

# WA-61-L SCARBOROUGH DRILLING AND COMPLETIONS

## CARNARVON BASIN, NORTH-WEST AUSTRALIA

Woodside is planning to conduct drilling and completions activities in accordance with the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (Cth). The Petroleum Activities Program is located in Permit Area WA-61-L in Commonwealth waters, about 374 km west-northwest of Dampier, Western Australia.

The activity is planned to occur anytime within a five-year window commencing in late H2 2023, pending approvals. Relevant stakeholders will be advised of the timing once determined.

The WA-61-L Scarborough Drilling and Completions Environment Plan (EP) will cover drilling and subsea tree installation activities for eight planned development wells and the potential for a further two additional contingency wells. Woodside may also need to intervene, workover or re-drill the wells. Subsea inspection, monitoring, maintenance and subsea infrastructure repair activities may also be undertaken.

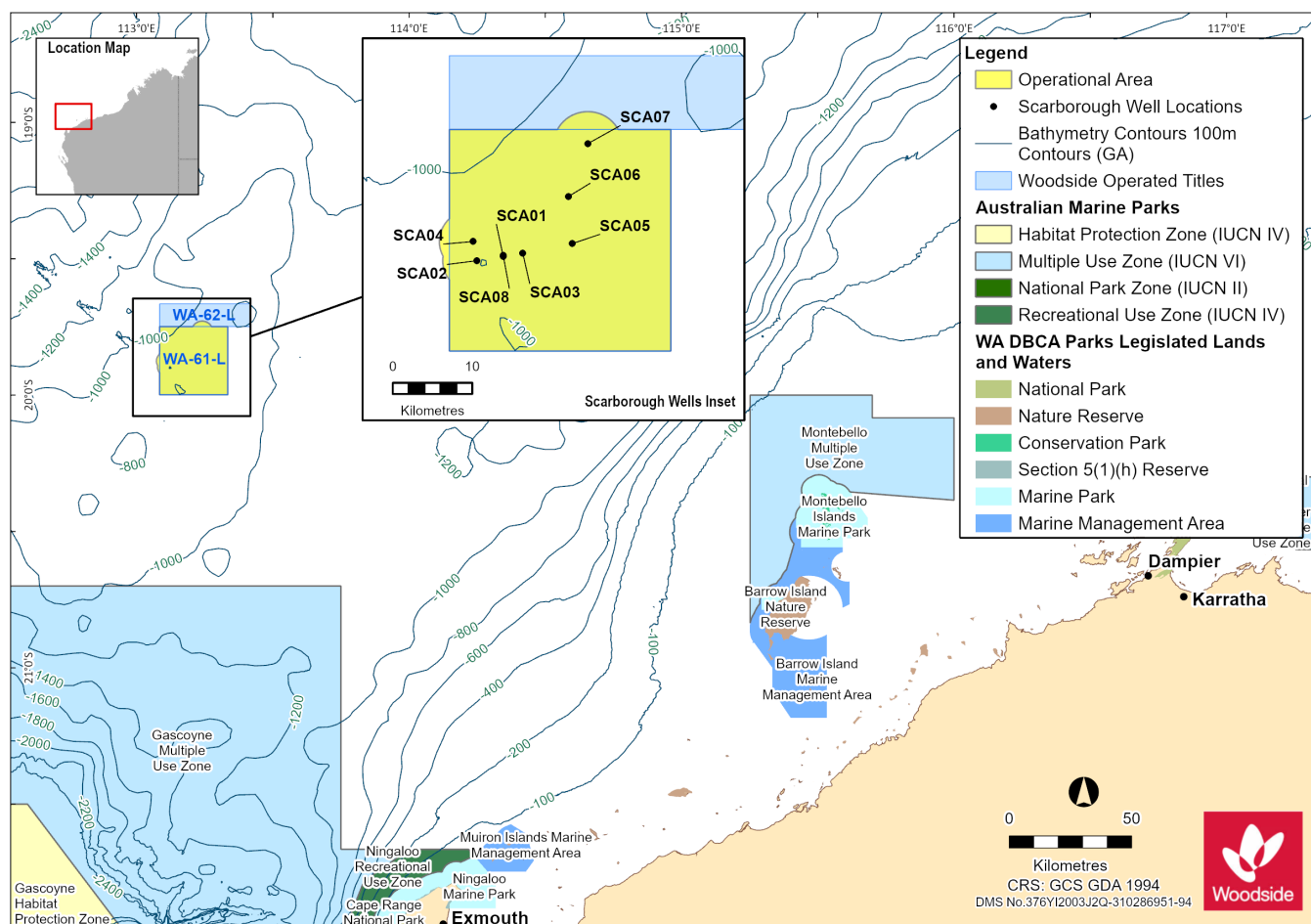


Figure 1. Proposed Scarborough Drilling and Completions Operational Area.

