form must comply with 2 to 5 of MARPOL Annex III, 	F: Yes. CS: Minimal cost. Standard practice.	Legislative requirements to be followed reduce the likelihood of an unplanned release. The consequence is unchanged.	Controls based on legislative requirements – must be adopted.	Yes C 11.1

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<p>with respect to stowage requirements.</p> <p>A vessel Master may only wash a substance overboard if:</p> <ul style="list-style-type: none"> the physical, chemical and biological properties of the substance have been considered, and washing overboard is considered the most appropriate manner of disposal, and the Vessel Master has authorised the washing overboard. 				
<p>Implementation of waste management procedures which provide for safe handling and transportation, segregation and storage and appropriate classification of all waste generated.</p>	<p>F: Yes. CS: Minimal cost. Standard practice.</p>	<p>Controls will reduce the likelihood of an unplanned release. The consequence is unchanged.</p>	<p>Benefit outweighs cost sacrifice.</p>	<p>Yes C 10.4</p>
<p>Vessel ROV, crane or project vessel may be used to attempt recovery of solid wastes /equipment lost overboard.</p> <p>Where safe and practicable for this activity will consider:</p> <ul style="list-style-type: none"> risk to personnel to retrieve object whether the location of the object is in recoverable water depths object's proximity to subsea infrastructure ability to recover the object (i.e. nature of object, lifting equipment or, ROV availability and suitable weather). <p>Any material dropped objects / waste that remain in the title will undergo an impact assessment and be added to the inventory.</p>	<p>F: May not always be possible. Assessed case by case. CS: Potentially significant cost. Standard practice.</p>	<p>Occurs after an unplanned release of solid waste and therefore no change to the likelihood. Since the waste objects may be recovered, a reduction in consequence is possible.</p>	<p>Benefit outweighs cost sacrifice.</p>	<p>Yes C 11.2</p>

Professional Judgement – Eliminate

No additional controls identified.

Professional Judgement – Substitute

No additional controls identified.

Professional Judgement – Engineered Solution

No additional controls identified.

ALARP Statement:

On the basis of the environmental risk assessment outcomes and use of the relevant tools appropriate to the decision type (i.e. Decision Type A, **Section 2.3.3**), Woodside considers the adopted controls appropriate to manage the risks and consequences of accidental loss of hazardous or non-hazardous solid wastes / equipment to the marine environment. As no reasonable additional/alternative controls were identified that would further reduce the risks and consequences without grossly disproportionate sacrifice, the risks and consequences are considered ALARP.

Demonstration of Acceptability
<p>Acceptability Criteria and Assessment</p> <p>Demonstration of acceptability for the sources of aspect and associated impacts assessed in this section are provided in Section 7.2.2.3 of the Scarborough OPP (SA0006AF0000002, rev 5). The Petroleum Activities Program meets the acceptability criteria (Section 2.3.5):</p> <ul style="list-style-type: none"> • Overall risk consequence/risk ratings for individual receptors are less than the significant impact level defined in the OPP. • EPOs and controls in the OPP that are relevant to an unplanned release of hazardous and non-hazardous wastes have been adopted. • There are no changes to internal/external context specific to this risk from the OPP. Feedback raised during consultation, including any specific updates to the EP in response, has been considered in Appendix F, Table 1 <p>Acceptability Statement:</p> <p>The impact assessment has determined that unplanned discharges from a release of solid hazardous and non-hazardous wastes / equipment represents a low current risk rating and is unlikely to result in a risk consequence greater than Minor. There are no BIAs for any EPBC Act listed Threatened or Migratory species overlapping or adjacent to the PAA. Relevant recovery plans and conservation advice have been considered during the impact assessment, and the Petroleum Activities Program is not considered to be inconsistent with the overall recovery objectives and actions of these recovery plans and conservation advice. The adopted controls are considered consistent with industry legislation, codes and standards, good practice and professional judgement and meet the requirements of Australian Marine Orders identified during impact assessment.</p> <p>Further opportunities to reduce the impacts have been investigated above.</p> <p>Based on an assessment against the defined acceptable levels, the risk from unplanned discharges of solid waste / equipment is considered acceptable.</p>

Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
<p>EPO 20 Undertake Petroleum Activities Program in a manner that will prevent an unplanned release of solid waste to the marine environment resulting in a significant impact</p> <p>EPO 8 Undertake the Petroleum Activities Program in a manner that will prevent a substantial adverse effect on a population of seabirds or shorebirds, or the spatial distribution of the population.</p> <p>EPO 5 Undertake the Petroleum Activities Program in a manner that will not seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.</p>	<p>C 7.1 See Section 6.7.6</p> <p>C 11.1 Marine Order 94 (where relevant to vessel class) – packaged harmful substances, which requires:</p> <ul style="list-style-type: none"> • vessels carrying harmful substances in packaged form must comply with 2 to 5 of MARPOL Annex III, with respect to stowage requirements <p>A Vessel Master may only wash a substance overboard if:</p> <ul style="list-style-type: none"> • the physical, chemical and biological properties of the substance have been considered, and • washing overboard is considered the most appropriate manner of disposal, and • the Vessel Master has authorised the washing overboard. 	<p>PS 7.1.1 See Section 6.7.6</p> <p>PS 11.1.1 Compliance with Marine Order 94 (where relevant to vessel class) – packaged harmful substances which provides information about preventing harmful substances carried by regulated Australian vessels, from entering the marine environment.</p>	<p>MC 7.1.1 See Section 6.7.6</p> <p>MC 11.1.1 Records demonstrate any non-compliance with Marine Orders are documented.</p>

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Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
<p>EPO 6 Undertake the Petroleum Activities Program in a manner that prevents a substantial adverse effect on a population of fishes, marine mammals, marine reptiles, or the spatial distribution of a population.</p> <p>EPO 7 Undertake the Petroleum Activities Program in a manner that will not substantially modify, destroy or isolate an area of important habitat for a migratory species.</p> <p>EPO 2 Undertake the Petroleum Activities Program in a manner that will prevent a substantial change in water quality which may adversely impact on biodiversity, ecological integrity, social amenity or human health.</p> <p>EPO 21 Undertake the Petroleum Activities Program in a manner that will prevent a substantial adverse effect on a population of marine mammals or the spatial distribution of the population.</p>	<p>C 10.4 See Section 6.8.4</p>	<p>PS 10.4.1 See Section 6.8.4</p>	<p>MC 10.4.1 See Section 6.8.4</p>
	<p>C 11.2 Vessel ROV, crane or project vessel may be used to attempt recovery of solid wastes /equipment lost overboard.</p> <p>Where safe and practicable for this activity will consider:</p> <ul style="list-style-type: none"> • risk to personnel to retrieve object • whether the location of the object is in recoverable water depths • object's proximity to subsea infrastructure • ability to recover the object (i.e. nature of object, lifting equipment or, ROV availability and suitable weather). <p>Any material dropped objects / waste that remain in the title will undergo an impact assessment and be added to the inventory.</p>	<p>PS 11.2.1 Any solid waste /equipment dropped to the marine environment will be recovered where safe and practicable to do so.</p> <p>Where retrieval is not practicable and / or safe, material items (property) that are lost to the marine environment will undergo an impact assessment and will be added to the inventory for the title.</p>	<p>MC 11.2.1 Records detail the recovery attempt consideration and status of any waste /equipment lost to marine environment.</p>

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Any unplanned seabed disturbance within the KEF would be highly localised and relatively small compared to the size of the KEF. There will be no substantial adverse effect on the KEF or the communities within it. On this basis, the magnitude of potential impacts to KEFs from unplanned seabed disturbance during activities is Slight. Receptor sensitivity for KEF is high, leading to a Minor (D) risk consequence.

Epifauna and Infauna

As a result of a change in water quality and change in habitat, injury or mortality to marine fauna resulting from an increase in turbidity may occur. Given a change to water quality is unlikely, the only receptors that would potentially be at risk of unplanned seabed disturbance are bottom dwelling species including epifauna and infauna. Benthic communities, including epifauna and infauna may be impacted by the dropped objects on the seabed. If not recovered, dropped objects may result in the permanent loss of a small area under the object.

Given generally sparse benthic communities in the PAA, no threatened or migratory species or ecological communities were identified, and those epifauna and infauna communities observed are likely to be well represented elsewhere in the region, impacts are expected to be restricted to a localised proportion of epifauna and infauna communities.

Based on the detailed evaluation, the magnitude of potential impacts to epifauna and infauna from unplanned seabed disturbance during activities associated with Scarborough is evaluated to be slight. Sensitivity for epifauna and infauna is low, leading to a Negligible (F) risk consequence.

Summary of Assessment Outcomes

Receptor	Impact	Receptor sensitivity	Risk Consequence	Likelihood	Risk Rating
Epifauna and infauna	Change in habitat Injury/ mortality to fauna	Low value	Negligible (F)	Highly Unlikely	Low
KEFs	Change in habitat	High Value	Minor (D)	Highly Unlikely	Moderate

Overall Risk Consequence: The overall risk rating for disturbance to benthic habitat from unplanned seabed disturbance is Moderate based on minor consequence to the high value receptor (KEFs) and a highly unlikely likelihood. The risk consequence/risk ratings for individual receptors are consistent with the levels rated in the OPP.

Demonstration of ALARP

Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/Risk Reduction	Proportionality	Control Adopted
Legislation, Codes and Standards				
No additional controls identified.				
Good Practice				
Installation vessel work procedures for lifts, bulk transfers and cargo loading, which require: <ul style="list-style-type: none"> The security of loads shall be checked prior to commencing lifts. Loads shall be covered if there is a risk of loss of loose materials. Lifting operations shall be conducted using the PTW and JSA systems to manage the specific risks of that lift, including consideration of weather and sea state. 	F: Yes. CS: Minimal cost. Standard practice.	Installation vessel work procedures for lifts, bulk transfers and cargo loading will reduce the risk of dropped objects.	Benefits outweigh cost/sacrifice.	Yes C 12.1
Subsea lifts of equipment (excluding concrete pads) will occur overboard in deployment zone and	F: Yes. CS: Minimal cost. Standard practice.	Lifting within designated deployment zone will reduce the risk of	Benefits outweigh cost/sacrifice.	Yes C 12.2

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Demonstration of ALARP				
Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/Risk Reduction	Proportionality	Control Adopted
stepped into location, in accordance with dropped object assessment.		dropped objects in proximity to existing subsea infrastructure that could potentially cause damage/leaks.		
Installation vessel inductions include control measures for dropped object prevention.	F: Yes. CS: Minimal cost. Standard practice.	By ensuring crew are appropriately trained in dropped object prevention, the likelihood of a dropped object event is reduced. No change in consequence will occur.	Benefits outweigh cost/sacrifice.	Yes C 12.3
Vessel ROV, crane or project vessel may be used to attempt recovery of solid wastes /equipment lost overboard. Where safe and practicable for this activity will consider: <ul style="list-style-type: none"> risk to personnel to retrieve object whether the location of the object is in recoverable water depths object's proximity to subsea infrastructure ability to recover the object (i.e. nature of object, lifting equipment or, ROV availability and suitable weather). Any material dropped objects / waste that remain in the title will undergo an impact assessment and be added to the inventory.	F: May not always be possible. Assessed case by case. CS: Potentially significant cost. Standard practice.	Occurs after a dropped object event; therefore, no change to the likelihood. Since the object may be recovered, a reduction in consequence is possible.	Benefit outweighs cost sacrifice.	Yes C 11.2
Infrastructure will be placed on the seabed within the design footprint using positioning technology	F: Yes. This is a standard practice and benefits project requirements aiding placement as per design requirements. CS: Costs associated with improved accuracy/tolerance for implementation	Positioning infrastructure within the design footprint will reduce the potential magnitude of impact.	Benefits outweigh cost/sacrifice.	Yes C 1.2
Professional Judgement – Eliminate				
No additional controls identified.				

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Demonstration of ALARP				
Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/Risk Reduction	Proportionality	Control Adopted
Professional Judgement – Substitute				
No additional controls identified.				
Professional Judgement – Engineered Solution				
No additional controls identified.				
Risk Based Analysis				
No additional controls identified.				
ALARP Statement:				
On the basis of the environmental risk assessment outcomes and use of the relevant tools appropriate to the decision type (i.e. Decision Type A, Section 2.3.3), Woodside considers the adopted controls appropriate to manage the risks and consequences of unplanned seabed disturbance. As no reasonable additional/alternative controls were identified that would further reduce the risks and consequences without grossly disproportionate sacrifice, the risks and consequences are considered ALARP.				
Demonstration of Acceptability				
Acceptability Criteria and Assessment				
Demonstration of acceptability for the sources of aspect and associated impacts assessed in this section are provided in Section 7.2.3.3 of the Scarborough OPP (SA0006AF0000002, rev 5). The Petroleum Activities Program meets the acceptability criteria (Section 2.3.5):				
<ul style="list-style-type: none"> • Overall risk consequence/risk ratings for individual receptors are less than the significant impact level defined in the OPP. • EPOs and controls in the OPP that are relevant to an unplanned seabed disturbance have been adopted. • There are no changes to internal/external context specific to this risk from the OPP. Feedback raised during consultation, including any specific updates to the EP in response, has been considered in Appendix F, Table 1 				
Acceptability Statement:				
The impact assessment has determined that disturbance to seabed from dropped objects represents a moderate current risk rating and is unlikely to result in a risk consequence greater than Minor. The adopted controls are considered industry good practice. The potential risks and consequences are considered broadly acceptable if the adopted controls are implemented. Therefore, Woodside considers the adopted controls appropriate to manage the risks of seabed disturbance from dropped objects / anchor drag to an acceptable level.				

Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
<p>EPO 13 Undertake the Petroleum Activities Program in a manner which does not modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity in an area defined as a KEF.</p> <p>EPO 22 Undertake the Petroleum Activities Program in a manner which prevents unplanned seabed disturbance.</p>	<p>C 12.1 The installation vessel work procedures for lifts, bulk transfers and cargo loading, which require:</p> <ul style="list-style-type: none"> the security of loads shall be checked prior to commencing lifts loads shall be covered if there is a risk of loss of loose materials. Lifting operations shall be conducted using the PTW and JSA systems to manage the specific risks of that lift, including consideration of weather and sea state. 	<p>PS 12.1.1 All lifts conducted in accordance with applicable installation vessel work procedures to limit potential for dropped objects.</p>	<p>MC 12.1.1 Records show lifts conducted in accordance with the applicable installation vessel work procedures.</p>
	<p>C 12.2 Subsea lifts of equipment (excluding concrete pads) will occur overboard in deployment zone and stepped into location, in accordance with dropped object assessment.</p>	<p>PS 12.2.1 Subsea lifts of equipment (excluding concrete pads) occur overboard in deployment zone and stepped into location.</p>	<p>MC 12.2.1 Records demonstrate that subsea lifts of equipment (excluding concrete pads) have occurred in the deployment zone and stepped into location.</p>
	<p>C 12.3 Installation vessel inductions include control measures for dropped object prevention.</p>	<p>PS 12.3.1 To ensure awareness of requirements for dropped object prevention.</p>	<p>MC 12.3.1 Records show dropped object awareness training is provided to the installation vessel.</p>
	<p>C 11.2 See Section 6.8.5</p>	<p>PS 11.2.1 See Section 6.8.5.</p>	<p>MC 11.2.1 See Section 6.8.5</p>
	<p>C 1.2 See Section 6.7.1</p>	<p>PS 1.2.1 See Section 6.7.1</p>	<p>MC 1.2.1 See Section 6.7.1</p>

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6.8.7 Physical Presence (Unplanned): Accidental Introduction and Establishment of Invasive Marine Species

Scarborough OPP – Relevant Impact Assessment Section														
OPP Section 7.2.4 – Physical Presence (Unplanned): IMS														
Context														
Relevant Activities Installation of Subsea Infrastructure – Section 3.10 Vessel Operations – Section 3.7				Existing Environment Marine Regional Characteristics – Section 4.2				Stakeholder consultation Consultation – Section 5						
Impact/Risk Evaluation Summary														
Source of Impact/Risk	Environmental Value Potentially Impacted							Evaluation						
	Soil and Groundwater	Marine Sediment	Water Quality	Air Quality (inc. odour)	Ecosystems / Habitat	Species	Socio-economic	Decision Type	Impact/Consequence	Likelihood	Current Risk Rating	ALARP Tools	Acceptability	Outcome
Introduction and establishment of invasive marine species (IMS) within the PAA.					✓	✓	✓	A	E	0	L	LCS	Broadly Acceptable	EPO 13, 23

Description of Source of Impact/Risk
<p>Vessel Operations</p> <p>During the Petroleum Activities Program, vessels will be transiting to and from the PAA, potentially including traffic mobilising from beyond Australian waters. Project vessels include installation and construction vessels and other general support vessels (Section 3.7).</p> <p>All vessels are subject to some level of marine fouling whereby organisms attach to the vessel hull. This could particularly occur in areas where organisms can find a good attachment surface (e.g. seams, strainers and unpainted surfaces) or where turbulence is lowest (e.g. niches, sea chests, etc.), although commercial vessels typically maintain anti-fouling coatings to reduce the build-up of fouling organisms.</p> <p>IMS could be present as biofouling on immersible equipment (survey equipment, ROV etc.) and could be translocated to the PAA and transferred directly to the seafloor or subsea structures where they could establish. Organisms can also be drawn into ballast tanks during onboarding of ballast water as cargo is loaded or to balance vessels under load.</p> <p>During the Petroleum Activities Program, project vessels have the potential to introduce IMS to the PAA through marine fouling (containing IMS) on vessels, as well as within high risk ballast water discharge. Cross contamination between vessels can also occur (e.g. IMS translocated between project vessels) during times when vessels need to be alongside each other.</p>

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Detailed Impact Assessment

Assessment of Potential Impacts

IMS are a subset of Non-indigenous Marine Species (NIMS) that have been introduced into a region beyond their natural biogeographic range resulting in impacts to social/cultural, human health, economic and/or environmental values. NIMS are species that have the ability to survive, reproduce and establish founder populations. However, not all NIMS introduced into an area will thrive or cause demonstrable impacts; the majority of NIMS around the world are relatively benign and few have spread widely beyond sheltered ports and harbours. NIMS are only considered IMS when they result in impacts to environmental values and/or have social/cultural, economic and/or human health impacts.

Once introduced, IMS may prey on local species (which had previously not been subject to this kind of predation and therefore not have evolved protective measures against the attack), they may outcompete indigenous species for food, space or light and can also interbreed with local species, creating hybrids such that the endemic species is lost. These changes to the local marine environment result in changes to the natural ecosystem.

IMS have also proven economically damaging to areas where they have been introduced and established. Such impacts include direct damage to assets (fouling of vessel hulls and infrastructure) and depletion of commercially harvested marine life (e.g. shellfish stocks). IMS have proven particularly difficult to eradicate from areas once established. If the introduction is detected early, eradication may be effective but is likely to be expensive, disruptive and, depending on the method of eradication, harmful to other local marine life.

Potential IMS have historically been introduced and translocated around Australia by a variety of natural and human means, including marine fouling and ballast water. Potential IMS vary from one region to another depending on various environmental factors such as water temperature, salinity, nutrient levels and habitat type, which dictate their survival and invasive capabilities. IMS typically require hard substrate in the photic zone; therefore, requiring shallow waters to become established. Highly-disturbed, shallow-water environments such as shallow coastal waters, ports and marinas are more susceptible to IMS colonisation, whereas IMS are generally unable to successfully establish in deep-water ecosystems and open-water environments where the rate of dilution and the degree of dispersal are high (Williamson and Fitter, 1996; Paulay et al., 2002; Geiling, 2014).

Epifauna and Infauna

Epifauna and infauna are susceptible to impacts from IMS due to the risk of changes to the ecosystem dynamics such as competition for resources and predation.

Benthic productivity on the outer continental shelf and slope is low, and is a function of water depth, low nutrient availability, and the absence of hard substrates. Studies completed within the region indicate that benthic composition in deep-water habitats is generally lower in abundance than shallow water habitats of the region (DEWHA, 2008a; Brewer et al., 2007). The seafloor in the PAA is characterised by sparse marine life dominated by motile organisms (ERM, 2013). Such motile organisms included shrimp, sea cucumbers, demersal fish and small, burrowing worms and crustaceans. This soft bottom habitat is also supporting patchy distributions of mobile epibenthos, such as sea cucumbers, ophiuroids, echinoderms, polychaetes and sea-pens (DEWHA, 2008a). The dominant types of epifauna were arthropods and echinoderms (especially shrimp and sea cucumbers, respectively), while the dominant infauna groups were crustaceans and polychaetes (ERM, 2013). Benthic communities in the PAA are representative of the Exmouth Plateau and of deep-water soft sediment habitats reported in the region.

While project vessels have the potential to introduce IMS into the PAA, the deep offshore open waters of the PAA (approximately 900–1000 m) are not conducive to the settlement and establishment of IMS. Furthermore, the PAA are away from shorelines and/or critical habitat. The likelihood of IMS being introduced and establishing viable populations within the PAA or immediate surrounds is considered not credible.

Accordingly, impact to epifauna/infauna in the PAA is not considered credible. Receptor sensitivity for epifauna and infauna is low, leading to a Negligible (F) risk consequence.

Industry, Shipping, Defence

The establishment of IMS has the potential to cause changes to the functions, interests or activities of other users through indirect impact such as changes to fisheries target species resulting in economic and social implications, or due to compromised reputation to the oil and gas industry.

Given the low likelihood of IMS translocation to, and colonisation of environments within the PAA, project activities will not result in establishment of IMS, and as such not adversely affect other marine user activities in the region.

Based on the detailed impact evaluation, the magnitude of potential impacts of a change to the functions, interests or activities of other users is slight (see **Table 6-18**). Receptor sensitivity for industry, shipping and defence is medium, leading to a Slight (E) risk consequence. The likelihood of the risk event occurring is Remote, therefore the risk is assessed as Low.

Summary

In support of Woodside's assessment of the risks and consequences of IMS introduction associated with the Petroleum Activities Program, Woodside conducted a risk and impact evaluation of the different aspects of a marine pest translocation. The results of this assessment are presented in **Table 6-18**.

Detailed Impact Assessment

As a result of this assessment, Woodside has presented the highest potential consequence as a Slight (E) and likelihood as Remote (0), resulting in an overall Low risk following the implementation of identified controls.

Table 6-18: Credibility, consequence and likelihood of introducing IMS

IMS Introduction Location	Credibility of Introduction	Consequence of Introduction	Likelihood
Introduced to PAA and establishment on the seafloor or subsea structures	<p>Not Credible</p> <p>The deep offshore open waters of the PPA, away from shorelines and/or critical habitat, more than 50 km from a shoreline and in waters more than 100 m deep are not conducive to the settlement and establishment of IMS.</p>		
Introduced to PAA and establishment on a project vessel.	<p>Credible</p> <p>There is potential for the transfer of marine pests between project vessels within the PAA.</p>	<p>Environment – Not Credible</p> <p>The translocation of IMS from a colonised project vessel to shallower environments via natural dispersion is not considered credible given the distances of the PAA from nearshore environments (i.e. greater than 12 nm/50 m water depth). There is therefore no credible environmental risk and the assessment is limited to Woodside's reputation.</p> <p>Reputation – E</p> <p>If IMS were to establish on a project vessel this could potentially impact the vessel operationally through the fouling of intakes, result in translocation of an IMS into the PAA and, depending on the species, potentially transfer of an IMS to other project vessels, which would likely result in the quarantine of the vessel until eradication could occur (through cleaning and treatment of infected areas), which would be costly to perform.</p> <p>Such introduction would be expected to have slight impact to Woodside's reputation, particularly with Woodside's contractors, and would likely have a reputational impact on future proposals.</p>	<p>Remote (0)</p> <p>Interactions between project vessel will be limited during the Petroleum Activities Program, with interactions limited short periods of time alongside (i.e. during backloading, bunkering activities). There is also no direct contact (i.e. they are not tied up alongside) during these activities.</p> <p>Spread of marine pests via ballast water or spawning in these open ocean environments is also considered remote.</p>
Transfer between project vessels and from project vessels to other marine	<p>Not Credible</p> <p>This risk is considered so remote that it is not credible for the purposes of the activity.</p>		

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Detailed Impact Assessment					
environments beyond the PAA.	<p>The transfer of a marine pest between project vessels was already considered remote, given the offshore open ocean environment (i.e. transfer pathway discussed above).</p> <p>For a marine pest to then establish into a mature spawning population on the new project vessel (which would have been through Woodside's IMS process) and then transfer to another environment is not considered credible (i.e. beyond the Woodside risk matrix).</p> <p>Project vessels will be located in an offshore, open ocean, deep environment, where IMS survival is implausible. Furthermore, this marine pest once transferred would need to survive on a new vessel with good vessel hygiene (i.e. has been through Woodside's risk assessment process) and survive the transport back from the PAA to shore. In the event it was to survive this trip, it would then need to establish a viable population in nearshore waters.</p>				
Summary of Assessment Outcomes					
Receptor	Impact	Receptor Sensitivity	Risk Consequence	Likelihood	Risk Rating
Epifauna and infauna	Change in ecosystem dynamics	Low value habitat (homogenous)	Negligible (F)	Remote	Low
Industry, Shipping, Defence	Changes to the functions, interests or activities of other users	Medium value	Slight (E)	Remote	Low
<p>Overall Risk Consequence: The overall risk rating for the accidental introduction of IMS is Low given the remote offshore location of the PAA. The risk consequence/risk ratings for individual receptors are consistent with the levels rated in the OPP.</p>					

Demonstration of ALARP				
Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/Risk Reduction	Proportionality	Control Adopted
Legislation, Codes and Standards				
Project vessels including foreign vessels not party to the International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004 (BWM Convention) will manage their ballast water using one of the approved ballast water management options, as specified in the Australian Ballast Water Management Requirements. This applies to all project vessels that will enter the Operational Area, including those carrying out activities outside of Australian Territorial Seas (>12nm).	F: Yes. CS: Minimal cost. Standard practice.	The use of an approved ballast water treatment system will reduce the likelihood of transfer of marine pests between project vessels within the PAA. No change in consequence would occur.	Controls based on legislative requirements under the Biosecurity Act 2015 – must be adopted.	Yes C 13.1
Internationally sourced Project vessels will manage their biosecurity risk associated with	F: Yes.	Reduces the likelihood of transfer of marine pests	Controls based on legislative requirements under	Yes C 13.2

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biofouling as specified in the Australian Biofouling Management Requirements.	CS: Standard practice.	between vessels within the Operational Area. No change in consequence would occur.	the <i>Biosecurity Act 2015</i> – must be adopted.	
Good Practice				
Woodside's IMS risk assessment process will be applied to project vessels and immersible equipment that enter the Operational Area, unless exempt (Section 7.2.2). Based on the outcomes of each IMS risk assessment, management options commensurate with the risk will be implemented to minimise the likelihood of IMS being introduced.	F: Yes. CS: Minimal cost. Good practice implemented across all Woodside Operations.	Identifies potential risks and additional controls implemented accordingly. In doing so, the likelihood of transferring marine pests between project vessels within the PAA is reduced. No change in consequence would occur.	Benefits outweigh cost/sacrifice.	Yes C 13.3
Professional Judgement - Eliminate				
No discharge of ballast water during the Petroleum Activities Program.	F: No. Ballast water discharges are critical for maintaining vessel stability. Given the nature of the Petroleum Activities Program, the use of ballast (including the potential discharge of ballast water) is considered to be a safety critical requirement. CS: Not assessed, control not feasible.	Not assessed, control not feasible.	Not assessed, control not feasible.	No
Eliminate use of vessels.	F: No. Given that vessels must be used to implement project, there is no feasible means to eliminate the source of risk. CS: Loss of the project.	Not assessed, control not feasible.	Not assessed, control not feasible.	No
Professional Judgement - Substitute				
Source project vessels based in Australia only.	F: Potentially. Limiting activities to only use local project vessels could potentially pose a significant risk in terms of time and duration of sourcing a vessel, as well as the ability of the local vessels to perform the required tasks. For	Sourcing vessels from within Australian will reduce the likelihood of IMS from outside Australian waters, however, it does not reduce the likelihood of introduction of species native to Australia but alien to the PAA and NWMR, or of IMS that have	Disproportionate. Sourcing vessels from Australian waters may result in a reduction in the likelihood of IMS introduction to the PAA; however, the potential cost of implementing this control is grossly disproportionate to the minor	No

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	<p>example, there are limited installation vessels based in Australian waters. While the project will attempt to source project vessels locally it is not always possible. Availability cannot always be guaranteed when considered competing Oil and Gas activities in the region. In addition, sourcing Australian based vessels only will cause increases in cost due to pressures of vessel availability.</p> <p>CS: Significant cost and schedule impacts due to restrictions of vessel hire opportunities.</p>	<p>established elsewhere in Australia. The consequence is unchanged.</p>	<p>environmental gain (or reducing an already remote likelihood of IMS introduction) potentially achieved by using only Australian based vessels, consequently this risk is considered not reasonably practicable.</p>	
<p>IMS inspection of all vessels.</p>	<p>F: Yes. Approach to inspect vessels could be a feasible option.</p> <p>CS: Significant cost and schedule impacts. In addition, Woodside's IMS risk assessment process (C 13.2) is seen to be more cost effective as this control allows Woodside to manage the introduction of marine pests through biofouling, while targeting its efforts to and resources to areas of greatest concern.</p>	<p>Inspection of all vessels for IMS would reduce the likelihood of IMS being introduced to the PAA. However, this reduction is unlikely to be significant given the other control measures implemented. No change in consequence would occur.</p>	<p>Disproportionate. The cost/sacrifice outweighs the benefit gained, as other controls to be implemented achieve an ALARP position.</p>	<p>No</p>

Professional Judgement – Engineered Solution

None identified.

ALARP Statement:

On the basis of the environmental risk assessment outcomes and use of the relevant tools appropriate to the decision type, Woodside considers the adopted controls appropriate to manage the risks and consequences of IMS introduction. As no reasonable additional/alternative controls were identified that would further reduce the risks and consequences without grossly disproportionate sacrifice, the risks and consequences are considered ALARP.

Demonstration of Acceptability
Acceptability Criteria and Assessment
<p>Demonstration of acceptability for the sources of aspect and associated impacts assessed in this section are provided in Section 7.2.4.3 of the Scarborough OPP (SA0006AF0000002, rev 5). The Petroleum Activities Program meets the acceptability criteria (Section 2.3.5):</p> <ul style="list-style-type: none"> • Overall risk consequence for individual receptors are less than the significant impact level defined in the OPP. • EPOs and controls in the OPP that are relevant to an unplanned introduction of IMS have been adopted. • There are no changes to internal/external context specific to this risk from the OPP. Feedback raised during consultation, including any specific updates to the EP in response, has been considered in Appendix F, Table 1
<p>Acceptability Statement:</p> <p>The impact assessment has determined that the accidental introduction and establishment of IMS represents a low current risk rating and is unlikely to result in a risk consequence greater than Slight. The adopted controls are considered consistent with industry legislation, codes and standards. Further opportunities to reduce the impacts have been investigated above</p> <p>The potential risks and consequences are considered broadly acceptable if the adopted controls are implemented. Therefore, Woodside considers the adopted controls appropriate to manage the risks of invasive marine species to an acceptable level.</p>

Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
<p>EPO 13 Undertake the Petroleum Activities Program in a manner which does not modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity in an area defined as a KEF.</p> <p>EPO 23 Undertake the Petroleum Activities Program in a manner which prevents a known or potential pest species (IMS) becoming established.</p>	<p>C 13.1 Project vessels including foreign vessels not party to the International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004 (BWM Convention) will manage their ballast water using one of the approved ballast water management options, as specified in the Australian Ballast Water Management Requirements. This applies to all project vessels that will enter the Operational Area, including those carrying out activities outside of Australian Territorial Seas (>12nm).</p>	<p>PS 13.1.1 Prevent the translocation of IMS within the vessel's ballast water from high risk locations to the Operational Area.</p>	<p>MC 13.1.1 Ballast Water Records System maintained by vessels which verifies compliance against Australian Ballast Water Management Requirements.</p>
	<p>C 13.2 Internationally sourced Project vessels will manage their biosecurity risk associated with biofouling as specified in the Australian Biofouling Management Requirements.</p>	<p>PS 13.2.1 Compliance with Australian Biofouling Management Requirements.</p>	<p>MC 13.2.1 Records of implementation of biofouling management measures and pre-arrival reporting</p>
	<p>C 13.3 Woodside's IMS risk assessment process will be applied to project vessels and immersible equipment</p>	<p>PS 13.3.1 Before entering the Operational Area, project vessels and relevant immersible equipment are</p>	<p>MC 13.3.1 Records of IMS risk assessments maintained for all project vessels and relevant immersible</p>

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Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
	<p>that enter the Operational Area, unless exempt (Section 7.2.2).</p> <p>Based on the outcomes, management options commensurate with the risk will be implemented to minimise the likelihood of IMS being introduced.</p>	<p>determined to be low risk of introducing IMS of concern.</p>	<p>equipment entering the Operational Area to undertake the Petroleum Activities Program.</p>
		<p>PS 13.3.2</p> <p>In accordance with Woodside's IMS risk assessment process, the IMS risk assessments will be undertaken by an authorised environment adviser who has completed relevant Woodside IMS training or by qualified and experienced IMS inspector.</p>	<p>MC 13.3.2</p> <p>Records confirm that the IMS risk assessments undertaken by an Environment Adviser or IMS inspector (as relevant).</p>

6.8.8 Physical Presence (Unplanned): Vessel Collision with Marine Fauna

Scarborough OPP – Relevant Impact Assessment Section														
Section 7.2.5 – Physical Presence (Unplanned): Collision with Marine Fauna														
Context														
Relevant Activities Vessel Operations – Section 3.7				Existing Environment Protected species – Section 4.6				Stakeholder consultation Consultation – Section 5						
Impact/Risk Evaluation Summary														
Source of Impact/Risk	Environmental Value Potentially Impacted							Evaluation						
	Soil and Groundwater	Marine Sediment	Water Quality	Air Quality (inc. odour)	Ecosystems / Habitat	Species	Socio-economic	Decision Type	Impact/Consequence	Likelihood	Current Risk Rating	ALARP Tools	Acceptability	Outcome
Accidental collision between project vessels and protected marine fauna						✓		A	E	1	L	LCS GP PJ	Broadly Acceptable	EPO 24
Description of Source of Impact/Risk														
<p>Activities associated with the Petroleum Activities Program will require vessels for subsea installation, support operations and supply/transport. The type and number of vessels in the PAA at any one time, and the duration of presence, will differ depending on the activities being undertaken. Vessels operating within the PAA may present a potential hazard to marine mammals and other protected marine fauna such as marine reptiles and fish. Vessel movements can result in collisions between the vessel (hull and propellers) and marine fauna, potentially resulting in superficial or serious injury that may affect life functions (e.g. movement and reproduction) or cause mortality.</p> <p>The factors that contribute to the frequency and severity of impacts due to collisions vary greatly due to vessel type, vessel operation (specific activity, speed), physical environment (e.g. water depth), the type of marine fauna present and their behaviours.</p> <p>Several vessel types will be required to complete the activities associated with the Petroleum Activities Program, including larger vessels associated with installation, and smaller support vessels (refer to Section 3.7). Such vessel-based activities will be separated spatially and temporally.</p>														
Detailed Impact Assessment														
Assessment of Potential Impacts														
<p>Project vessels operating in and around the PAA may present a potential hazard to marine mammals and other protected marine fauna, such as marine turtles. Vessel movements can result in collisions between the vessel (hull and propellers) and marine fauna, potentially resulting in superficial injury, serious injury that may affect life functions (e.g. movement and reproduction), or mortality. Marine fauna are also at risk of mortality through being caught in thrusters during station keeping operations (dynamic positioning).</p> <p>The likelihood of vessel/fauna collision being lethal is influenced by vessel speed—the greater the speed at impact, the greater the risk of mortality (Jensen and Silber, 2004; Laist et al., 2001). Vanderlaan and Taggart (2007) found that the chance of lethal injury to a large whale as a result of a vessel strike increases from about 20% at 8.6 knots to 80% at 15 knots. Project vessels within the PAA are likely to be travelling <8 knots (and will often be stationary), unless operating in an emergency. At times, vessels will be transiting between wells where speed could be up to a maximum of about 15 knots, however these would only be transitory through the area. Therefore, the chance of a vessel collision with protected species resulting in a lethal outcome is considered highly unlikely.</p>														

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The risk of marine life getting caught in operating thrusters is highly unlikely, given the low presence of individuals, combined with the avoidance behaviour commonly displayed during dynamic positioning operations.

