

SUNRISE WELLHEAD MANAGEMENT ENVIRONMENT PLAN

GREATER SUNRISE AREA

Woodside consults relevant persons in the course of preparing an environment plan (EP) to notify them, obtain their input and to assist Woodside to confirm current measures or identify additional measures, if any, that could be taken to lessen or avoid potential affects of the proposed activity on the environment. This is the intended outcome of consultation.

Woodside's aim is to ensure the activity is carried out in a manner that is consistent with the principles of ecologically sustainable development (ESD), by which the environmental impacts and risks of the activity are reduced to as low as reasonably practicable (ALARP) and of an acceptable level. We want relevant persons whose functions, interests or activities that may be affected by the proposed activity to have the opportunity to provide feedback on our proposed activity, in accordance with the intended outcome of consultation.

Overview

Woodside is submitting a Wellhead Management Environment Plan (EP) in Commonwealth waters, in accordance with the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (Cth) (regulations). The EP covers three exploration wellheads in the Greater Sunrise Area (Sunrise-1, Sunrise-3, Troubadour-1).

The EP addresses requirements under the current regulations which apply to the wellheads situated in retention lease NT/RL 2. We note however that following the enactment of the Treaty Between Australia and the Democratic Republic of Timor-Leste Establishing Their Maritime Boundaries in the Timor Sea and the Timor Sea Maritime Boundaries Treaty Consequential Amendments Act 2019 (Cth) that the regulatory regime applying to the area in which the retention lease NT/RL 2 is located is in a transition phase.

Proposed Activity

The EP covers ongoing management of the three exploration wellheads until final decommissioning activities can be confirmed including following any updates to the applicable regulatory regime. Under the EP, non-routine inspection, monitoring and repair (IMR) vessel-based activities may be required via a risk-based assessment to ensure that impacts and risks to the environment are continually reduced to acceptable and ALARP. Implementation of non-routine IMR activities supports Woodside's obligation under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) to maintain in good condition and repair structures that are in the title area.

Location

The wellheads are located approximately 140 km southeast of Timor-Leste and around 430 km northwest of Darwin (see Figure 1). The water depth of the Sunrise-1, Sunrise-3 and Troubadour-1 exploration wellheads are approximately 159 m, 525 m and 96 m, respectively. The wells were permanently plugged for abandonment to prevent hydrocarbon release to the environment in 1975, 2008 and 1974 respectively. The wells will continue to be marked on navigational charts.

Project Vessels

An offshore support vessel will be used to complete non-routine IMR activities for the wellheads if required.

The Operational Area includes an area encompassing a 1500 m radius around each wellhead. A temporary 500 m radius exclusion zone would apply around the vessel during operations. Marine users are requested to avoid this area during the activity to ensure the safety of the project vessel and third-party vessels.

Joint Venture

Woodside Energy Ltd is the operator and joint venture participant with Timor GAP Greater Sunrise RL, Unipessoal, LDA and Timor Gap Greater Sunrise RL2, Unipessoal, LDA and Osaka Gas Australia Pty Ltd (Sunrise NT/RL-2 Joint Venture).