## Proposed activity

**Table 1 – Activity summary**

Activity	Details
<b>Earliest commencement date</b>	H2 2023 pending approvals, vessel availability and weather constraints
<b>Estimated duration</b>	50-60 days per well
<b>Operational Area</b>	4,000 m for moored mobile offshore drilling unit (MODU), 500 m for dynamically positioned mobile offshore drilling unit (DPMODU)
<b>Water depth in Operational Area</b>	Approximately 900 m – 955 m
<b>MODU</b>	DPMODU with contingency for moored MODU, depending on availability and suitability for the development well locations and to allow options for relief well drilling.
<b>Project Vessels</b>	<ul style="list-style-type: none"> <li>• Installation vessels for installing the subsea infrastructure.</li> <li>• Light well intervention vessel as an option for well intervention, subsea hardware installation or contingent activities.</li> <li>• Support vessels including installation vessel(s), anchor handling vessel(s) and general supply/support vessels.</li> </ul>
<b>Distance from Operational Area to nearest port/marina</b>	244 km north-northwest of Exmouth, 374 km west-northwest of Dampier
<b>Distance from Operational Area to nearest marine park</b>	<ul style="list-style-type: none"> <li>• 83 km north of the Gascoyne Marine Park (Cwlth)</li> <li>• 206 km north-west of Montebello Marine Park (Cwlth)</li> <li>• 208 km north-northwest of Ningaloo Marine Park (Cwlth)</li> </ul>

Drilling and completions for the development wells is expected to take approximately 50-60 days per well to complete. Subsea inspection, monitoring, maintenance and repair activities may be conducted intermittently and over short durations in the immediate vicinity of installed subsea infrastructure. Activities will be conducted 24 hours per day, seven days per week. Timing and duration of these activities is subject to change due to project schedule requirements, drill rig and vessel availability, weather and unforeseen circumstances. Technical details are outlined in Table 2.

### Project vessels

Woodside is currently considering rig options for drilling of the wells, which include a moored semi-submersible MODU, a dynamically positioned drill ship or a DPMODU. Dynamic positioning is a computer-controlled system to automatically maintain a vessel or rig's position and heading by using its own propellers and thrusters. Typically, two or three vessels will support drilling activities, with at least one vessel in the vicinity to complete standby duties, if required. Supply vessels will visit the selected MODU/drill ship at regular intervals. A subsea installation vessel will be used for the installation of the subsea infrastructure, with support from additional dedicated vessels. Support vessels are also required for inspection, monitoring, maintenance and repair activities.

### Communications with mariners

A petroleum safety zone of 500 m will be in place around the MODU and installation vessel for the duration of activities. The following Operational Areas will also apply:

- DPMODU/drillship – 500 m radius from each well centre
- Moored MODU – 4,000 m radius from each well centre.
- Installation vessel – 1,500 m radius around subsea locations

Marine notices will be issued prior to activity commencement to alert vessels which may be operating in waters nearby.

### Proposed locations

Approximate development well locations for the eight planned wells are provided in Table 2. In the event the two additional contingency wells are installed, they will be also be in WA-61-L, with all activities undertaken within the relevant Operational Area.

### Implications for stakeholders

Woodside will consult relevant stakeholders whose interests, functions, and activities may be affected by the proposed activities. We will also keep informed other stakeholders who have an identified interest in the planned activities. Woodside has undertaken an assessment to identify potential risks to the marine environment and relevant stakeholders, considering timing, duration, location and potential impacts arising from the drilling, construction and installation activities. This EP approval falls under the primary environmental approval of the Scarborough Offshore Project Proposal (OPP) and will be conducted in line with relevant requirements of the OPP. A number of mitigation and management measures will be implemented and are summarised in Table 3.

### About Scarborough

The Scarborough gas resource is located offshore, approximately 375 km west-northwest of the Burrup Peninsula and is part of the Greater Scarborough gas fields which are estimated to hold 13.0 Tcf (2C, 100%) of dry gas.

Woodside, as operator of the Scarborough Joint Venture, is proposing to develop the Scarborough gas resource through new offshore facilities connected by an approximately 430 km pipeline to a proposed expansion of the existing Pluto LNG onshore facility (Pluto Train 2).

For more information about the proposed Scarborough development, visit [woodside.com](http://woodside.com).

**Table 2 – Proposed well locations**

Activity	Water Depth (Approx. m LAT)	Latitude	Longitude	Permit Area
<b>New development wells</b>				
SCA01 well	910	19° 53' 30.499" S	113° 08' 43.568" E	WA-61-L
SCA02 well	912	19° 53' 48.471" S	113° 06' 55.261" E	WA-61-L
SCA03 well	912	19° 53' 18.551" S	113° 10' 03.300" E	WA-61-L
SCA04 well	918	19° 52' 30.359" S	113° 06' 41.412" E	WA-61-L
SCA05 well	918	19° 52' 38.718" S	113° 13' 24.437" E	WA-61-L
SCA06 well	902	19° 49' 27.763" S	113° 13' 08.300" E	WA-61-L
SCA07 well	907	19° 45' 52.900" S	113° 14' 27.449" E	WA-61-L
SCA08 well	909	19° 53' 27.254" S	113° 08' 43.647" E	WA-61-L
<b>Contingent wells</b>		Within permit area WA-61-L		

### Environment That May Be Affected (EMBA)

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

The EMBA does not represent the extent of predicted impact of the highly unlikely marine diesel release. Rather, the EMBA represents the merged area of many possible paths a highly unlikely 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.