Marine Mammals

As described above, vessel speed influences the probability of a vessel collision with a cetacean and also whether a collision may result in lethal injury (Vanderlaan and Taggart, 2007). Additionally, behaviour of individuals may also influence the likelihood of a collision occurring. Although large cetaceans are expected to show localised avoidance in response to vessel noise, studies have reported limited behavioural response to approaching ships (McKenna et al., 2015) and individuals engaging in behaviours such as feeding, mating or nursing may be less aware of their surroundings and more susceptible to collision (Laist et al., 2001).

No known key aggregation areas for marine mammals (resting, breeding or feeding) are located within or immediately adjacent to the PAA. However, individuals may occasionally be present in the PAA, including pygmy blue whales during seasonal migrations (**Section 4.6.5**). Pygmy blue whale may occasionally transit through the PAA as individuals and/or small groups during the northbound (April to July) and southbound (October to January) migratory seasons. However, the migration BIA is about 35 km to the west of the PAA and the likelihood of encountering pygmy blue whales is low. The Conservation Management Plan for the Blue Whale identifies vessel disturbance and strike as a threat to the EPBC listed species (Commonwealth of Australia, 2015a; TSSC, 2015b).

According to the data of Vanderlaan and Taggart (2007), it is estimated that the risk of lethal injury to a large whale as a result of a vessel strike is less than 10% at a speed of 4 knots. Vessel-whale collisions at this speed are uncommon and, based on reported data contained in the NOAA database (Jensen and Silber, 2004) there are only two known instances of collisions when the vessel was travelling at less than 6 knots; both of these were from whale-watching vessels that were deliberately positioned amongst whales

Smaller cetaceans, such as dolphins, comprise a lower proportion of vessel collision records (DoEE, 2016), though it is difficult to determine if this is due to a lower collision rate or lower detection rate of incidents. Dolphins often engage in bow riding which may make them more vulnerable to entanglement with propellers or thrusters compared to larger cetaceans.

Marine Reptiles

The Recovery Plan for Marine Turtles in Australia recognises turtles are at risk from vessel strikes, particularly in shallow coastal foraging habitats and internesting areas where there are high numbers of recreational and commercial vessels (Commonwealth of Australia, 2017). Considering the offshore location, it is expected that the presence of marine turtles would be very unlikely and only comprise individuals transiting the open, offshore waters for short periods of time. It is expected that individuals will respond to vessel presence by avoiding the immediate vicinity of the vessels and, combined with low vessel speed, will reduce the likelihood of a vessel-turtle collision.

It is highly unlikely that vessel movement associated with the Petroleum Activities Program will have a significant impact on marine fauna populations, given the low presence of transiting individuals and the low operating speed of the support vessels (generally <8 knots or stationary, unless operating in an emergency).

Marine Fauna Summary

Potential impacts from collision with marine fauna will not result in a substantial adverse effect on a population or the spatial distribution of the population. Additionally, no adverse impact on marine ecosystem functioning or integrity or impacts to lifecycles of the population of migratory whales will occur.

Cumulative Impacts

There is potential for some cumulative impacts to marine fauna to occur as a result of overlap with the Scarborough D&C Petroleum Activities Program and SI&TI Petroleum Activities Program. Given the offshore waters and deep water depths (approximately 900-1000 m), interaction with marine fauna is likely to be limited to individuals and/or small groups of transient cetaceans, with potential impacts expected to result in a behavioural disturbance, i.e. avoidance of the project vessels, with no lasting effect.

Summary of Assessment Outcomes

Receptor	Impact	Receptor Sensitivity	Risk Consequence	Likelihood	Risk Rating
Marine Mammals	Injury to/ mortality of fauna	High value species	Slight (E)	Highly Unlikely	Low
Marine Reptiles	Injury to/ mortality of fauna	High value species	Slight (E)	Highly Unlikely	Low

Overall Risk Consequence: The overall risk rating is Low based on slight consequence, to the high value receptors (marine mammals and reptiles) and a highly unlikely likelihood. The risk rating/risk consequence for individual receptors are consistent with the levels rated in the OPP.

Demonstration of ALARP				
Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/ Risk Reduction	Proportionality	Control Adopted
Legislation, Codes and Standards				
<p>EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with cetaceans, including the following measures³⁷:</p> <ul style="list-style-type: none"> Project vessels will not travel greater than 6 knots within 300 m of a cetacean (caution zone) and not approach closer than 100 m from a whale. Project vessels will not approach closer than 50 m for a dolphin and/or 100 m for a whale (with the exception of animals bow riding). If the cetacean shows signs of being disturbed, project vessels will immediately withdraw from the caution zone at a constant speed of less than 6 knots. 	<p>F: Yes. CS: Minimal cost. Standard practice.</p>	<p>Implementation of controls for reduced vessel speed around cetaceans can potentially reduce the underwater noise footprint of a vessel and lower the likelihood of interaction above significant thresholds</p>	<p>Controls based on legislative requirements – must be adopted.</p>	<p>Yes C 3.1</p>
Good Practice				
<p>Project vessels will not travel greater than 6 knots within 250 m of a whale shark and not allow the vessel to approach closer than 30 m of a whale shark.</p>	<p>F: Yes. CS: Minimal cost. Standard practice.</p>	<p>Implementation of controls for reduced vessel speed around whale sharks will reduce the likelihood of a collision occurring. The consequence of a collision is unchanged.</p>	<p>Legislative control for State waters, Whale Shark Interaction Protocol, being adopted for the Petroleum Activities Program.</p>	<p>Yes C 3.2</p>
<p>Vessels will not travel greater than 6 knots within 300m of a turtle (caution zone). If the turtle shows signs of being disturbed, vessels will immediately withdraw from the caution zone at a constant speed of less than 6 knots.</p>	<p>F: Yes CS: Minimal cost. Standard practice.</p>	<p>Implementation of controls for reduced vessel speed around whale sharks will reduce the likelihood of a collision occurring.</p>	<p>Benefits outweigh cost / sacrifice. Good Practice.</p>	<p>Yes C 3.3</p>

³⁷ For safety reasons, the distance requirements are not applied for a vessel holding station or with limited manoeuvrability e.g. lifting, loading, back-loading, bunkering, close standby cover for overside working and emergency situations.

Demonstration of ALARP				
Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/ Risk Reduction	Proportionality	Control Adopted
Variation of the timing of the Petroleum Activities Program to avoid whale migration periods.	F: No. Timing of activities is linked to Vessel schedule. Timing of all activities is currently not determined, and due to Vessel availability and operational requirements, undertaking activities during migration seasons may not be able to be avoided. CS: Not considered – control not feasible.	Not considered – control not feasible.	Not considered – control not feasible.	No
Professional Judgement – Eliminate				
No additional controls identified.				
Professional Judgement – Substitute				
No additional controls identified.				
Professional Judgement – Engineered Solution				
The use of dedicated MFOs on project vessels for the duration of each activity to watch for whales and provide direction on and monitor compliance with Part 8 of the EPBC Regulations.	F: Yes. However, vessel bridge crews already maintain a constant watch during operations in compliance with the Woodside Marine – Charterers Instructions on the requirements of vessel and whale interactions, and crew undertake specific cetacean observation training. CS: Additional cost of MFOs	Given that project vessel bridge crews already maintain a constant watch during operations in compliance with the Woodside Marine – Charterers Instructions, additional MFOs would not significantly further reduce the risk.	Disproportionate. The cost/sacrifice outweighs the benefit gained.	No
Manage vessel speed to reduce likelihood of interaction with marine fauna	F: Yes. CS: Good practice	There is an established relationship between the likelihood of vessel strikes to whales and the speed of the vessel. However, the PAA does not overlap with any cetacean BIAs or critical habitat and the presence of marine fauna is likely to be limited to infrequent occurrences of individuals or small groups. Therefore, there is no further risk reduction from the	Given the slow speeds at which vessels operate, the likely presence of marine fauna in the PAA and the controls currently in place (C 3.1) the adoption of this control offers no further reduction in risk.	No

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Demonstration of ALARP				
Control Considered	Control Feasibility (F) and Cost/Sacrifice (CS)	Benefit in Impact/ Risk Reduction	Proportionality	Control Adopted
		application of this control.		
<p>ALARP Statement:</p> <p>On the basis of the environmental risk assessment outcomes and use of the relevant tools appropriate to the decision type (i.e. Decision Type A, Section 2.3.3), Woodside considers the adopted controls appropriate to manage the risks and consequences of potential vessel collision with protected marine fauna. As no reasonable additional/alternative controls were identified that would further reduce the risks and consequences without grossly disproportionate sacrifice, the risks and consequences are considered ALARP.</p>				

Demonstration of Acceptability
<p>Acceptability Criteria and Assessment</p> <p>Demonstration of acceptability for the sources of aspect and associated impacts assessed in this section are provided in Section 7.2.5.3 of the Scarborough OPP (SA0006AF0000002, rev 5). The Petroleum Activities Program meets the acceptability criteria (Section 2.3.5):</p> <ul style="list-style-type: none"> Overall risk consequence/risk ratings for individual receptors are less than the significant impact level defined in the OPP. EPOs and controls in the OPP that are relevant to the risk of vessel collision with marine fauna have been adopted. There are no changes to internal/external context specific to this risk from the OPP. Feedback raised during consultation, including any specific updates to the EP in response, has been considered in Appendix F, Table 1
<p>Acceptability Statement:</p> <p>The impact assessment has determined that, given the adopted controls, a vessel collision with marine fauna represents a low current risk rating that is unlikely to result in a risk consequence to marine fauna greater than Slight. There are no BIAs for any EPBC Act listed Threatened or Migratory species overlapping or adjacent to the PAA. Relevant recovery plans and conservation advice have been considered during the impact assessment, and the Petroleum Activities Program is not considered to be inconsistent with the overall recovery objectives and actions of these recovery plans and conservation advice (Section 6.9). The adopted controls are considered consistent with industry good practice and professional judgement and meet the requirements of Part 8 (Division 8.1) of the EPBC Regulations 2000. The potential risks and consequences are considered broadly acceptable if the adopted controls are implemented. Therefore, Woodside considers the adopted controls appropriate to manage the risks of vessel collision with marine fauna to a level that is broadly acceptable.</p> <p>Feedback (EPO 26 and C2.8) has been developed to enable Woodside to manage potential uncertainty on the impacts and risks to cultural values which may be identified at any time during Woodside’s activities via ongoing dialogue with Traditional Custodians</p>

Environmental Performance Outcomes, Standards and Measurement Criteria			
EPO	Adopted Control(s)	EPS	MC
<p>EPO 24</p> <p>Undertake the Petroleum Activities Program in a manner which prevents a vessel strike with protected marine fauna during project activities.</p>	<p>C 3.1</p> <p>See Section 6.7.3</p>	<p>PS 3.1</p> <p>See Section 6.7.3</p>	<p>MC 3.1.1</p> <p>See Section 6.7.3</p>
	<p>C 3.2</p> <p>See Section 6.7.3</p>	<p>PS 3.2</p> <p>See Section 6.7.3</p>	<p>MC 3.2.1</p> <p>See Section 6.7.3</p>
	<p>C 3.3</p> <p>See Section 6.7.3</p>	<p>PS 3.3</p> <p>See Section 6.7.3</p>	<p>MC 3.3.1</p> <p>See Section 6.7.3</p>

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6.9 EPBC Act Assessment

6.9.1 Principles of ESD

For all impacts and risks assessed in **Section 6** an assessment was conducted to determine if the Petroleum Activities Program was consistent with relevant principles of ESD, as described in **Section 2.4.1**.

This assessment determined that the activity is consistent with principles of ESD a), b), c) and d). Principle e) ('improved valuation, pricing and incentive mechanisms should be promoted') is not relevant to the activity.

6.9.2 MNES Significant Impact Guidelines

As part of the evaluation of potential impacts and risks from planned and unplanned activities (**Sections 6.7** and **6.8**) an assessment was undertaken to determine if any relevant significant impact criteria for EPBC Act listed Endangered or Vulnerable species were met.

The activity will not result in any population level effects on any populations of listed Endangered or Vulnerable species, nor will it "modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline". Therefore, the Petroleum Activities Program will not have a significant impact on any MNES.

6.9.3 Recovery Plan and Threat Abatement Plan Assessment

As described in **Section 1.10.2.2**, an EP must not be inconsistent with a recovery plan or threat abatement plan for a listed threatened species or ecological community. This section describes the assessment that Woodside has undertaken to demonstrate that the Petroleum Activities Program is not inconsistent with any relevant recovery plans or threat abatement plans. For the purposes of this assessment, the relevant Part 13 statutory instruments (recovery plans and threat abatement plans are:

- Recovery Plan for Marine Turtles in Australia 2017–2027 (Commonwealth of Australia, 2017).
- Conservation Management Plan for the Blue Whale - A Recovery Plan under the Environment Protection and Biodiversity Conservation Act 1999 2015-2025 (Commonwealth of Australia, 2015a).
- Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans 2018 (DoEE, 2018).

Table 6-19 lists the objectives and (where relevant) the action areas of these plans, and also describes whether these objectives/action areas are applicable to government, the Titleholder and/or the Petroleum Activities Program. For those objectives/action areas applicable to the Petroleum Activities Program, the relevant actions of each plan have been identified, and an evaluation has been conducted as to whether impacts and risks resulting from the activity are clearly inconsistent with that action or not. The results of this assessment against relevant actions are presented in **Table 6-20** to **Table 6-22**.

The assessment of potential impacts and risks to pygmy blue whales from underwater noise emissions in **Section 6.7.3** has taken into account the definitions of terminology in the CMP, as described in the DAWE and NOPSEMA guidance released in September 2021. Similarly, the assessment against relevant actions in the CMP in **Table 6-20** has been undertaken in the context of the definitions included in the guidance note.

Table 6-19: Identification of applicability of recovery plan and threat abatement plan objectives and action areas

EPBC Act Part 13 Statutory Instrument	Applicable to:		
	Government	Titleholder	Petroleum Activities Program
Marine Turtle Recovery Plan			
Long-term Recovery Objective: Minimise anthropogenic threats to allow for the conservation status of marine turtles to improve so they can be removed from the EPBC Act threatened species list	Y	Y	Y
Interim Recovery Objectives			
Current levels of legal and management protection for marine turtle species are maintained or improved, both domestically and throughout the migratory range of Australia's marine turtles	Y		
The management of marine turtles is supported	Y		
Anthropogenic threats are demonstrably minimised	Y	Y	Y
Trends in nesting numbers at index beaches and population demographics at important foraging grounds are described	Y	Y	
Action Areas			
A. Assessing and addressing threats			
A1. Maintain and improve efficacy of legal and management protection	Y		
A2. Adaptively manage turtle stocks to reduce risk and build resilience to climate change and variability	Y		
A3. Reduce the impacts of marine debris	Y	Y	Y
A4. Minimise chemical and terrestrial discharge	Y	Y	Y
A5. Address international take within and outside Australia's jurisdiction	Y		
A6. Reduce impacts from terrestrial predation	Y		
A7. Reduce international and domestic fisheries bycatch	Y		
A8. Minimise light pollution	Y	Y	Y
A9. Address the impacts of coastal development/infrastructure and dredging and trawling	Y	Y	
A10. Maintain and improve sustainable Indigenous management of marine turtles	Y		
B. Enabling and measuring recovery			
B1. Determine trends in index beaches	Y	Y	Y
B2. Understand population demographics at key foraging grounds	Y		
B3. Address information gaps to better facilitate the recovery of marine turtle stocks	Y	Y	Y
Blue Whale Conservation Management Plan			
Long-term recovery objective: Minimise anthropogenic threats to allow for their conservation status to improve so that they can be removed from the EPBC Act threatened species list	Y	Y	Y

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EPBC Act Part 13 Statutory Instrument	Applicable to:		
	Government	Titleholder	Petroleum Activities Program
Interim Recovery Objectives			
The conservation status of blue whale populations is assessed using efficient and robust methodology	Y		
The spatial and temporal distribution, identification of biologically important areas, and population structure of blue whales in Australian waters is described	Y	Y	Y
Current levels of legal and management protection for blue whales are maintained or improved and an appropriate adaptive management regime is in place	Y		
Anthropogenic threats are demonstrably minimised	Y	Y	Y
Action Areas			
A. Assessing and addressing threats			
A.1: Maintain and improve existing legal and management protection	Y		
A.2: Assessing and addressing anthropogenic noise	Y	Y	Y
A.3: Understanding impacts of climate variability and change	Y		
A.4: Minimising vessel collisions	Y	Y	Y
B. Enabling and Measuring Recovery			
B.1: Measuring and monitoring population recovery	Y		
B.2: Investigating population structure	Y		
B.3: Describing spatial and temporal distribution and defining biologically important habitat	Y	Y	Y
Marine Debris Threat Abatement Plan			
Objectives			
Contribute to long-term prevention of the incidence of marine debris	Y	Y	
Understand the scale of impacts from marine plastic and microplastic on key species, ecological communities and locations	Y	Y	Y
Remove existing marine debris	Y		
Monitor the quantities, origins, types and hazardous chemical contaminants of marine debris, and assess the effectiveness of management arrangements for reducing marine debris	Y		
Increase public understanding of the causes and impacts of harmful marine debris, including microplastic and hazardous chemical contaminants, to bring about behaviour change	Y		

Table 6-20: Assessment against relevant actions of the Marine Turtle Recovery Plan

Part 13 Statutory Instrument	Relevant Action Areas/Objectives	Relevant Actions	Evaluation	EPO, Controls and PS
Marine Turtle Recovery Plan	Action Area A3: Reduce the impacts from marine debris	Action: Support the implementation of the Marine Debris Threat Abatement Plan (TAP) <u>Priority actions at stock level:</u> G-NWS – understand the threat posed to this stock by marine debris LH-WA – determine the extent to which marine debris is impacting loggerhead turtles F-Pil and H-WA – no relevant actions	Refer Section 6.8.5 Not inconsistent assessment: The assessment of accidental release of solid hazardous and non-hazardous wastes has considered the potential risks to marine turtles.	EPO 2, 5, 6, 7, 8, 19, 20 C 7.1, 11.1, 10.4, 11.2 EPS 7.1.1, 11.1.1, 10.4.1, 11.2.1
	Action Area A4: Minimise chemical and terrestrial discharge	Action: Ensure spill risk strategies and response programs adequately include management for marine turtles and their habitats, particularly in reference to ‘slow to recover habitats’, e.g. nesting habitat, seagrass meadows or coral reefs <u>Priority actions at stock level:</u> G-NWS – ensure that spill risk strategies and response programs include management for turtles and their habitats LH-WA, F-Pil – ensure that spill risk strategies and response programs include management for turtles and their habitats, particularly in reference to slow to recover habitats, e.g. seagrass meadows or corals H-WA – no relevant actions	Refer Sections 6.8.2 and 6.8.4. Not inconsistent assessment: The assessment of accidental release of chemicals / hydrocarbons has considered the potential risks to marine turtles. Spill risk strategies and response program include management measures for turtles and their nesting habitats.	Refer Section 7.11. Detailed oil spill preparedness and response performance outcomes, standards and measurement criteria for the Petroleum Activities Program are presented in Appendix D.
		Action: Routine discharges from project vessels are managed such that marine turtles are not adversely affected by changes in water quality. <u>Priority actions at stock level:</u> G-NWS – as above LH-WA, F-Pil – as above H-WA – no relevant actions	Refer Sections 6.7.6 and 6.7.7 Not inconsistent assessment: The assessment of routine discharges of chemicals, deck drainage, treated sewerage, putrescible wastes and grey water has considered the potential risks to marine turtles. Individuals transiting the localised area may come into contact with routine discharges, however these	EPO 11 C 6.1, 6.2, 7.1, 7.2, 7.3, 7.4 EPS 6.1.1, 6.2.1, 7.1.1, 7.2.1, 7.3.1, 7.4.1

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Part 13 Statutory Instrument	Relevant Action Areas/Objectives	Relevant Actions	Evaluation	EPO, Controls and PS
			are sporadic and in small quantities, and are unlikely to pose a significant risk.	
	Action Area A8: Minimise light pollution	Action: Artificial light within or adjacent to habitat critical to the survival of marine turtles will be managed such that marine turtles are not displaced from these habitats <u>Priority actions at stock level:</u> G-NWS – as above LH-WA – no relevant actions F-Pil and H-WA – manage artificial light from onshore and offshore sources to ensure biologically important behaviours of nesting adults and emerging/dispersing hatchlings can continue	Refer Section 6.7.4 Not inconsistent assessment: The assessment of light emissions has considered the potential impacts to marine turtles. Internesting, mating, foraging or migrating turtles are not impacted by light from offshore vessels. Vessel light emissions could cause localised and temporary behavioural disturbance to isolated transient individuals, which is unlikely to result in displacement of adult turtles from internesting or nesting habitat critical to the survival of marine turtles.	EPO 1, 5, 6, 7 C 4.1 EPS 4.1.1
	Action Area B1: Determine trends at index beaches	Action: Maintain or establish long-term monitoring programs at index beaches to collect standardised data critical for determining stock trends, including data on hatchling production <u>Priority actions at stock level:</u> G-NWS – continue long-term monitoring of index beaches LH-WA – continue long-term monitoring of nesting and foraging populations F-Pil and H-WA – no relevant actions	Not inconsistent assessment: Woodside contributes to Action Area B1 via its support of the Ningaloo Turtle Program ³⁸ . Given the offshore location of the PAA, impacts to turtle nesting beaches will not occur.	N/A
	Action Area B3: Address information gaps to better facilitate the recovery of marine turtle stocks	Action: Understand the impacts of anthropogenic noise on marine turtle behaviour and biology <u>Priority actions at stock level:</u> G-NWS – given this is a relatively accessible stock that is likely to be exposed to anthropogenic noise – Investigate the impacts of anthropogenic noise on	Refer Section 6.7.3 Not inconsistent assessment: The assessment of acoustic emissions has considered the potential impacts to flatback and olive ridley turtles. Vessel and seismic acoustic emissions could	EPO 5, 6, 7 C 3.3 PS 3.1.1

³⁸ http://www.ningalooturtles.org.au/media_reports.html

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Part 13 Statutory Instrument	Relevant Action Areas/Objectives	Relevant Actions	Evaluation	EPO, Controls and PS
		turtle behaviour and biology and extrapolate findings from the North West Shelf stock to other stocks LH-WA, F-Pil – no relevant actions H-WA – investigate mixed stock genetics at foraging grounds	cause localised and short-term behavioural disturbance to isolated transient individuals, which is unlikely to result in displacement of adult turtles from internesting or nesting habitat critical to the survival of marine turtles.	
<p>Assessment Summary</p> <p>The Marine Turtle Recovery Plan has been considered during the assessment of impacts and risks, and the Petroleum Activities Program is not considered to be inconsistent with the relevant actions of this plan.</p>				

Table 6-21: Blue Whale Conservation Management Plan

Part 13 Statutory Instrument	Relevant Action Areas/Objectives	Relevant Actions	Evaluation	EPO, Controls and PS
Blue Whale Conservation Management Plan	Action Area A.2: Assessing and addressing anthropogenic noise	Action 2: Assessing the effect of anthropogenic noise on blue whale behaviour Action 3: Anthropogenic noise in biologically important areas will be managed such that any blue whale continues to use the area without injury, and is not displaced from a foraging area	Refer Section 6.7.3 Not inconsistent assessment: The assessment of acoustic emissions has considered the potential impacts to pygmy blue whales.	EPO 1, 5, 6, 7, 25 C 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7 PS 3.1.1, 3.2.1, 3.3.1, 3.4.1, 3.5.1, 3.6.1, 3.7.1
	Action Area A.4: Minimising vessel collisions	Action 3: Ensure the risk of vessel strikes on blue whales is considered when assessing actions that increase vessel traffic in areas where blue whales occur and, if required, appropriate mitigation measures are implemented	Refer Section 6.8.8 Not inconsistent assessment: The assessment of vessel collision with marine fauna has considered the potential risks to pygmy blue whales. If the Petroleum Activities Program overlaps with the northern migration, individuals may deviate slightly from migratory route, but will continue on their migration to possible breeding grounds in Indonesian waters. Vessel collisions with pygmy blue whales are highly	EPO 24, 25 C 3.1, 3.4, 3.5, 3.6, 3.7 PS 3.1.1, 3.4.1, 3.5.1, 3.6.1, 3.7.1

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Part 13 Statutory Instrument	Relevant Action Areas/Objectives	Relevant Actions	Evaluation	EPO, Controls and PS
			unlikely to occur, given the very slow vessel speeds and presence of MFOs.	
	Action Area B.3: Describing spatial and temporal distribution and defining biologically important habitat	Action 2: Identify migratory pathways between breeding and feeding grounds Action 3: Assess timing and residency within Biologically Important Areas	Not inconsistent assessment: Woodside contributes to Action Area B3 via its support of targeted research initiatives (e.g. satellite tracking of pygmy blue whale migratory movements ³⁹).	N/A
<p>Assessment Summary</p> <p>The Blue Whale Conservation Management Plan has been considered during the assessment of impacts and risks, and the Petroleum Activities Program is not considered to be inconsistent with the relevant actions of this plan.</p>				

Table 6-22: Assessment against relevant Marine Debris Threat Abatement Plan

Part 13 Statutory Instrument	Relevant Action Areas/Objectives	Relevant Actions	Evaluation	EPO, Controls and PS
Marine Debris TAP	Objective 1: Contribute to long-term prevention of marine debris.	Action 1.02: Limit the amount of single use plastic material lost to the environment in Australia.	Refer Section 6.8.5 Not inconsistent assessment: The assessment of accidental release of solid hazardous and non-hazardous wastes has considered the potential risks to vertebrate wildlife.	EPO 2, 5, 6, 7, 8, 19, 20 C 7.1, 11.1, 10.4, 11.2 EPS 7.1.1, 11.1.1, 10.4.1, 11.2.1
<p>Assessment Summary</p> <p>The Marine Debris TAP has been considered during the assessment of impacts and risks, and the Petroleum Activities Program is not considered to be inconsistent with the relevant actions of this plan.</p>				

³⁹ Double, M.C., Andrews-Goff, V., Jenner, K.C.S., Jenner, M.-N., Laverick, S.M., Branch, T.A., Gales, N.J., 2014. Migratory movements of pygmy blue whales (*Balaenoptera musculus brevicauda*) between Australia and Indonesia as revealed by satellite telemetry. PLoS One 9, e93578

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6.10 Cultural Features and Heritage Values Assessment

As described in **Section 4.9**, the identification of cultural features and heritage values of the environment as well as the social, economic and cultural features important to First Nation’s people is integral to understanding the environment and any potential impacts and risks to the environment.

In line with Woodside’s First Nations Communities Policy (Woodside 2022), Woodside seeks to avoid damage or disturbance to cultural heritage (including intangible heritage) and, if avoidance is not possible, minimise and mitigate the impacts, in consultation with First Nation communities and Traditional Custodians. Mitigation can include any measure or control aimed at ensuring the viability of the intangible cultural heritage and its intergenerational transmission. This can include reducing impacts and risks to environmental features that are associated with intangible cultural heritage (UNESCO 2003; ICOMOS 2013).

It is important to note that not all topics raised by First Nations groups / individuals through consultation are considered values for the purpose of the cultural features and heritage values impact assessment below. A number of topics were raised in the context of a general interest in environmental management and ecosystem health (i.e., natural environment interest), where the group/individual was seeking further information about potential impacts and risks from the Petroleum Activities Program on a receptor. As these interests relate to the maintenance of the natural environment, these are adequately addressed through impact and risk assessments described in **Sections 6.7** and **6.8** respectively and not further assessed below.

Aspect	Cultural Features and Heritage Values
Description of source impact/ risk (Key aspects)	<p>Vessel Operations</p> <p>Several vessel types will be required to complete the activities associated with the Petroleum Activities Program. Temporary Petroleum Safety Zones will be established around operating vessels. These will be confirmed during Safety Case development and notifications to mariners will be issued at the time of the activity.</p> <p>Vessels do not plan to anchor within the PAA during activities and instead maintain positioning using DP. The physical presence and movement of project vessels within the PAA has the potential to displace other marine users. Project vessels are predominantly transient through the PAA. The Petroleum Activities Program may not be executed as a single campaign or in a consecutive sequence, therefore the presence of vessels and associated routine and non-routine vessel discharges may occur at any time during the approval period of the EP.</p> <p>Refer to Section 6.7.2 and 6.7.7 for more details.</p> <p>Physical presence of subsea infrastructure</p> <p>Subsea infrastructure installed as part of the Petroleum Activities Program will be located within the PAA as described in Section 3.4. The physical presence of this infrastructure will remain for the duration of field life. The infrastructure will be installed on the seabed and in some cases extend up to several metres above the seabed (e.g., 6 m for the rise-based mooring). The 20 suction piles will extend approximately 1.5 m above the seabed and be connected to wire and chain that will be wet stored on the seabed until connection to the FPU.</p> <p>Refer to Section 6.7.2 for more details.</p> <p>Acoustic emissions from vessels</p> <p>There are various sources of underwater acoustic emissions during the Petroleum Activities Program including survey activities, underwater positioning equipment and helicopter operations; however the most significant noise emitter will be vessel operations themselves.</p> <p>The sound levels and frequencies generated by vessels varies with the size of the vessel, speed, engine type and the activity being undertaken. The greatest sound levels are likely to be associated with vessels using DP thrusters to maintain position on station. The loudest single activity covered under this EP is expected to be the mooring pre-lay, which involves an HCV with the potential for an HLV alongside intermittently for support. Subsea installation campaign 2 and part of campaign 1 will likely be executed with two vessels plus intermittent support vessels. While, concrete pad installation / mooring pre-lay survey, gravimetry baseline survey and part of subsea campaign 1 will likely be executed with single vessels, which are smaller than the HCV and HLV.</p> <p>Refer to Section 6.7.3 for more details.</p> <p>Routine and Non-Routine Discharges: Subsea Infrastructure Installation</p>

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There are numerous sources of potential subsea discharges as part of the Petroleum Activities Program including installation of pre-filled risers, jumpers and spools which may result in small volumes of preservation fluid being discharged and leak testing discharges from FCG of the flowlines. A summary of the discharges associated with FCG and leak testing are in **Table 3-7** and **Table 3-8**. **Table 3-8** also includes contingency volumes of filtered and treated water from the flowlines, ranging from 272 m³ to 373 m³, in the event there is no clear indication of pigs' arrival.

The Petroleum Activities Program also includes contingency for discharges associated with unplanned events such as wet buckle and flowline recovery.

Refer to **Section 6.7.6** for more details.

Unplanned hydrocarbon release from vessel (basis of EMBA)

The temporary presence of the project vessels in the Operational Area may result in a navigational hazard for commercial shipping within the immediate area. This navigational hazard could result in a third-party vessel colliding with the project vessels which could result in a loss of containment. The largest project vessel for the Petroleum Activities Program is a heavy construction vessel, which has a maximum single fuel tank capacity of 1000 m³. For the purposes of an indication of the risks associated with a vessel collision for the Petroleum Activities Program, a worst-case loss of volume of 1000 m³ of marine diesel is considered an appropriate for rupture of a single fuel tank.

The EMBA is the largest spatial extent where unplanned events could have an environmental consequence. For this EP, the EMBA is the potential spatial extent of surface and in-water hydrocarbons at concentrations above ecological impact thresholds, in the highly unlikely event of the worst-case credible spill. Modelling of an instantaneous surface release of 2000 m³ of marine diesel was conducted (RPS, 2019) and while this volume is significantly larger than the 1000 m³ worst-case spill volume from a project vessel, the results of the modelling can be used to demonstrate that a much larger marine diesel spill in the vicinity of the PAA has an EMBA that is not predicted to include any surface slicks above threshold volumes resulting in any shoreline contact or accumulation. The EMBA covers a larger area than the area that would be affected during any one single spill event. In the event of a spill the EMBA would be much smaller and is intermittent e.g., plume travels away from the release location based on prevailing currents and winds directions.