We welcome your feedback by 26 July 2024

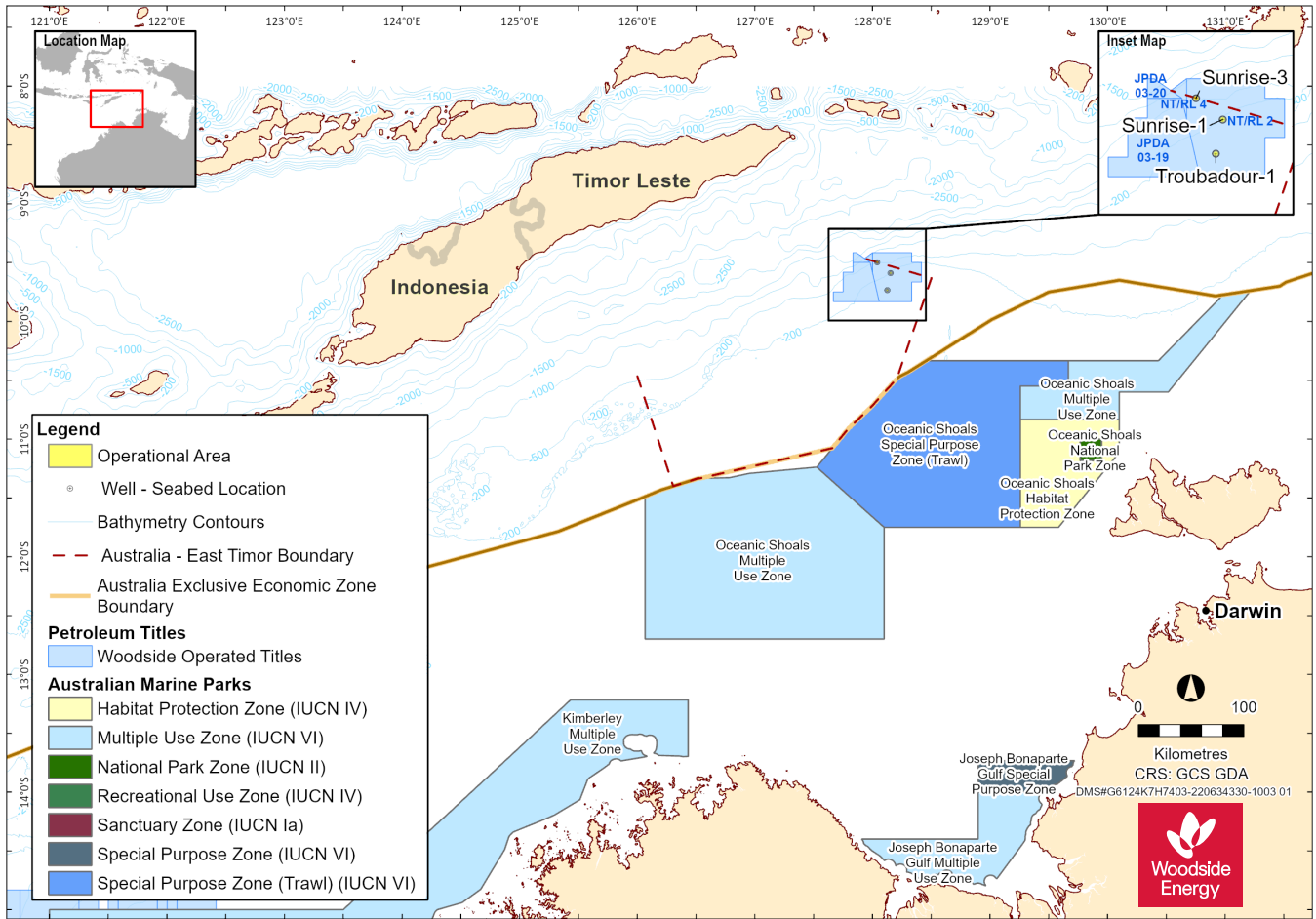


Figure 1. Sunrise-1, Sunrise-3 and Troubadour-1 Wellhead Locations.

Table 1. Activity summary for all wellheads

Exploration wellhead activities		Sunrise-1	Sunrise-2	Troubadour-1
Commencement date	No planned activities. Non-routine IMR activities may be required via a risk-based assessment.			
Approximate estimated duration	Should IMR activities be required, estimated duration would be up to 10 days per well.			
Infrastructure	Exploration wellhead and permanent guide base	Exploration wellhead, permanent guide base and temporary guide base	Exploration wellhead, corrosion cap and permanent guide base	
Vessels	An offshore support vessel will be used to conduct any required IMR activities.			
Distance to nearest Australian town	-430 km northwest of Darwin	-445 km northwest of Darwin	-424 km northwest of Darwin	
Distance to nearest Australian marine park	-89 km north of Oceanic Shoals Marine Park	-100 km north of Oceanic Shoals Marine Park	-75 km north of Oceanic Shoals Marine Park	

Table 2. Approximate locations

Wellhead	Water Depth (m)	Latitude	Longitude	Exclusion Zones	Title Area
Sunrise-1	-159	9°35'19.341"S	128°09'17.958"E	A temporary 500 m radius exclusion zone around the IMR vessel will apply during operations.	NT/RL-2
Sunrise-3	-525	9°29'52.969992"S	128°2'28.579992" E		
Troubadour-1	-96	9°43'58.684"S	128°07'29.846"E		

Environment That May Be Affected (EMBA)

The environment that may be affected (EMBA) is the largest spatial extent where activities could potentially have an environmental consequence (direct or indirect impact). The broadest extent of the EMBA takes into consideration planned and unplanned activities (should vessel-based activities be required), and for this EP is determined by a highly unlikely release of hydrocarbons to the environment as a result of a vessel collision. This is depicted in **Figure 2**.