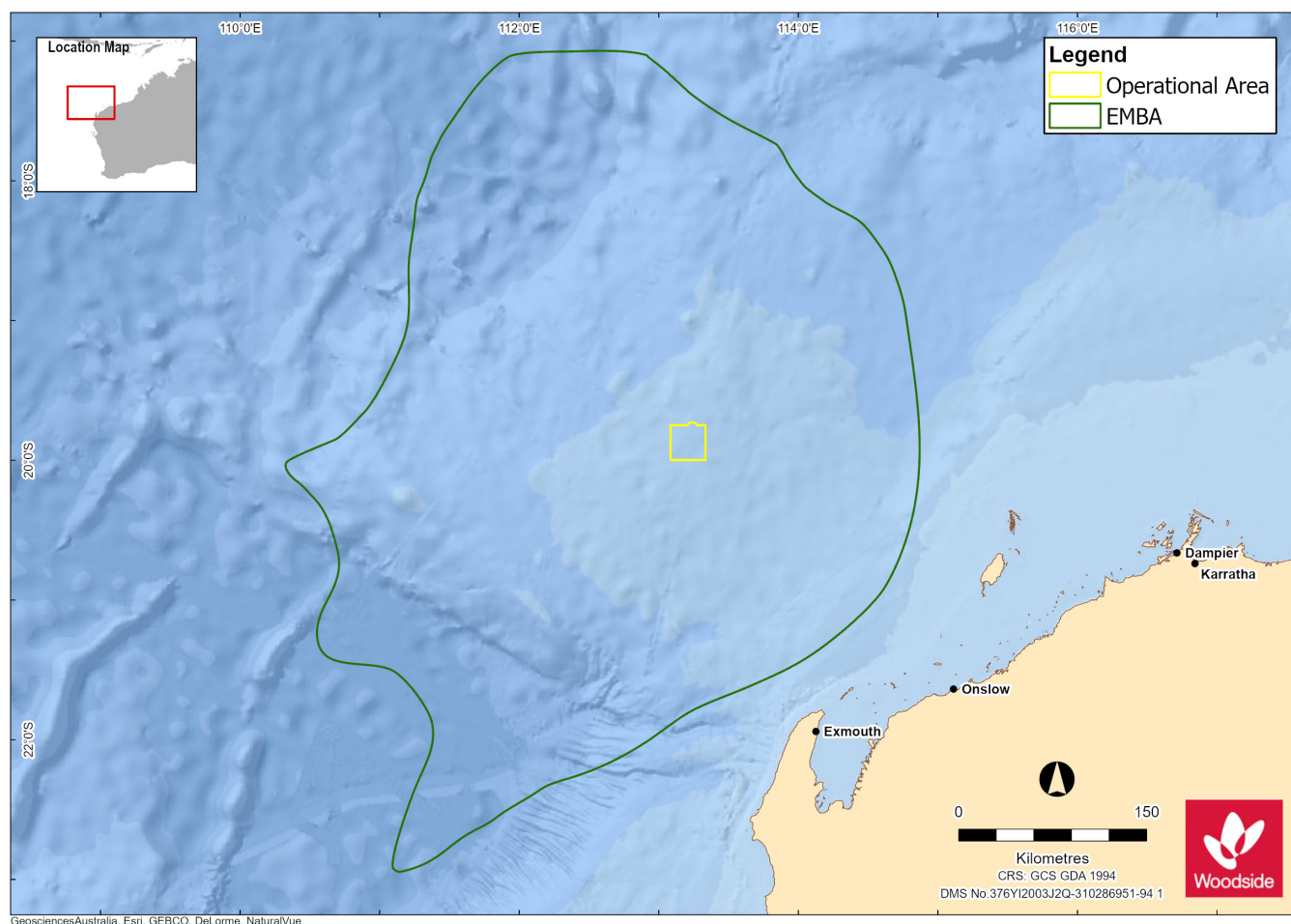


Figure 2. Environment that May Be Affected by the Scarborough Drilling and Completions Activity.

## Mitigation and management measures

Woodside has undertaken an assessment to identify potential impacts and risks to the environment arising from the Scarborough Drilling and Completions Activity.

A number of mitigation and management measures for the Scarborough Drilling and Completions Activity are outlined in **Table 3**.