Refer to **Section 6.8.2** for more details.

Receptor sensitivity	Cultural features and heritage values: High value Marine mammals: High value species Marine reptiles: High value species Fish: High value species Seabirds: High value species
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Planned Activity Aspect *The potential environmental impact from the Petroleum Activities Program to species that have a cultural feature or heritage value have been summarised below to provide the context related cumulative impact on the cultural feature or heritage value.*

Impact Significance Level

Environmental impact assessment to marine species		Marine mammals	Marine reptiles	Fish	Seabirds	
6.7.3	Routine Acoustic Emissions		Slight (E)	Slight (E)	Slight (E)	N/A
6.7.4	Routine Light Emissions from Project Vessels		N/A	Slight (E)	N/A	Slight (E)
6.7.6	Routine and Non-routine Discharges: Subsea Infrastructure Installation		Slight (E)	Slight (E)	Slight (E)	N/A
6.7.7	Routine and Non-Routine Discharges: Project Vessels and Installation		Slight (E)	Slight (E)	Slight (E)	Slight (E)

Unplanned Activity Aspect	The potential environmental risk from the Petroleum Activities Program to species that have a cultural feature or heritage value have been summarised below to provide the context related cumulative risk on the cultural feature or heritage value.			
	Risk Rating			
Environmental impact assessment to marine species				
	Marine mammals	Marine reptiles	Fish	Seabirds
6.8.2 Unplanned Hydrocarbon Release: Vessel Collision	Moderate	Moderate	Moderate	Moderate
6.8.3 Unplanned Hydrocarbon Release: Bunkering	Low	Low	Low	Low
6.8.4 Unplanned Discharge: Chemicals and Minor Hydrocarbon Spills (Deck and Subsea)	Low	Low	Low	Low
6.8.5 Unplanned Discharge: Loss of Solid Hazardous and Non-hazardous Wastes/Equipment	Low	Low	Low	Low
6.8.8 Physical Presence (Unplanned): Vessel Collision with Marine Fauna	Low	Low	N/A	N/A

Impact and Risk Assessment The Petroleum Activities Program has the potential to impact cultural features and heritage values through the following ways:

- Archaeological heritage:
 - Places that are identified in the literature for their value as archaeological sites can be assumed to be impacted where there is an impact to the archaeological or scientific values of its tangible elements. This could include damage or disturbance of archaeological material or to the archaeological context.
- Intangible cultural heritage:
 - Songlines: Songlines can become lost, fragmented, or broken when there is a loss of Country or forced removal from Country (Neale and Kelly 2020:30). Physical sites that have been identified as comprising a component of a songline are important to protect to prevent the fragmenting or breaking apart of songlines and loss of sacred cultural knowledge. It is noted that oil and gas infrastructure exists in many areas of the North West Shelf, and that songlines are still acknowledged and recognised. It is inferred that if there were to be any impacts to surviving songlines these would be significantly more likely to be described as qualitative (i.e. “weaken” a songline) rather than binary or absolute (i.e. destroy a songline).
 - Creation/dreaming sites; sacred sites; ancestral beings: Activities that physically alter landscape features may be assumed to potentially impact values of creation/dreaming sites, sacred sites or ancestral beings.
 - Cultural obligations to care for Country: Environmental impacts may be assumed to impact rights and obligations to care for Sea Country. Exclusion of Traditional Custodians from Sea Country (e.g., by restricting access) or decision-making processes (e.g., by not conducting ongoing consultation) are other potential sources of impact.
 - Knowledge of Country/customary law and transfer of knowledge: Direct impact to communities practicing these skills will inherently occur when relevant aspects of the environment disappear, are displaced or suffer a reduction in population. Therefore, the transmission of these skills is expected to be impacted where there are impacts at the species/population level. Limitations on access to sites or disruption/relocation of First Nations communities may have implications for the preservation of First Nations knowledge.

- Connection to Country: Where people are displaced or disrupted (e.g., during colonisation) or where there is a loss of technical skills or environmental knowledge this may damage connection to Country (McDonald and Phillips, 2021).
- Access to Country: Impacts to access to Country may be classified as temporary (e.g. where exclusion zones exist around activities for safety reasons) or permanent (e.g. where infrastructure obstructs access or navigation). Impacts to access to Country can only occur in areas that were traditionally accessed by Traditional Custodians. This is anticipated to be focussed on areas adjacent to the coast.
- Kinship systems and totemic species: It is assumed that marine species may have kinship/totemic relationships to Traditional Custodians, but it is understood that these relationships do not prohibit people outside of that “skin group” from hunting or eating that same species (Juluwarlu 2004). It is therefore inferred that the management of totemic or kinship species applies at the species/population level and not to individual plants and animals.
- Resource collection: Direct impact to communities using these resources will inherently occur when the resource disappears, is displaced or suffers a reduction in population. Therefore, marine species (as resources) will be impacted where there is an impact at the species/population level.
- Marine ecosystems and species:
 - Marine ecosystems may hold both cultural and environmental value (see **Section 4.9.1.5**), with cultural and environmental values intrinsically linked (DCCEE 2023, MAC 2021 as cited in Woodside 2023a). It necessarily follows that an impact to marine ecosystems has the potential to impact cultural features where the impact is detectable within sea country—the seascape which Traditional Custodians view, interact with or hold knowledge of.

Archaeological Heritage

As described in **Section 4.9.1.5**, there are no identified archaeological sites within the PAA, which lies beyond the Ancient Landscape. While the EMBA extends slightly over the Ancient Landscape, it is driven by an unplanned surface marine diesel spill, which is not expected to impact the seabed or archaeological material on or within it given the water depth, as outlined in **Section 6.8.2**. Therefore, there is no anticipated impact pathway to archaeological features, such as petroglyphs, or fish traps, or to archaeologically prospective features of the existing environment in the broader EMBA from the Petroleum Activities Program, such as waterholes or seeps.

General Intangible values

Songlines

Management of intangible cultural heritage can include reducing impacts and risks to environmental features that are associated with intangible cultural heritage (UNESCO 2003; ICOMOS 2013). Impacts to marine plants, animals and other cultural features associated with songlines might impact the intergenerational transmission of knowledge of songlines when individuals can no longer witness or interact with the cultural features tied to songlines on Country. Therefore, managing songlines may require environmental controls protecting species at a population level, including migratory routes. Refer to species specific assessment below for further information, in addition to the impact and risk assessment in Section 6.7 and 6.8 respectively.

Physical features comprising a component of a songline are important to protect to prevent the fragmenting or breaking apart of songlines and loss of sacred cultural knowledge. Songlines can become lost, fragmented, or broken when there is a loss of Country or impact to culturally important physical features (Neale and Kelly 2020:30). No specific details of songlines within the EMBA have been provided by relevant persons during consultation for this Activity, and no landforms typical of songlines (e.g. mountains, rivers, caves and hills (Higgins 2021)) are anticipated to be impacted by the Activity. It has been asserted that locations where saltwater and freshwater meet “are where the biggest energy lines are”. Energy lines are understood by Woodside to be the same as songlines. The EMBA is driven by an unplanned marine diesel spill, which is not expected to impact the seabed or features on it. As such, there is no anticipated impact pathway from this activity to submerged water sources in the broader EMBA.

In publicly available literature, Murujuga is acknowledged as a starting point for songlines, including the flying fox songline (MAC 2023a). Precise location of this songline, and features of this songline that might be impacted, are not clearly articulated in the reviewed sources, but it is stated that “the sea is a source of creation for flying foxes” (DEC 2013). Although this does not provide the specificity required to determine the location of the flying fox songline or associated sites, Murujuga is located outside of the EMBA. Ethnographic survey (see **Studies of Cultural Features and Heritage Values** in Section 4.9.1.5) also noted that “Dreamtime narratives... that commence at Murujuga and may also arrive from the sea including the... Bat (Flying Fox)” (McDonald and Phillips 2021). Although this does not provide the specificity required to determine the location of the flying fox songline or associated

sites, Murujuga is located outside of the EMBA. The ethnographic survey did not identify any sites within the EMBA related to songlines or make recommendations that any mitigations were required to manage songlines. Consultation with MAC and other Traditional custodians has not identified the flying fox songline as overlapping the EMBA, and flying foxes do not occur within the EMBA.

In publicly available literature, Murujuga is acknowledged as the starting point for the seven sisters songline (Bainger 2021). Precise location of this songline, and features of this songline that might be impacted, are not clearly articulated in the reviewed sources, however Murujuga is located outside of the EMBA. Ethnographic survey (see **Studies of Cultural Features and Heritage Values** in Section 4.9.1.5) also noted that “a number of Dreamtime narratives... extend from the waters around Murujuga on to country, including the KurriKurri (Seven Sisters)” (McDonald and Phillips 2021). The seven sisters story is associated with Whitnell [sic] Bay, Murujuga, Depuch Island and Port Hedland, all being outside of the EMBA (McDonald and Phillips 2021). The ethnographic survey did not identify any sites within the EMBA related to songlines or make recommendations that any mitigations were required to manage songlines. Consultation with MAC and other Traditional custodians has not identified the seven sisters songline as overlapping the EMBA.

An ethnographic survey also noted “Dreamtime narratives... that commence at Murujuga and may also arrive from the sea including the Marlu (Plains Kangaroo)” (McDonald and Phillips 2021). Kearney et al (2023) notes a connection between the Kangaroo songline and a pair of submerged waterholes identified through seabed mapping by the Deep History of Sea Country project, which later found submerged artefacts in Flying Foam Passage. Other terrestrial species with narratives originating or potentially originating from the sea at Murujuga noted by McDonald and Phillips (2021) include Tarnguna (Emu) and Jugurru (Dingo). Murujuga and the Flying Foam Passage are located outside of the EMBA. The ethnographic survey did not identify any sites within the EMBA related to any songlines or make recommendations that any mitigations were required to manage songlines. Consultation with MAC and other Traditional custodians has not identified these songlines as overlapping the EMBA, and these species do not occur within the EMBA.

The existence of a whale songline potentially intersecting the EMBA has also been asserted by members of Save Our Songlines. Consultation with this group and associated individuals has not provided detail on the presence, features or route of this songline. It is assumed (from information provided by this group) that whales as an environmental receptor are a feature of this songline; the environmental impacts and risk on whales are assessed in Sections 6.7 and 6.8. The most detailed description available to Woodside is asserted in the Concise Statement and Affidavit filed by ██████████ in the context of Scarborough seismic activities. Specifically, “whales carry important songlines, the whale dreaming, and connection between land and sea.” Specific details regarding the whale dreaming story are provided in Table 4-20. In summary, the whale dreaming story relates to transmission of knowledge and connection between environment and people, the women’s lore and connection to whales through their heart centre and obligation to care for country. It is stated that “because each animal uses songlines for migration, breeding and feeding, the disruption or distortion to the songlines causes the animals to become disoriented, confused or lost.” Further, that the whale’s songline creates a path for other fauna to follow.

It is therefore expected that the whale songline has the potential to be affected by the Petroleum Activities Program where there are impacts to whales at a population level, including disruption of migration routes, permanent displacement of whales and population decline, that result in discontinuation of story/transmission of knowledge, interruption of caring for Country activities, interruption of whale caretaker/midwife behaviour and interruption to performance of song/ceremony onshore. Given potential impacts to whales are limited to behavioural disturbance to transient individuals, which are not considered to be ecologically significant at a population level, the whale songline and associated whale dreaming story is not anticipated to be affected by the Petroleum Activities Program. Note further assessment of intangible values and marine mammals are provided below, in addition to the impact and risk assessment in Sections 6.7 and 6.8 respectively.

Creation/dreaming sites; sacred sites; ancestral beings

Woodside has undertaken all reasonable steps to identify creation and dreaming sites, and places associated with ancestral beings within the EMBA. No such sites have been identified. A review of relevant literature has been undertaken which has identified creation, dreaming and ancestral narratives related to the sea more broadly without confirming where (if anywhere) these overlap the EMBA. These references are of a general nature, and do not identify any features or values requiring specific protection or management from the proposed activities.

Sea serpents or water serpents are common in Aboriginal creation narratives, and several references were identified in the reviewed literature. The majority of these refer to serpents residing within inland rivers or pools outside of the EMBA (Barber and Jackson 2011, Hayes v Western Australia [2008] FCA 1487, Juluwarlu 2004, Kalbarri Visitor Centre 2023, Water Corporation 2019). In some versions, the serpent originates from the sea or coast and creates the rivers as it heads inland. Barber and Jackson (2011) also recount a story where a freshwater serpent pushes a sea serpent back into the ocean where it presumably continues to reside. This does not provide the specificity required to

determine the location of sea serpents within the sea, and it is possible that the ocean as a whole (out to and beyond other continents) should be viewed generally as housing the sea serpent(s). Consultation with Traditional Custodians and ethnographic surveys have not identified activities of this Petroleum Activities Program as having an impact on sea serpents. However, by analogy to other water serpent narratives across Australia, possible impact pathways may include interruption of its path by blocking or reducing flows of water, damaging sacred sites such as thalu or rock art sites or depleting water sources.

No impacts to water flows (either tidal movement or ocean currents) or depletion of water sources are anticipated from this Petroleum Activities Program. However, there are no anticipated impact pathways to submerged landscape features within the broader EMBA from the Petroleum Activities Program.

Cultural obligations to care for Country

Caring for Country collectively refers to the cultural obligations of individuals and groups, as well as rituals and ceremonies required for the physical and spiritual health of the environment. Lack of access to coastally located cultural sites that carry songlines or remain ceremonially important can impact First Nations people's livelihoods and impact their ability to carry out cultural obligations on Country. The EMBA does not interact with coastal sites and no impacts to coastal sites of significance are anticipated. No cultural activities to care for Country which are performed within the EMBA were identified.

Knowledge of Country/ customary law and transfer of knowledge

Cultural knowledge about Sea Country/customary law and the intergenerational transmission of knowledge are important values identified through consultation, assessments and the literature review. Transfer of knowledge includes continuing traditional practices to pass on practical skills. No traditional practices conducted within the EMBA have been identified.

Direct impact to communities practicing these skills will inherently occur when relevant aspects of the environment disappear, are displaced or suffer a reduction in population—for example traditional fishing methods require the survival of traditional fish resources. Therefore, ensuring the transmission of cultural knowledge may require environmental controls protecting species and migratory pathways at a population level. Refer to species specific assessment below for further information, in addition to the impact and risk assessment in Sections 6.7 and 6.8 respectively.

Connection to Country

Connection to Country describes the multi-faceted relationship between First Nations people and the landscape, which is envisioned as having personhood and spirit. Connection to Country may be damaged where people are displaced or disrupted (e.g. during colonisation) or where there is a loss of technical skills or environmental knowledge (McDonald and Phillips, 2021). No impacts of this nature are considered to arise from this Petroleum Activities Program. Access to Country is discussed below.

Access to Country

Access to Country, including Sea Country, is necessary for the continuation of other values including caring for Country and the transfer of traditional knowledge. Access is also a value in its own right, as a continuation of traditional Sea Country access and use.

Access to areas within the PAA may be limited where exclusion zones are established around vessels for safety purposes. The PAA is located around 215 km from the closest landfall and no traditional activities within the PAA have been identified. Exclusion zones around vessels are temporary, and the presence of subsea infrastructure are not anticipated to affect navigation associated with access to country, particularly given the water depth within the PAA and the distance offshore for the PAA. Access to country within the EMBA would be limited to temporary exclusion in areas where there are hydrocarbons present. However relevant cultural authorities will be engaged in the event of a spill that may affect them, as specified in Appendix D.

Kinship systems and totemic species

Individuals may have kinship to specific species (Smyth 2008, Juluwarlu 2004) and/or a responsibility to care for species (Muller 2008). These relationships are understood to impose obligations on Traditional Custodians. It is understood that these obligations do not impose restrictions on other people generally, but it is considered that impacts to species at a population level may inhibit Traditional Custodians with kinship relationships' ability to perform their obligations where this results in reduced or displaced populations. It is therefore considered that the management of totemic or kinship species applies at the species/population level and not to individual plants and animals. As such, impacts to individual marine fauna is not expected to impact on the totemic or kinship cultural connection.

Totemic species identified during consultation include whales and fish. Refer to species specific assessment below for further information, in addition to the impact and risk assessment in

Sections 6.7 and 6.8 respectively. In the highly unlikely event of a marine diesel spill relevant cultural authorities will be engaged in the event of a spill that may affect them, as specified in Appendix D.

Resource collection

A suite of marine species have been identified through consultation and literature as important resources, particularly as food sources. For example, Sea Country resources of noted relevance to Thalanyji people which may be present in the vicinity of the Montebello Islands include dugongs, majun (marine turtles), fish.

In addition to their immediate value as sustenance, the gathering and preparation of these resources are informed by cultural knowledge, and an inability to use these resources may result in a loss of ability to transfer that knowledge to future generations. Direct impact to communities using these resources will inherently occur when the resource disappears, is displaced or suffers a reduction in population. Therefore, these communities may be impacted where there is an impact at the species/population level.

As assessed in Section 6.7, impacts from planned activities on the marine environment, including resources important to First Nations people, is expected to be limited to negligible or slight and therefore impacts that result in population effects (e.g., population decline, changes in migration routes, etc) are not expected. Impacts to potential resources within the EMBA, in the highly unlikely event of marine diesel spill, are described and risk assessed in Section 6.8.2 and are not expected to result in species / population level impacts. Therefore, impacts to resource collection would be limited to temporary exclusion in areas where there are hydrocarbons present, which will be limited to offshore waters. Further relevant cultural authorities will be engaged in the event of a spill that may affect them, as specified in **Appendix D**.

Marine Species

Marine mammals (whale, dolphins, dugongs)

There are increase ceremonies / rituals for species of animals and plants important to First Nations, to enhance or maintain populations. Thalu are places where these increase ceremonies are performed. All mentions of active ceremonial sites in the reviewed literature were confined to onshore locations, though the values may extend offshore where, for example, the thalu relates to marine species populations. As thalu ceremonies are performed to maintain and increase populations of marine species, it is inferred that management applies at the species/population level and not to individuals—for example the thalu site on Murujuga which “brings in whales to beach” will continue to serve its purpose so long as whales continue to migrate through Mermaid Sound. Reviewed literature (DFCA 2020) also includes information that is marked as information that cannot be copied, reproduced or used without consent. The values described in the literature are environmental in nature, apply to marine mammal behaviours at a population level and are managed through existing environmental controls in Sections 6.7 and 6.8.

Related intangible cultural heritage may include the transmission of cultural knowledge about whales and whale behaviour, including birthing areas, whale communication and migratory patterns. Such cultural knowledge may be associated with various cultural functions and activities that support the social and economic life of a community (Fijn 2021). Whale symbology expressed through stories, music, and dance can reflect a group’s connections with the sea, as well as marine fauna, which then comprise a group’s cultural values (Ardler 2021; Bursill et al. 2007; Cressey 1998). Whales also speak to a broader connection that exists between First Nation people and their surrounding environment. Beyond mythology and symbolism, whales can be connected with various economic and social functions associated with everyday life. Cultural knowledge of whales, whale migration, behaviour and the related marine environment may all be important in ensuring the continuation of these socio-economic functions and other related activities that remain valuable to First Nations people (Fijn 2021). No impacts to communities’ ability to perform or transmit stories, music or dance are anticipated from the Petroleum Activities Program. Where timing or performance is linked to sighting or engaging with these species, impacts may occur where numbers or migration behaviours are impacted at a population level.

First Nations groups have expressed interest about whale migratory routes and studies. Inter-generational transmission of cultural knowledge (including songlines) relating to marine mammals may be impacted where changes to population or behaviour at a population level results in reduced sightings (e.g. through population decline, changes to migration routes or changes to migration seasonality). This transfer of knowledge may be integral to managing a group’s intangible cultural heritage (UNESCO 2003).

As described in the relevant environmental impact and risk assessments in Sections 6.7 and 6.8 respectively, potential impacts to cetaceans from planned activities are limited to behavioural impact, which may include temporary and localised deviations from migratory pathways for cetaceans. These impacts and risks are not considered to be ecologically significant at a population level, and hence are not expected to impact the value of marine mammals, including the transmission of cultural knowledge.

As such, cultural values and intangible cultural heritage associated with these species are expected to be maintained.

Marine reptiles (turtles, sea snakes)

Turtles and their eggs have been identified through consultation and existing literature as an important resource, particularly as food sources. Direct impact to communities using these resources will inherently occur when the resource disappears, is displaced or suffers a reduction in population. Therefore, these species (as resources) will be impacted where there is an impact at the species/population level.

Intangible cultural heritage may also include the transmission of cultural knowledge about marine reptiles, such as nesting areas, hunting areas and migratory patterns. Cultural knowledge may also be conveyed through stories, such as the turtle being trapped in the sea as a result of its greed for berries as recounted by Capewell (2020). Such cultural knowledge may be associated with various cultural functions and activities that support the social and economic life of a community (Fijn 2021). First Nations groups have expressed an interest regarding turtle monitoring programs and migration patterns. Activities that impact turtle populations and their marine environment may have an indirect impact on some Aboriginal communities as this can limit access to cultural sites or deplete hunting areas that would threaten local food security (Delisle et al. 2018:251). Inter-generational transmission of cultural knowledge (including songlines) relating to marine reptiles may be impacted where changes to population or behaviour results in reduced sightings (e.g. through population decline, changes to migration routes or changes to migration seasonality). This transfer of knowledge may be integral to managing a group's intangible cultural heritage (UNESCO 2003).

As described in the relevant environmental impact and risk assessments in Sections 6.7 and 6.8 respectively, potential impacts to marine reptiles from planned activities are likely to be restricted to temporary behavioural changes, which are not considered to be ecologically significant at a population level, and hence not expected to impact the value of marine reptiles, including the transmission of cultural knowledge or use as a resource. As such, cultural values and intangible cultural heritage associated with these species are expected to be maintained.

Fish

Fish and squid have been identified through consultation and existing literature as an important resource, particularly as food sources. Direct impact to communities using these resources will inherently occur when the resource disappears, is displaced or suffers a reduction in population. Therefore these species (as resources) will be impacted where there is an impact at the species/population level.

Through consultation, fish were identified as important agents in the management of the broader ecosystem. It may be assumed that inter-generational transmission of cultural knowledge relating to fish may be impacted where changes to population or behaviour results in reduced sightings (e.g. through population decline). This transfer of knowledge may be integral to managing a group's intangible cultural heritage (UNESCO 2003). Intangible cultural heritage associated with fish, including inter-generational knowledge regarding fishing techniques and migratory patterns, can be managed by reducing impacts to fish in nearshore marine environments to which this cultural knowledge is intrinsically connected.

As described in the relevant environmental impact and risk assessments in Sections 6.7 and 6.8 respectively, the potential impacts from the Petroleum Activities Program on fish are considered to be no lasting effect, limited to a behavioural response and are not considered to be ecologically significant at a population level. As such, cultural values and intangible cultural heritage associated with these species are expected to be maintained. As such, cultural values and intangible cultural heritage associated with these species are expected to be maintained.

Seabirds

Seabirds, specifically shags, have been identified through literature as a culturally significant species (Malgana Land and Sea Management et al. 2021), as well as a resource (seabird eggs; Smyth 2007). Direct impact to communities using these resources will inherently occur when the resource disappears, is displaced or suffers a reduction in population. Therefore, these species (as resources) will be impacted where there is an impact at the species/population level. Intangible cultural heritage may also include the transmission of cultural knowledge about seabirds, such as nesting areas, hunting areas and migratory patterns. Such cultural knowledge may be associated with various cultural functions and activities that support the social and economic life of a community (Fijn 2021). Inter-generational transmission of cultural knowledge relating to seabirds may be impacted where changes to population or behaviour results in reduced sightings (e.g. through population decline, changes to migration routes or changes to migration seasonality). This transfer of knowledge may be integral to managing a group's intangible cultural heritage (UNESCO 2003).

As described in the relevant environmental impact and risk assessments in Sections 6.7 and 6.8 respectively, the potential impacts from the Petroleum Activities Program on seabirds is assessed to be no lasting effect. As the PAA is offshore and away from islands or other emergent features, any presence of seabirds or shorebirds is considered likely to be of a transient nature only. The temporary behavioural disturbance of birds will be localised around the light sources, and is not expected to result in a substantial adverse effect on a population of species or its lifecycle. Additionally, light emissions are not expected to seriously disrupt the lifecycle of an ecologically significant proportion of any migratory birds. As such, cultural values and intangible cultural heritage associated with these species are expected to be maintained.

Conclusion

The impact and risk assessment for cultural features and heritage values has determined that the planned activities are unlikely to result in an impact greater than negligible (F) and unplanned activities are assessed to have a residual risk rating of moderate (or lower). Woodside will continue to consider new heritage information as it becomes available (See C 14.2).

ALARP Demonstration	<i>As marine ecosystems may hold both cultural and environmental value (see Section 4.9.1), with cultural and environmental values intrinsically linked, in addition to the specific controls for cultural features and heritage values, the controls and performance standards in section 6.7 and 6.8 will reduce impacts to cultural features and heritage values, including marine species and habitats.</i>				
	Control considered	Feasibility (F) & Cost/ Sacrifice (Cs)	Benefit in Impact/Risk Reduction	Proportionality	Adopted
	Apply a 'living heritage' ⁴⁰ management approach. Woodside seeks advice and incorporates Traditional Custodian cultural knowledge across our activities. Cultural safety considerations are factored for our workforce and the Traditional Custodian community.	F: Yes CS: Minimal	Implementation of the 'living heritage' approach pays acknowledgement and respect to Traditional Custodian communities. It supports the transfer of cultural knowledge and is an effective strategy to manage intangible cultural values.	Benefits outweigh cost/ sacrifice.	Yes C 14.1
Implement a program, which is compliant with Corporate Woodside Policies Strategies and procedures, to undertake ongoing consultation with Traditional Custodians whose functions, interests and activities may be affected by the	F: Yes CS: Substantial costs	Implementation of this program is anticipated to allow Woodside to improve their understanding of potential cultural values and Heritage in the Operational Area and or EMBA and then develop avoidance or mitigation strategies in collaboration with Traditional Custodians if	Benefits outweigh cost/ sacrifice	Yes C 14.2	

⁴⁰ Living heritage supports community and individual identity. Intangible cultural heritage is 'living heritage' that is inherited from ancestors and passed on to their descendants. It is comprised of many influences, including oral traditions, art, social practices, rituals and ceremonies, cultural knowledge and practices. It is transmitted from generation to generation, and evolves in response to the environment. Woodside applies a 'living heritage' approach to its cultural heritage management. This includes ensuring that Traditional Custodians are given voice to identify interests, transmit information and express concerns. Woodside works with Traditional Custodians to support and follow appropriate cultural protocols, including calling to Country, conducting smoking ceremonies (in areas where this custom is appropriate) and undertaking cultural awareness.

Petroleum Activities Program.		impacts to cultural values are identified.		
The environmental impacts and risks of the activity will continue to be managed to as low as reasonably practicable and an acceptable level for cultural features and heritage values.	F: Yes CS: Substantial costs	Implementation of activities and associated controls to ALARP and acceptable levels supports the maintenance of cultural features and heritage values	Benefits outweigh cost/sacrifice	Yes C 14.3
Use of cultural heritage monitors on vessels to oversee implementation of controls protecting cultural values	F: No CS: Minimal Cost	On vessel cultural heritage monitors would have access to areas normally subject to exclusion zones and can shape the management of cultural features and heritage values in real time. The PAA is located beyond the Ancient Landscape and there is no impact pathway to features of the Ancient Landscape. Due to the distance offshore the determination of appropriate of cultural authorities to supply heritage monitors is not clear.	Disproportionate The cost/sacrifice outweighs the benefit gained.	No
Project inductions to all relevant marine crew, prior to the individual commencing the activity, will include information on cultural features and heritage values, including tangible and intangible cultural heritage.	F: Yes CS: Minimal	Ensures workforce is suitably aware of cultural features and heritage values in the area they are operating.	Benefits outweigh cost/sacrifice.	Yes C 14.4
Should it be identified that relevant cultural authorities may be affected in the unlikely event of a spill, Woodside will engage with those parties as appropriate and in alignment with the OSPRMA.	F: Yes CS: Minimal	Engaging with relevant cultural authorities that may be impacted by a spill will allow the Traditional Custodians to identify areas of concern.	Benefits outweigh cost/sacrifice	Yes Adopted, see Appendix D

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<p>Communicate known or possible sightings of Pygmy Blue Whales and Humpback Whales to other Scarborough Project vessels in the area.</p>	<p>F: Yes CS: Time / Cost associated with persons used for communications</p>	<p>Sharing information on PBW and humpback whales presence and behaviour may assist in reducing risks associated with Scarborough Project vessels. By making crews aware of PBWs and humpback whales in the area, management actions can be effectively implemented.</p> <p>Where this control prevents impacts to whales at a population level, it maintains a culturally significant resource to a level that results in no observable change to coastal communities (migratory pathways maintained).</p> <p>The for humpback whales is not considered necessary to reduce impacts and risks to ALARP and Acceptable levels.</p> <p>However, Woodside has adopted this control as a further precautionary measure.</p>	<p>Benefits outweigh cost/sacrifice.</p>	<p>Yes C 3.5</p>
<p>Use of adaptive management actions while operating during PBW migration season (April to July, and October to January). For any sightings of known or possible PBWs or Humpback Whales:</p> <ul style="list-style-type: none"> A dedicated watch⁴¹ will be maintained by an MFO⁴²; If the vessel (PV, LCV, HCV) is in transit, will reduce speed to <6 knots; and No new support vessels will enter the Operational Area; <p>until the whale(s) is observed to move out</p>	<p>F: Yes CS: Time / cost in delay or interruption to activity execution.</p>	<p>Adjusting operations to limit increases in cumulative vessel noise and preventing sudden changes in movement may help reduce likelihood of underwater noise impacts to PBWs and humpback, by providing adequate time and space for cetaceans to move away if disturbed by the noise.</p> <p>Where this control prevents impacts to whales at a population level, it maintains a culturally significant resource to a level that results in no observable change to coastal communities (migratory pathways maintained).</p> <p>The application of adaptive management for humpback whales is</p>	<p>Benefits outweigh cost/sacrifice.</p>	<p>Yes C 3.6</p>

⁴¹ Dedicated watch - A period of time during which the dedicated MFO actively and exclusively looks for cetaceans.

⁴² MFO - A dedicated and suitably trained person (can be vessel crew) who must not have any other duties that impede their ability to engage in visual observations for marine fauna.

<p>of visible range from the project vessel (~3-5 km) or is not observed for a period of 30 mins</p>	<p>not considered necessary to reduce impacts and risks to ALARP and Acceptable levels. However, Woodside has adopted this control as a further precautionary measure.</p>
<p>While operating during PBW migration seasons (April – July, October – January), The SIMOPs management plan (as per C 8.6) will consider the scheduling of and distances between Scarborough activities, to reduce the potential for injury to cetaceans.</p>	<p>F: Yes CS: Time / cost in delay or interruption to activity execution, Consideration of project schedule to reduce concurrent activities within the PAA can help reduce likelihood of underwater noise impacts to cetaceans from cumulative noise. Where this control prevents impacts to whales at a population level, it maintains a culturally significant resource to a level that results in no observable change to coastal communities (migratory pathways maintained).</p>

ALARP Statement

On the basis of the impact and risk assessment outcomes and use of the relevant tools appropriate to the decision type (i.e. Decision Type A, Section **Error! Reference source not found.**), Woodside considers the adopted controls appropriate to manage the potential impacts and risks to cultural features and heritage values. As no reasonable additional/alternative controls were identified that would further reduce the impacts without grossly disproportionate sacrifice, the impacts are considered ALARP.

Acceptability Statement

The impact and risk assessment has determined that, given the adopted controls, planned activities are unlikely to result in an impact greater than negligible (F)⁴³ and unplanned activities are assessed to have a residual risk rating of moderate (or lower).

The Petroleum Activities Program and the EMBA are not expected to have a significant impact (e.g. changes in population levels) on MNES including marine fauna with a First Nations connection with, or traditional use in nearshore areas as defined in Section 4.9.1. Woodside has engaged with Traditional Custodians adjacent to the EMBA to understand the cultural features and heritage values that may occur and potential impacts from the activity. Additional controls considered and adopted, to minimise impacts to whales and associated songlines (C 3.6) have been discussed with the relevant persons who have raised the value.

The Program of Ongoing Engagement with Traditional Custodians (EPO 26 and C 14.2) and ‘living heritage’ management approach (C 14.1) have been developed to enable Woodside to manage cultural values which may be identified at any time during Woodside’s activities via ongoing dialogue with Traditional Custodians.

Further opportunities to reduce the impacts have been investigated above. The potential impacts and risks are considered acceptable if the adopted controls are implemented. Therefore, Woodside considers the adopted controls appropriate to manage the impacts and risks to cultural features and heritage values to a level that is acceptable, if ALARP.

⁴³ Noting that as the receptor sensitivity is high the impact significance level is Slight (E).