The EMBA does not represent the extent of predicted impact of the highly unlikely hydrocarbon release. Rather, the EMBA represents the merged area of many possible paths a hydrocarbon release could travel depending on the weather and ocean conditions at the time of the release. This means in the highly unlikely event a hydrocarbon release does occur, the entire EMBA will not be affected and the specific and minimal part of the EMBA that is affected will only be known at the time of the release.

For this EP Woodside has defined the EMBA by combining the potential spatial extent of surface and in-water (dissolved and entrained) hydrocarbons, resulting from a worst-case credible spill from a vessel collision.

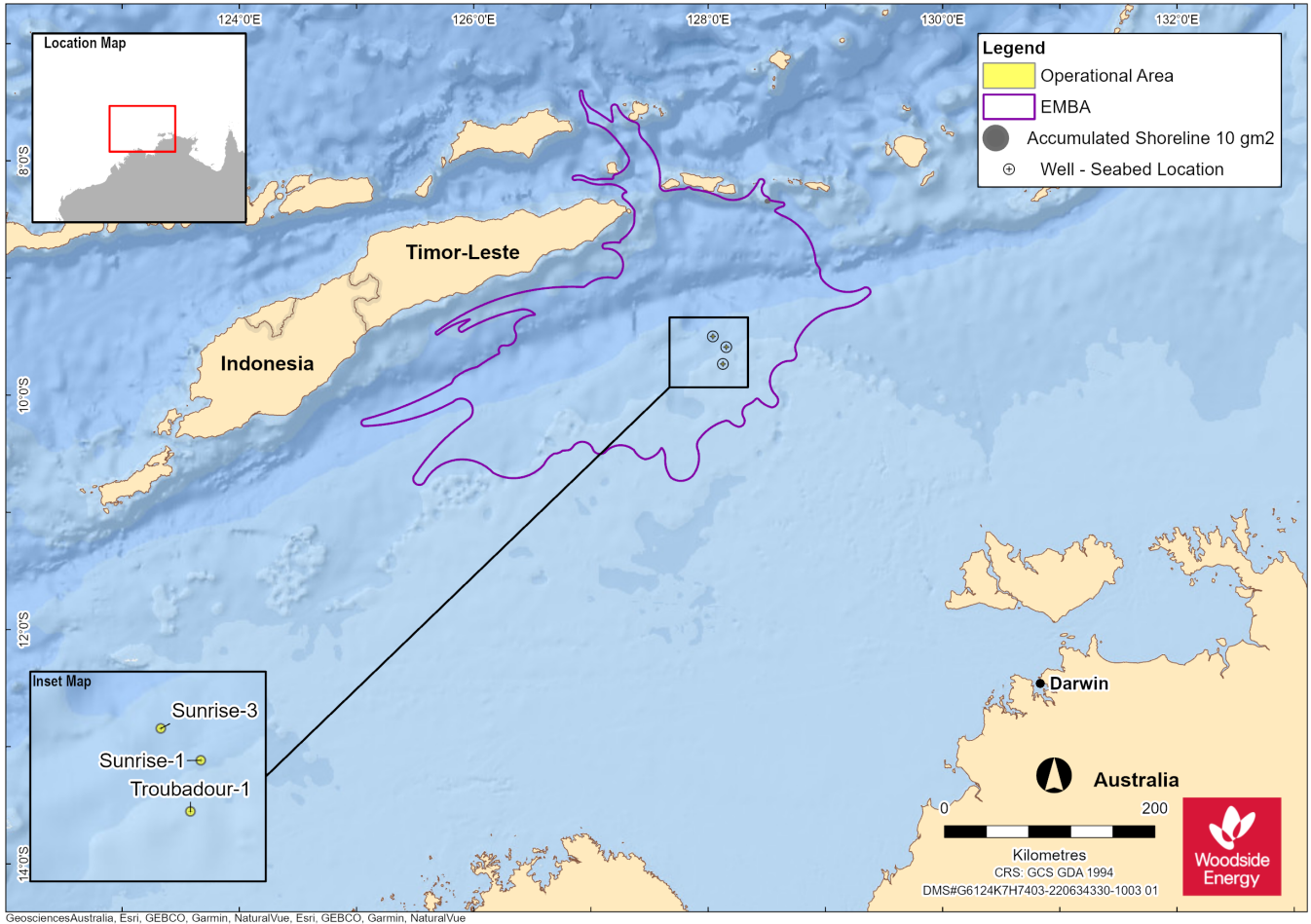


Figure 2. Environment that May Be Affected

Note: This EMBA map has been updated in May 2024 based on a new best practice scientific approach to oil spill modelling. The new modelling has reduced the EMBA that was originally defined for consultation with relevant persons in Australia in 2023.

Mitigation and management measures

Woodside has undertaken an assessment to identify potential impacts and risks to the environment arising from the Sunrise Wellhead Management activities.

A number of mitigation and management measures for the Petroleum Activities Program (PAP) are outlined in Table 3. Further details will be provided in the EP.

Table 3. Summary of key risks and/or impacts and preliminary draft management measures for the Petroleum Activities Program

Potential Impact/Risk	Description of Source of Potential Impact/Risk	Description of Potential Impacts and Risks	Preliminary Draft Mitigation and/or Management Measures
Planned			
Physical presence: interference or displacement of third party vessels	<ul style="list-style-type: none"> An offshore support vessel may be required to complete non-routine inspection, maintenance and repair (IMR) of the three wellheads. During non-routine IMR activities one vessel will be present in the Operational Area of each wellhead (1500 m radius) up to 10 days per well. The physical presence and movement of the offshore support vessel within the Operational Area for each wellhead has the potential to temporarily displace other marine users. The ongoing presence of wellheads also has the potential to displace other marine users. 	