**Table 3 - Summary of key risks and/or impacts and preliminary management measures for the Scarborough Drilling and Completions Activity**

Potential Impact/ Risk	Description of Source of Potential Impact/Risk	Description of Potential Impact/Risk	Preliminary Mitigation and/or Management Measures <sup>1</sup>
<b>Planned</b>			
<b>External lighting on the MODU and project vessels</b>	<ul style="list-style-type: none"> <li>Project vessels and the Mobile Offshore Drilling Unit (MODU) will use external lighting to navigate and conduct safe operations at night.</li> <li>Vessel lighting will also be used to communicate the MODU and vessel presence to other marine users (i.e. navigation/warning lights).</li> <li>Light may also be emitted from flaring during well unloading.</li> </ul>	<ul style="list-style-type: none"> <li>Light emissions can affect fauna (such as marine turtles and birds) in two main ways:               <ol style="list-style-type: none"> <li>Behaviour: artificial lighting has the potential to create a constant level of light at night that can override natural levels and cycles.</li> <li>Orientation: if an artificial light source is brighter than a natural source, the artificial light may override natural cues, leading to disorientation.</li> </ol> </li> <li>Given the distance from shore (&gt;215 km from the North West Cape), 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 activity, light emissions to marine turtles are unlikely to result in more than slight, localised behavioural disturbance to isolated transient individuals, with no lasting effect to the species.</li> <li>As the Operational Area is offshore and away from islands or other emergent features, presence of seabirds or shorebirds is considered likely to be of a transient nature only. Behavioural disturbance to birds from light is expected to be localised to within the vicinity of the MODU and vessels, and will not seriously disrupt the lifecycle of an ecologically significant proportion of migratory birds.</li> </ul>	<ul style="list-style-type: none"> <li>Lighting limited to the minimum required for navigational and safety requirements, except for emergency events.</li> <li>Flaring restricted to a duration necessary to achieve the well objectives, eliminating unnecessary flared volumes and corresponding light emissions.</li> </ul>
<b>Atmospheric emissions and greenhouse gas (GHG) emissions</b>	<ul style="list-style-type: none"> <li>Atmospheric emissions and GHG emissions will be generated by the project vessels and MODU from internal combustion engines and incineration activities.</li> <li>Well flowback if carried out, will result in flaring and/or venting of hydrocarbons.</li> <li>Contingent venting of gas during drilling in the unplanned event of a well-kick will also result in release of some GHG emissions.</li> </ul>	<ul style="list-style-type: none"> <li>Emissions from project vessels and MODU could result in temporary, localised reductions in air quality in the immediate vicinity.</li> <li>Given the offshore location of the activity, and the low volumes of atmospheric emissions which will be generated, biodiversity, ecological integrity, social amenities and human health will not be impacted and potential impact to air quality is considered negligible.</li> <li>Given the nature and scale of GHG emissions from vessel and MODU fuel usage for this activity, the potential GHG impact and risk from this activity is considered negligible.</li> </ul>	<ul style="list-style-type: none"> <li>Comply with regulatory requirements for marine air pollution and GHG emissions reporting. Vessel speed will be managed to reduce fuel consumption where practicable.</li> <li>Wells drilled in compliance with the accepted Well Operations Management Plan (WOMP), including implementation of barriers to prevent a loss of well integrity.</li> <li>Flaring restricted to a duration necessary to achieve the well objectives, eliminating unnecessary flared volumes and corresponding GHG emissions.</li> <li>Assess opportunities to eliminate well flowback flaring to MODU to reduce GHG emissions.</li> <li>Contractors engaged on energy/GHG emissions efficiencies and opportunities identified are implemented where feasible and as low as reasonably practicable (ALARP).</li> <li>Track and review GHG emissions during the activity to identify further opportunities to improve efficiencies if possible.</li> </ul>

<sup>1</sup> This EP is currently under assessment – these mitigation and management measures are subject to change through the consultation and assessment process and may not represent content in the publicly available EP or in the final plan once accepted.