Key Environmental Performance Outcomes, Standards and Measurement Criteria related to Cultural Features and Heritage Values⁴⁴			
EPO	Adopted Control(s)	EPS	MC
<p>EPO 26</p> <p>Woodside will actively support Traditional Custodians' capacity for ongoing engagement and consultation on environment plans for the purpose of avoiding impacts to cultural heritage values.</p> <p>EPO 28</p> <p>New cultural values identified through the Program (EPO26) will be managed to ALARP and an Acceptable level of impact.</p> <p>EPO 29</p> <p>No impact to cultural features and heritage values, as stated in Table 4-21, greater than a consequence level of F⁴⁵ from the Petroleum Activities Program.</p> <p>EPO 5</p> <p>Undertake the Petroleum Activities Program in a manner that will not seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.</p> <p>EPO 6</p> <p>Undertake the Petroleum Activities Program in a manner that prevents a substantial adverse effect on a population of fishes, marine mammals, marine reptiles, or the spatial</p>	<p>C 14.1</p> <p>Apply a 'living heritage' management approach. Woodside seeks advice and incorporates Traditional Custodian cultural knowledge across our activities. Cultural safety considerations are factored for our workforce and the Traditional Custodian community.</p>	<p>PS 14.1.1</p> <p>Woodside will continue to give voice to Traditional Custodians to identify interests, transmit information and express concern through Woodside's program as per PS 14.2.1</p>	<p>MC 14.1.1</p> <p>Records demonstrate Change Management and Management of Knowledge processes have been followed where new controls or management measures identified</p>
		<p>PS 14.1.2</p> <p>Woodside will assess and where deemed practicable will implement appropriate cultural protocols where requested by Traditional Custodians</p>	<p>PS 14.1.2</p> <p>Records demonstrate Woodside implemented cultural protocols as requested</p>
	<p>C 14.2</p> <p>Implement a program, which is compliant with Corporate Woodside Policies Strategies and procedures, to undertake ongoing consultation with Traditional Custodians whose functions, interests and activities may be affected by the Petroleum Activities Program.</p>	<p>PS 14.2.1</p> <p>Implement a program, which is compliant with Corporate Woodside Policies, Strategies and procedures, to undertake ongoing consultation with Traditional Custodians whose functions, interests and activities may be affected by the Petroleum Activities Program.</p> <p>The Program will include, as agreed with relevant Traditional Custodians:</p> <ul style="list-style-type: none"> • Social investment to support Indigenous ranger programs • Support for Indigenous oil spill response capabilities • Support for recording Sea Country values • Support to Traditional Custodian groups to build capabilities and capacity with respect to ability to engage with Woodside and the broader O&G industry on activities • Development of ongoing relationships with Traditional Custodian groups • Any other initiatives proposed for the purpose of protecting Country including cultural values 	<p>MC 14.2.1</p> <p>Records demonstrate discussions with relevant Traditional Custodian Groups on proposed partnerships and/or initiatives initiated by Woodside, and responses to feedback provided by Woodside within 4 weeks</p> <p>MC 14.2.2</p> <p>Progress of the Program will be reported in line with annual sustainability reporting via the Woodside website.</p>

⁴⁴ As marine ecosystems may hold both cultural and environmental value (see Section 4.9.1), with cultural and environmental values intrinsically linked, in addition to the specific controls for cultural features and heritage values, the controls and performance standards in section 6.7 and 6.8 will reduce impacts to cultural features and heritage values including marine species and habitats.

⁴⁵ Defined as F – Negligible, no lasting effect (< 1 month) Localised impact not significant to areas /items of cultural significance

<p>distribution of a population.</p> <p>EPO 7</p> <p>Undertake the Petroleum Activities Program in a manner that will not substantially modify, destroy or isolate an area of important habitat for a migratory species.</p> <p>EPO 8</p> <p>Undertake the Petroleum Activities Program in a manner that will not have a substantial adverse effect on a population of seabirds or shorebirds, or the spatial distribution of the population.</p>	<p>C 14.3</p> <p>The environmental impacts and risks of the activity will continue to be managed to as low as reasonably practicable and an acceptable level for cultural features and heritage values.</p>	<p>PS 14.3.1</p> <p>Consideration of cultural values / new information, through the life of the EP, and the development of avoidance or mitigation strategies in collaboration with Traditional Custodians if impacts to cultural values are identified. Where avoidance is not possible, impact minimisation will be prioritised and demonstrated through a written options analysis / ALARP to ensure an acceptable level of impact. This will be documented through Woodside's Management of Change and Management of Knowledge processes.</p>	<p>MC 14.3.1</p> <p>Records demonstrate Change Management and Management of Knowledge processes have been followed where new controls or management measures identified</p>
	<p>C14.4</p> <p>Project inductions to all relevant marine crew, prior to the individual commencing the activity, will include information on cultural features and heritage values, including tangible and intangible cultural heritage.</p>	<p>PS 14.4.1</p> <p>All relevant marine crew have completed Project inductions that include information on cultural values, including tangible and intangible cultural heritage for awareness</p>	<p>MC 14.4.1</p> <p>Records demonstrate all relevant marine crew have completed inductions that include cultural material</p>
	<p>C 3.5</p> <p>Communicate known or possible sightings of PBWs and Humpback Whales to other Scarborough Project vessels in the area.</p>	<p>PS 3.5.1</p> <p>Sightings of known or possible PBWs and Humpback Whales communicated to other Scarborough Project vessels in the area.</p>	<p>MC 3.5.1</p> <p>Records of communications kept in bridge log.</p>
	<p>C 3.6</p> <p>While operating during PBW migration season (April to July, and October to January) For any sightings of known or possible PBWs or Humpback Whales (as per C 3.4):</p> <ul style="list-style-type: none"> A dedicated watch⁴⁶ will be maintained by an MFO⁴⁷; If the vessel (PV, LCV, HCV) is in transit, reduce speed to <6 knots; and <p>No new support vessels will enter the Operational Area until the whale(s) is observed to move out of visible range from the project vessel (~3-5 km) or is not observed for a period of 30 mins.</p>	<p>PS 3.6.1</p> <p>While operating during PBW migration season (April to July, and October to January), For any sightings of known or possible PBWs or Humpback Whales apply C 3.6.</p>	<p>MC 3.6.1</p> <p>Records show C 3.6 implemented as required.</p>

	<p>C 3.7 While operating during PBW migration seasons (April – July, October – January), The SIMOPs management plan (as per C 8.6) will consider the scheduling of and distances between Scarborough activities, to reduce the potential for injury to cetaceans.</p>	<p>PS 3.7.1 To reduce the potential for injury to cetaceans, the SIMOPs management plan (as per C 8.6) considered the scheduling of and distances between Scarborough activities year round.</p>	<p>MC 3.7.1 Records the SIMOPS management plan considered scheduling and distances between Scarborough activities.</p>
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⁴⁶ Dedicated watch - A period of time during which the dedicated MFO actively and exclusively looks for cetaceans.

⁴⁷ MFO - A dedicated and suitably trained person (can be vessel crew) who must not have any other duties that impede their ability to engage in visual observations for marine fauna.

7 IMPLEMENTATION STRATEGY

7.1 Overview

Regulation 14 of the Environment Regulations requires an EP to contain an implementation strategy for the activity. The implementation strategy for the Petroleum Activities Program confirms fit for purpose systems, practices and procedures are in place to direct, review and manage the activities so environmental risks and impacts are continually being reduced to ALARP and are acceptable, and that EPOs and standards outlined in this EP are achieved.

Woodside, as Operator, is responsible for ensuring the Petroleum Activities Program is managed in accordance with this Implementation Strategy and the WMS (see **Section 1.9**).

7.2 Systems, Practice and Procedures

All operational activities are planned and carried out in accordance with relevant legislation and standards, management measures (i.e. controls) identified in this EP and internal environment standards and procedures (**Section 6**).

The systems, practices and procedures that will be implemented are listed in the Performance Standards (PS) contained in this EP. Document names and reference numbers may be subject to change during the statutory duration of this EP and is managed through a Change Register and update process.

7.2.1 Assessment of Project Fluids

All chemicals that may be operationally released or discharged to the marine environment by the Petroleum Activities Program are evaluated using a defined framework and set of tools to ensure the potential impacts are acceptable, ALARP and meet Woodside’s expectation for environmental performance.

The chemical assessment process follows the principles outlined in the Offshore Chemical Notification Scheme (OCNS), which manages chemical use and discharge in the United Kingdom (UK) and the Netherlands. It applies the requirements of the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention). The OSPAR Convention is widely accepted as best practice for chemical management.

All chemical substances on the OCNS ranked list of registered products have an assigned ranking based on toxicity and other relevant parameters, such as biodegradation and bioaccumulation, in accordance with one of two schemes (as shown in **Figure 7-1**):

- Hazard Quotient (HQ) Colour Band: Gold, Silver, White, Blue, Orange or Purple (listed in order of increasing environmental hazard).
- OCNS Grouping: E, D, C, B or A (listed in order of increasing environmental hazard). Used for inorganic substances, hydraulic fluids and pipeline chemicals only.

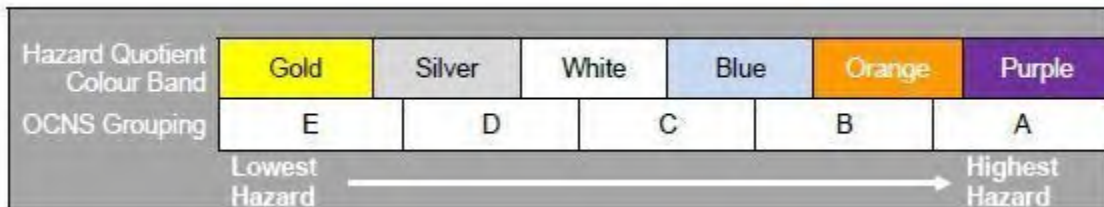


Figure 7-1: OCNS ranking scheme

Chemicals fall into the following assessment types:

- No further assessment: Chemicals with an HQ band of Gold or Silver or an OCNS ranking of E or D with no substitution or product warnings do not require further assessment. Such chemicals do not represent a significant impact on the environment under standard use scenarios and are therefore considered ALARP and acceptable.
- Further assessment/ALARP justification required: The following types of chemicals require further assessment to understand the environmental impacts of discharge into the marine environment:
 - chemicals with no OCNS ranking
 - chemicals with an HQ band of White, Blue, Orange or Purple or an OCNS ranking of A, B or C
 - chemicals with an OCNS product or substitution warning.

This includes assessing the ecotoxicity, biodegradation and bioaccumulation of the chemicals in the marine environment in accordance with the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) Hazard assessment and the Department of Mines and Petroleum (DMP) Chemical Assessment Guide: Environmental Risk Assessment of Chemicals used in WA Petroleum Activities Guideline.

Ecotoxicity

Chemical ecotoxicity is assessed using the criteria used by CEFAS to group chemicals based on ecotoxicity results (**Table 7-1**). If a chemical has an aquatic or sediment toxicity within the criteria for the OCNS grouping of D or E, this is considered acceptable in terms of ecotoxicity.

Table 7-1: CEFAS OCNS grouping based on ecotoxicity results

Initial Grouping	A	B	C	D	E
Results for aquatic-toxicity data (ppm)	<1	>1-10	>10-100	>100-1000	>1000
Results for sediment toxicity data (ppm)	<10	>10-100	>100-1000	>1000-10,000	>10,000

Note: Aquatic toxicity refers to the Skeletonema costatum EC50, Acartia tonsa LC50 and Scopthalmus maximus (juvenile turbot) LC50 toxicity tests; sediment toxicity refers to Corophium volutator LC50 test.

Biodegradation

The biodegradation of chemicals is assessed using the CEFAS biodegradation criteria, which align with the categorisation outlined in the DMP Chemical Assessment Guide: Environmental Risk Assessment of Chemicals used in WA Petroleum Activities Guideline.

CEFAS categorises biodegradation into the following groups:

- readily biodegradable: results of >60% biodegradation in 28 days to an OSPAR harmonised offshore chemical notification format (HOCNF) accepted ready biodegradation protocol
- inherently biodegradable: results >20% and <60% to an OSPAR HOCNF accepted ready biodegradation protocol or result of >20% by OSPAR accepted inherent biodegradation study
- not biodegradable: results from OSPAR HOCNF accepted biodegradation protocol or inherent biodegradation protocol are <20%, or half-life values derived from aquatic simulation test indicate persistence.

Chemicals with >60% biodegradation in 28 days to an OSPAR HOCNF accepted ready biodegradation protocol are considered acceptable in terms of biodegradation.

Bioaccumulation

The bioaccumulation of chemicals is assessed using the CEFAS bioaccumulation criteria, which align with the categorisation outlined in the DMP Chemical Assessment Guide: Environmental Risk Assessment of Chemicals used in WA Petroleum Activities Guideline.

The following guidance is used by CEFAS:

- non-bioaccumulative: Log Pow <3, or BCF ≤100 and molecular weight is ≥700
- bioaccumulative: Log Pow ≥3 or BC >100 and molecular weight is <700.

Chemicals that meet the non-bioaccumulative criteria are considered acceptable. If a product has no specific ecotoxicity, biodegradation or bioaccumulation data available, the following options are considered:

- Environmental data for analogous products can be referred to where chemical ingredients and composition are largely identical.
- Environmental data may be referenced for each separate chemical ingredient (if known) within the product.

Alternatives

If no environmental data is available for a chemical or if the environmental data does not meet the acceptability criteria outlined above, potential alternatives for the chemical will be investigated, with preference for options with an HQ band of Gold or Silver, or OCNS Group E or D with no substitution or product warnings.

Decision

Once the further assessment/ALARP justification has been completed, the relevant environment adviser must concur that the environmental risk as a result of chemical use is ALARP and acceptable.

7.2.2 Woodside IMS risk assessment process

7.2.2.1 Objective and scope

To minimise the risk of introducing IMS as a result of the Petroleum Activities Program, all applicable vessels and immersible equipment will be subject to Woodside's IMS risk assessment process (unless exempt as outlined below).

The objective of the risk assessment process is to identify the level of threat a contracted vessel, or immersible equipment poses if no additional risk reduction management measures are implemented. This allows Woodside (and its contractors) to apply management options that are commensurate to the identified level of risk.

In context of the activities specified in **Section 3**, the IMS risk assessment process does not apply to the following:

- Vessels or immersible equipment that do not plan to enter the IMS Management Area (IMSMA)⁴⁸ or operational areas defined in environmental approvals
- 'New build' vessels launched less than 14 days prior to mobilisation

⁴⁸ MSMA is based on current legal framework and includes all nearshore waters around Australia, extending from the lowest astronomical tide mark to 12 nm from land (including Australian territorial islands). The IMSMA also includes all waters within 12 nm from the 50 metre depth contour outside of the 12 nm boundary (i.e. Submerged reefs and atolls).

- Vessels or immersible equipment which have been inspected by a suitably qualified IMS inspector who has classified the vessels or immersible equipment as acceptably low risk no more than 14 days prior to mobilisation
- Locally sourced vessels or immersible equipment from within the Pilbara locally sourced zone⁴⁹. Vessels, or immersible equipment are defined as Locally Sourced when the same supply facilities/port have been used since their last IMS inspection, full hull clean in dry dock or application of antifouling coating (AFC⁵⁰).

7.2.2.2 Risk assessment process

Woodside’s IMS risk assessment process was developed with regard to the national biofouling management guidelines for the petroleum production and exploration industry and guidelines for the control and management of a ships’ biofouling to minimise the transfer of invasive aquatic species (IMO Guidelines, 2011).

In order to effectively evaluate the potential for vessels and immersible equipment to introduce IMS, a risk assessment process has been developed to score and evaluate the risk posed by each Project vessel, or immersible equipment planning to undertake activities within the IMSMA / Operational Area. The risk assessment process considers a range of factors, as listed in **Table 7-2** and **Table 7-3**.

The IMS risk assessments will be undertaken by a trained environment adviser who has completed relevant Woodside IMS training or by a qualified and experienced IMS inspector. A QA/QC process is implemented for all Woodside conducted IMS risk assessments where a secondary trained environment adviser verifies the assessment to minimise the risk of misapplication and errors within the risk assessment process.

Table 7-2: Key factors considered as a part of the risk assessment process for vessels

Factors	Details
Vessel type	The risk of IMS infection varies depending on the type of vessel undertaking the activity. A higher risk rating is applied for more complex, slow-moving vessels (e.g., dredges) in comparison to simple vessels (e.g., crew transfer vessel).
Recent IMS inspection and cleaning history, including for internal niches	In the case of biofouling on external hull niches, different risk ratings are applied dependant on whether out-of-water or in-water IMS inspections by qualified IMS inspectors and cleaning (if required) have been undertaken prior to contract commencement. If an IMS inspection (and clean if required) has not been undertaken in the past six months (from the time of contract commencement), the highest risk factor is applied. The risk factor then lessens for vessels as the time between inspection and mobilisation reduces.
Out-of-water period before mobilisation	A risk reduction factor can be applied for vessels that are hauled out and then mobilised as deck cargo or by road during mobilisation, therefore becoming air dried over an extended period. Risk reduction factor increases with exposure time out of water.
Age and suitability of AFC at mobilisation date	AFC manufacturers provide a range of coatings, each designed to avoid premature coating failure if it is correctly applied and matched to the vessel’s normal speeds and activity profile (i.e., proportion of time spent stationary or below three knots), and its main operational region (i.e., tropical, sub-tropical temperate). If the AFC type is deemed to be unknown, unsuited or absent, the highest risk value is applied. If the AFC type is suitable the risk factor applied reduces with age since application.
Internal treatment systems	A risk reduction factor applied if the vessel has an internal biological fouling control system in place at the time of assessment, or evidence of manual dosing.

⁴⁹ The Pilbara Zone includes Port, nearshore and offshore movements between Exmouth and Port Headland (excluding high environmental value areas, World Heritage Areas, Commonwealth Marine Reserve Sanctuary Zones and State Marine Management Areas and Marine Parks).

⁵⁰ Vessels and immersible equipment can still be classified as locally sourced even if the AFC application occurred in a different port provided the amount of time between AFC application and departure to the locally sourced area (i.e. period of time in waters <12nm/50m water depth) did not exceed consecutive 7 days or the period of time the vessel or immersible equipment has spent within the locally sourced zone exceeds 1 year (i.e. the risk of introducing a species from a different location has already passed).

Factors	Details
Vessel origin and proposed area of operation	Differing risk ratings are assigned in relation to the climatic relationship between the vessel's origin and the proposed climatic region of the proposed area of operation. Highest risk rating is applied to similar climatic regions.
Number of stationary/slow speed periods >7 days	A risk factor is calculated based on the number of 7 day periods that the vessel has operated at stationary or at low speed (less than three knots) in port or coastal waters which is any waters less than 50 metres deep outside 12 nautical miles from land or any waters within 12 nautical miles of land. The greater the number of periods the higher the risk factor applied.
Region of stationary or slow periods	A further multiplier is applied depending on the location of the stationary/slow speed periods. The highest risk rating applied if the stationary or slow speed periods occurred within ports or coastal waters of the same climatic region,
Type of activity – contact with seafloor.	The potential for the introduction of IMS varies on the planned vessel activity taking place. Those activities that come in contact with sediments and thus have the potential to accumulate and harbour IMS in areas such as hoppers (dredges) and spud cans (drilling rigs) are considered to have a greater risk of infection.

Table 7-3: Key factors considered as a part of the risk assessment process for immersible equipment

Factors	Details
Region of deployment since last thorough clean, particularly coastal locations	Climatic region of use since last overhaul, thorough cleaning or prolonged period out of water (>28 day). Highest risk rating is applied to similar climatic regions. Activities occurring in nearshore areas (less than 50 meters deep and/or within 12 nautical miles from land) are given the highest risk rating.
Duration of deployments	Maximum duration of deployment (maximum time in water) since last overhaul or thorough cleaning. The longer the period of immersion the higher the risk rating applied.
Duration of time out of water since last deployment	A further risk reduction factor can be applied for immersible equipment that has been out of the water for an extended period.
Transport conditions during mobilisation	If the equipment is stored in damp conditions then a high risk factor is applied, while if equipment is stored in dry and well ventilated (low humidity) conditions then a low risk factor is applied.
Post-retrieval maintenance regime.	A risk reduction factor is applied if the equipment/item of interest is routinely washed, cleaned, checked and/or disassembled between project sites. While a higher risk rating is applied where no routine cleaning occurs.

Following implementation of the risk assessment process, vessels and/or immersible equipment are classified as one of three risk categories, as defined below.

- ‘Low’– Low risk of introducing IMS of concern and hence no additional management required, or management options have been applied to reduce the risk.
- ‘Uncertain’– Risk of introducing IMS is not apparent and as such the precautionary approach is adopted, and additional management options may be required.
- ‘High’– High risk of introducing IMS means additional management options are required prior to this vessel mobilising to the Operational Area.

Following the allocation of a ‘low’ risk rating for a vessel or immersible equipment, the information provided by the vessel operator for the purposes of risk assessment must be confirmed prior to mobilisation. For vessels or equipment classified as posing an ‘uncertain’ or ‘high’ theoretical risk, a range of management options are presented to reduce this theoretical risk to acceptable levels and achieve a low risk status. These management options have been developed with the intention of reducing IMS risk to levels that are as low as reasonably practicable (i.e., ALARP). It is a flexible approach that allows for a range of management actions to be tailored for a specific vessel

movement. These will be assessed on a case-by-case basis and may include, but not limited to, the following:

- Inspection (desktop, in-water or dry dock) by a suitably qualified and experienced IMS inspector to verify risk status. Where practicable, the inspection shall occur within seven days (but not more than 14 days) prior to final departure to the Operational Area.
- In-water or dry dock cleaning of the hull and other niche areas. This is typically applied where the risk assessment outcome is High risk driven by the age of the AFC on the vessel and its time spent in similar climatic region ports.
- Treatment of vessels internal seawater systems. This is typically applied in isolation for vessels with AFC applied to their hull within the last twelve months and where subsequent assessment through the process achieves a Low risk rating.
- Limiting the duration that the vessel spends within the IMSMA to a maximum of 48 hours (cumulative entries). This is applicable for Uncertain risk vessels only.
- Reject the vessel.

Project vessels and immersible equipment are required to be a low risk of introducing IMS prior to entering the Operational Area.

7.3 Woodside Decommissioning Framework

Decommissioning is a planned activity for the offshore oil and gas industry. Current best practice is for decommissioning to include:

- designing for decommissioning during the development phase of projects / facilities
- maintaining and removing property, equipment and infrastructure, such as a facility or a pipeline, and plugging wells associated with a petroleum activity
- assessing decommissioning options and opportunities during the operational life of the facility leading up to cessation of production
- selecting, developing and planning the selected decommissioning option
- executing decommissioning plans; and
- restoring the marine environment.

This assists with compliance with Section 270 and Section 572 (3) of the OPGGS Act, which requires titleholders to remove property when it is neither used, nor to be used, in connection with the operations or other arrangements that are satisfactory to NOPSEMA in relation to the property.

7.3.1 Decommissioning Planning

Decommissioning planning generally commences 2–10 years prior to Cessation of Production (CoP) (**Figure 7-2**). The timeframe selected for decommissioning planning depends on the complexity of the infrastructure requiring decommissioning.

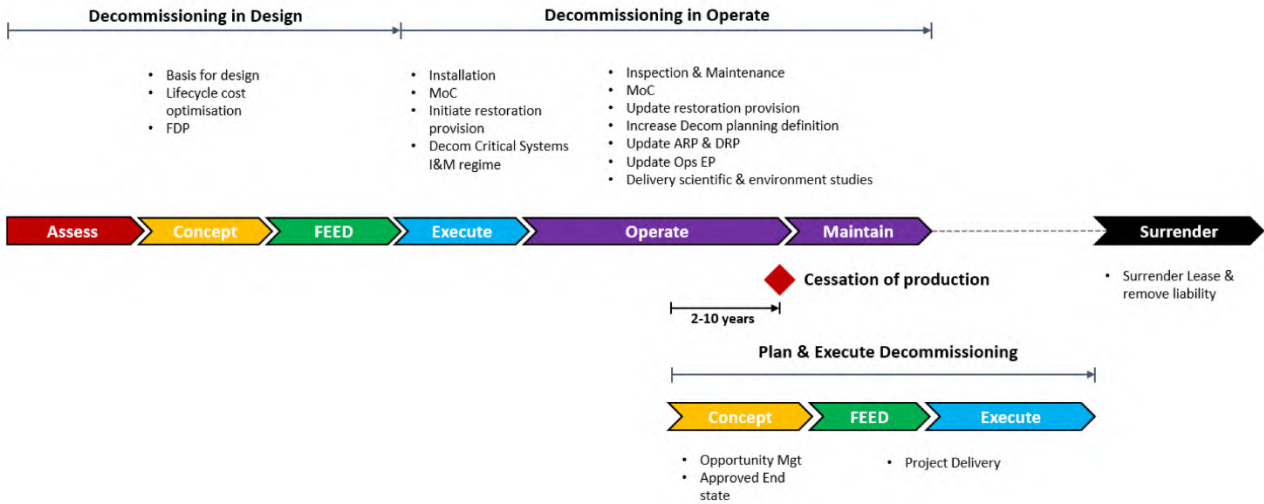


Figure 7-2: Woodside’s process for decommissioning planning

7.3.1.1 Scarborough Decommissioning Planning

In proactively planning for decommissioning, the following information has been collated within a Scarborough Decommissioning Strategy, for all major and ancillary infrastructure:

- Specifications
- Compositions
- Decommissioning critical systems
- IMMR management plans
- Feasibility of infrastructure removal options

This information will be reviewed for accuracy and regulatory compliance prior to start-up, before being captured in Maintenance Builds / Plans and handed over to Production for continual management throughout field life. Ancillary equipment will be tracked and inventoried in the same way, and removal options will be subject to future decommissioning planning, as per **Figure 7-2**.

The identified decommissioning critical systems are asset systems that are designed to facilitate the flushing, cleaning and decommissioning of infrastructure. These systems were identified through consultation with package leads and will be appropriately maintained to ensure system functionality is available at the time of decommissioning. The standard IMMR requirements will ensure that the systems remain in functional condition, in connection with operations until EOFL. These requirements will be integrated within suitable operational documents, ensuring the system, used in connection with operations, is appropriately maintained throughout field life.

In order to satisfy future decommissioning obligations, including the requirements of the OPGGS Act, all equipment has been designed to be feasible to remove. More detailed preparation for decommissioning execution, including relevant plans and procedures, will be developed as per the timeline in **Figure 7-2**, with due consideration of best environmental outcome and technological advances available at the time. Detailed plans and justification will be subject of a future EP.

For example, for the production flowlines, the following information is contained within the Decommissioning Strategy:

- Flowline materials composition, expected contaminants at EOFL, expected embedment at EOFL

- Inspection, monitoring, maintenance and repair plans
- Basis of Design functional and design requirements (e.g., “Subsea equipment must be able to be cleaned of hydrocarbons and contaminants, in situ, to a level based on ALARP assessment”)
- Decommissioning critical systems (e.g., “Manual ROV valve operability is required to enable Flowline pigging for hydrocarbon removal to FPU and riser isolation”)
- Typical sequence of events for subsea system decommissioning, including system preparation and subsea hardware recovery (e.g., Subject to Technical feasibility and Safety analysis, the most efficient method of flowline recovery could be via reverse installation to a dedicated Reel Lay Vessel (RLV).

All property has been designed and will be installed and operated so that it can be removed when it is neither used, nor to be used in connection with the operations, as per section 572 of the OPGGS Act. Design features and maintenance plans for major infrastructure, which allow removal to occur at the end of field life, are detailed in **Table 7-4**. Decommissioning critical systems have also been identified; these are asset systems that will be required to facilitate the decommissioning of infrastructure. If no such system is identified, there are no specific features critical for the future removal of the infrastructure. It should be noted that in this case all infrastructure is critical to the operation of the facility, as well as the decommissioning, so will be maintained for full functionality and integrity so that it can be removed at EOFL.

Table 7-4: Design features and maintenance plans to enable removal of infrastructure at decommissioning

Infrastructure	Design and maintenance to enable removal
3 x flowlines 8 x flexible jumpers 6 x risers 1 x trunkline spool and support	Decommissioning critical systems: Operability of subsea control system, manual valves, and 32” RBM valve and 16” Upstream FLET valves Design: Cathodic protection for 25+ years; pad eyes on descent/recovery clamp for lifting Maintenance: Risk based inspections to monitor/maintain system integrity and operability Removal: Pigging/cleaning of system to remove hydrocarbons and contaminants; isolations as required; water jetting of sediment if embedded/buried; disconnect and recover to surface via re-reeling or cutting and recovering in sections; lift using pad eyes on descent/recovery clamp or use of alternate rigging
7 x umbilicals 1 x dynamic umbilicals	Decommissioning critical systems: None Design: Cathodic protection for 25+ years; pad eyes on descent/recovery clamp for lifting Maintenance: Risk based inspections to monitor system integrity and operability; no maintenance required to facilitate removal Removal: Local disconnections of equipment; water jetting of sediment if embedded/buried; recover to surface via re-reeling or cutting and recovering in sections; lift using pad eyes on descent/recovery clamp or use of alternate rigging
1 x riser base manifold (RBM) 8 x flowline sleepers 7 x in-line structures (in-line T) 6 x flowline end terminations (FLETS) 7 x umbilical termination assemblies Multiple flying leads 7 x umbilical termination heads 2 x subsea distribution units 1 x subsea distribution assembly	Decommissioning critical systems: None Design: Cathodic protection for 25+ years; pad eyes for lifting Maintenance: Risk based inspections to monitor system integrity and operability; no maintenance required to facilitate removal Removal: Local disconnections of equipment; water jetting of sediment if embedded/buried; recovery using existing pad eyes or use of alternate rigging

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13 x mud mats 12 x mud mats (contingency)	
1 x riser base manifold foundation (RBMF)	Decommissioning critical systems: None Design: Cathodic protection for 25+ years; trunnions for lifting Maintenance: Risk based inspections to monitor system integrity and operability; no maintenance required to facilitate removal Removal: Water jetting of sediment if embedded/buried; installation process is reversible for removal, via use of existing suction port to connect ROV mounted pressure pump, or use of intervention points on individually piles not requiring valve operability; lifting via existing trunnions or use of alternate rigging
20 x mooring legs	Decommissioning critical systems: Fairleads Design: Cathodic protection for 25+ years Maintenance: Inspections based on class requirement; no maintenance required to facilitate removal Removal: Release of mooring legs from FPU via top of column pull-in equipment (temporary) and fairlead controls; Mooring systems to be removed from subsea / seabed using anchor handling tugs or similar
20 x suction piles	Decommissioning critical systems: None Design: Cathodic protection for 25+ years; suction/pressure ports existing and able to be retrofitted Maintenance: Inspections based on class requirement; no maintenance required to facilitate removal Removal: Installation process is reversible for removal, via use of existing suction ports to connect ROV mounted pressure pump, retro install of pressure ports, or relief of pressure by other means (e.g. drilling holes in the pile and connecting lift rigging to a vessel and slowly easing the pile out)
Up to 265 x concrete pads	Decommissioning critical systems: None Design: 50-year design life; elimination of corrosion sources Maintenance: Periodic inspections during gravimetry surveys to monitor condition; no maintenance required to facilitate removal Removal: Water jetting of sediment if embedded/buried; lifting with subsea grab to subsea basket for recovery to vessel deck

7.3.1.2 Roles and Responsibilities

Key roles and responsibilities for Woodside and contractor personnel relating to implementing, managing and reviewing this EP are described in **Table 7-5**. Individuals fulfilling these roles will differ between each activity. Roles and responsibilities for oil spill preparation and response are outlined in **Appendix D** and the [Woodside Oil Pollution Emergency Arrangements \(Australia\)](#).

It is the responsibility of all Woodside employees and contractors to implement the Woodside *Environment and Biodiversity Policy (Appendix A)* and *Health and Safety Policy* in their areas of responsibility and that the personnel are suitably trained and competent in their respective roles.

Table 7-5: Roles and responsibilities

Title (role)	Environmental Responsibilities
Office-based Personnel	
Woodside Project Activity Manager (or delegate/s)	<ul style="list-style-type: none"> • Monitor and manage the activity so it is undertaken as per the relevant standards and commitments in this EP. • Notify the Woodside Environment Adviser of any scope changes in a timely manner. • Liaise with regulatory authorities as required. • Review this EP as necessary and manage change requests. • Ensure all project and support vessel crew members complete an HSE induction. • Verify that contractors meet environmental related contractual obligations. • Confirm environmental incident reporting meets regulatory requirements (as outlined in this EP) and Woodside’s Health, Safety and Environment Reporting and Investigation Procedure. • Monitor and close out corrective actions identified during environmental monitoring or audits.
Woodside Environmental Adviser	<ul style="list-style-type: none"> • Verify relevant Environmental Approvals for the activities exist prior to commencing activity. • Track compliance with performance outcomes and performance standards as per the requirements of this EP. • Prepare environmental component of relevant Induction Package. • Assist with the review, investigation and reporting of environmental incidents. • Ensure environmental monitoring and inspections/audits are undertaken as per the requirements of this EP. • Liaise with relevant regulatory authorities as required. • Assist in preparation of external regulatory reports required, in line with environmental approval requirements and Woodside incident reporting procedures. • Monitor and close out corrective actions (Campaign Action Register (CAR)) identified during environmental monitoring or audits. • Provide advice to relevant Woodside personnel and contractors to assist them to understand their environment responsibilities. • Liaise with primary installation contractors to ensure communication and understanding of environment requirements as outlined in this EP and in line with Woodside’s Compass values and management systems.
Woodside Corporate Affairs Adviser	<ul style="list-style-type: none"> • Prepare and implement the Stakeholder Consultation Plan for the Petroleum Activities Program. • Report on stakeholder consultation. • Ongoing liaison and notification as required as per Section 7.10.
Woodside Marine Assurance Superintendent	<ul style="list-style-type: none"> • Conducts relevant audit and inspection to confirm vessels comply with relevant Marine Orders and Woodside Marine Charters Instructions requirements to meet safety, navigation and emergency response requirements.