<ul style="list-style-type: none"> Should non-routine IMR be required, other vessels in close vicinity of the wellheads may experience temporary and localised displacement during the activity. Given the location of the Operational Area (outside the Australian Fishing Zone), no Australian Commonwealth, State or Territory managed fisheries overlap the wellheads. One Indonesian managed commercial fishery (Aru Sea, Arafura Sea and eastern Timor Sea Fisheries Management Area (FMA 718)) overlaps the wellheads and data suggest vessels may be active in the area. Therefore, temporary and localised displacement of fishers is possible if activities are required. Given the depth of the wellheads and practices used by the fishery, the ongoing presence of the wellheads is not expected to negatively impact fishers. Given the offshore location and depths of the wellheads, traditional fishing, recreational fishing and tourism are unlikely to occur in the area, however, any impacts would be localised and temporary displacement. No defence or other oil and gas activities are expected to occur in the area. The wellheads do not overlap any shipping fairways, however, any impacts to these vessels would be localised and temporary displacement. 	<ul style="list-style-type: none"> Vessels adhere to the regulatory requirements for navigational safety. Establish a temporary 500 m exclusion zone around IMR vessel, which is communicated to marine users. Notify relevant government departments, fishing industry representative bodies and licence holders of activities prior to commencement and on completion of activities. Notify the Australian Hydrographic Office (AHO) prior to commencement of the activity to enable them to update maritime charts ensuring marine users are aware of the activity. Consult with relevant persons so they are informed of the proposed activities.
Physical presence: seabed disturbance	<ul style="list-style-type: none"> During non-routine IMR activities seabed disturbance may result from the following: <ol style="list-style-type: none"> Movement of a ROV near seabed. DP transponders - clump weight. 	<ul style="list-style-type: none"> Habitat modification as a result of seabed disturbance could occur within a localised radius of the well. Within this area, it is possible that benthic communities may be reduced or altered, leading to a highly localised impact to epifauna and infauna benthic communities present. The Operational Area for each wellhead is expected to consist of primarily sandy substrate and soft, muddy sediments and do not overlap any sensitive or protected habitats. 	<ul style="list-style-type: none"> No additional controls required to manage impacts to an ALARP and acceptable level.