Potential Impact/ Risk	Description of Source of Potential Impact/Risk	Description of Potential Impact/Risk	Preliminary Mitigation and/or Management Measures <sup>1</sup>
<b>Routine acoustic emissions</b>	<ul style="list-style-type: none"> <li>Project vessels and MODU will generate noise in the air and underwater due to the operation of thruster engines, propellers, and on-board machinery etc.</li> <li>Underwater noise may also be generated by positioning equipment (subsea transponders).</li> </ul>	<ul style="list-style-type: none"> <li>Elevated underwater noise can affect marine fauna, including marine mammals, turtles and fish in three main ways:               <ol style="list-style-type: none"> <li>By causing direct physical effects, including injury or hearing impairment. Hearing impairment may be temporary or permanent.</li> <li>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.</li> <li>By masking or interfering with other biologically important sounds (including vocal communication, echolocation, signals and sounds produced by predators or prey).</li> </ol> </li> <li>There is no potential for injury permanent or temporary to pygmy blue whales migrating within the Biologically Important Area (BIA) (about 35 km from the Operational Area). Injury to other whale species is also not considered credible as individuals are not expected to spend long durations close to operations and are more likely to be transiting through the area.</li> <li>Marine turtle presence is expected to be infrequent, and potential impacts from predicted noise levels from the project vessels (including MODU and support vessels) are not considered to be ecologically significant at a population level.</li> <li>It is reasonable to expect fish, sharks and rays may demonstrate avoidance or attraction behaviour to the noise generated by the activity. However, potential impacts from predicted noise levels from the project vessels and MODU are not considered to be ecologically significant at a population level.</li> </ul>	<ul style="list-style-type: none"> <li>Comply with regulatory requirements for interactions with marine fauna to prevent adverse interactions.</li> <li>Implement adaptive management procedure prior to and during MODU/ installation vessel moves to the next well location, during daylight hours.</li> <li>Collect data on opportunistic sightings of pygmy blue whales to gauge presence and behaviour.</li> <li>Move support vessel(s) away from MODU (&gt;2 km) if pygmy blue whale are observed foraging within 500 m when support vessel is not being used to perform functionality as required by Safety Case.</li> </ul>
<b>Physical presence - interactions with other marine users</b>	<ul style="list-style-type: none"> <li>Several vessel types will be required to complete the activity including a MODU (may be Dynamic Positioned (DP) or moored), installation vessel and support vessels.</li> <li>The physical presence and movement of project vessels within the Operational Area has the potential to displace other marine users.</li> <li>The presence of subsea infrastructure also has the potential to interfere with or displace third party vessels (commercial fishing).</li> </ul>	<ul style="list-style-type: none"> <li>Other vessels in the Operational Area, which may include commercial fishing and shipping and defence, may experience temporary and localised displacement during the activity.</li> <li>The Operational Area is not an area of high commercial fishing activity, and displacement of fishing activities will be temporary and have no lasting effect.</li> <li>Tourism and recreation within the Operational Area are expected to be limited due to the distance offshore and water depths. Given the location, and short-term nature of activities, it is expected that there will be no impact.</li> </ul>	<ul style="list-style-type: none"> <li>Vessels adhere to regulatory requirements for navigational safety.</li> <li>Establish a 500 m petroleum safety zone around MODU and the installation vessel and communicate to marine users.</li> <li>Notify relevant government departments, fishing industry representative bodies and licence holders of activities prior to commencement and on completion of activities.</li> <li>Notify the Australian Hydrographic Service (AHS) prior to commencement of the activity to enable them to update maritime charts ensuring marine users are aware of the activity. Notify Defence of activities no less than five weeks before the scheduled activity commencement date.</li> <li>Consult with relevant persons so that they are informed of the proposed activities.</li> </ul>

Potential Impact/ Risk	Description of Source of Potential Impact/Risk	Description of Potential Impact/Risk	Preliminary Mitigation and/or Management Measures <sup>1</sup>
<b>Physical presence – disturbance to Benthic Habitat from MODU anchoring, drilling operations, subsea installation and ROV operations</b>	<ul style="list-style-type: none"> <li>Seabed disturbance may result from: <ul style="list-style-type: none"> <li>Drilling operations (from installation of the blowout preventer (BOP) and conductor), mooring installation (if a moored MODU is used instead of a DP MODU) and</li> <li>Remotely Operated Vehicle (ROV) operations and other activities in proximity to the seabed such as marine growth removal from infrastructure.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Habitat modification as a result of seabed disturbance (excluding drill cuttings and fluids) could occur within a radius of up to 10 m from each well (10 wells in total). Near this area, benthic communities may be reduced or altered, leading to a highly localised impact to epifauna and infauna benthic communities present.</li> <li>The Exmouth Plateau Key Ecological Feature (KEF) overlaps the Operational Area and seabed disturbance may lead to a highly localised change in habitat and water quality, which will be short-term. These potential short-term impacts are unlikely to impact on the ecological value of the KEF.</li> </ul>	<ul style="list-style-type: none"> <li>Mooring systems (chains/wires and anchors) will be removed.</li> <li>Infrastructure will be placed on the seabed within the predefined design footprint using positioning technology to limit seabed disturbance. Project specific Mooring Design Analysis (for anchored MODU) to reduce the likelihood of anchor drag leading to seabed disturbance.</li> </ul>
<b>Routine and non-routine discharges – MODU and project vessels</b>	<ul style="list-style-type: none"> <li>Sewage, greywater and macerated food waste will be discharged from project vessels and MODU.</li> <li>Bilge water, deck drainage and brine and cooling water may also be discharged.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>No significant impacts are expected to water quality from planned discharges because of 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.</li> <li>Similarly, although some marine fauna may transit the Operational Area, potential for impacts remains low due to the localised nature of discharges and rapid dilution.</li> </ul>	<ul style="list-style-type: none"> <li>Marine discharges will be managed according to regulatory requirements.</li> <li>Chemicals will be selected with the lowest practicable environmental impacts and risks subject to technical constraints and approved through the Woodside chemical assessment process.</li> </ul>