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Title (role)	Environmental Responsibilities
Woodside CICC Duty Manager	<p>On receiving notification of an incident, the Woodside CICC Duty Manager shall:</p> <ul style="list-style-type: none"> • establish and take control of the IMT and establish an appropriate command structure for the incident • assess situation, identify risks and actions to minimise the risk • communicate impact, risk and progress to the Crisis Management Team and stakeholders • develop the incident action plan (IAP) including setting objectives for action • approve, implement and manage the IAP • communicate within and beyond the incident management structure • manage and review safety of responders • address the broader public safety considerations • conclude and review activities.
Vessel-based Personnel	
Vessel Master (all vessel types)	<ul style="list-style-type: none"> • Ensure the vessel management system and procedures are implemented. • Ensure personnel commencing work on the vessel receive an environmental induction that meets the relevant requirements specified in this EP. • Ensure personnel are competent to undertake the work they have been assigned. • Verify SOPEP drills are conducted as per the vessel's schedule. • Ensure the vessel Emergency Response Team (ERT) has been given sufficient training to implement the SOPEP. • Ensure any environmental incidents or breaches of relevant Environmental Performance Outcomes or performance standards detailed in this EP, are reported immediately to the Woodside Well Site Manager. • Ensure corrective actions for incidents or breaches are developed, communicated to the Well Site Representative, and tracked to close out in a timely manner. Close out of actions is communicated to the Well Site Representative.
Vessel Logistics Coordinators	<ul style="list-style-type: none"> • Ensure waste is managed on the relevant vessels and sent to shore as per the relevant Waste Management Plan.
Vessel HSE Advisers*	<ul style="list-style-type: none"> • Support the Woodside Site Representative to ensure the controls detailed in this EP relevant to offshore activities are implemented on the vessels and help collect and record evidence of implementation (other controls are implemented and evidence collected onshore). • Support the Woodside Site Representative to ensure the EPOs are met and the PSs detailed in this EP are implemented on the vessels • Support the Woodside Site Representative to ensure environmental incidents or breaches of outcomes or standards outlined in this EP, are reported, and corrective actions for incidents and breaches are developed, tracked and closed out in a timely manner.

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Title (role)	Environmental Responsibilities
	<ul style="list-style-type: none"> • Ensure periodic environmental inspections/reviews are completed and corrective actions from inspections are developed, tracked and closed out in a timely manner. • Review contractors' procedures, input into Toolbox talks and JSAs. • Provide day-to-day environmental support for activities in consultation with the Woodside Environment Adviser.
Offshore Construction Manager (OCM)*	<ul style="list-style-type: none"> • Confirm that activities are undertaken in accordance with this EP, as detailed in the Woodside approved Contactor Environmental Management Plan • Ensure personnel commencing work on the project receive a relevant environmental induction that meets the requirements specified in this EP • Ensure personnel are competent to undertake the work they have been assigned • Ensure any environmental incidents or breaches of objectives, standards or criteria outlined in this EP, are reported immediately to the Woodside Responsible Engineer or Vessel Master.
Woodside Site Representative (WSR) / Resident Engineer*	<ul style="list-style-type: none"> • Ensure activities are undertaken as detailed in this EP. • Ensure the management measures made in this EP are implemented on the vessel • Ensure environmental incidents or breaches of objectives, standards or criteria outlined in this EP, are reported as per the Woodside Corporate Event Notification Matrix • Verify HSE improvement actions identified during the project are implemented where practicable • Ensure periodic environmental inspections are completed.

**Apply to primary installation vessels – other vessels in the Petroleum Activities Program will have different levels of crewing. Where named roles are not present onboard, responsibilities will fall to the primary installation vessel personnel who will manage the other vessels accordingly.*

7.4 Thalanyji Sea Country Management Process

During consultation, BTAC, on behalf of the Thalanyji People, advised it has a cultural obligation to care for the environmental values of Sea Country (refer to Appendix F, Table 1).

In correspondence from 20 February 2023 (refer to Appendix F, Table 1) BTAC advised that:

- BTAC seeks support from Woodside to enable BTAC to define and articulate its values on Sea Country in a manner that could be more clearly understood by the offshore sector, government, and the community. This would enable BTAC and Woodside to collaborate to develop effective management plans that can provide adequate protection to Sea Country values; and
- BTAC seeks support from Woodside to obtain technical support to review the information and provide BTAC and its members with feedback on the project risks to Sea Country and help BTAC contemplate the potential management controls that could be developed to protect its values and interests.

Woodside's offer of technical support is detailed in Appendix F, Table 1, but this has not yet been accepted.

A review of publicly available literature has been undertaken to seek clarity on the extent of Sea Country for Thalanyji people (**Section 4.9.1.5.3**).

The publicly available information considered does not record any instances of Thalanyji sea country extending beyond the Montebello Multiple Use Zone within the vicinity of the islands.

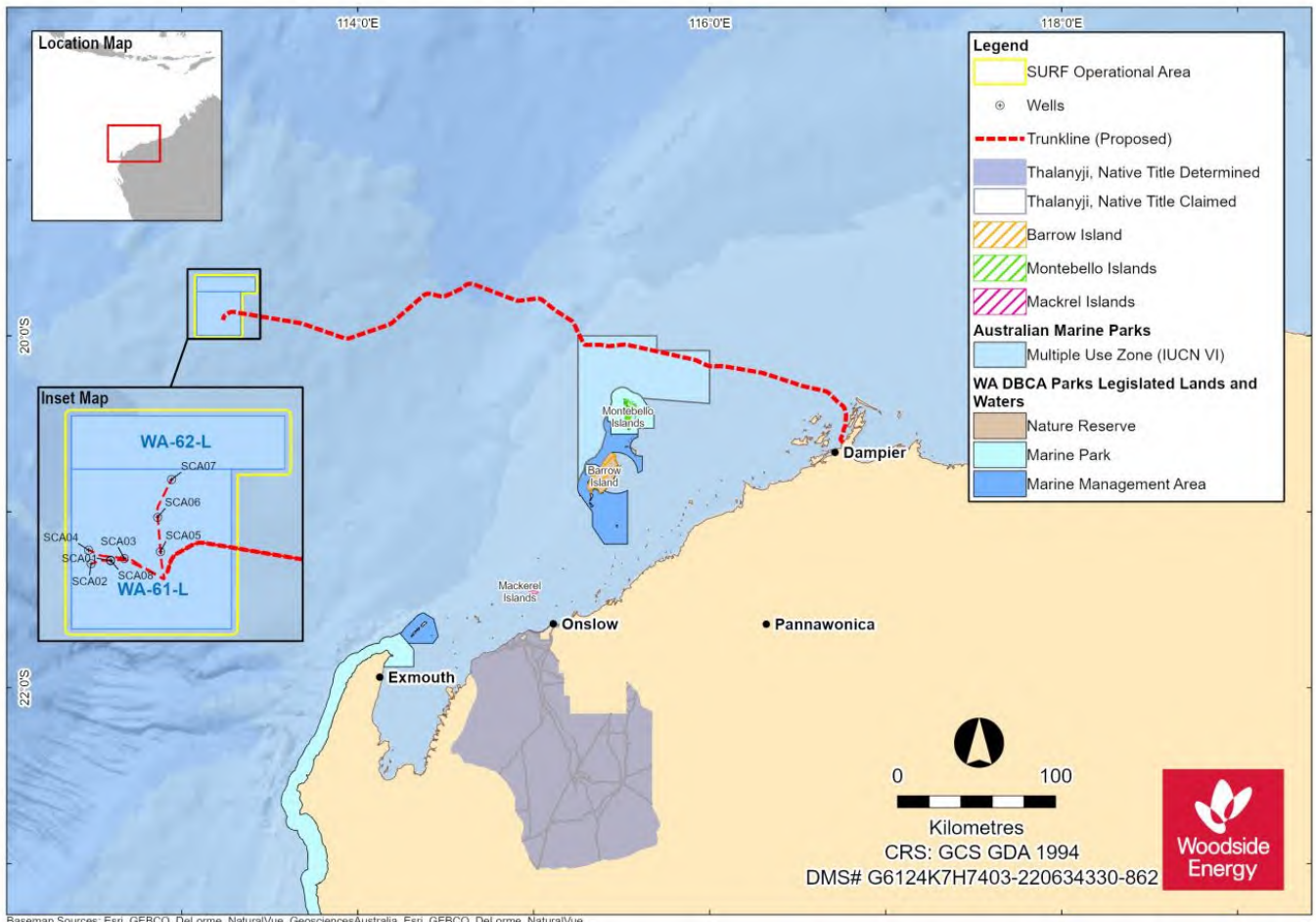
There are no credible planned or unplanned impacts to the Montebello Islands, Barrow Island or the Mackerel Islands or the Montebello Marine Park Multiple Use Zone, or the islands indicated in WC1999/045. They are outside the EMBA for the activity.

Woodside has developed a robust understanding of Thalanyji Sea Country cultural values and heritage features through publicly available information (Section 4.9.1.5.1) and consultation with BTAC under Regulation 11A. Woodside considers that it has taken all reasonable steps to identify cultural features and heritage values of Thalanyji people in the EMBA.

If further guidance from BTAC is received as part of ongoing consultation which changes Woodside's understanding of the extent of Thalanyji Sea Country, Woodside's Management of Change and Management of Knowledge process with EPO 28 will be applied to manage potential impact to newly identified cultural values or features to ALARP and Acceptable levels. This estimation does not limit the extent of consultation with BTAC or the features and values they are encouraged to identify and communicate. Woodside will implement the process in Table 7-6 to ensure all reasonable steps have been taken to identify sea country values relative to BTAC through ongoing consultation.

BTAC has not provided further detail regarding heritage value of places or cultural features of the Operational Area or the EMBA but did note that this Sea Country extends "out to the vast islands off the coast of the Pilbara, including the Monte Bello Islands, Barrow Island, and the Mackerel Islands." In the absence of further advice from BTAC, Woodside has nominally estimated from this description that BTAC's interests fall between KP109 and KP192 (trunkline kilometre points), where the Trunkline intersects the Montebello Marine Park Multiple Use Zone and as detailed in Error! Reference source not found..

This area may be increased or reduced if further guidance from BTAC is received. The use of this delineation as a starting point is due to BTAC reference to the Montebello Islands and noting that the other locations identified by BTAC are at a greater distance from the Operational Area. This area is used only to inform the extent of notifications proposed in this section to BTAC (e.g., when advising of timeframes for project activities) and may be increased or reduced if further guidance from BTAC is received. This nominal estimation does not limit the extent of consultation with BTAC or the features and values they are encouraged to identify and communicate.



Woodside recognises that identification of these cultural features/ values can only be meaningfully achieved with the participation of BTAC. Woodside will implement the process in Table 7-6 to ensure all reasonable steps have been taken to identify sea country values relative to BTAC.

Table 7-6: BTAC Ongoing Consultation -

Activity	Timing
Woodside contacted BTAC to discuss the best way forward to consult with BTAC	Completed January 2023
Woodside and BTAC commenced correspondence regarding a consultation or engagement framework, including financial resourcing for BTAC	Ongoing since February 2023
BTAC confirmed that subject to formalising arrangements – for example under a collaboration agreement - BTAC agrees in principle for Woodside to include the statements described in the letter from Woodside dated 17 March.	Completed 18 April 2023
BTAC requested Woodside provide a draft presentation for BTAC's board regarding Woodside's activities on Thalanyji country, and draft key terms / key principles regarding a Collaboration Agreement	Completed 4 May 2023
Woodside provided to BTAC a draft of principles for a consultation framework, targeting having the framework agreed and in place by 31 July 2023	Completed 14 June 2023
Woodside wrote to BTAC inviting BTAC to submit a cost estimate to continue consultations and address items in the draft framework principles, in the interim whilst the framework is being agreed	Completed 14 July 2023
BTAC wrote to Woodside regarding the draft framework principles and proposed to forward Woodside a Costs Acceptance Letter to address resourcing for ongoing consultation	Completed

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Activity	Timing
	19 July 2023
Woodside provided BTAC with a draft presentation for BTAC's board, including a map showing a consolidated EMBA - a consolidation of all single activity EMBA's that have been notified to BTAC to date	Completed 20 July 2023
<p>1 Request an ethnographic assessment to be undertaken by BTAC, including:</p> <ul style="list-style-type: none"> • That the scope of works identifies the values of sea-country generally sufficient to inform all Woodside EPs; • That Woodside will cover all reasonable costs of this assessment, to be agreed upon receipt of a cost estimate from BTAC; • That, in order to ensure the independence of any assessment and confidence in the process and consultants, Woodside's preference is for BTAC to manage the assessment, including selection of any consultant, but acknowledging the constraints on BTAC's time and resources that where directed Woodside (or a consultant) is willing to provide in-kind support for the assessment, including some or all tasks required to coordinate the assessment; • That any resulting report or other materials will remain the intellectual property of BTAC, but that Woodside will retain a perpetual right to use the content of any non-culturally sensitive report or other materials produced for the purposes of project approvals and planning, including providing these in-full to regulators and government authorities as needed, and that where culturally sensitive reports or other materials are produced a non-culturally sensitive (redacted or edited) version will be provided subject to the same perpetual right above; and • To minimise the burden of duplication on BTAC and allow prioritisation of this assessment any results of this assessment may be shared by BTAC with other proponents, and where other proponents require ethnographic assessment outside of the proposed scope but aligned with the assessment timeframes, the engaged consultants may perform the required additional work (including additional days of research, fieldwork etc.) as an extension of this assessment at the cost of those proponents (thus avoiding duplication of time and costs relating to logistics, administration etc.) • Reiterate commitment to undertaking ethnographic assessments with BTAC, at BTAC's earliest availability. 	Completed 31 July 2023 Follow up after 2 weeks and once monthly in September and October.
<p>2 Woodside will continue to implement its Management of Change and Management of Knowledge processes where new information is communicated from BTAC at any time. Consult with BTAC on management and mitigation measures as required.</p>	Within 14 days of new cultural values being communicated from BTAC
<p>3 Ongoing consultation as per Ongoing Program of Traditional Owner Consultation</p>	Per Ongoing Program
<p>4 Building capacity for the ongoing protection of country, including initiatives agreed with BTAC for the articulation of values on Sea Country in a manner that could be more clearly understood by the offshore sector, government, and the community.</p>	Per Ongoing Program
<p>Woodside notified BTAC of the planned start date of the activity, again providing information about the activity and requesting any further information on cultural features and/or heritage values prior to a date specified, to be considered in ongoing consultation. PS14.3 will be implemented to manage potential impact to newly identified cultural values or features to ALARP and Acceptable Levels.</p>	14 September
<p>In absence of further response from BTAC, Woodside has undertaken desktop research to: Activity Timing</p> <ul style="list-style-type: none"> • Identify Indigenous cultural features and heritage values off the WA coastline (Section 4.9.1.5.3) • Clarify the extent of Thalanyji sea country (Section 4.9.1.5.3) <p>PS14.3 will be implemented to manage potential impact to newly identified cultural values or features to ALARP and Acceptable Levels.</p>	

7.5 Unexpected Finds Procedure

In the event of the discovery of what appears to be Underwater Cultural Heritage (defined as ‘any trace of human existence that has a cultural, historical or archaeological character and is located under water’); the following Unexpected Finds Procedure will apply:

- All activities with the potential to impact the suspected Underwater Cultural Heritage must cease immediately. Retain all records of the potential Underwater Cultural Heritage including any imagery, description and location.
- Person who discovers the heritage object must inform the Activity Supervisor.
- Activity Supervisor (or delegate) must notify Woodside’s Principal Heritage Adviser.
- Woodside will specify an appropriate buffer around the potential Underwater Cultural Heritage, taking into consideration the nature and scale of the potential Underwater Cultural Heritage and the activities to be managed.
- No seabed disturbance may occur within the buffer area around the potential Underwater Cultural Heritage until approved by Woodside’s Principal Heritage Adviser.
- Woodside’s Principal Heritage Adviser (or delegate) must notify a qualified maritime archaeologist and provide all available documentation of the potential Underwater Cultural Heritage.
- If the potential Underwater Cultural Heritage appears to be Aboriginal Underwater Cultural Heritage, Woodside’s Principal Heritage Adviser (or delegate) must notify the appropriate Traditional Custodians to determine whether it is a heritage site and if so, how the site should be managed.
- If the potential Underwater Cultural Heritage appears to be a shipwreck or aircraft that has been wrecked for more than 75 years, or is otherwise reportable under Section 40 of the UCH Act, Woodside’s Principal Heritage Adviser (or delegate) must notify the Minister responsible for the UCH Act, the DCCEEW underwater archaeological section through the Australasian Underwater Cultural Heritage Database, and the Western Australian Museum.
- If the suspected heritage object includes human remains, Woodside’s Principal Heritage Adviser (or delegate) must also notify:
 - the Australian Federal Police (phone: 131 444) of the location of the remains, that the remains are likely to be historic or Aboriginal in origin, and that it may be appropriate that Traditional Custodians and a maritime archaeologist are present during any handling of the remains; and
 - the Office of the Federal Environment Minister in accordance with Section 20 of the ATSIHP Act
- Work must not recommence in the vicinity of the heritage object until Woodside’s Principal Heritage Adviser provides written approval. Woodside’s Principal Heritage Adviser must only provide written approval once agreed management measures are implemented consistent with approvals and legislation or where the potential Underwater Cultural Heritage is confirmed to not be Underwater Cultural Heritage.

7.6 Training and Competency

7.6.1 Overview

Woodside as part of its contracting process undertakes assessments of a proposed Contractor’s environmental management system to determine the level of compliance with the standard AS/NZS ISO 14001. This assessment is undertaken for the Petroleum Activities Program as part of

the pre-mobilisation process. The assessment determines whether there is a clearly defined organisational structure that clearly defines the roles and responsibilities for key positions. The assessment also assesses whether there is an up-to-date training matrix that defines any corporate and site/activity-specific environmental training and competency requirements.

As a minimum, environmental awareness during inductions is required for all vessel personnel, detailing awareness and compliance with the project vessel Contractor's environmental policy and environmental management system.

7.6.2 Inductions

Inductions are provided to all relevant personnel (e.g. contractors and Company representatives) before mobilising to or on arrival at the activity location. The induction covers the HSE requirements and environmental information specific to the activity location. Attendance records will be maintained.

The Petroleum Activities Program induction may cover information about:

- Description of the activity.
- Ecological and socio-economic values of the activity location, including an overview of pygmy blue whales.
- Regulations relevant to the activity.
- Woodside's Environmental Management System – Environment and Biodiversity Policy.
- EP importance/structure/implementation/roles and responsibilities.
- Main environmental aspects/hazards and potential environmental impacts and related performance outcomes.
- Oil spill preparedness and response.
- Monitoring and reporting on performance outcomes and standards using MC.
- Incident reporting.
- In addition, the inductions will cover the requirement that there will be no recreational fishing from the vessels.

7.6.3 Activities Program Specific Environmental Awareness

Before petroleum activities begin, a pre-activity meeting will be held on-board the project vessels with all relevant personnel. The pre-activity meeting provides an opportunity to reiterate specific environmental sensitivities or commitments associated with the activity. Relevant sections of the pre-activity meeting will also be communicated through to the support vessel personnel. Attendance lists are recorded and retained.

During operations, regular HSE meetings will be held on the project vessels which cover all crew. During these meetings, recent environmental incidents are regularly reviewed, and awareness material presented.

7.6.4 Marine Fauna Observation Training

Relevant crew onboard the installation vessels will undertake Marine Fauna Observation (MFO) training prior to commencing activities. Woodside and Contractor personnel will be trained to deliver the PBW training ('train-the-trainer' model) by an external organisation specialising in marine environmental training, with expertise in marine fauna observations. Training materials will be developed by the external organisation in consultation with WEL, to ensure Project specific information is incorporated. The bespoke training package will cover:

- An overview of Scarborough Project activities and the cetaceans that may be present during these activities
- An overview of the potential impacts and risks to marine megafauna, including PBW
- An overview of marine megafauna that may be present during activities
- an overview of EP controls and management procedures relevant to marine megafauna (including PBW) presence
- different types of PBW behaviours inc. the difference between foraging and migrating, and how to identify these based on the latest information on persistence in the area, dive time and swimming speed (Owen et al. 2016; AIMS unpublished data 2021; Thums & Ferreira 2021),;
- precautionary approach to identification i.e. assume PBW if positive ID of different species type not possible;
- the observation and reporting requirements.

When trained crew are undertaking observations, expectations are that:

- Observation equipment / tools are used as required (i.e. range-finding binoculars, marine megafauna ID prompts etc.)
- Escalation process carried out if cetaceans/PBW are identified to allow for implementation of adaptive management as required by controls throughout EP
- Make and maintain records including the date, time and approximate distance from the vessel, and the action taken to comply with EPS

Completion of PBW Observation Training (focusing on PBW) is a minimum requirement for those performing observations relevant to PBW mitigation/adaptive management measures in this EP (such as C 3.5, C 3.6). Records will be maintained as evidence of the personnel who have completed PBW observation training.

For any trained crew who haven't conducted PBW observations for greater than 12 months, refresher training is required prior to undertaking the role.

Training and competency is informed by a competency framework and tracked by a contractor MFO Coordinator who assures appropriate competency of trained vessel crew prior to them being allowed to perform MFO duties.

7.6.5 Management of Training Requirements

All personnel on the project vessels are required to be competent to perform their assigned positions. This may be in the form of external or 'on the job' training. The vessel Safety Training Coordinator (or equivalent) is responsible for identifying training needs, keeping records of training performed and identifying minimum training requirements.

7.7 Monitoring, Auditing, Management of Non-conformance and Review

7.7.1 Monitoring

Woodside and its contractors will perform a program of periodic monitoring during the Petroleum Activities Program – starting at mobilisation of each activity and continuing through the duration of each activity to activity completion. This information will be collected using the tools and systems outlined below, developed based on the EPOs, controls, standards and MC in this EP. The tools and systems will collect, as a minimum, the data (evidence) referred to in the MC in **Section 6** and **Appendix D**.

The collection of this data (against the MC) will form part of the permanent record of compliance maintained by Woodside and will form the basis for demonstrating that the EPOs and standards are met, which will be summarised in a series of routine reporting documents.

7.7.1.1 Source-based Impacts and Risks

The tools and systems to monitor environmental performance, where relevant, will include:

- Daily reports which include leading indicator compliance.
- Periodic review of waste management and recycling records.
- Use of contractor's risk identification program that requires recording and submitting safety and environment risk observation cards routinely (frequency varies with contractor).
- Collection of evidence of compliance with the controls detailed in the EP relevant to offshore activities by the Woodside Offshore HSE Adviser (other compliance evidence is collected onshore).
- Environmental discharge reports that record volumes of planned and unplanned discharges, to ocean and atmosphere.
- Internal auditing and assurance program as described in **Section 7.7.2**.

Throughout this activity, Woodside will continuously identify new source-based risks and impacts through the Monitoring and Auditing systems and tools described above and in **Section 7.7.2**.

7.7.1.2 Management of Knowledge

Review of knowledge relevant to the existing environment is undertaken in order to identify changes relating to the understanding of the environment or legislation that supports the risk and impact assessments for EPs (in-force and in-preparation). Relevant knowledge is defined as:

- Environmental science supporting the description of the existing environment.
- Socio-economic environment and stakeholder information.
- Environmental legislation.

The frequency and documentation of reviews, communication of relevant new knowledge and consideration of management of change are documented in the WMS Environment Plan Guideline.

Any relevant new information on cultural values will be assessed using the EP Management of Change Process (refer to **Section 7.8**).

Under the Oil Spill Scientific Monitoring Program preparedness, an annual review and update to the environmental baseline studies database is completed and documented. Periodic location-focused environmental studies and baseline data gap analyses are completed and documented. Any subsequent studies scoped and executed as a result of such gap analysis are managed by the Environment Science Team and tracked via the Corporate Environment Baseline Database.

7.7.2 Auditing

Environmental performance auditing will be performed to:

- Identify potential new or changes to existing environmental impacts and risk, and methods for reducing those to ALARP.
- Confirm that mitigation measures detailed in this EP are effectively reducing environmental impacts and risk, that mitigation measures proposed are practicable and provide appropriate information to verify compliance.

- Confirm compliance with the Performance Outcomes, Controls and Standards detailed in this EP.

Internal auditing will be performed to cover each key project activity as summarised below.

7.7.2.1 Subsea Infrastructure Installation Activities

The following internal assurance will be performed for the subsea infrastructure installation activities:

- Pre-mobilisation inspection/audit report will be conducted by a relevant person (before commencing). The scope of the audits are risk-based and specific to the relevant activity, but will generally focus on aspects relating to ensuring appropriate understanding of environmental commitments and the operational readiness of the activity scope, including appropriate environmental controls in place. All installation vessels associated with the above scopes will be audited by Woodside or a delegate. Support or transport vessels will be assessed on a risk-based approach, but will be audited via the primary subsea installation contractor's process.
- At least one operational compliance audit relevant to applicable EP commitments will be conducted by a Woodside Environment Adviser for the subsea infrastructure installation activities. The audit may be conducted offshore or office-based, subject to the duration of the activity and logistics of performing the audit offshore for short duration scopes.
- Contractor-specific HSE audits will also be conducted of the associated support vessels. The audits will consider the implementation of HSE management, risk management, as well as pre-mobilisation and offshore readiness.
- Vessel based HSE inspections will be conducted fortnightly by vessel HSE personnel (or delegate). Each inspection will focus on a specific risk area relevant to the project activity and a formal report will be issued (for example, bunkering controls, chemical and discharge management, cetacean reporting, etc).

The internal audits and reviews, combined with the ongoing monitoring described in **Section 7.7.1**, and collection of evidence for MC are used to assess EPOs and standards.

As part of Woodside's EMS and/or assurances processes, activities may also be periodically selected for environmental audits as per Woodside's internal auditing process. Audit, inspection and review findings relevant to continuous improvement of environmental performance are tracked through the Environmental Commitments and Actions Register.

This Environmental Commitments and Actions Register is used to track subsea support vessel and subsea activity compliance with EP commitments, including any findings and corrective actions.

Non-conformances identified will be reported and/or tracked in accordance with **Section 7.7.3**.

7.7.2.2 Marine Assurance

Woodside's marine assurance is managed by the Marine Assurance Team of the Logistics Function in accordance with Woodside's Marine Offshore Vessel Assurance Procedure. The Woodside process is based on industry standards and consideration of guidelines and recommendations from recognised industry organisations such as Oil Companies International Marine Forum and International Maritime Contractors Association.

Woodside's Marine Offshore Assurance process is mandatory for all vessels (other than Tankers and Floating Production Storage and Offloading vessels) that are chartered directly by or on behalf of Woodside, including for short term hires (i.e. <3 months in duration). It defines applicable marine offshore assurance activities, ensuring all vessel operators operate seaworthy vessels that meet the requirements for a defined scope of work and are managed with a robust Safety Management System.

The process is multi-faceted and encompasses the following marine assurance activities:

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- Safety Management System Assessment
- Dynamic Positioning (DP) System Verification
- Vessel Inspections
- Project support for tender review, evaluation and pre/post contract award.

Vessel inspections are used to verify actual levels of compliance with the company's Safety Management System, the overall condition of the vessel and the status of the planned maintenance system onboard. Woodside Marine Assurance Specialist will conduct a risk assessment on the vessel to determine the level of assurance applied and the type of vessel inspection required.

Methods of vessel inspection may include, and are not limited to:

- Woodside Marine Vessel Inspection
- OCIMF OVID Inspection
- IMCA CMID Inspection
- Marine Warranty Survey

Upon completion of the marine assurance process, to confirm that identified concerns are addressed appropriately and conditions imposed are managed, the Woodside Marine Assurance Team will issue the vessel a statement of approval. Should a vessel not meet the requirements of the Woodside Marine Offshore Vessel Assurance Process and be rejected, there does exist an opportunity to further scrutinise the proposed vessel.

Where a vessel inspection and/or OVMSA Verification Review is not available and all reasonable efforts based on time and resource availability to complete an vessel inspection and/or OVMSA Verification Review are performed (i.e. short term vessel hire), the Marine Assurance Specialist Offshore may approve the use of an alternate means of inspection, known as a risk assessment.

7.7.2.3 Risk Assessment

Woodside conducts a risk assessment of vessels where either an OVMSA Verification Review and/or vessel inspection cannot be completed. This is not a regular occurrence and is typically used when the requirements of the assurance process are unable to be met or the processes detailed are not applicable to a proposed vessel(s). The Marine Vessel Risk Assessment will be conducted by the Marine Assurance Specialist, where the vessel meets the short term hire prerequisites.

The risk assessment is a semi-quantitative method of determining what further assurance process activity, if any, is required to assure a vessel for a particular task or role. The process compares the level of management control a vessel is subject to against the risk factors associated with the activity or role.

Several factors are assessed as part of a vessel risk assessment, including:

- Management control factors:
 - Company audit score (i.e. management system)
 - vessel HSE incidents
 - vessel Port State Control deficiencies
 - instances of Port State Control vessel detainment
 - years since previous satisfactory vessel inspection
 - age of vessel
 - contractors' prior experience operating for Woodside.

- Activity risk factors:
 - people health and safety risks (a function of the nature of the work and the area of operation)
 - environmental risks (a function of environmental sensitivity, activity type and magnitude of potential environment damage (e.g. largest credible oil spill scenario))
 - value risk (likely time and cost consequence to Woodside if the vessel becomes unusable)
 - reputation risk
 - exposure (i.e. exposure to risk based on duration of project)
 - industrial relations risk.

The acceptability of the vessel or requirement for further vessel inspections or audits is based on the ratio of vessel score to activity risk. If the vessel management control is not deemed to appropriately manage activity risk, a satisfactory company audit and/or vessel inspection may be required before awarding work.

The risk assessment is valid for the period a vessel is on hire and for the defined scope of work.

7.7.3 Management of Non-conformance

Woodside classifies non-conformances with EPOs and standards in this EP as environmental incidents. Woodside employees and contractors are required to report all environmental incidents, and these are managed as per Woodside's internal event recording, investigation and learning requirements.

An internal computerised database called First Priority is used to record and report these incidents. Details of the event, immediate action taken to control the situation, investigation outcomes and corrective actions to prevent reoccurrence are all recorded. Corrective actions are monitored using First Priority and closed out in a timely manner.

Woodside uses a consequence matrix for classification of environmental incidents, with the significant categories being A, B and C (as detailed in **Section 2.3**). Detailed investigations are completed for all categories A, B, C and high potential environmental incidents.

7.7.4 Review

7.7.4.1 Management Review

Within the Environment Function, senior management regularly monitor and review environmental performance and the effectiveness of managing environmental risks and performance. Within each Function and Business Unit Leadership Team (e.g. seabed infrastructure installation), managers review environmental performance regularly, including through quarterly HSE review meetings.

Woodside's Environment Team will perform six-monthly reviews of the effectiveness of the implementation strategy and associated tools. This will involve reviewing the:

- Seabed infrastructure installation activities environment KPIs (leading and lagging).
- Tools and systems to monitor environmental performance (detailed in **Section 7.7.1**).
- Lessons learned about implementation tools and throughout each campaign.

Reviews of oil spill arrangements and testing are performed in accordance with **Section 7.11**.

7.7.4.2 Learning and Knowledge Sharing

Learning and knowledge sharing occurs via a number of different methods including:

- Event investigations.
- Event bulletins.
- After action review conducted at the end of each well, including review of environmental incidents as relevant.
- Ongoing communication with project vessel operators.
- Formal and informal industry benchmarking.
- Cross asset learnings.
- Engineering and technical authorities discipline communications and sharing.

7.7.4.3 Review of Impacts, Risks and Controls Across the Life of the EP

In the unlikely case that activities described in this EP do not occur continuously or sequentially, before recommencing activities after a cessation period greater than 12 months, impacts, risks and controls will be reviewed.

The process will identify or review impacts and risks associated with the newly-commencing activity, and will identify or review controls to ensure impacts and risks remain/are reduced to ALARP and acceptable levels. Information learned from previous activities conducted under this EP will be considered. Controls which have previously been excluded on the basis of proportionality will be reconsidered. Any required changes will be managed by the MOC process outlined below (**Section 7.8**).

7.8 Management of Change and Revision

7.8.1 EP Management of Change

Management of changes are managed in accordance with Woodside's Environmental Approval Requirements Australia Commonwealth Guideline. Management of changes relevant to this EP, concerning the scope of the activity description (**Section 3**) including: review of advances in technology at stages where new equipment may be selected such as vessel contracting; changes in understanding of the environment, DAWE EPBC Act listed threatened and migratory species status, Part 13 statutory instruments (recovery plans, threat abatement plans, conservation advice, wildlife conservation plans) and current requirements for AMPs (**Section 4**); and potential new advice from external stakeholders (**Section 5**), will be managed in accordance with Regulation 17 of the Environment Regulations.

Risk will be assessed in accordance with the environmental risk management methodology (**Section 2.3**) to determine the significance of any potential new environmental impacts or risks not provided for in this EP. Risk assessment outcomes are reviewed in compliance with Regulation 17 of the Environment Regulations.

Minor changes where a review of the activity and the environmental risks and impacts of the activity do not trigger a requirement for a formal revision under Regulation 17 of the Environment Regulations, will be considered a 'minor revision'. Minor administrative changes to this EP, where an assessment of the environmental risks and impacts is not required (e.g. document references, phone numbers, etc.), will also be considered a 'minor revision'. Minor revisions as defined above will be made to this EP using Woodside's document control process. Minor revisions will be tracked in an MOC Register to ensure visibility of cumulative risk changes, as well as enable internal EP updates/reissuing as required. This document will be made available to NOPSEMA during regulator environment inspections.

7.8.2 OPEP Management of Change

Relevant documents from the OPEP will be reviewed in the following circumstances:

- implementation of improved preparedness measures
- a change in the availability of equipment stockpiles
- a change in the availability of personnel that reduces or improves preparedness and the capacity to respond
- the introduction of a new or improved technology that may be considered in a response for this activity
- to incorporate, where relevant, lessons learned from exercises or events
- if national or state response frameworks and Woodside's integration with these frameworks changes.

Where changes are required to the OPEP, based on the outcomes of the reviews described above, they will be assessed against Regulation 17 to determine if EP, including OPEP, resubmission is required (see **Section 7.8.1**). Changes with potential to influence minor or technical changes to the OPEP are tracked in management of change records, project records and incorporated during internal updates of the OPEP or the five-yearly revision.

7.9 Record Keeping

Compliance records (outlined in MC in **Section 6**) will be maintained.

Record keeping will be in accordance with Regulation 14(7) that addresses maintaining records of emissions and discharges.

7.10 Reporting

To meet the EPOs and standards outlined in this EP, Woodside reports at a number of levels, as outlined in the next sections.

7.10.1 Routine Reporting (Internal)

7.10.1.1 Daily Progress Reports and Meetings

Daily reports for activities are prepared and issued to key support personnel and stakeholders, by relevant managers responsible for the well. The report provides performance information about installation activities, health, safety and environment, and current and planned work activities.