Potential Impact/Risk	Description of Source of Potential Impact/Risk	Description of Potential Impacts and Risks	Preliminary Draft Mitigation and/or Management Measures
Routine acoustic emissions	<ul style="list-style-type: none"> During non-routine IMR activities the offshore support vessel will generate noise in the air and underwater due to the operation of thruster engines, propellers, and on-board machinery etc. Underwater noise may also be generated by positioning equipment (subsea transponders) 	<ul style="list-style-type: none"> Elevated underwater noise may affect marine fauna, including marine mammals (cetaceans), turtles and fish in three main ways: <ol style="list-style-type: none"> By causing direct physical effects, including injury or hearing impairment. Hearing impairment may be temporary (temporary threshold shift – TTS), or permanent (PTS), with PTS generally considered to represent a form of injury. Through disturbance leading to behavioural changes or displacement from important areas. The occurrence and intensity of disturbance is highly variable and depends on a range of factors relating to the animal and situation. By masking or interfering with other biologically important sounds (including vocal communication, echolocation, signals and sounds produced by predators or prey). The Operational Area for each wellhead is not known to represent any significant foraging/aggregation habitat for any protected marine species, however, it is adjacent to the migration Biologically Important Area (BIA) for pygmy blue whales and individuals may be more likely to occur in the area during their northern migration (April – August) or their southern migration (October – January). Given the duration and nature of the activities, if required, and offshore location where they will occur, impacts to marine fauna are expected to be limited to temporary avoidance of the area with no lasting effect. No direct physical effects are expected to occur to any protected marine species from noise emissions. 	<ul style="list-style-type: none"> Comply with regulatory requirements for interactions with marine fauna to prevent adverse interactions.

Potential Impact/Risk	Description of Source of Potential Impact/Risk	Description of Potential Impacts and Risks	Preliminary Draft Mitigation and/or Management Measures
Routine and non-routine discharges: project vessels	<ul style="list-style-type: none"> During non-routine IMR activities sewage, greywater, and putrescible waste will be discharged from the offshore support vessel. Bilge water, deck drainage and brine may also be discharged. 	<ul style="list-style-type: none"> The main impact associated with ocean disposal of sewage and other organic wastes (i.e. putrescible waste) is eutrophication. Eutrophication occurs when the addition of nutrients, such as nitrates and phosphates, causes adverse changes to the ecosystem including short-term, localised impacts to water quality. No significant impacts to water quality are expected from discharges given the minor quantities involved, the expected localised mixing zone, and the high level of dilution into the open water marine environment of the Operational Area for each wellhead. Similarly, although some marine fauna may transit the area, potential for impacts remains low due to the localised nature of discharges and rapid dilution. 	<ul style="list-style-type: none"> Comply with regulatory requirements for marine discharges.
Routine and non-routine discharges: IMR Activities	<ul style="list-style-type: none"> During non-routine IMR activities discharges of small volumes of fluids (e.g. chemicals for marine growth removal) may be required. 	<ul style="list-style-type: none"> Impacts from discharges of fluids will be localised to the immediate vicinity of the release location with no lasting impacts, given the small volumes discharged, rapid dilution and low sensitivity of the receiving environment. 	<ul style="list-style-type: none"> Comply with regulatory requirements for marine discharges. Chemicals intended or likely to be discharged into the marine environment reduced to ALARP using Woodside's chemical assessment process.
Atmospheric emissions	<ul style="list-style-type: none"> During non-routine IMR activities atmospheric emissions and greenhouse gases (GHG) will be generated by the offshore support vessel and helicopters from internal combustion engines and incineration activities. 	<ul style="list-style-type: none"> Emissions from the offshore support vessel and helicopters could result in temporary, localised reductions in air quality in the immediate vicinity. Given the offshore location of the wellheads, 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 negligible. Given the nature and scale of GHG emissions for this activity, the potential GHG impact and risk is considered negligible. 	<ul style="list-style-type: none"> Comply with regulatory requirements for marine air pollution.