Potential Impact/ Risk	Description of Source of Potential Impact/Risk	Description of Potential Impact/Risk	Preliminary Mitigation and/or Management Measures <sup>1</sup>
<b>Routine and non-routine discharges – drill cuttings and drilling fluid</b>	<ul style="list-style-type: none"> <li>Routine discharge of Water Based Mud (WBM) and/or treated Non-Water Based Mud (NWB) and drill cuttings to the seabed and marine environment will occur.</li> <li>Discharges of other fluids may occur as required such as wash water from mud pits, vessel tank wash fluids and well clean-out fluids.</li> </ul>	<ul style="list-style-type: none"> <li>Drill cuttings and retained drilling fluid discharges are expected to increase turbidity and total suspended sediment (TSS) levels above ambient concentrations above the seabed (for top-hole well sections) or in the upper surface layers (for bottom-hole well sections). This reduction in water quality will be temporary (limited to the operational discharges during drilling) and subject to rapid dispersion and dilution by prevailing seabed currents.</li> <li>It is expected that impacts to plankton species will be highly localised and return to previous conditions within a relatively short period of time due to the open nature of the marine environment and associated environmental conditions, the content and dispersive nature of drilling muds within the marine environment and the high population replenishment of these organisms.</li> <li>Impacts to benthic communities will be largely limited to an area surrounding the well locations. The low sensitivity of the benthic communities/habitats within and in the vicinity of the Operational Area, combined with the low toxicity of WBMs and residual NWBs, no bulk discharges of NWBM and the highly localised nature and scale of predicted physical impacts to seabed biota, mean predicted impact is considered to be slight.</li> <li>Potential impacts to the Exmouth Plateau KEF, which overlaps the Operational Area, relate to ecological impacts to the seabed habitat and benthic communities. The extremely small portion of the overall KEF area predicted to be impacted in combination with the predicted recovery of the affected benthic communities, mean that predicted impact is considered to be minor.</li> </ul>	<ul style="list-style-type: none"> <li>All chemicals intended or likely to be discharged into the marine environment reduced to ALARP using the Woodside chemical assessment process.</li> <li>NWBM base oils selected based on expected toxicity.</li> <li>NWBMs only used where written justification process has been followed and bulk NWBM will be retained for disposal onshore or maintained on rig for re-use.</li> <li>Fluids contaminated with hydrocarbons will be treated to meet specified discharge limits prior to discharge or contained. If discharge specification not met the fluid will be returned to shore. Drill cuttings returned to the MODU will be discharged below the water line to facilitate dispersion.</li> </ul>
<b>Routine and non-routine discharges – cement, cementing fluids, subsea well fluids, produced water and unused bulk product</b>	<ul style="list-style-type: none"> <li>Routine discharge of cement and cementing fluids to the seabed and marine environment.</li> <li>Routine discharge of subsea well fluids, completion fluids, produced water and well intervention/workover fluids.</li> <li>Non-routine discharge of unused bulk product.</li> </ul>	<ul style="list-style-type: none"> <li>Cement operations during drilling involve routine and non-routine discharges that can result in turbidity in the water column. Reduction in water quality will be temporary (limited to the cement operational discharges during drilling) and subject to rapid dispersion and dilution by prevailing currents.</li> <li>The highly localised physical footprint of cement on the seabed at the well site is not expected to affect the overall diversity or ecosystem function of the benthic communities of the area.</li> <li>Given the small volumes associated with subsea control fluids discharge and limited exposure times due to rapid dilution, potential impacts from these fluids is expected to be minor, localised and short term.</li> <li>Well intervention fluids are typically inert and of low-toxicity. These fluids may include subsea control fluid, completions fluids and well annular fluids. Changes to water quality are expected to be localised and temporary as discharges would be discrete and short in duration.</li> </ul>	<ul style="list-style-type: none"> <li>Chemicals intended or likely to be discharged into the marine environment reduced to ALARP using Woodside's chemical assessment process.</li> <li>Fluids contaminated with hydrocarbons will be treated to meet specified discharge limits prior to discharge or contained. If discharge specification not met during well unloading and completion activities, if produced water is not flared, it will be processed through the well test water filtration treatment package prior to discharge to the environment.</li> <li>No bulk cement, bentonite or barite discharged without a documented environmental assessment.</li> </ul>