Meetings between key personnel are used to transfer information, discuss incidents, agree plans for future activities and develop plans and accountabilities for resolving issues.

7.10.1.2 Regular HSE Meetings

Regular dedicated HSE meetings are held with the offshore and Perth-based management and advisers to address targeted HSE incidents and initiatives. Minutes of these meetings are produced and distributed as appropriate.

7.10.1.3 Performance Reporting

Monthly and quarterly performance reports are developed and reviewed by the Function and Business Unit Leadership Teams. These reports cover a number of subject matters, including:

- HSE incidents (including high potential incidents and those related to this EP) and recent activities.

- Corporate KPI targets, which include environmental metrics.
- Outstanding actions as a result of audits or incident investigations.
- Technical high and low lights.

7.10.2 Routine Reporting (External)

7.10.2.1 Ongoing Consultation

In accordance with Regulation 14 (9) of the Environment Regulations, the implementation strategy must provide for appropriate consultation with relevant authorities of the Commonwealth, a State or Territory and other relevant interested persons or organisations.

Woodside proposes to undertake the engagements with directly impacted relevant persons or organisations listed in **Table 7-7**.

Any significant changes on this activity will be communicated to relevant persons. Woodside hosts community forums at which members are updated on Woodside activities. These community and heritage meetings are held on a regular basis (for example, Karratha Community Liaison Group, Exmouth Community Reference Group). Representatives are from community and industry and include Woodside, State Government (for instance relevant Regional Development Commissions), Local Government, Indigenous Groups, Industry representative bodies, Community and industry organisations.

Relevant persons and those who are interested in the activities, can remain up to date on this activity through subscribing to our website.

In accordance with Regulation 14 (9) of the Environment Regulations, the implementation strategy must provide for appropriate consultation with relevant authorities of the Commonwealth, a State or Territory and other relevant interested persons or organisations.

Woodside's approach to ongoing consultation is that feedback and comments received from relevant persons continue to be assessed and responded to, as required, through the life of an EP, including during EP assessment and throughout the duration of the accepted EP, in accordance with the intended outcome of consultation (as set out in **Section 5.2**).

Woodside proposes to undertake the engagements with directly impacted relevant persons listed in **Table 7-7**. Relevant new information identified during ongoing consultation will be assessed, as appropriate using the EP Management of Knowledge (refer to **Section 7.7.1.2**) and Management of Change Process (refer to **Section 7.8**).

Woodside hosts community forums at which members are provided updates on Woodside activities on a regular basis (for example community reference group meetings). Representatives who present at those meetings are from community and industry and include Woodside, State Government (for instance relevant Regional Development Commissions), Local Government, Indigenous Groups, industry representative bodies, Community and industry organisations.

Relevant persons and those who are merely interested in the activities, can otherwise remain up to date on this activity through subscribing to the Woodside website, or by reading the publicly available version of the EP on NOPSEMA's website, where available.

Should consultation feedback be received following EP acceptance that identifies a measure or control that requires implementation or update to meet the intended outcome of consultation (see **Section 2**), Woodside will apply its EP Management of Knowledge process (refer to **Section 7.7.1.2**) and Management of Change process (refer to **Section 7.8**), as appropriate.

Woodside has developed a Program of Ongoing Engagement with Traditional Custodians (Appendix J), directly informed by feedback from Traditional Custodians. It provides a mechanism for ongoing dialogue so that Traditional Custodians can, on an ongoing basis, provide Woodside with feedback

relating to the possible consequences of an activity to be carried out under an Environment Plan on their functions, interests and activities as they relate to cultural values.

The ongoing consultation engagements that Woodside intends to progress for this EP are set out in the table below.

Table 7-7: Ongoing consultation engagements

Report/ Information	Recipient	Purpose	Frequency	Content
Emails / Meetings	Relevant cultural authorities	Identification, assessment and consideration of cultural values relevant to the Operational Area and EMBA.	Ongoing	Assessment of cultural values Any relevant new information on cultural values will be assessed using the EP Management of Knowledge (see Section 7.7) and Management of Change Process (see to Section 7.8).
Program of Ongoing Engagement with Traditional Custodians (Appendix J)	Relevant cultural authorities	Identification, assessment and consideration of cultural values relevant to the Operational Area and EMBA	Ongoing	Assessment of cultural values Any relevant new information on cultural values will be assessed using the EP Management of Knowledge (refer to Section 7.7) and Management of Change Process (refer to Section 7.8)
Notification (email)	AHO	As requested by AMSA during consultation.	No less than 4 weeks prior to commencement.	PS 2.3.1 (Section 6.7.2) Date of activity start.
Updates (email)			As required.	Changes to planned activities
Notification (email)	AMSA	As requested by AMSA during consultation	At least 24-48 hours before operations commence.	PS 2.5.1 (Section 6.7.2) Date of activity start.
Update (email)			Provide updates to the AHO and JRCC should there be changes to the activity.	Changes to planned activities
Notification (email)	DoD	As requested by DoD during consultation	Five weeks prior to commencement of activities.	PS 2.7.1 (Section 6.7.2) Date of activity start.
Notification (email)	DMIRS	To meet DMIRS requirements	At least 10 days prior to commencement	Activity start date
Notification (email)	Eni AFMA WAFIC CFA DPIRD	As requested during consultation	At least 10 days prior to commencement	PS 2.4.1 (Section 6.7.2) Date of activity start and end.

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Report/ Information	Recipient	Purpose	Frequency	Content
	Recfishwest DAFF (Fisheries) Individual fishery licence holders (no relevant fisheries identified at time of EP submission)			
Notification (email)	Other relevant persons	Notification of significant change	As appropriate	Notification of significant change
Emails/meetings	Persons or organisations who provide feedback to Woodside post EP submission.	Identification, assessment and consideration of feedback, claims and / or objections	As appropriate	Assessment of claims and / or objections. Relevant new information will be assessed using the EP Management of Knowledge (refer to Section 7.7) and Management of Change Process (refer to Section 7.8).
Notification (email)	WA Museum Australasian Underwater Cultural Heritage Database Any other stakeholders as required in the Unexpected Finds Procedure (Section 7.5).	Report any unexpected finds of potential Underwater Cultural Heritage	If triggered by Unexpected Finds Procedure (Section 7.5)	Refer to Unexpected Finds Procedure (Section 7.5) and C1.4

7.10.2.2 Start and End Notifications of the Petroleum Activities Program

In accordance with Regulation 29, Woodside will notify NOPSEMA of the commencement of the Petroleum Activities Program at least ten days before the activity commences, and will notify NOPSEMA within ten days of completing the activity.

7.10.2.3 Environmental Performance Review and Reporting

In accordance with applicable environmental legislation for the activity, Woodside is required to report information about environmental performance to the appropriate regulator. Regulatory reporting requirements are summarised in **Table 7-8**.

Table 7-8: Routine external reporting requirements

Report	Recipient	Frequency	Content
Monthly Recordable Incident Reports (Appendix E)	NOPSEMA	Monthly, by the 15th of each month.	Details of recordable incidents that have occurred during the Petroleum Activities Program for previous month (if applicable).
Environmental Performance Report	NOPSEMA	Annually, with the first report submitted within 12 months of the commencement of the Petroleum Activities Program covered by this EP	Compliance with EPOs, controls and standards outlined in this EP, in accordance with the Environment Regulations.

Report	Recipient	Frequency	Content
		(as per the requirements of Regulation 14(2)).	

7.10.2.4 End of the Environmental Plan

The EP will end when Woodside notifies NOPSEMA that the Petroleum Activities Program has ended and all of the obligations identified in this EP have been completed, and NOPSEMA has accepted the notification, in accordance with Regulation 25A of the Environment Regulations.

7.10.3 Incident Reporting (Internal)

The process for reporting environmental incidents is described in **Section 7.10.4** of this EP. It is the responsibility of the Woodside Project Manager to ensure reporting of environmental incidents meets Woodside and regulatory reporting requirements as detailed in the Woodside HSE Event Reporting and Investigation Procedure and this section of this EP.

7.10.4 Incident Reporting (External) – Reportable and Recordable

7.10.4.1 Reportable Incidents

Definition

A reportable incident is defined under Regulation 4 of the Environment Regulations as:

- ‘an incident relating to the activity that has caused, or has the potential to cause, moderate to significant environmental damage’.

A reportable incident for the Petroleum Activities Program is:

- an incident that has caused environmental damage with a Consequence Level of Moderate (C) or above (as defined under Woodside’s Risk Table (refer to **Section 2.3.1**)).
- an incident that has the potential to cause environmental damage with a Consequence Level of Moderate (C) or above (as defined under Woodside’s Risk Table (refer to **Section 2.3.1**)).

The environmental Risk assessment for the Petroleum Activities Program (**Section 6**) identified one risk with a potential consequence level of C+ for environment, a vessel collision resulting in a hydrocarbon spill. All incidents with actual or potential environmental consequences will be investigated. Where an actual or potential environment consequence of C+ is identified this incident will still be classified as a reportable incident and appropriate notifications completed.

Any such incidents represent potential events which would be reportable incidents. Incident reporting is performed with consideration of NOPSEMA (2014) guidance stating, ‘if in doubt, notify NOPSEMA’, and assessed on a case-by-case basis to determine if they trigger a reportable incident as defined in this EP and by the Regulations.

Notification

NOPSEMA will be notified of all reportable incidents, according to the requirements of Regulations 26, 26A and 26AA of the Environment Regulations. Woodside will:

- Report all reportable incidents to the regulator (orally) ASAP, but within two hours of the incident or of its detection by Woodside.
- Provide a written record of the reported incident to NOPSEMA, the National Offshore Petroleum Titles Administrator (NOPTA) and the Department of the responsible State Minister (DMIRS) ASAP after orally reporting the incident.
- Complete a written report for all reportable incidents using a format consistent with the NOPSEMA Form FM0831 – Reportable Environmental Incident (**Appendix E**) which must be

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submitted to NOPSEMA ASAP, but within three days of the incident or of its detection by Woodside.

- Provide a copy of the written report to the NOPTA and DMIRS, within seven days of the written report being provided to NOPSEMA.

AMSA will be notified of oil spill incidents ASAP after their occurrence, and DCCEEW notified if MNES are to be affected by the oil spill incident.

7.10.4.2 Recordable Incidents

Definition

A recordable incident as defined under Regulation 4 of the Environment Regulations is an incident arising from the activity that 'breaches an environmental performance outcome or environmental performance standard, in the EP that applies to the activity, that is not a reportable incident'.

Notification

NOPSEMA will be notified of all recordable incidents, according to the requirements of Regulation 26B(4), no later than 15 days after the end of the calendar month using the NOPSEMA Form – Recordable Environmental Incident Monthly Summary Report (**Appendix E**) detailing:

- All recordable incidents that occurred during the calendar month.
- All material facts and circumstances concerning the recordable incidents that the operator knows or is able, by reasonable search or enquiry, to find out.
- Any action taken to avoid or mitigate any adverse environment impacts of the recordable incidents.
- The corrective action that has been taken, or is proposed to be taken, to prevent similar recordable incidents.
- The action that has been taken, or is proposed to be taken, to prevent a similar incident occurring in the future.

7.10.4.3 Other External Incident Reporting Requirements

In addition to the notification and reporting of environmental incidents defined under the Environment Regulations and Woodside requirements, **Table 7-9** describes the incident reporting requirements that also apply to the Petroleum Activities Program.

Table 7-9: External Incident Reporting Requirements

Event	Responsibility	Notifiable party	Notification requirements	Contact	Contact detail
Any marine incidents during Petroleum Activities Program	Vessel Master	AMSA	Incident Alert Form 18 as soon as reasonably practicable* Within 72 hours after becoming aware of the incident, submit Incident Report Form 19	AMSA	reports@amsa.gov.au
Oil pollution incidents in Commonwealth waters	Vessel Master	AMSA Rescue Coordination Centre (RCC)	As per Article 8 and Protocol I of MARPOL within two hours via the national emergency 24hour notification contacts and a written report within 24 hours of the request by AMSA	AMSA RCC Australia	If the ship is at sea, reports are to be made to: Free call: 1800 641 792 Phone: 08 9430 2100 (Fremantle)
Oil pollution incidents in Commonwealth waters	Vessel Master	AMSA	Without delay as per Protection of the Sea Act, part II, section 11(1), AMSA RCC notified verbally via the national emergency 24hour notification contact of the hydrocarbon spill; follow up with a written Pollution Report ASAP after verbal notification	RCC Australia	Phone: 1800 641 792 or +61 2 6230 6811 AFTN: YSARYCYX
Any oil pollution incident which has the potential to enter a National Park or requires oil spill response activities to be conducted within a National Park	Vessel Master	DCCEEW	Reported verbally, ASAP	Director of National Parks	Phone: 02 6274 2220
Activity causes unintentional death of or injury to fauna species listed as Threatened or Migratory under the EPBC Act	Vessel Master	DCCEEW	Within seven days of becoming aware	Secretary of the DCCEEW	Phone: 1800 803 772 Email: protected.species@environment.gov.au

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The following activities should also be reported to AMSA via RCC Australia by the Vessel Master:

- loss of plastic material
- garbage disposed of in the sea within 12 nm of land (garbage includes food, paper, bottles, etc)
- any loss of hazardous materials.

For oil spill incidents, other agencies and organisations will be notified as appropriate to the nature and scale of the incident as per procedures and contact lists in the Oil Pollution Emergency Arrangements (Australia) and the WA-61-L and WA-62-L Subsea Infrastructure Installation Oil Pollution First Strike Plan (**Appendix H**).

External incident reporting requirements under the *OPGGS (Safety) Regulations*, including under Subregulation 2.42, notices and reports of dangerous occurrences will be reported to NOPSEMA under the approved activity safety cases.

7.11 Emergency Preparedness and Response

7.11.1 Overview

Under Regulation 14(8), the implementation strategy must contain an Oil Pollution Emergency Plan (OPEP) and provide for updating the OPEP. Regulation 14(8AA) outlines the requirements for the OPEP which must include adequate arrangements for responding to and monitoring oil pollution.

A summary of how this EP and supporting documents address the various requirements of Environment Regulations relating to oil pollution response arrangements is shown in **Table 7**.

Table 7: Oil pollution and preparedness and response overview

Content	Environment Regulations Reference	Document/Section Reference
Details of (oil pollution response) control measures that will be used to reduce the impacts and risks of the activity to ALARP and an acceptable level	Regulation 13(5), (6), 14(3)	Oil Spill Preparedness and Response Mitigation Assessment (Appendix D)
Describes the OPEP	Regulation 14(8)	EP: Woodside's oil pollution emergency plan has the following components: <ul style="list-style-type: none"> • Woodside Oil Pollution Emergency Arrangements (Australia) • Oil Pollution First Strike Plan (Appendix H) • Oil Spill Preparedness and Response Mitigation Assessment (Appendix D)
Details the arrangements for responding to and monitoring oil pollution (to inform response activities), including control measures	Regulation 14(8AA)	Oil Spill Preparedness and Response Mitigation Assessment (Appendix D) Oil Pollution First Strike Plan (Appendix H)
Details the arrangements for updating and testing the oil pollution response arrangements	Regulation 14(8), (8A), (8B), (8C)	EP: Section 7.11.5 Oil Spill Preparedness and Response Mitigation Assessment (Appendix D)
Details of provisions for monitoring impacts to the environment from oil pollution and response activities	Regulation 14(8D)	Oil Spill Preparedness and Response Mitigation Assessment (Appendix D)

Content	Environment Regulations Reference	Document/Section Reference
Demonstrates that the oil pollution response arrangements are consistent with the national system for oil pollution preparedness and control	Regulation 14(8E)	Oil Pollution Emergency Arrangements (Australia)

7.11.2 Emergency Response Training

Regulation 14(5) requires that the implementation strategy includes measures to ensure that employees and contractors have the appropriate competencies and training. Woodside has conducted a risk-based training needs analysis on positions required for effective oil spill response. Following the mapping of training to Woodside identified competencies, training was then mapped to positions based on their required competencies.

Table 7: Minimum levels of competency for key IMT positions

IMT Position	Minimum Competency
Corporate Incident Coordinate Centre (CICC) Leader	<ul style="list-style-type: none"> Incident and Crisis Leadership Development Program (ICLDP) Oil Spill Response Skills Enhancement Course (OSREC – internal course) Participation in L2 oil spill exercise (initial) Participation in L2 oil spill exercise (refresher)
Security & Emergency Manager Duty Manager	<ul style="list-style-type: none"> ICLDP OSREC IMO2 or equivalent spill response specialist level with an oil spill response organisation (OSRO) Participation in L2 oil spill exercise (initial) Participation in L2 oil spill exercise (refresher)
Operations, Planning, Logistics, Safety	<ul style="list-style-type: none"> OSREC ICC Fundamentals Course (internal course) Participation in L2 oil spill exercise (initial) Participation in L2 oil spill exercise (refresher)
Environment Coordinator	<ul style="list-style-type: none"> ICC Fundamentals OSREC IMO2 or equivalent spill response specialist level with an OSRO Participation in L2 oil spill exercise (initial) Participation in L2 oil spill exercise (refresher)

Note on competency/equivalency

In 2018 Woodside undertook a review of incident and crisis systems, processes and tools to assess whether these were fit-for purpose and has rolled out a change to the Incident and Crisis Management training and the oil spill response training requirements for both ICC and field-based roles.

The revised ICC Fundamentals training Program and Incident and Crisis Leaders Development Program (ICLDP) align with the performance requirements of the *PMAOMIR320 – Manage Incident Response Information* and *PMAOMOR418 - Coordinate Incident Response*.

Regarding training specific equivalency;

- ICLDP is mapped to *PMAOMOR418* (and which is equivalent to IMOIII when combined with Woodside’s OSREC course) and ensures broader incident management principles aligned with Australasian Inter-service Incident Management System (AIIMS).
- The revised ICC Fundamentals Course is mapped to *PMAOMIR320* (and which is equivalent to IMOII). The blended learning program offers modules aligned to IMOIII, IMOII, IMO I and AMOSC Core Group Training Oil Spill Response Organisation Specialist Level training.

- OSREC involves the completion of two (2) online AMSA Modules (Introduction to National Plan and Incident management; and Introduction to oil spills) as well as elements of IMO I and IMO II tailored to Woodside specific OSR capabilities.

Woodside Learning Services (WLS) are responsible for collating and maintaining personnel training records. The HSP Dashboard reflects the competencies required for each oil spill role (IMT/operational).

7.11.3 Emergency Response Preparation

The CICC, based in Woodside's head office in Perth, is the onshore coordination point for an offshore emergency. The CICC is staffed by a roster of appropriately skilled personnel available on call 24 hours a day. The CICC, under the leadership of the CICC Leader, supports the site-based Incident Management Team by providing additional support in areas such as operations, logistics, planning, people management and public information (corporate affairs). A description of Woodside's Incident Command Structure and arrangements is further detailed in the Woodside Oil Pollution Emergency Arrangements (Australia).

Woodside will have an Emergency Response Plan (ERP) in place relevant to the Petroleum Activities Program. The ERP provides procedural guidance specific to the asset and location of operations to control, coordinate and respond to an emergency or incident. For a vessel activity, the ERP will be a bridging document to the contracted vessel's emergency documentation. This document summarises the emergency command, control and communications processes for the integrated operation and management of an emergency. It is developed in collaboration with the contracted vessel and ensures roles and responsibilities between the contracted vessel and Woodside personnel are identified and understood. The ERPs will contain instructions for vessel emergency, medical emergency, search and rescue, reportable incidents, incident notification, contact information and activation of the contractor's emergency centre and Woodside Communication Centre (WCC).

In the event of an emergency of any type:

- Vessel Master (depending on the location of the emergency) will assume overall onsite command and act as the IC. All persons will be required to act under the IC's directions. The vessels will maintain communications with the onshore project manager and/or other emergency services in the event of an emergency. Emergency response support can be provided by the contractor's emergency centre or WCC if requested by the IC.
- The project vessels will have on-board equipment for responding to emergencies including medical equipment, fire-fighting equipment and oil spill response equipment.

7.11.4 Oil and Other Hazardous Materials Spill

A significant hydrocarbon spill during the proposed Petroleum Activities Program is unlikely, but should such an event occur, it has the potential to result in a serious safety or environmental incident and cause asset and reputational damage if not managed properly. The Woodside Oil Pollution Emergency Arrangements (Australia) document, supported by the Oil Pollution First Strike Plan (**Appendix H**) which provides tactical response guidance to the activity/area and **Appendix D** of this EP, cover spill response for this Petroleum Activities Program.

The Security and Emergency Management Function is responsible for managing Woodside's hydrocarbon spill response equipment and for maintaining oil spill preparedness and response documentation. In the event of a major spill, Woodside will request that AMSA (administrator of the National Plan) provides support to Woodside through advice and access to equipment, people and liaison. The interface and responsibilities, as defined under the National Plan, are described in the Woodside Oil Pollution Emergency Arrangements (Australia). AMSA and Woodside have a Memorandum of Understanding in place to support Woodside in the event of an oil spill.

The Oil Pollution First Strike Plan provides immediate actions required to commence a response (**Appendix H**).

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The project vessels will have SOPEPs in accordance with the requirements of MARPOL 73/78 Annex I. These plans outline responsibilities, specify procedures and identify resources available in the event of a hydrocarbon or chemical spill from vessel activities. The Oil Pollution First Strike Plan is intended to work in conjunction with the SOPEPs, if hydrocarbons are released to the marine environment from a vessel.

Woodside has established EPOs, performance standards and MC to be used for oil spill response during the Petroleum Activities Program, as detailed in **Appendix D**.

7.11.5 Emergency and Spills Response

Woodside categorises incidents and emergencies in relation to response requirements as follows:

7.11.5.1 Level 1

Level 1 incidents are those that can be resolved using existing resources, equipment and personnel. A Level 1 incident is contained, controlled and resolved by site/regionally based teams using existing resources and functional support services.

7.11.5.2 Level 2

Level 2 incidents are characterised by a response that requires external operational support to manage the incident. It is triggered if the capabilities of the tactical level response are exceeded. This support is provided to the activity by activating all or part of the responsible CICC.

7.11.5.3 Level 3

A Level 3 incident or crisis is identified as a critical event that seriously threatens the organisation's people, the environment, company assets, reputation, or livelihood. At Woodside, the Crisis Management Team (CMT) manages the strategic impacts in order to respond to and recover from the threat to the company (material impacts, litigation, legal and commercial, reputation etc.). The ICC may also be activated as required to manage the operational incident response.

7.11.6 Emergency and Spill Response Drills and Exercises

Woodside's capability to respond to incidents will be tested periodically, in accordance with the Emergency and Crisis Management Procedure. The scope, frequency and objective of these tests is described in **Table 7**. Emergency response testing is aligned to existing or developing risks associated with Woodside's operations and activities. Corporate hazards/risks outlined in the corporate risk register, respective Safety Cases or project Risk Registers, are reference points developing and scheduling emergency and crisis management exercises. External participants may be invited to attend exercises (e.g., government agencies, specialist service providers, oil spill response organisations, or industry members with which Woodside has mutual aid arrangements).

The overall objective of exercises is to test procedures, skills and the teamwork of the Emergency Response and Command Teams in their ability to respond to major accident / major environment events. After each exercise, the team holds a debriefing session, during which the exercise is reviewed. Any lessons learned or areas for improvement are identified and incorporated into revised procedures, where appropriate.

Table 7: Testing of response capability

Response Category	Scope	Response Testing Frequency	Response Testing Objective
Level 1 Response	Exercises are project-/ activity-specific	One Level 1 'First Strike' drill conducted on all Petroleum Activities Program vessels within two weeks of commencing activity (exempting supply vessel or any vessel that plans to spend less than 2 weeks cumulative in the Operational Area). For campaigns with an operational duration of greater than one month this will occur within the first two weeks of commencing the activity and then at least every 6-month hire period thereafter.	Comprehensive exercises test elements of the Oil Pollution First Strike Plan (Appendix H). Emergency drills are scheduled to test other aspects of the Emergency Response Plan.
Level 2 Response	Exercises are vessel-specific	Level 2 Emergency Management exercises conducted on primary installation vessels ⁵¹ for activities with an operational duration of one month or greater. At least one Emergency Management exercise per campaign must be conducted within the first month of commencing the activity and then at every 6 month hire period thereafter, where applicable based on duration.	Testing both the facility IMT response and/or that of the CICC following handover of incident control.
Level 3 Response	Exercises are relevant to all Woodside assets	The number of CMT exercises conducted each year is determined by the Chief Executive Officer, in consultation with the Vice President of Security and Emergency Management.	Test Woodside's ability to respond to and manage a crisis level incident

7.11.7 Hydrocarbon Spill Response Testing of Arrangements

There are a number of arrangements which, in the event of a spill, will underpin Woodside's ability to implement a response across its petroleum activities. In order to ensure these arrangements are adequately tested, the Capability Development Team within Security and Emergency Management ensures tests are conducted in alignment with the Hydrocarbon Spill Testing of Arrangements Schedule.

Woodside's arrangements for spill response are common across its Australian operating assets and activities to ensure the controls are consistent. The overall objective of testing these arrangements is to ensure that Woodside maintains an ability to respond to a hydrocarbon spill, specifically to:

- Ensure relevant responders, contractors and key personnel understand and practise their assigned roles and responsibilities.
- Test response arrangements and actions to validate response plans.
- Ensure lessons learned are incorporated into Woodside's processes and procedures and improvements are made where required.

If new response arrangements are introduced, or existing arrangements significantly amended, additional testing is undertaken accordingly. Additional activities or activity locations are not anticipated to occur; however, if they do, testing of relevant response arrangements will be undertaken as soon as practicable.

In addition to the testing of response capability described in **Table 7**, up to eight formal exercises are planned annually, across Woodside, to specifically test arrangements for responding to a hydrocarbon spill to the marine environment.

⁵¹ This applies to HLVs and PVs engaged in the Petroleum Activities Program, as specified in this EP (e.g. exempting transitory vessels such as supply, pipe-supply, refueling etc.).

7.11.7.1 Testing of Arrangements Schedule

Woodside’s Testing of Arrangements Schedule (**Figure 7-3**) aligns with international good practice for spill preparedness and response management; the testing is compatible with the IPIECA Good Practice Guide and the Australian Institute for Disaster Resilience (AIDR) Australian Emergency Management Arrangements Handbook. If a spill occurs, enacting these arrangements will underpin Woodside’s ability to implement a response across its petroleum activities.

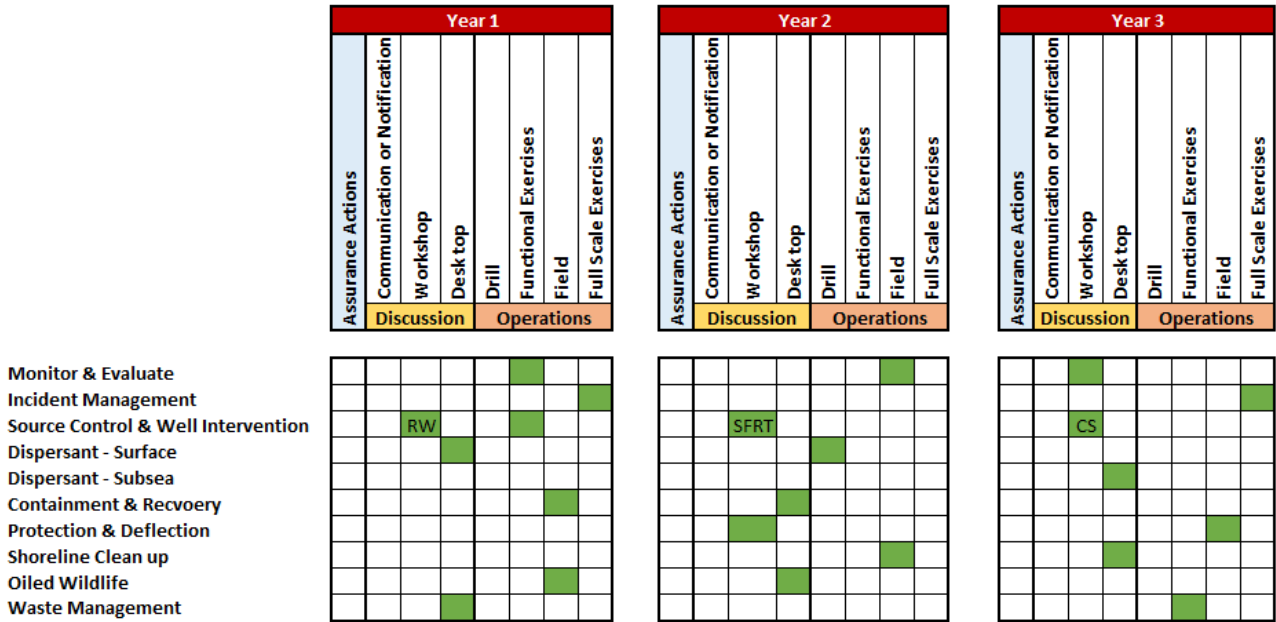


Figure 7-3: Indicative 3-yearly testing of arrangements schedule

The hydrocarbon spill arrangements shown in the rows of the schedule are tested against Woodside’s regulatory commitments. Each arrangement has a support agency/company and an area to be tested (e.g., capability, equipment and personnel). For example, an arrangement could be to test Woodside’s personnel capability for conducting scientific monitoring, or the ability of the Australian Marine Oil Spill Centre to provide response personnel and equipment.

The vertical columns relate to how hydrocarbon spill arrangements will be tested over the 3-year rolling schedule. The sub-heading for the column describes the standard method of testing likely to be undertaken (e.g., discussion exercise, desktop exercise), and the green cells indicate the arrangements that could be tested for each method.

Some arrangements may be tested across multiple exercises (e.g., critical arrangements) or via other ‘additional assurance’ methods outside the formal Testing of Arrangements Schedule that also constitute sufficient evidence of testing of arrangements (e.g., audits, no-notice drills, internal exercises, assurance drills).

7.11.8 Cyclone and Dangerous Weather Preparation

As the timing of some activities associated with the Petroleum Activities Program are not yet determined, it is possible subsea infrastructure installation activities will overlap with the cyclone season (November to April, with most cyclones occurring between January and March). If conduction activities in cyclone season, the vessel contractors must have a Cyclone Contingency Plan (CCP) in place outlining the processes and procedures that would be implemented during a cyclone event, which will be reviewed and accepted by Woodside.

The project vessels will receive daily forecasts from the Bureau of Meteorology. If a cyclone (or severe weather event) is forecast, the path and its development will be plotted and monitored using the BoM data. If there is the potential for the cyclone (severe weather event) to affect the Petroleum

Activities Program, the CCP will be actioned. If required, vessels can transit from the proposed track of the cyclone (severe weather event).

8 REFERENCES

- Apache, 2013. Coniston Novara Phase 2 Drilling EP Summary. Apache Energy. Perth, Australia.
- Ardler, T. 2021. Place, tradition, whales, and story of the Eora, Dharawal and Yuin nations: Linking Aboriginal life and spirituality from past to present. Council for the Historic Environment Australia, 1, 94-107.
- Australian and New Zealand Environment and Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ), 2000. Water quality guidelines.
- Austin, M.E., G.A. Warner, and A. McCrodan. 2012. Underwater Sound Propagation Acoustics Technical Report: Maersk Oil Kalaallit Nunaat A/S 2012 3D Seismic Program Block 9 (Tooq). Version 2.0. Technical report by JASCO Applied Sciences for Golder Associates A/S and Golder Associates Ltd.
- Austin, A. McCrodan, J. Wladichuk, C.M. Reiser, K.B. Matthews, J.R. Brandon, K. Leonard, et al. (eds.). Marine mammal monitoring and mitigation during Shell's activities in the Chukchi Sea, July–September 2013: 90-Day Report. Report Number P1272D–2. Technical report by LGL Alaska Research Associates Inc., Anchorage, AK, USA and JASCO Applied Sciences, Victoria, BC, Canada for Shell Gulf of Mexico, Houston, TX, USA, National Marine Fisheries Service, and US Fish and Wildlife Services.
- Australia ICOMOS, 2013. The Burra Charter (The Australia ICOMOS Charter for Places of Cultural Significance).
- Australian Heritage Council, 2012. The Potential Outstanding Universal Value of the Dampier Archipelago Site and Threats to that Site: A report by the Australian Heritage Council to the Minister for Sustainability, Environment, Water, Population and Communities.
- Australian Indigenous HealthInfoNet, n.d. Country, culture and spirituality. Available at: <https://healthinfolnet.ecu.edu.au/learn/health-topics/social-and-emotional-wellbeing/country-culture-spirituality/>
- Australian Transport Safety Bureau (ATSB)., 2011. Annual Report 2010-2011. Azis, P. A., Al-Tisan, I. A., Daili, M. A., Green, T. N., Dalvi, A. G. I., and Javeed, M. A. 2003. Chlorophyll and plankton of the Gulf coastal waters of Saudi Arabia bordering a desalination plant. *Desalination*, 154(3), 291-302.
- Bainger, F, 2021. Songlines through the Pilbara. Australian Traveler.
- Barber, M. & Jackson, S. 2011. Water and Indigenous People in the Pilbara, Western Australia: A Preliminary Study.
- Bartol, S. M., and Musick, J. A. 2003. Sensory biology of sea turtles. In *The Biology of Sea Turtles Vol. 2.* (Ed. by P. L. Lutz, J. A. Musick, & J. Wyneken), pp. 70 – 102. Boca Raton: CRC Press.
- Batten, S.D., Allen, R.J.S. and Wotton, C.O.M., 1998. The effects of the Sea Empress Oil Spill on the Plankton of the Southern Irish Sea, *Marine Pollution Bulletin* 36(10): 764–774.
- Benjamin, J., O'Leary, M., McDonald, J., Wiseman, C., McCarthy, J., Beckett, E., Morrison, P., Stankiewicz, F., Leach, J., Hacker, J., Baggaley, P., Jerbic, K., Fowler, M., Fairweather, J., Jeffries, P., Ulm, S., and Bailey, G. 2020. Aboriginal artefacts on the continental shelf reveal ancient drowned cultural landscapes in northwest Australia. *PLOS ONE* 15(7).
- Benjamin, J., O'Leary, M., McCarthy, J., Reynen, W., Wiseman, C., Leach, J., Bobeldyk, S., Buchler, J., Kermeen, P., Langley, M., Black, A., Yoshida, H., Parnum, I., Stevens, A., Ulm, S., McDonald, J., Veth, P., Bailey, G. (2023) Stone artefacts on the seabed at a submerged freshwater spring confirm a drowned cultural landscape in Murujuga, Western Australia. *Quaternary Science Reviews* 313: 108190. <https://doi.org/10.1016/j.quascirev.2023.108190>
- BHP Billiton, 2004. Stybarrow Development Draft EIS. BHP Billiton, Perth, Australia.
- Black, K.P., Brand, G.W., Grynberg, H., Gwyther, D., Hammond, L.S., Mourtikas, S., Richardson, B.J. and Wardrop, J.A. 1994. Production facilities. In: *Environmental implications of offshore oil and gas*
- Bonn Agreement, 2015. Bonn Agreement Counter Pollution Manual, December 2015. Ed. Bonn Agreement Secretariat, London.
- Bradshaw, R. 2021. The First Oceanographers: Aboriginal Connections to the Sea. Schmidt Ocean Institute.