Potential Impact/Risk	Description of Source of Potential Impact/Risk	Description of Potential Impacts and Risks	Preliminary Draft Mitigation and/or Management Measures
Light emissions	<ul style="list-style-type: none"> During non-routine IMR activities the offshore support vessel will use external lighting to navigate and conduct safe operations at night. Vessel lighting will also be used to communicate the vessel's presence to other marine users (i.e. navigation/warning lights). 	<ul style="list-style-type: none"> Light emissions have the potential to affect fauna such as marine turtles in two main ways: <ol style="list-style-type: none"> Behaviour: artificial lighting has the potential to create a constant level of light at night that may override natural levels and cycles Orientation: if an artificial light source is brighter than a natural source, the artificial light may override natural cues, leading to disorientation. The Operational Area for each wellhead may be occasionally visited by seabirds and lies within the East Asian Australian Flyway (EAAF) for migratory shorebirds. Individuals may migrate through the area, but due to the lack of suitable stopover features, large numbers are not expected. Potential impacts are expected to be limited to localised behavioural disturbance to isolated individuals, with no significant impact to seabird foraging. The presence of marine turtles in the Operational Area for each wellhead is likely to be limited to individuals temporarily transiting the area. As such, light emissions from a vessel is unlikely to result in more than localised behavioural disturbance to isolated transient individuals, with no lasting effect to the species. 	<ul style="list-style-type: none"> No additional controls required to manage impacts to an ALARP and acceptable level.

Unplanned

Unplanned hydrocarbon release: vessel collision

- During non-routine IMR activities the offshore support vessel will use marine diesel fuel, meaning a vessel collision involving a project vessel or third-party during the activity may potentially result in the release of marine diesel.
- For a collision to result in the worst-case scenario diesel release, several factors must occur as follows:
 - Identified causes of vessel interaction must result in a collision,
 - The collision has enough force to penetrate the vessel hull and 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.

- In the highly unlikely event of a vessel collision causing a release of hydrocarbons, impacts to water quality and marine ecosystems could occur.
- Modelling of a surface release of marine diesel was used to understand potential impacts.
- Marine diesel is a relatively volatile, non-persistent nature hydrocarbon with up to 41% evaporating within the first 24 hours.
- Potential impacts across the whole EMBA were assessed including receptors such as plankton, fish, marine turtles, marine mammals, seabirds and migratory shorebirds, tourism, recreation, and commercial fisheries (for example).
- Taking into account receptor sensitivity, the receptors were rated as having a potential consequence level of 'Minor' or less.

Preventing vessel collision

- Comply with regulatory requirements for the prevention of vessel collisions and safety and emergency arrangements.
- Consult with relevant persons so that other marine users are informed and aware, reducing the likelihood of a collision.
- Establish temporary exclusion zone around the offshore support vessel which is communicated to marine users to reduce the likelihood of collision.

Spill response arrangements

- Arrangements supporting the Oil Pollution Emergency Preparation document (OPEP) will be tested to confirm the OPEP can be implemented as planned.
- Emergency response activities would be implemented in line with the OPEP.

Potential Impact/Risk	Description of Source of Potential Impact/Risk	Description of Potential Impacts and Risks	Preliminary Draft Mitigation and/or Management Measures
Unplanned discharge: deck spills	<ul style="list-style-type: none"> During non-routine IMR activities accidental discharge of hydrocarbons/chemicals from vessel deck activities and equipment may occur. 	<ul style="list-style-type: none"> Unplanned discharges of non-process chemicals and hydrocarbons may decrease the water quality in the immediate vicinity of the release. Only small volumes (<100 L) would be expected to potentially occur, resulting in very short-term impacts to water quality, and limited to the immediate release location. No significant impacts from the accidental discharges described would be anticipated due to the offshore/open water locations, low sensitivity of surrounding water quality and high level of dilution into the open water marine environment of the Operational Area for each wellhead. 	<ul style="list-style-type: none"> Compliance with Marine Order 91 – marine pollution prevention—oil. Liquid chemical and fuel storage areas are banded or secondarily contained when they are not being handled/moved temporarily. Spill kits positioned in high-risk locations around the vessel (near potential spill points such as transfer stations).
Unplanned discharge: hazardous and non-hazardous solid waste/equipment	<ul style="list-style-type: none"> During non-routine IMR activities accidental, unplanned loss of hazardous or non-hazardous solid wastes/equipment to the marine environment may occur if dropped or blown overboard. 	<ul style="list-style-type: none"> The potential impacts of hazardous or non-hazardous solid wastes and 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. The temporary or permanent loss of waste materials/equipment into the marine environment is not likely to have a significant environmental impact, based on the location of the wellheads, the types, size and frequency of wastes that could occur, and species present. 	<ul style="list-style-type: none"> Compliance with Marine Order 95 – marine pollution prevention—garbage. Any solid waste/equipment dropped to the marine environment will attempted to be recovered where safe and practicable to do so.