Potential Impact/ Risk	Description of Source of Potential Impact/Risk	Description of Potential Impact/Risk	Preliminary Mitigation and/or Management Measures <sup>1</sup>
<b>Unplanned</b>			
<b>Unplanned hydrocarbon release – vessel collision</b>	<ul style="list-style-type: none"> <li>Project vessels will use marine diesel fuel, meaning a vessel collision involving a project vessel or third-party during the activity may result in the release of marine diesel.</li> <li>For a collision to result in the worst-case scenario diesel release, several factors must occur as follows: <ul style="list-style-type: none"> <li>Identified causes of vessel interaction must result in a collision.</li> <li>The collision has enough force to penetrate the vessel hull and in the exact location of the fuel tank.</li> <li>The fuel tank must be full or at least of volume which is higher than the point of penetration.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>In the highly unlikely event of a vessel collision causing a release of hydrocarbons, impacts to water quality and marine ecosystems could occur.</li> <li>Modelling of a surface release of marine diesel was undertaken at a location within the Operational Area.</li> <li>Marine diesel is a relatively volatile, non-persistent nature hydrocarbon with up to 35% evaporating within the first 24 hours.</li> <li>Potential impacts across the whole EMBA were assessed including receptors such as plankton, fish, marine mammals, seabirds and migratory shorebirds, tourism, recreation and cultural heritage (for example).</li> <li>Taking into account receptor sensitivity, the receptors were rated as having a potential consequence level of minor or less (slight or negligible).</li> </ul>	<p><b>Preventing Vessel Collision:</b></p> <ul style="list-style-type: none"> <li>Comply with regulatory requirements for the prevention of vessel collisions and safety and emergency arrangements.</li> <li>Consult with relevant persons so that other marine users are informed and aware, reducing the likelihood of a collision.</li> <li>Establish temporary exclusion zones around vessels which are communicated to marine users to reduce the likelihood of collision.</li> <li>Develop a management plan for simultaneous operations to manage rig interactions with other facilities and vessels.</li> </ul> <p><b>Spill Response Arrangements:</b></p> <ul style="list-style-type: none"> <li>Develop a project specific Oil Pollution Emergency Preparation document (OPEP) including first strike response plan.</li> <li>Arrangements supporting the OPEP will be tested to ensure the OPEP can be implemented as planned.</li> <li>Emergency response activities would be implemented in line with the OPEP.</li> </ul>
<b>Unplanned hydrocarbon release – loss of well control</b>	<ul style="list-style-type: none"> <li>Accidental loss of hydrocarbons to the marine environment due to loss of well control may occur caused by failure of well barriers.</li> </ul>	<ul style="list-style-type: none"> <li>Given hydrocarbons of the Scarborough reservoir contain no measurable liquid fraction (predominantly natural gas), there is expected to be no or negligible liquid component in the event of a loss of containment. This means there is no credible hydrocarbon spill scenario in the event of a well blowout.</li> <li>A loss of well control may temporarily decrease the water quality in the immediate vicinity of the release.</li> </ul>	<ul style="list-style-type: none"> <li>Wells drilled in compliance with the accepted Wells Operations Management Plan (WOMP) including implementation of barriers to prevent a loss of well control.</li> <li>Checks completed during well operations to establish a minimum acceptable standard of well integrity.</li> <li>Implement requirements for permanent well abandonment to reduce likelihood of a spill occurring from a suspended well.</li> <li>An approved Source Control Emergency Response Plan will be prepared prior to drilling each well including feasibility and specific considerations for relief well.</li> <li>Subsea BOP specification, installation and testing compliant with internal Woodside Standards and international requirements.</li> <li>Project-specific mooring design analysis to enable adequate MODU station holding capacity to prevent loss of station keeping and reduce the likelihood of a blowout.</li> </ul>