- Brewer, D.T., Lyne, V., Skewes, T.D., Rothlisberg, P. 2007. Trophic Systems of the North West Marine Region. A Report to The Department of the Environment, Water, Heritage and the Arts, by CSIRO Marine and Atmospheric Research: pp156.
- Briggs, W. and Green, M. 2008. The Historic Shipwrecks of Shark Bay. Accessed at: <https://museum.wa.gov.au/sites/default/files/SharkBay.pdf>
- Bursill, L., Beller, B., Ryan, M. & Jacobs, M. 2007. Dharawal: The Story of the Dharawal Speaking People of Southern Sydney. Kurranulla Aboriginal Corporation, Sydney, New South Wales.
- Buurabalayji Thalanyji Aboriginal Corporation (BTAC) 2021. Thalanyji Website. Available at: <https://thalanyji.com.au>
- Chevron Australia Pty Ltd, 2015. Gorgon gas development and Jansz feed gas pipeline: Long-term marine turtle management plan (No. G1-NT-PLNX0000296). Chevron Australia Pty Ltd, Perth.
- Capewell, D. 2020. Dreamtime Stories with Darren 'Capes' Capewell | LIVE from Aus, Shark Bay. Available at: <https://www.youtube.com/watch?v=7G0mzUMEF-g>
- Chisholm, S. 2013. Desktop report of known Aboriginal and European heritage places and values within the Shire of Exmouth local planning scheme no. 4 area. Terra Rosa Cultural Resource Management, Perth. Available at: https://www.exmouth.wa.gov.au/Profiles/exmouth/Assets/ClientData/Local_Planning_Strategy_-_Heritage_Report.pdf
- Clarkson, C., Jacobs, Z., Marwick, B., Fullagar, R., Wallis, L., Smith, M., Roberts, R., Hayes, E., Lowe, K., Carah, X., Florin, S., McNeil, J., Cox, D., Arnold, L., Hua, Q., Huntley, J., Brand, H., Manne, T., Fairbairn, A., Shulmeister, J., Lyle, L., Salinas, M., Page, M., Connell, K., Park, G., Norman, K., Murphy, T. and Pardoe, C. 2017. Human occupation of northern Australia by 65,000 years ago. *Nature* (547) 306–310. Doi: <https://doi.org/10.1038/nature22968>
- Cohen, A., Gagnon, M.M. and Nugegoda, D., 2005. Alterations of metabolic enzymes in Australian bass, *Macquaria novemaculeata*, after exposure to petroleum hydrocarbons. *Archives of Environmental Contamination and Toxicology* 49: 200–205. doi:10.1007/s00244-004-0174-1.
- Commonwealth of Australia (CoA), 2002. Ningaloo Marine Park (Commonwealth Waters) Management Plan. Environment Australia, Canberra.
- Commonwealth of Australia (CoA), 2013. Recovery plan for the white shark (*Carcharodon carcharias*) 2013. Department of Sustainability, Environment, Water, Population and Communities.
- Commonwealth of Australia (CoA), 2014a. Streamlining offshore petroleum environmental approvals, NOPSEMA. <https://www.nopsema.gov.au/sites/default/files/documents/2021-03/Program-report-Streamlining-offshore-petroleum-environmental-approvals-February-2014.pdf>
- Commonwealth of Australia (CoA), 2014b. Recovery plan for the grey nurse shark (*Carcharias taurus*). Department of the Environment, Canberra.
- Commonwealth of Australia (CoA), 2015a. Conservation management plan for the blue whale: A recovery plan under the Environment Protection and Biodiversity Conservation Act 1999 2015–2025. Department of the Environment, Canberra.
- Commonwealth of Australia (CoA), 2015b. Sawfish and River Sharks Multispecies Recovery Plan. Department of the Environment Canberra, Australian Capital Territory.
- Commonwealth of Australia (CoA), 2015c. Wildlife Conservation Plan for Migratory Shorebirds. Threatened Species Scientific Committee, Department of the Environment and Energy, Canberra, Australian Capital Territory.
- Commonwealth of Australia (CoA), 2017. The Recovery Plan for Marine Turtles in Australia Department of the Environment and Energy. Canberra, Australia. 146 p
- Commonwealth of Australia (CoA). 2018. Threat abatement plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans. Department of the Environment and Energy
- Commonwealth of Australia (CoA), 2020. National Light Pollution Guidelines for Wildlife, Including marine turtles, seabirds and migratory shorebirds. Light Pollution Guidelines. Department of the Environment and Energy, Canberra.

- Commonwealth of Australia (CoA)., 2020b Wildlife Conservation Plan for Seabirds. Commonwealth of Australia, 2020
- Commonwealth of Australia (CoA)., 2022. National recovery plan for albatrosses and petrels. Commonwealth of Australia, 2022
- Connell, S.C., Cusano, D.A., Zammit, K.E., Weirathmueller, M.J., Koessler, M.W. and McPherson, C.R., 2021. Scarborough Trunkline Pipeline Assessment: Acoustic Modelling for Assessing Marine Fauna Sound Exposures. Document 02610, Version 1.0 DRAFT. Technical report by JASCO Applied Sciences for Woodside Energy Limited.
- Cressey, J. 1998. Making a Splash in the Pacific: Dolphin and Whale Myths and Legends of Oceania. *Rapa Nui Journal* 12: 75-84.
- Delisle, A., Kim, M., Stoeckl, N., Lui, F.W., Marsh, H., 2018. The socio-cultural benefits and costs of the traditional hunting of dugongs *Dugong dugon* and green turtles *Chelonia mydas* in Torres Strait, Australia. *Oryx* 52: 250 – 261.
- Department of Biodiversity, Conservation and Attractions. 2020. Pilbara inshore islands nature reserves and proposed additions draft management plan.
- Department of Biodiversity, Conservation and Attractions, Parks and Wildlife Service, Nyngulu Joint Management and Parks Australia. 2022. Ningaloo Coast: Nyngulu Visitor guide.
- Department of Biodiversity, Conservation and Attractions (DBCA). 2022. Nyngulu (Ningaloo) coastal reserves: Red Bluff to Winderabandi joint management plan No. 101. Department of Biodiversity, Conservation and Attractions, Perth.
- Department of Climate Change, the Environment, Energy and Water (DCCEEW), 2023. Indigenous Protected Areas. Department of Climate Change, the Environment, Energy and Water, Canberra. Available at <https://www.dcceew.gov.au/environment/land/indigenous-protected-areas>.
- Department of Conservation and Land Management (CALM), 2005. Management Plan for the Ningaloo Marine Park and Muiron Islands Marine Management Area 2005–2015 (Management Plan No. 52).
- Department of Conservation and Land Management (DEC), Perth. Department of Environment and Conservation. 2013. Murujuga National Park: Management Plan 78. Department of Environment and Conservation, Perth.
- Department of Environment and Energy (DoEE). 2016. Draft national strategy for mitigating vessel strike of marine megafauna. Department of the Environment and Energy, Canberra.
- Department of Environmental Protection, 2001. Shark Bay World Heritage Property: Environmental values, cultural uses and potential petroleum industry impacts. Department of Environmental Protection, Perth.
- Department of Primary Industries and Regional Development (DPIRD). 2021. Fishcube Data 2021.
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC), 2012a. Marine bioregional plan for the North-west Marine Region. Prepared under the Environment Protection and Biodiversity Conservation Act 1999. Accessed at <https://www.environment.gov.au/system/files/pages/1670366b-988b-4201-94a1-1f29175a4d65/files/north-west-marine-plan.pdf>.
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC), 2012b. Conservation management plan for the southern right whale: a recovery plan under the Environment Protection and Biodiversity Conservation Act 1999 2011–2021. Department of Sustainability, Environment, Water, Population and Communities, Canberra.
- Department of the Environment (DoE), 2013. Matters of National Environmental Significance – Significant Impact Guidelines
- Department of Climate Change, the Environment, Energy and Water (DCCEEW), 2023. Indigenous Protected Areas. Department of Climate Change, the Environment, Energy and Water, Canberra. Available at <https://www.dcceew.gov.au/environment/land/indigenous-protected-areas>

- Department of the Environment and Heritage. 2006. Australian Heritage Database Places for Decision: Burrup Peninsula, Islands of the Dampier Archipelago and Dampier Coast. Available at: <https://www.dcceew.gov.au/sites/default/files/documents/dampier-archipelago.pdf>
- Department of the Environment, Water, Heritage and the Arts (DEWHA), 2008a. The North Marine Bioregional Plan: Bioregional Profile. Australian Government Department of the Environment, Water, Heritage and the Arts. Commonwealth of Australia.
- Department of the Environment, Water, Heritage and the Arts (DEWHA). 2009b. Threat abatement plan for the impacts of marine debris on vertebrate marine life. Department of the Environment, Water, Heritage and the Arts, Canberra
- Director of National Parks (DNP). 2018a. North-West Marine Parks Network Management Plan 2018. Director of National Parks, Canberra. ISBN: 978-0-9876152-3-7.
- Director of National Parks (DNP). 2018b. South-West Marine Parks Network Management Plan 2018. Director of National Parks, Canberra. ISBN: 978-0-9876152-4-4.
- Ditchfield, K., Manne, T., Hook, F., Ward, I. and Veth, P. 2018. Coastal occupation before the “Big Swamp”: Results from excavations at John Wayne Country Rockshelter on Barrow Island. *Archaeology in Oceania* 53, 163–178.
- Dortch, J., Balme, J., McDonald, J., Morse, K., O’Connor, S. and Veth, P. 2019. Settling the West: 50 000 years in a changing land. *Journal of the Royal Society of Western Australia* 102, 30-44.
- Double, M., Gales, N., Jenner, K., & Jenner, M., 2010. Satellite tracking of south-bound female humpback whales in the Kimberley region of Western Australia. Australian Marine Mammal Centre, Hobart.
- Double, M., Jenner, K., Jenner, M.N., Ball, I., Laverick, S., & Gales, N., 2012. Satellite tracking of pygmy blue whales (*Balaenoptera musculus breviceuda*) off Western Australia. Australian Marine Mammal Centre, Hobart
- Energy Institute. 2000. Guidelines for the calculation of estimates of energy use and gaseous emissions in the decommissioning of offshore structures
- Environment Australia, 2002. Ningaloo marine park (Commonwealth waters) management plan. Environment Australia, Canberra.
- Erbe, C. 2012. The effects of underwater noise on marine mammals. In A.N. Popper and A. Hawkins (Eds.), *The Effects of Noise on Aquatic Life* (pp.17–22). New York: Springer-Verlag.
- Erbe, C., Reichmuth, C., Cunningham, K., Lucke, K., and Dooling, R. 2015. Communication masking in marine mammals: A review and research strategy. *Marine Pollution Bulletin*. 103 (1-2): pp. 15-38.
- Erbe, C., Dunlop, R.A., Dolman, S.J. 2018. Effects of noise on marine mammals. *Effects of anthropogenic noise on animals* (pp. 277–309).
- ERM, 2013. Scarborough Project Oil Spill Modelling Study. ExxonMobil Scarborough. Reference: 0176695.
- Falkner, I., Whiteway, T., Przeslawski, R., Heap, A.D., 2009. Review of Ten Key Ecological Features (KEFs) in the Northwest Marine Region: a report to the Department of the Environment, Water, Heritage and the Arts by Geoscience Australia, Geoscience Australia Record. Geoscience Australia, Canberra.
- Fijn, N. 2021. Donald Thomson: Observations of Animal Connections in Visual Ethnography in Northern Australia. *Ethnos* 86: 44-68.
- Finneran, J.J., Henderson, E.E., Houser, D.S., Jenkins, K., Kotecki, S., and Mulsow, J. 2017. Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III). Technical report by Space and Naval Warfare Systems Center Pacific (SSC Pacific). 183 pp.
- Fodrie, F.J. and Heck, Jr., K.L., 2011. Response of coastal fishes to the Gulf of Mexico Oil Disaster, *Plos ONE* 6(7): 8.
- Foote, A.D., Osborne, R.W., and Hoelzel, A.R. 2004. Whale-call response to masking boat noise. *Nature*, 428, 910.
- French, D.P., Schuttenberg, H.Z., Isaji, T., 1999. Probabilities of oil exceeding thresholds of concern: examples from an evaluation for Florida Power and Light. Presented at the Arctic and Marine Oilspill Program Technical Seminar, Ministry of Supply and Services, Ottawa, pp. 243–270.

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- French-McCay, D.P., 2002. Development and application of an oil toxicity and exposure model, *OilToxEx. Environmental Chemistry*.21(10), pp. 2080-2094.
- French-McCay, D. P., Horn, M., Li, Z., Jayko, K., Spaulding, M. L., Crowley, D., and Mendelsohn, D., 2018. Modeling distribution, fate, and concentrations of Deepwater Horizon oil in subsurface waters of the Gulf of Mexico. In *Oil Spill Environmental Forensics Case Studies* (pp. 683-735). Butterworth-Heinemann.
- French-McCay, D., 2009. State-of-the-art and research needs for oil spill impact assessment modelling, in: *Proceedings of the 32nd AMOP Technical Seminar on Environmental Contamination and Response. Presented at the 32nd AMOP Technical Seminar on Environmental Contamination and Response, Environment Canada, Ottawa*, pp. 601–653.
- Frick W.E., Roberts, P.J.W., Davis, L.R., Keyes, J., Baumgartner, D.J., George, K.P., 2001. *Dilution Models for Effluent Discharges, 4th Edition (Visual Plumes) Draft*. US Environmental Protection Agency, Georgia. July 2001.
- Fristrup, K.M., Hatch, L., Clark, C.W. 2003. Variation in humpback whale (*Megaptera novaengliae*) song length in relation to low-frequency sound broadcasts. *The journal of acoustical society of America*.
- Fugro, 2010. Report on the Activity 2a Deepwater Field Development Geophysical AUV Survey, North West shelf, Australia, Volume 1. Report for ExxonMobil, Perth, Australia. Australia, Canberra.
- Gagnon, M.M. and Rawson, C.A., 2010. *Montara Well Release: Report on necropsies from a Timor Sea green sea turtle*. Perth, Western Australia, Curtin University, vol. 15.
- Gascoyne Development Commission, 2012. *Gascoyne Development Commission Annual Report 2011-2012*. Government of Western Australia, Perth.
- Gaston, K. J., Gaston, S., Bennie, J., and Hopkins, J. 2014. Reducing the impacts of artificial light. *British Wildlife*, 25(5), 332-339.
- Geiling, N., 2014. *Arctic Shipping: Good for Invasive Species, Bad for the Rest of Nature*. Smithsonian Magazine
- Geraci, J.R. and Aubin, D.J.S. eds., 1988. *Synthesis of effects of oil on marine mammals*. Department of the Interior, Minerals Management Services, Atlantic OCS Region.
- Gotz, T. 2009. Overview of the impacts of anthropogenic underwater sound in the marine environment. *OSPAR Biodiversity Series*.
- Hannay, D., A. MacGillivray, M. Laurinolli, and R. Racca. 2004. *Sakhalin Energy: Source Level Measurements from 2004 Acoustics Program*. Document Number Version 1.5. Technical report prepared for Sakhalin Energy by JASCO Applied Sciences.
- Hassan, A., and Javed, H., 2011. Effects of Tasman Spirit oil spill on coastal birds at Clifton, Karachi coast, Pakistan. *Journal of Animal and Plant Sciences* 21: pp333–339.
- Hazel, J. Lawler, I.R., & Hamann, M., 2009. Diving at the shallow end: Green turtle behaviour in nearshore foraging habitat. *Journal of Experimental Marine Biology and Ecology* 371: 84- 92.
- Heap, A. D., and Harris, P. T., 2008. Geomorphology of the Australian margin and adjacent seafloor. *Australian Journal of Earth Sciences*, 55(4), 555-585.
- Helm, R.C., Costa, D.P., DeBruyn, T.D., O'Shea, T.J., Wells, R.S. and Williams, T.M., 2015. Overview of effects of oil spills on marine mammals, in: Fingas, M. (Ed.), *Handbook of Oil Spill Science and Technology*. Wiley, pp. 455–475.
- Heritage Chairs of Australia and New Zealand, 2020. *Dhawura Ngilan: A vision for Aboriginal and Torres Strait Islander heritage in Australia*. Heritage Chairs of Australia and New Zealand, Canberra.
- Hjermann, D.Ø., Melsom, A., Dingsør, G.E., Durant, J.M., Eikeset, A.M., Røed, L.P., Ottersen, G., Størvik, G. and Stenseth, N.C., 2007. Fish and oil in the Lofoten–Barents Sea system: synoptic review of the effect of oil spills on fish populations. *Marine Ecology Progress Series* 339: 283–299.
- Higgins, N., 2021. Songlines and Land Claims; Space and Place, *International Journal for the Semiotics of Law* 34:1-19.

- Hodge, W., Limpus, C. J. and Smissen, P. 2007. Queensland turtle conservation project: Hummock Hill Island Nesting Turtle Study December 2006 Conservation Technical and Data Report Environmental Protection Agency, Queensland. 10 p.
- Hook, F., McDonald, E., Paterson, A., Souter, C. and Veitch B., 2004. *Cultural Heritage Assessment & Management Plan - Proposed Gorgon Development*, Pilbara, North Western Australia.
- Hook, F., 2020. A Report on the Reconnaissance Assessment of Cultural heritage Sites within the Ashburton Salt project Area, Urala Station, Western Australia. Archae-aus, Fremantle.
- Horton D. R., 1996. The AIATSIS Map of Indigenous Australia. Australian Institute of Aboriginal and Torres Strait Islander Studies, Canberra.
- International Council of Monument and Sites, 2013. The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance, International Council of Monument and Sites. Available at: <https://australia.icomos.org/publications/burra-charter-practice-notes/>
- Intergovernmental Panel on Climate Change (IPCC). 2021. Working Group I contribution to the Sixth Assessment Report. Climate Change 2021: The Physical Science Basis.
- International Maritime Organisation Guidelines (IMO)., 2011. Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species.
- International Petroleum Industry Conservation Association (IPIECA)., 2004. A guide to Oiled Wildlife Response Planning, International Petroleum Industry Conservation Association, No. 13.
- International Tanker Owners Pollution Federation (ITOPF)., 2011a. Effects of oil pollution on the marine environment (Technical Information Paper No. 13). International Tanker Owners Pollution Federation Limited, London.
- International Tanker Owners Pollution Federation (ITOPF). 2011b. Fate of marine oil spills. International Tankers Owners Pollution Federation (ITOPF).
- Japingka Aboriginal Art Gallery. 2023. Creation Dreaming - In the beginning when the world was soft. Available at: <https://japingkaaboriginalart.com/articles/in-the-beginning-when-the-world-was-soft/>
- Jiménez-Arranz, G., Banda, N., Cook, S. and Wyatt, R., 2020. Review on Existing Data on Underwater Sounds Produced by the Oil and Gas Industry. A report prepared by Seiche Ltd for the Joint Industry Programme (JIP) on E&P Sound and Marine Life. JIP Topic - Sound source characterisation and propagation, September 2020. 182 pp
- Jenner, K., Jenner, M., and McCabe, K., 2001. Geographical and temporal movements of humpback whales in Western Australian waters. APPEA Journal 41, 692–707.
- Jensen, A., and Silber, G., 2004. Large whale ship strike database (NOAA Technical Memorandum No. NMFS-OPR). National Marine Fisheries Service, Silver Spring.
- Johnstone, R.F and Storr, F.M., 1998. Handbook of Western Australian birds. Western Australian Museum, Perth.
- Juluwarlu. 2004. Wanggangarra: That which gives life. Available at: <https://www.youtube.com/watch?v=uvJr4-d475w>
- Kalbarri Visitor Centre. 2023. History: Indigenous Culture. Available at: <https://www.kalbarri.org.au/plan/history>
- Kamrowski, R. L., CJ, L., Pendoley, K. and Hamann, M. 2014, Influence of industrial light pollution on the sea-finding behaviour of flatback turtle hatchlings. Wildlife Research 41:421-434.
- Kangas, M., Wilkin, S., Koefoed, I., and Brown, S. 2021. Exmouth Gulf Prawn Resource Status Report 2021. In: Newman, S.J., Wise, B.S., Santoro, K.G. and Gaughan, D.J. (eds). 2021. Status reports of the fisheries and aquatic resources of Western Australia 2020/21. State of the fisheries. Department of Primary Industries and Regional Development, Western Australia.
- Kearney, A., O'Leary, M., Platten, S., 2023. Sea Country: Plurality and knowledge of saltwater territories in Indigenous Australian contexts. The Geographical Journal 189: 104-116.

- King, D., Lyne, R., Girling, A., Peterson, D., Stephenson, R. and Short, D., 1996. Environmental risk assessment of petroleum substances: The hydrocarbon block method (CONCAWE No. 96/52). CONCAWE, Brussels.
- Koops, W., Jak, R., and van der Veen, D., 2004. Use of dispersants in oil spill response to minimize environmental damage to birds and aquatic organisms. Interspill 2004.
- Laist, D.W., Knowlton, A.R., Mead, J.G., Collet, A.S., and Podesta, M., 2001. Collisions between ships and whales. *Marine Mammal Science* 17, 35–75.
- Leach, J. 2020. Ngurra Nyunjunggamu Submerged landscape identification and interpretation: Cape Bruguieres Island and North Gidley Island. Masters Thesis, Flinders University.
- Lenhardt, M.L., 1994. Seismic and very low frequency sound induced behaviours in captive loggerhead marine turtles (*Caretta Caretta*). Virginia Commonwealth University, USA.
- Li, Z., Spaulding, M.L., and French-McCay, D., 2017, 'An algorithm for modelling entrainment and naturally and chemically dispersed oil droplet size distribution under surface breaking wave conditions', *Marine Pollution Bulletin*, vol. 119, no. 1, pp145–152.
- Lincoln, G., Hedge, P., 2019. Promoting partnerships for Sea Country Research and Monitoring in Western Australia: A snapshot of Indigenous, science and management agency partners, Version 1. Report to the National Environmental Science Program, Marine Biodiversity Hub. Mosaic Environmental, Broome.
- Longcore, T., and Rich, C. 2004. Ecological light pollution. *Frontiers in Ecology and the Environment*, 2(4), 191-198.
- Lutcavage, M.E., Lutz, P.L., Bossart, G.D. and Hudson, D.M., 1995. Physiologic and clinicopathological effects of crude oil on loggerhead sea turtles, *Archives of Environmental Contamination and Toxicology* (28): 417–422.
- Lyons, I., Harkness, N., Raisbeck-Brown, N. and Malgana Aboriginal Corporation Board, Rangers, and Malgana Elders. 2021. Indigenous perspectives of risk – Learning and sharing knowledge for climate change: Workshop report: 8 to 12 March 2021, Denham Western Australia.
- Macfarlane, I., McConnell, A., 2017. 'The Waters of Australian Deserts' Cultural Heritage Study: A report to the Department of Environment and Energy and the Australian Heritage Council. Australian Heritage Council, Canberra.
- Malgana Land and Sea Management, University of Western Australia, Malgana Aboriginal Corporation RNTBC and Marine Biodiversity Hub. 2021. Seagrass (wirriya jalyanu): giving life to sea country of Shark Bay (Gathaagudu).
- Manne T, Veth P., 2015. Late Pleistocene and early Holocene exploitation of estuarine communities in North West Australia. *Quaternary International* 385: 112-123.
- Martin, B., J.T. MacDonnell, N.E. Chorney, and D.G. Zeddies. 2012. Appendix A: Sound Source Verification of Fugro Geotechnical Sources. In ESS Group, Inc. Renewal Application for Incidental Harassment Authorization for the Non-Lethal Taking of Marine Mammals Resulting from Pre-Construction High Resolution Geophysical Survey. For Cape Wind Associates, LLC.
- McCauley, R., 1998. Radiated underwater noise measured from the drilling rig Ocean General, rig tenders Pacific Ariki and Pacific Frontier, fishing vessel Reef Venture and natural sources in the Timor Sea, Northern Australia. (Report No. C98–20). Centre for Marine Science and Technology, Curtin University of Technology, Perth.
- McCauley, R.D., Fewtrell, J., Duncan, A.J., Jenner, M.N., Jenner, C., Jenner, M.N., Penrose, J.D., Prince, R.I.T., Adhitya, A., Murdoch, J., McCabe, K. 2000. Marine seismic surveys: a study of environmental implications. APPEA 2000, pp. 692-708.
- McCauley, R., 2005. Underwater sea noise in the Otway Basin – drilling, seismic and blue whales, Oct-Dec 2003, in: Howell, E. (Ed.), *A Compilation of Recent Research into the Marine Environment*. Australian Petroleum Exploration Association, Canberra, pp. 18–19.
- McCauley, R. D., 2011a. Fugro Scarborough sea noise logger program: January 2012 to January 2011 (Report No. R2011-50) Curtin University, Perth.

- McCauley, R. D., 2011b. Woodside Kimberley sea noise logger program, September 2006 to June 2009: whales, fish and man made noise (Report No. R2010–50_3). Curtin University, Perth.
- McCauley, R. D., and Jenner, C., 2001. The underwater acoustic environment in the vicinity of Vincent and Enfield petroleum leases, North West Cape, Exmouth WA (Report No. R2001–22). Centre for Marine Science and Technology, Curtin University of Technology, Perth.
- McCauley, R. D., and Jenner, C., 2010. Migratory patterns and estimated population size of pygmy blue whales (*Balaenoptera musculus brevicauda*) traversing the Western Australian coast based on passive acoustics (International Whaling Commission Report No. SC/62/SH26). International Whaling Commission.
- McCauley, R.D., 2011a. Woodside Kimberley sea noise logger program, September 2006 to June 2009: whales, fish and man made noise (Report No. R2010–50_3). Curtin University, Perth.
- McDonald, E. M., and Phillips, T., 2021. Report of an Ethnographic Consultation Regarding Woodside's Scarborough Gas Project & Submerged Landscape, Pilbara, Western Australia – Phase 1. Prepared for the Muru Aboriginal Corporation.
- McDonald, J. 2015. "I must go down to the sea again: Or, what happens when the sea comes to you? Murujuga rock art as an environmental indicator for Australia's north-west". *Quaternary International*, 395:124-135.
- McDonald, J. 2023. Murujuga: Dynamics of the Dreaming. Available at: https://www.crarm.uwa.edu.au/_files/ugd/25d7cd_b26dd21ca4c448e287b7c544c0ce7ba1.pdf
- McDonald, J., Reynen, W., Blunt, Z., Ditchfield, K., Dortch, J., Leopold, M., Monks, C., Paterson, A. and Veth, P. 2022a. Enderby Island Excavations. Available at: https://api.research-repository.uwa.edu.au/ws/portalfiles/portal/218515317/2206UWA_Murujuga_Chapter_6_F_FINAL.pdf
- McDonald, J., Reynen, W., Blunt, Z., Ditchfield, K., Monks, C., Leopold, M. and Dortch J. 2022b. Rosemary Island Excavations. Available at: https://api.research-repository.uwa.edu.au/ws/portalfiles/portal/218515863/2206UWA_Murujuga_Chapter_8_FINAL.pdf
- McKenna, M.F., Calambokidis, J., Oleson, E.M., Laist, D.W., and Goldbogen, J.A., 2015. Simultaneous tracking of Blue whales and large ships demonstrates limited behavioural responses for avoiding collision. *Endangered Species Research* 27: 219-232.
- McNiven, I. 2004. *Saltwater People: spiritscapes, maritime rituals and the archaeology of Australian indigenous seascapes*. *World Archaeology*, 35(3): 329-349.
- Mearns, A., Krause, C.J.B., Stekoll, M., Hall, K., Watson, M. and Atkinson, M., 2003, September. Biological and ecological effects of wastewater discharges from cruise ships in Alaska. In *Oceans 2003. Celebrating the Past... Teaming Toward the Future* (IEEE Cat. No. 03CH37492) (Vol. 2, pp. 737-747). IEEE.
- Milroy, J., Revell, G., 2013. Aboriginal Story Systems: Re-mapping the West, Knowing Country, Sharing Space. Occasion: *Interdisciplinary Studies in the Humanities* 5. Available at: https://arcade.stanford.edu/sites/default/files/article_pdfs/OCCASION_v05i01_MilroyRevell_032213_0.pdf
- Milton, S.L., and Lutz, P.L., 2003. Physiological and genetic responses to environmental stress, in: Lutz, P.L., Musick, J.A., Wyneken, J. (Eds.), *The Biology of Sea Turtles*. CRC Press, Boca Raton, pp. 164–198.
- Morse, K., 1993. Who can see the sea? Prehistoric Aboriginal occupation of the Cape Range peninsula. *Records of the Western Australian Museum, Supplement* 45: 227-248.
- Mott, D. 2019. Preliminary desktop assessment and ethnographic inspection concerning the potential for submerged Aboriginal heritage, Woodside Pluto LNG Plant, Scarborough Project Area, Murujuga (Dampier Archipelago), Western Australia. Integrated Heritage Services.
- Mott, D., 2023. Definition of ethnographic survey. Advice by Integrated Heritage Services to Woodside Energy Limited.
- Muller, S., 2008. Community-Based Management of Saltwater Country, Northern Australia. *Development* 51: 139–143.

- Murdock, T. 2010. Where new meanings spring: The relationship between Indigenous cultural meanings for freshwater springs and management practices: Analysis of stories from Kalbarri, Western Australia. Honours Thesis, Edith Cowan University
- Murujuga Aboriginal Corporation (MAC), 2021. Cultural Values of the Environment for Scarborough DSDMP: Consultation Report on Mermaid Sound. Unpublished Report to Woodside Energy Limited. Murujuga Aboriginal Corporation, Dampier.
- Murujuga Aboriginal Corporation (MAC), 2022. About Murujuga. <https://www.murujuga.org.au/about/about-murujuga/>
- Murujuga Aboriginal Corporation (MAC), 2023a. About Our Land. Available at: <https://murujuga.org.au/our-land/our-land/>
- Murujuga Aboriginal Corporation (MAC), 2023b. Custodians showcase the magic of Murujuga at ICOMOS General Assembly 2023. Available at: <https://murujuga.org.au/custodians-showcase-the-magic-of-murujuga-at-icomos-general-assembly-2023/>
- Ngarluma Aboriginal Corporation. n.d. History of our Land. Accessed at: <https://www.ngarluma.com.au/history-of-our-land/>
- Neale, M., Kelly, L., 2020. Songlines: The Power and the Promise. Thames & Hudson Australia, Port Melbourne.
- NERA (NERA). 2017. Environmental Plan Reference Case Planned discharge of sewage, putrescible waste and grey water. Department of Industry, Innovation and Science. Australian Government.
- National Marine Fisheries Service (NMFS). 2014. Marine Mammals: Interim Sound Threshold Guidance (webpage). National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce. http://www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/threshold_guidance.html
- National Marine Fisheries Service (NMFS) (US)., 2018. 2018 revision to technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing (Version 2.0): underwater thresholds for onset of permanent and temporary threshold shifts. NOAA Technical Memorandum NMFS-OPR-59. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Maryland, USA
- National Oceanic and Atmospheric Administration (NOAA), 1996. Aerial observations of oil at sea (HAZMAT Report No. 96–7). National Oceanic and Atmospheric Administration, Seattle.
- National Oceanic and Atmospheric Administration (NOAA (US). 2019. ESA Section 7 Consultation Tools for Marine Mammals on the West Coast (webpage), 27 Sep 2019. <https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/esa-section-7-consultation-tools-marine-mammals-west>.
- National Offshore Petroleum Safety Environmental Management Authority (NOPSEMA), 2019. Oil spill modelling. Environmental Bulletin.
- National Research Council (NRC)., 2005. Oil Spill Dispersant: Efficacy and Effects. National Academies Press. ISBN 978-0309095624
- National Science Foundation (NSF). 2011. RPS. Marine mammal and sea turtle monitoring report for the Costa Rica 3D Seismic Survey (Bangs Crisp Project) in the Pacific Ocean offshore Costa Rica 7 April 2011–12 May 2011.
- Newell, R. C., Seiderer, L. J., and Hitchcock, D. R., 1998. The impact of dredging works in coastal waters: a review of the sensitivity to disturbance and subsequent recovery of biological resources on the sea bed. *Oceanography and Marine Biology: an annual review*, 36(1), 127-178.
- Newman, S.J., Wise, B.S., Santoro, K.G. and Gaughan, D.J. (eds). 2021. Status Reports of the Fisheries and Aquatic Resources of Western Australia 2020/21: The State of the Fisheries. Department of Primary Industries and Regional Development, Western Australia.
- Nutley, D., 2022. Scarborough Side Scan Sonar Data – Analysis for evidence of Underwater Cultural Heritage. Report by Comber Consultants to Woodside Energy Limited.
- Nutley, D. 2023, Heritage ROV Survey Report – Scarborough Trunkline. Report by Comber Consultants to Woodside Energy Limited.