Potential Impact/Risk	Description of Source of Potential Impact/Risk	Description of Potential Impacts and Risks	Preliminary Draft Mitigation and/or Management Measures
Physical presence (unplanned): vessel collision with marine fauna	<ul style="list-style-type: none"> During non-routine IMR activities accidental collision between project vessels and protected marine fauna may occur. 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) and the type of animal potentially present and their behaviours. 	<ul style="list-style-type: none"> Vessel movements have the potential to result in accidental collisions between the vessel (hull and propellers) and marine fauna. The risk of vessel collision with marine fauna is present year-round but is seasonally elevated for species such as pygmy blue whales during migration periods. The wellheads are adjacent to the migration BIA for pygmy blue whales and individuals may be more likely to occur in the area during their northern migration (April – August) or their southern migration (October – January). Given the short duration of activities, and the slow speeds at which offshore support vessel would operate collisions with cetaceans are considered highly unlikely. Due to the absence of potential nesting habitat and location offshore, the Operational Area for the wellheads are unlikely to represent important habitat for marine turtles. The occurrence of all species of marine reptiles within the area is expected to be limited to infrequent occurrences of transitory individuals. Given the duration of activities, and the slow speeds at which the offshore support vessel would operate, collisions or entanglement with transiting marine turtles are considered highly unlikely. 	<ul style="list-style-type: none"> Comply with regulatory requirements for interactions with marine fauna to reduce the likelihood of a collision occurring.
Physical presence (unplanned): accidental introduction and establishment of invasive marine species (IMS)	<ul style="list-style-type: none"> During non-routine IMR activities the offshore support vessel may be subject to marine fouling whereby organisms attach to the vessel hull. Organisms may also be drawn into ballast tanks during onboarding of ballast water. Submersible equipment (e.g. ROV) may be subject to marine fouling. 	<ul style="list-style-type: none"> The wellheads are located in deep offshore open waters, away from shorelines and/or critical habitat, more than 100 km from a shoreline and in waters between 96 m and 525 m deep, are not conducive to the settlement and establishment of IMS. 	<ul style="list-style-type: none"> Ballast water and biofouling will be managed according to regulatory requirements, including the Australian Ballast Water Management Requirements, and the Australian Biofouling Management Requirements (international vessels), as applicable. Woodside's IMS risk assessment process will be applied to the offshore support vessel and immersible equipment entering the Operational Area.

Feedback

Woodside consults relevant persons in the course of preparing Environment Plans to notify them of the activity and to obtain relevant feedback to inform its planning for proposed petroleum activities in the region.

If you would like to comment on the proposed activities outlined in this information sheet, or would like additional information, please contact Woodside before **26 July 2024** via:

E: Feedback@woodside.com

Toll free: 1800 442 977

You can subscribe on our website to receive Consultation Information Sheets for proposed activities:

www.woodside.com/sustainability/consultation-activities.

Please note that your feedback and our response will be included in our Environment Plan for the proposed activity, which will be submitted to the NOPSEMA for acceptance in accordance with the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (Cth)* or the *Petroleum (Submerged Lands) (Environment) Regulations 2009 (Cth)*. Your feedback may also be used to support other regulatory processes associated with the planned activities (which may or may not be confidential).

Please let us know if your feedback for this activity is sensitive and we will make this known to NOPSEMA upon submission of the EP in order for this information to remain confidential to NOPSEMA.

Woodside will communicate any material changes to the proposed activity to affected stakeholders as they arise.