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- Oil and Gas UK, 2014. Guidance on risk related decision making (Issue No. 2). United Kingdom Offshore Operators Association, London.
- O'Leary, M.J., Paumard, V., and Ward I., 2020. Exploring Sea Country through High-Resolution 3D Seismic Imaging of Australia's NW Shelf: Resolving Early Coastal Landscapes and Preservation of Underwater Cultural Heritage. *Quaternary Science Reviews* (239), 106353.
- Owen, K., C.S. Jenner, M.-N.M. Jenner, and R.D. Andrews. 2016. A week in the life of a pygmy blue whale: Migratory dive depth overlaps with large vessel drafts. *Animal Biotelemetry* 4: 17. <https://doi.org/10.1186/s40317-016-0109-4>
- Owens, E.H., Humphrey, B., and Sergy, G.A., 1994. Natural cleaning of oiled coarse sediment shorelines in Arctic and Atlantic Canada. *Spill Science and Technology Bulletin* 1, 37–52.
- Paterson, A. 2017. Unearthing Barrow Island's Past: The Historical Archaeology of Colonial-Era Exploitation, Northwest Australia. *International Journal of Historical Archaeology* 21 (2), 346-368.
- Paterson, A., Shellam, T., Veth, P., Mulvaney, K., Anderson, R., Dortch, J. & McDonald, J. 2019. The Mermaid? Re-envisaging the 1818 exploration of Enderby Island, Murujuga, Western Australia. *The Journal of Island and Coastal Archaeology*, 1-21.
- Patterson, H., Noriega, R., Georgeson, L., Stobutzki, I. and Curtotti, R., 2016. Fishery status reports 2016, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra. CC BY 3.0.
- Patterson, H., Noriega, R., Georgeson, L., Larcombe, J. and Curtotti, R., 2017. Fishery status reports 2017, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra. CC BY 4.0.
- Patterson, H., Larcombe, J., Nicol, S. and Curtotti, R., 2018. Fishery status reports 2018, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra. CC BY 4.0.
- Patterson, H., Woodhams, J., Williams, A. and Curtotti, R., 2019. Fishery status reports 2019. Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra. CC BY 4.0.
- Patterson, H., Larcombe, J., Woodhams, J. and Curtotti, R., 2020. Fishery status reports 2020. Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra. CC BY 4.0.
- Patterson, H., Bromhead, D., Galeano, D., Larcombe, J., Woodhams, J., and Curtotti, R. 2021. Fishery status reports 2021, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra. CC BY 4.0. <https://doi.org/10.25814/vahf-ng93>.
- Patterson, H., Bromhead, D., Galeano, D., Larcombe, J., Timmiss, T., Woodhams, J and Curtotti, R 2022, Fishery status reports 2022, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra. CC BY 4.0. <https://doi.org/10.25814/gx9r-3n90>.
- Paulay, G., Kirkendale, L., Lambert, G., and Meyer, C., 2002. Anthropogenic biotic interchange in a coral reef ecosystem: a case study from Guam. *Pacific Science* 56: 403-422.
- PENV 2020a. Scarborough Desktop Lighting Impact Assessment. Report prepared for Advisian (on behalf of Woodside Energy). Available in Appendix K of the Scarborough Offshore Project Proposal (OPP).
- PENV 2020b. Scarborough Light Modelling. Report prepared for Advisian (on behalf of Woodside Energy). Available in Appendix L of the Scarborough Offshore Project Proposal (OPP).
- Popper, A.N., Hawkins, A.D., Fay, R.R., Mann, D.A., Bartol, S.M., Carlson, T.J., Coombs, S., Ellison, W.T., Gentry, R.L., Halvorsen, M.B., Løkkeborg, S., Rogers, P., Southall, B.L., Zeddies, D.G. and Tavalga, W.N., 2014. ASA S3/SC1.4 TR-2014 sound exposure guidelines for fishes and sea turtles: a technical report prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI. Springer, New York.
- Quijano, J.E., Hannay, D.E. and Austin, M.E. 2018. Composite Underwater Noise Footprint of a Shallow Arctic Exploration Drilling Project. *IEEE Journal of Oceanic Engineering*.
- Rich, C. and Longcore, T. 2006. *Ecological consequences of artificial night lighting*. Island Press.
- Richardson, W.J., Greene Jr, C.R., Malme, C.I., and Thomson, D.H., 1995. *Marine Mammals and Noise*. Academic Press, San Diego.
- Roberts, L., 2023. Songlines are for singing: Un/Mapping the Lived Spaces of Travelling Memory, *Humanities*, 12: 52-67.

- Rodríguez, A., Burgan, G., Dann, P., Jessop, R., Negro, J. J. and Chiaradia, A. 2014, Fatal attraction of short-tailed shearwaters to artificial lights. PLoS ONE 9(10):e110114.
- Rolland, R.M., Parks, S.E., Hunt, K.E., Castellote, M., Corkeron, P.J., Nowacek, D.P., Wasser, S.K., and Kraus, S.D. 2012. Evidence that ship noise increases stress in right whales. Proceedings of the royal society biological sciences.
- Ross, D. 1987. Mechanics of Underwater Noise. Chap; 4;8;10. Pergamon Press 1976; reprinted Peninsula Publishing 1987.
- Ross, D. 1993. On ocean underwater ambient noise. Inst. Acoust.Bull.18, 5-8.
- RPS, 2011. Sediment quality surveys March-April 2011, Greater Western Flank Marine Environmental Baseline Studies, RPS Planning and Environment Pty Ltd, Perth, WA.
- RPS 2019. WEL Scarborough development Quantitative Spill Risk Assessment - Preliminary Results. Prepared for Advisian on behalf of Woodside Energy Ltd. RPS Group
- Salgado Kent, C., McCauley, R.D., Duncan, A., Erbe, C., Gavrilov, A., Lucke, K. and Parnum, I., 2016. Underwater sound and vibration from offshore petroleum activities and their potential effects on marine fauna: an Australian perspective. Centre for Marine Science and Technology, Curtin University, Perth, WA.
- Sanderfoot, V., and Holloway, T. 2017 Air Pollution impacts on avian species via inhalation exposure and associated outcomes. Environmental Research Letters 12: 8.
- Schaefer, T. 2013. Aquatic Impacts of Firefighting Foams. Whitepaper. Form Number F-2012007, Solberg.
- Shell, 2010. Prelude Floating LNG Project, Environmental Impact Statement (EPBC No. 2008/4146) Shell Development (Australia) Pty Ltd.
- Simmonds, M., Dolman, S., and Weilgart, L., 2004. Oceans of noise, WDCS Science Report. Whale and Dolphin Conservation Society, Chippenham.
- Simpson, S. L., Batley, G. E. and Chariton, A. A., 2013. Revision of the ANZECC/ARMCANZ Sediment Quality Guidelines, CSIRO Land and Water Report 8/07, CSIRO Land and Water.
- Sleeman, J. C., Meekan, M. G., Fitzpatrick, B. J., Steinberg, C. R., Ancel, R., and Bradshaw, C. J., 2010. Oceanographic and atmospheric phenomena influence the abundance of whale sharks at Ningaloo Reef, Western Australia. Journal of Experimental Marine Biology and Ecology, 382(2), 77-81.
- Smyth, D. 2007. "Sea Countries of the North-West: Literature review on Indigenous connection to and uses of the North West Marine Region"
- Smyth, D. 2008. Just Add Water? Taking Indigenous Protected Areas into Sea Country.
- Smyth, D., Isherwood, M., 2016. Protecting sea country: Indigenous people and marine protected areas in Australia, in Westcott, G., Fitzsimons, J. (Eds.), Big, Bold and Blue: Lessons from Australia's Marine Protected Areas. CSIRO Publishing, Melbourne.
- Southall, B.L., Finneran, J.J., Reichmuth, C., Nachtigall, P.E., Ketten, D.R., Bowles, A.E., Ellison, W.T., Nowacek, D.P., and Tyack, P.L. Marine mammal noise exposure criteria: Updated scientific recommendations for residual hearing effects. Aquatic Mammals.
- Spaulding, M.L., Li, Z., Mendelsohn, D., Crowley, D., French-McCay, D., and Bird, A., 2017. 'Application of an integrated blowout model system, OILMAP DEEP, to the Deepwater Horizon (DWH) Spill', Marine Pollution Bulletin, vol. 120, no. 1-2, pp. 37-50.
- Statton, J., Sinclair, E., McNeair, S., Kendrick, A. and Kendrick, G. 2021. Assisting recovery of seagrass in Shark Bay, Gathaagudu.
- Strain, L.W.S., Brown, J.M. and Hart, A.M., 2019. Recovering a collapsed abalone stock through translocation: Fisheries Research Report No 292. Seafood CRC Project No. 2011/762. Department of Primary Industries and Regional Development, Western Australia.
- Stroot, D.H., S. Welch, A.M. Muellenmeister, M.W. Koessler, and C.R. McPherson, 2023. Cumulative Vessel Operations Assessment: Acoustic Modelling for Assessing Marine Fauna Sound Exposures. Document 02970, Version 1.0. Technical report by JASCO Applied Sciences for Woodside Energy Limited.

- Terrens, G.W., Gwyther, D., Keough, M.J., and Tait, R.D., 1998. Environmental Assessment of Synthetic-Based Drilling-Mud Discharges to Bass Strait, Australia. Presented at the International Conference on Health, Safety, and Environment in Oil and Gas Exploration and Production, Society of Petroleum Engineers, Caracas, p. SPE-46622-MS. Doi:10.2118/46622-MS.
- Thornhill, D.J., Struck, T.H., Ebbe, B., Lee, R.W., Mendoza, G.F., Levin, L.A., and Halanych, K.M., 2012. Adaptive radiation in extremophilic Dorvilleidae (Annelida): diversification of a single colonizer or multiple independent lineages? *Ecology and Evolution* 2(8): pp1958–1970.
- Threatened Species Scientific Committee (TSSC). 2008a. Approved conservation advice for green sawfish. Threatened Species Scientific Committee, Canberra.
- Threatened Species Scientific Committee (TSSC). 2008b. Approved conservation advice for *Dermochelys coriacea* (Leatherback Turtle). Threatened Species Scientific Committee, Canberra, ACT.
- Threatened Species Scientific Committee (TSSC). 2009a. Approved conservation advice for *Pristis clavata* (Dwarf Sawfish). Canberra, ACT.).
- Threatened Species Scientific Committee (TSSC). 2011a. Approved conservation advice for *Aipysurus foliosquama* (Leaf-scaled Sea Snake). Canberra, ACT.
- Threatened Species Scientific Committee (TSSC). 2011b. Approved conservation advice for *Aipysurus apraefrontalis* (Short-nosed Sea Snake). Canberra, ACT.
- Threatened Species Scientific Committee (TSSC)., 2014. Approved Conservation Advice for *Pristis pristis* (argetooth sawfish). Threatened Species Scientific Committee, Canberra
- Threatened Species Scientific Committee (TSSC) 2014b. Conservation advice on *Ardenna carneipes* Flesh-footed Shearwater. Threatened Species Scientific Committee, Canberra.
- Threatened Species Scientific Committee (TSSC)., 2015a. Approved Conservation Advice *Rhincodon typus* (whale shark). Threatened Species Scientific Committee, Canberra, Australian Capital Territory.
- Threatened Species Scientific Committee (TSSC)., 2015b. Approved Conservation Advice *Balaenoptera borealis* (sei whale). Threatened Species Scientific Committee, Department of the Environment, Canberra, Australian Capital Territory.
- Threatened Species Scientific Committee (TSSC). 2015c. Approved Conservation Advice *Balaenoptera physalus* (fin whale). Threatened Species Scientific Committee, Department of the Environment, Canberra, Australian Capital Territory.
- Threatened Species Scientific Committee (TSSC). 2015d. Conservation advice *Numenius madagascariensis* eastern curlew. Threatened Species Scientific Committee, Canberra.
- Threatened Species Scientific Committee (TSSC). 2015e. Conservation advice *Calidris ferruginea* curlew sandpiper. Threatened Species Scientific Committee, Canberra.
- Threatened Species Scientific Committee (TSSC). 2015f. Conservation advice *Pterodroma mollis* soft-plumage petrel. Threatened Species Scientific Committee, Canberra.
- Threatened Species Scientific Committee (TSSC). 2015g. Conservation advice *Papasula abbotti* Abbott's booby. Threatened Species Scientific Committee, Canberra.
- Threatened Species Scientific Committee (TSSC). 2016. Conservation advice *Calidris canutus* red knot. Threatened Species Scientific Committee, Canberra.
- Threatened Species Scientific Committee (TSSC) (2020). Conservation advice on *Thalassarche cauta* Shy Albatross. Threatened Species Scientific Committee, Canberra.
- Threatened Species Scientific Committee (TSSC) (2022). Conservation advice on *Sternula nereis nereis* Fairy Tern. Threatened Species Scientific Committee, Canberra.
- Thums, M. and L.C. Ferreira. 2021. Informing spatial management for pygmy blue whale management: fine scale analysis of movement. Australian Institute of Marine Science, Confidential Report to Woodside Energy Ltd. Final Rev 0, October 2021. 19 pp.
- Thums, M., Ferreira, L.C., Jenner, C., Jenner, M., Harris, D., Davenport, A., Andrews-Goff, V., Double, M., Moller, L., Attard, C.R.M., Bilgmann, K., Thomson, P.G., and McCauley, R., 2022. Pygmy blue whale,

movement, distribution and important areas in the Eastern Indian Ocean. *Global Ecology and Conservation*. Volume 35.

- Tindale, N.B., 1947. *Aboriginal Tribes of Australia: Their terrain, environmental controls, distribution, limits and proper names*. University of California Press, Oakland.
- Tindale, N. B., 1940. Map showing the distribution of the Aboriginal Tribes of Australia. Results of the Harvard-Adelaide Universities Anthropological Expedition, 1938 – 1939: Distribution of Australian Aboriginal Tribes: A Field Survey. *Transactions of the Royal Society of South Australia*. Vol. 64: 140-231.
- Tomajka, J., 1985. The influence of petroleum hydrocarbons on the primary production of the Danube River plankton, *Acta Hydrochimie-Hydrobiologie* 13: 615–618.
- United Nations Educational, Scientific and Cultural Organisation (UNESCO), 2003. 2003 Convention for the Safeguarding of the Intangible Cultural Heritage, United Nations Educational, Scientific and Cultural Organisation. Available at: <https://ich.unesco.org/en/convention>.
- United Nations Environment Programme (UNEP). 1985. GESAMP: Thermal discharges in the marine environment. UNEP Regional Seas Reports and Studies No. 45.
- UWA, 2021. Scarborough Pipeline Cultural Heritage Assessment: Establishing Archaeological Potential and Significance. Technical report by UWA for Woodside Energy Limited.
- Vanderlaan, A.S.M., and Taggart, C.T., 2007. Vessel collisions with whales: the probability of lethal injury based on vessel speed. *Marine Mammal Science* 23, 144–156. Doi:10.1111/j.1748-7692.2006.00098.x.
- Veth, P., McDonald, J., Ward, I., O’Leary, M., Beckett, E., Benjamin, J., Ulm, S., Hacker, J., Ross, P. and Bailey, G., 2019. A Strategy for Assessing Continuity in Terrestrial and Maritime Landscapes from Murujuga (Dampier Archipelago), North West Shelf, Australia. *The Journal of Island and Coastal Archaeology* 15(4): 477-503. Doi: 10.1080/15564894.2019.1572677
- Veth, P., Ward, I., Manne, T., Ulm, S., Ditchfield, K., Dortch, J., Hook, F., Petchey, F., Hogg, A., Questiaux, D., Demuro, M., Arnold, L., Spooner, N., Levchenko, V., Skippington, J., Byrne, C., Basgall, M., Zeanah, D., Belton, D., Kendrick, P., 2017. Early human occupation of a maritime desert, Barrow Island, North-West Australia. *Quaternary Science Reviews* 168: 19-29.
- Ward, I., Larcombe, P., Ross, P. and Fandry, C. 2022. Applying geoarchaeological principles to marine archaeology: A reappraisal of the “first marine” and “in situ” lithic scatters in the Dampier Archipelago, NW Australia. *Geoarchaeology* (37), 783– 810. <https://doi.org/10.1002/gea.21917>
- Warner, G., Mccrodan, A., 2011. Underwater Sound Measurements (Chapter 3) In: Hartin, K.G., Bisson, L.N., S.A.
- Warren, V. E., Delarue, J.J.Y., Robinson, C., Kowarski, K.A., McPherson, C.R., Wilson, C.C., Maxner, E.E., Lawrence, C.B., Gaudet, B.J. and Muellenmeister, A., 2023. Marine Mammal Acoustic Monitoring Report: Characterisation of Pygmy Blue Whales and Other Acoustic. Document 02826, Version 3.0 FINAL. Technical report by JASCO Applied Sciences for Woodside Energy Limited.
- Water Corporation. 2019. Pilbara dreamtime story comes to life. Available at: <https://www.watercorporation.com.au/About-us/Media-releases/2019/October-2019/Pilbara-dreamtime-story-comes-to-life>
- Weerianna Street Media Production, 2017. Connection to Country. Documentary by Screen Australia and National Indigenous Television. Available at: <https://www.kanopy.com/en/product/5389044?vp=nd>
- Weilgart, L.S. 2007. A brief review of known effect of noise on marine mammals. *International Journal of Comparative psychology*, 20 (2-3), 159-168.
- Williams, A., Ulm, S., Sapienza, T. Lewis, S. Turney, C. 2018. Sea-level change and demography during the last glacial termination and early Holocene across the Australian continent. *Quaternary Science Reviews* (182), 144-154. Doi: <https://doi.org/10.1016/j.quascirev.2017.11.030>
- Williamson, M.H., & Fitter, A., 1996. The characters of successful invaders. *Biological Conservation*. 78(1-2):163-170

- Witherington, B. E., and Martin, R. E., 2003. Understanding, assessing, and resolving light-pollution problems on sea turtle nesting beaches. 3rd edn revised. Florida Marine Research Institute Technical Reports TR-2, St. Petersburg, FL.
- Woodside Energy Limited (Woodside). 2005. The Vincent Development Draft Environmental Impact Statement. Woodside Energy Limited. Perth, Australia.
- Woodside Energy Limited (Woodside), 2006. Pluto LNG development draft Public Environment Report/Public Environment Review (EPBC Act Referral No. 2006/2968). Woodside Energy Limited, Perth.
- Woodside Energy Ltd. 2008. Torosa South - 1 (TS-1) Pilot Appraisal well, Environmental Monitoring Program - Development of Methodologies Part 1 (p51). Report produced by Environmental Resources Management and SKM.
- Woodside Energy Limited (Woodside). 2013. Goodwyn Alpha (GWA) Facility Operations Environment Plan Summary. Woodside Energy Limited. Perth, Australia.
- Woodside Energy Ltd. 2014. Browse FLNG Development Draft Environmental Impact Statement.
- Woodside Energy Ltd., 2022. First Nations Communities Policy. 2078766. Available at: <https://www.woodside.com/docs/default-source/about-us-documents/corporate-governance/woodside-policies-and-code-of-conduct/indigenous-communities-policy.pdf>
- Woodside Energy Ltd., 2023. Scarborough, Dredging and Spoil Disposal Management Plan. SA0006AH0000002
- Yamatji Marlpa Aboriginal Corporation (YMAC), 2010. Pilbara Sea Country Plan. Pilbara Indigenous Marine Reference Group. Available at: [PilbaraSeaPlan_FinalReport.pdf \(ymac.org.au\)](#).
- Yender, R., Michel, J., and Lord, C. 2002., Managing seafood safety after an oil spill. National Oceanic and Atmospheric Administration, Seattle.
- Ytreberg, E., Eriksson, M., Maljutenko, I., Jalkanen, J. P., Johansson, L., Hassellöv, I. M., and Granhag, L. 2020. Environmental impacts of grey water discharge from ships in the Baltic Sea. Marine pollution bulletin, 152, 110891.

9 GLOSSARY AND ABBREVIATIONS

9.1 Glossary

Term	Meaning
(the) Regulator	The Government Agency (State or Commonwealth) that is the decision maker for approvals and performs ongoing regulation of the approval once granted
4D seismic data	A set of numerous closely-spaced seismic lines that provide a high spatially sampled measure of subsurface reflectivity and 4D image
Acceptability	The EP must demonstrate that the environmental impacts and risks of an activity will be of an acceptable level as per Regulation 10A(c).
ALARP	A legal term in Australian safety legislation, it is taken here to mean that all contributory elements and stakeholdings have been considered by assessment of costs and benefits, and which identifies a preferred course of action
Ballast	Extra weight taken on to increase a ship's stability to prevent rolling and pitching. Most ships use seawater as ballast. Empty tank space is filled with inert (non-combustible) gas to prevent the possibility of fire or explosion.
Bathymetry	Related to water depth, a bathymetry map shows the depth of water at a given location on the map.
Benthos/Benthic	Relating to the seabed and includes organisms living in or on sediments/rocks on the seabed
Biodiversity	Relates to the level of biological diversity of the environment. The EPBC Act defines biodiversity as "the variability among living organisms from all sources (including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part) and includes: (a) diversity within species and between species; and (b) diversity of ecosystems".
Biota	The animal and plant life of a particular region, habitat or geological period
Cetacean	Whale and dolphin species
Consequence	The worst-case credible outcome associated with the selected event, assuming some controls (prevention and mitigation) have failed. Where more than one impact applies (e.g. environmental and legal/compliance), the consequence level for the highest severity impact is selected.
Coral	Anthozoa that are characterised by stonelike, horny or leathery skeletons (external or internal). The skeletons of these animals are also called coral.
Coral Reef	A wave-resistant structure resulting from skeletal deposition and cementation of hermatypic corals, calcareous algae, and other calcium carbonate-secreting organisms
Crustacean	A large and variable group of mostly aquatic invertebrates that have a hard external skeleton (shell), segmented bodies, with a pair of often very modified appendages on each segment, and two pairs of antennae (e.g. crabs, crayfish, shrimps, wood lice, water fleas and barnacles)
Cyclone	A rapidly-rotating storm system characterised by a low-pressure centre, strong winds, and a spiral arrangement of thunderstorms that produce heavy rain
dB	Decibel, a measure of the overall noise level of sound across the audible spectrum with a frequency weighting (that is, 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies
dB re 1 μ Pa ²	Measure of underwater noise, in terms of sound pressure. Because the dB is a relative measure rather than an absolute measure, it must be referenced to a standard 'reference intensity', in this case 1 micro Pascal (1 mPa), which is the standard reference that is used. The dB is also measured over a specified frequency, which is usually either a one Hertz bandwidth (expressed as dB re 1 mPa ² /Hz), or over a broadband that has not been filtered. Where a frequency is not specified, it can be assumed that the measurement is a broadband measurement.
dB re 1 μ Pa ² .s	Normal unit for sound exposure level
Demersal	Living close to the floor of the sea (typically of fish)

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Term	Meaning
Dynamic positioning	In reference to a marine vessel that uses satellite navigation and radio transponders in conjunction with thrusters to maintain its position
Echinoderms	Any of numerous radially symmetrical marine invertebrates of the phylum Echinodermata, which includes the starfishes, sea urchins and sea cucumbers, that have an internal calcareous skeleton and are often covered with spines
Endemic	A species that is native to or confined to a certain region
Environment	The surroundings in which an organisation operates, including air, water, land, natural resources, flora, fauna, humans and their interrelations (Source: ISO 14001)
Environment Regulations	OPGGS (Environment) Regulation 2009
Environmental approval	The action of approving something, which has the potential to have an adverse impact on the environment. Environmental impact assessment is generally required before environmental approval is granted.
Environmental impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services (Source: HB 203:2006).
Environmental impact assessment	An orderly and systematic process for evaluating a proposal or scheme (including its alternatives), and its effects on the environment, and mitigation and management of those effects (Source: Western Australian Environmental Impact Assessment Administrative Procedures 2010)
EP	Prepared in accordance with the OPGGS (Environment) Regulations 2009, which must be assessed and accepted by the Designated Authority (NOPSEMA) before any petroleum-related activity can be performed
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999. Commonwealth legislation designed to promote the conservation of biodiversity and protection of the environment.
Epifauna	Benthic animals that live on the surface of a substrate
Fauna	Collectively, the animal life of a particular region
Flora	Collectively, the plant life of a particular region
Infauna	Aquatic animals that live in the substrate of a body of water, especially in a soft sea bottom
ISO 14001	ISO 14001 is an international standard that specifies a process (called an EMS) for controlling and improving a company's environmental performance. An EMS provides a framework for managing environmental responsibilities so they become more efficient and more integrated into overall business operations.
Likelihood	The description that best fits the chance of the selected consequence actually occurring, assuming reasonable effectiveness of the prevention and mitigation controls
MARPOL (73/78)	The International Convention for the Prevention of Pollution from Ships 1973, as modified by the Protocol of 1978. MARPOL 73/78 is one of the most important international marine environmental conventions. It was designed to minimise pollution of the seas, including dumping, oil and exhaust pollution. Its stated objective is to preserve the marine environment through the complete elimination of pollution by oil and other harmful substances and the minimisation of accidental discharge of such substances.
Meteorology	The study of the physics, chemistry and dynamics of the earth's atmosphere, including the related effects at the air–earth boundary over both land and the oceans
Mitigation	Management measures that minimise and manage undesirable consequences
pH	Measure of the acidity or basicity of an aqueous solution
Protected Species	Threatened, vulnerable or endangered species that are protected from extinction by preventive measures. Often governed by special Federal or State laws.
Putrescible	Refers to food scraps and other organic waste associated with food preparation that will be subject to decay and rot (putrefaction)

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Term	Meaning
Risk	The combination of the consequences of an event and its associated likelihood. For guidance, see Environmental Guidance on Application of Risk Management Procedure.
Sessile	Organism that is fixed in one place; immobile
Stereo-BRUVS	Stereo-baited remote underwater video systems
Teleost	A fish belonging to the Teleostei or Teleostomi, a large group of fishes with bony skeletons, including most common fishes. The teleosts are distinct from the cartilaginous fishes such as sharks, rays, and skates.
Zooplankton	Plankton consisting of small animals and the immature stages of larger animals

9.2 Abbreviations

Abbreviation	Meaning
µm	Micrometer
350A	350 Australia
ABF	Australian Border Force
AFMA	Australian Fisheries Management Authority
AHO	Australian Hydrographic Office
AIIMS	Australasian Inter-service Incident Management System
AIMS	Australian Institute of Marine Science
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
AMP	Australian Marine Park
AMSA	Australian Maritime Safety Authority
ANZECC	Australian and New Zealand Environment and Conservation Council
APPEA	Australian Petroleum Production and Exploration Association
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
ASAP	As soon as practicable
ATSB	Australian Transport Safety Bureau
AusSAR	Australian Search and Rescue
AUV	Autonomous Underwater Vehicle
AWR	Air Weapons Range
BIA	Biologically Important Area
BMSL	Below mean sea level
BoM	Bureau of Meteorology
CALM	Department of Conservation and Land Management
CCP	Cyclone Contingency Plan
CCWA	Conservation Council of Western Australia
CFA	Commonwealth Fisheries Association
CH ₄	Methane
CICC	Corporate Incident Coordination Centre
CMID	Common Marine Inspection Document

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Abbreviation	Meaning
CMP	Conservation Management Plan
CMT	Crisis Management Team
CO	Carbon Monoxide
CO2	Carbon Dioxide
CS	Cost/Sacrifice
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cth	Commonwealth
CV	Construction Vessel
D&C	Drilling and Completions
DAA	Department of Aboriginal Affairs
DAFF	Department of Agriculture, Fisheries and Forestry
DAWE	Department of Agriculture, Water and the Environment
dB	Decibel
DFAT	Department of Foreign Affairs and Trade
DEA	Doctors for the Environment Australia
DEWHA	Department of Environment, Water, Heritage and the Arts
DGVs	Default guideline values
DISER	Department of Industry, Science, Energy and Resources
DLV	Derrick lay vessel
DMIRS	Department of Mines, Industry Regulation and Safety
DNP	Director of National Parks
DoD	Department of Defence
DoEE	Department of the Environment and Energy
DoT	Department of Transport
DP	Dynamically Positioned
DPIRD	Department of Primary Industries and Regional Development
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
EBSA	Ecologically or Biologically Significant Marine Areas
EMBA	Environment that May Be Affected
EMS	Environmental Management System
ENVID	Environmental hazard Identification
EP	Environment Plan
EPO	Environmental Performance Outcome
EPS	Environmental Performance Standard
ERM	Environmental Resource Management
ERP	Emergency Response Plans
ERT	Emergency Response Team
ESD	Ecological Sustainable Development

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Abbreviation	Meaning
F	Control Feasibility
FARA	Friends of Australian Rock Art
FCG	Flooded, cleaned and gauged
FLETS	Flowline end terminations
FLNG	Floating Liquefied Natural Gas units
FPU	Floating Production Unit
g/m ²	Grams per square metre
GAP	Greenpeace Australia Pacific
GHG	Greenhouse Gas
GP	Good Practice
GV	Guideline value
HCV	Heavy Construction Vessel
HF	High Frequency
HFC	Hydrofluorocarbons
HFO	Heavy Fuel Oil
HLV	Heavy lift vessel
HP	High Pressure
HSE	Health, Safety and Environment
HSP	Hydrocarbon Spill Preparedness
IAP	Incident Action Plan
IAPP	International Air Pollution Prevention
ICLDP	Incident and Crisis Leadership Development Program
IEA	International Energy Agency
IFO	Intermediate Fuel Oils
ILTs	In-Line Tees
IMCA	International Marine Contractors Association
IMCRA	Integrated Marine and Coastal Regionalisation of Australia
IMMR	Inspection, Maintenance, Monitoring, Repair
IMO	International Marine Organisation
IMS	Invasive Marine Species
IMT	Incident Management Team
IPCC	Intergovernmental Panel on Climate Change
IPIECA	International Petroleum Industry Environmental Conservation Association
ISPP	International Sewage Pollution Prevention Certificate
ITF	Indonesian Through Flow
IUCN	International Union for Conservation of Nature
JRCC	Joint Rescue Coordination Centre
JSA	Job Safety Analysis
KEF	Key Ecological Feature

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Abbreviation	Meaning
kHz	Kilohertz
km	Kilometre
KPI	Key Performance Indicator
L	Litres
LBL	Long Baseline
LCS	Legislation, Codes and Standards
LCV	Light Construction Vessel
LF	Low Frequency
LNG	Liquefied Natural Gas
LP	Low Pressure
LTGA	Lock the Gate
m	metre
MARPOL	International Convention for the Prevention of Pollution from Ships
MC	Measurement Criteria
MDO	Marine Diesel Oil
MEG	Mono-ethylene Glycol
MFO	Marine Fauna Observers
MGO	Marine Gas Oil
MMSI	Maritime Mobile Service Identity
MNES	Matters of National Environmental Significance
MOC	Management of Change
MODU	Mobile Offshore Drilling Unit
MPA	Marine Protected Area
MSIN	Maritime Safety Information Notifications
N ₂ O	Nitrous Oxide
NCVA	National Conservation Values Atlas
NDC	Nationally Determined Contribution
NGERS	National Greenhouse and Energy Reporting
NIMS	Non-indigenous Marine Species
nm	Nautical mile (1,852 m) a unit of distance on the sea
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NOPTA	National Offshore Petroleum Titles Administrator
NO _x	Oxides of Nitrogen
NRC	North Rankin Complex
NTM	Notice to Mariners
NWMR	North-west Marine Region
NWS	North-west Shelf

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Abbreviation	Meaning
NWXA	North West Exercise Area
OCIMF	Oil Companies International Marine Forum
OILMAP	Oil Spill Mapping and Analysis Program
OIW	Oil in Water
OPEP	Oil Pollution Emergency Plan
OPGGS	Offshore Petroleum and Greenhouse Gas Storage
OPP	Offshore Project Proposal
OSREC	Oil Spill Response Skills Enhancement Course
OSRO	Oil Spill Response Organisation
OSV	Offshore Supply Vessel
OVID	Offshore Vessel Inspection Database
OVMSA	Offshore Vessel Safety Management System assessment
PAA	Petroleum Activity Area
PAH	Polycyclic Aromatic Hydrocarbon
PAM	Passive Acoustic Monitoring
PAP	Petroleum Activities Program
PBA	Pre-emptive Baseline Areas
PBW	Pygmy Blue Whale
PFC	Perfluorocarbons
PJ	Professional Judgement
PLET	Pipeline End Termination
PLRs	Pig Launcher Receivers
PM10	Particulate Matter less than 10 microns
PMST	Protected Matters Search Tool
PPA	Pearl Producers Association
ppb	Parts Per Billion
ppm	Parts Per Million
PS	Performance Standards
PTS	Permanent Threshold Shift
PTW	Permit To Work
PV	Pipelay vessel
PV	Pipelay vessel
RAAF	Royal Australian Air Force
RBM	Riser base manifold
RCC	Rescue Coordination Centre
RMS	Root Mean Square
ROV	Remotely Operated Vehicle
SDA	Subsea distribution assembly
SDU	Subsea distribution units

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Abbreviation	Meaning
SEEMP	Ship Energy Efficiency Management Plan
SEL	Sound exposure level
SF6	Sulphur hexafluoride
SI&TI	Seabed Intervention and Trunkline Installation
SIMAP	Spill Impact Mapping and Analysis Program
SIMOPS	Simultaneous Operations
SMPEP	Spill Monitoring Programme Execution Plan
SO2	Sulphur Dioxide
SOLAS	Safety of Life at SEA
SOPEP	Ship Oil Pollution Emergency Plan
SPL	Sound Pressure Levels
SURF	Subsea Umbilicals Risers and Flowlines
TAP	Threat Abatement Plan
TSS	Total Suspended Solids
TTS	Temporary Threshold Shift
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change
USBL	Ultra-short baseline
UTAs	Umbilical termination assemblies
UTHs	Umbilical termination heads
UXO	Unexploded Ordnance
VHF	Very high frequency
VOC	Volatile Organic Hydrocarbons
WA	Western Australia
WAFIC	Western Australian Fishing Industry Council
WCC	Woodside Communication Centre
WEL	Woodside Energy Ltd
WLS	Woodside Learning Service
WMS	Woodside Management System
Woodside	Woodside Energy Ltd
WSR	Woodside Site Representative