Potential Impact/ Risk	Description of Source of Potential Impact/Risk	Description of Potential Impact/Risk	Preliminary Mitigation and/or Management Measures <sup>1</sup>
<b>Unplanned hydrocarbon release - bunkering</b>	<ul style="list-style-type: none"> <li>Accidental loss of hydrocarbons to the marine environment during planned bunkering/refueling may occur caused by partial or total failure of a bulk transfer hose or fittings due to operational stress or other integrity issues.</li> </ul>	<ul style="list-style-type: none"> <li>Marine diesel surface release expected to be confined to within several kilometers of the release site, and well within the EMBA identified for the vessel collision scenario.</li> <li>This unplanned marine diesel release may have the potential to result in changes in water quality and fauna behaviour. Receptors considered in the risk assessment for this unplanned event included marine mammals, marine reptiles, fish, sharks and rays. Taking into account receptor sensitivity, the receptors were rated as having a potential consequence level of minor or less (slight or negligible).</li> </ul>	<p><b>Preventing unplanned hydrocarbon release due to bunkering:</b></p> <ul style="list-style-type: none"> <li>Comply with regulatory requirements for the prevention of marine pollution.</li> <li>Liquid chemical and fuel storage areas banded or secondarily contained when they are not being handled or temporarily moved.</li> <li>Appropriate bunkering equipment kept and maintained.</li> <li>Compliance with Contractor procedures for the management of bunkering/helicopter operations to reduce the likelihood and potential severity of a spill.</li> </ul> <p><b>Spill Response Arrangements:</b></p> <ul style="list-style-type: none"> <li>Maintain and locate spill kits in close proximity to hydrocarbon storage and deck areas for use to contain and recover deck spills.</li> <li>Arrangements supporting the OPEP will be tested to ensure the OPEP can be implemented as planned.</li> <li>Emergency response activities would be implemented in line with the OPEP.</li> </ul>
<b>Unplanned discharge - chemicals and hydrocarbons</b>	<ul style="list-style-type: none"> <li>Accidental discharge of hydrocarbons/chemicals from MODU/project vessels deck activities and equipment and from subsea ROV hydraulic leaks may occur.</li> <li>Accidental discharge of drilling fluids (WBM/NWBM/base oil) and cement to marine environment due to failure of slip joint packers, bulk transfer hose/fitting, emergency disconnect system or from routine MODU operations.</li> </ul>	<ul style="list-style-type: none"> <li>Unplanned discharges of non-process chemicals and hydrocarbons may decrease the water quality in the immediate vicinity of the release. Only small volumes (&lt;50 L) are anticipated, resulting in very short-term impacts to water quality and limited to the immediate release location.</li> <li>Unplanned discharges of drilling fluids have a worst-case credible spill scenario of up to 8 m<sup>3</sup>. Unplanned discharge of cement would typically be &lt;100 litres. These discharges would be to the sea surface and would rapidly dilute through mixing by surface currents and wave action. Given the occasional nature of unplanned chemical discharge, the small volumes, and the offshore location of the Operational Area, the change to water quality resulting from unplanned discharge of chemicals will not be substantial.</li> <li>If activation of the emergency disconnect sequence is required, a release of base oil could occur. This process is in place to prevent damage to the well or MODU from identified threats, such as loss of MODU station keeping, well blowout or potential collision by a third-party vessel, which could lead to further hydrocarbon release or infrastructure damage.</li> <li>As a result of a change in water quality, further impacts to receptors may occur including injury or mortality to marine fauna resulting from exposure to toxins in the released chemicals/hydrocarbons. Potential impacts would be highly localised and temporary meaning the predicted impact is considered to be slight.</li> </ul>	<ul style="list-style-type: none"> <li>Comply with regulatory requirements for the prevention of marine pollution.</li> <li>Liquid chemical and fuel storage areas are banded or secondarily contained when they are not being handled/moved temporarily.</li> <li>Spill kits positioned in high-risk locations around the vessel (near potential spill points such as transfer stations).</li> <li>Chemicals will be selected with the lowest practicable environmental impacts and risks subject to technical constraints and approved through the Woodside chemical assessment process.</li> <li>Liquid chemical and fuel storage areas are banded or secondarily contained when they are not being handled/moved temporarily.</li> <li>Drilling fluid transfers are performed in accordance with the applicable contractor procedures, and associated equipment is functional in preventing the unacceptable use or discharge of NWBM/base oil.</li> <li>Installation vessels have self-containing hydraulic oil drip tray management system.</li> </ul>

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<b>Unplanned discharge of solid hazardous/non-hazardous solid waste/equipment</b>	<ul style="list-style-type: none"> <li>Accidental, unplanned loss of hazardous or non-hazardous solid wastes/equipment to the marine environment may occur if dropped or blown overboard.</li> </ul>	<ul style="list-style-type: none"> <li>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 Operational Area, the types, size and frequency of wastes that could occur, and species present.</li> </ul>	<ul style="list-style-type: none"> <li>Comply with regulatory requirements for the prevention of marine pollution and handling of hazardous wastes.</li> <li>Implement waste management procedures which provide for safe handling and transportation, segregation and storage and appropriate classification of waste generated.</li> <li>Solid waste/equipment dropped to the marine environment will be recovered where safe and practicable to do so.</li> <li>Where retrieval is not practicable and/or safe, material items (property) lost to the marine environment will undergo an impact assessment and will be added to the inventory for the title.</li> </ul>
<b>Unplanned seabed disturbance</b>	<ul style="list-style-type: none"> <li>Unplanned disturbance to seabed may occur in the case of failed MODU mooring leading to anchor drag.</li> <li>Dropped objects may also result in unplanned disturbance of benthic habitat.</li> </ul>	<ul style="list-style-type: none"> <li>Unplanned seabed disturbance may result in localised changes to water and sediment quality or a localised temporary impact to benthic communities.</li> <li>Potential impacts to KEFs which intersect the Operational Area of the activity are limited to the footprint of a dropped object or dragged anchor, resulting in potential highly localised and temporary change in habitat.</li> </ul>	<ul style="list-style-type: none"> <li>MODU/installation vessel inductions include control measures for dropped object prevention.</li> <li>Dropped objects to be recovered and relocated where safe and practicable to do so.</li> <li>Where retrieval is not practicable and/or safe, material items (property) lost to the marine environment will undergo an impact assessment and will be added to the inventory for the title.</li> <li>Specifications and requirements for mooring systems enforced which require the system to have sufficient capability that a failure of single components will not cause progressive failure of the remaining anchoring arrangement.</li> <li>Tracking of the MODU will be possible when the MODU is unmanned to ensure the MODU location is tracked at all times.</li> <li>Project-specific Mooring Design Analysis and mooring system testing undertaken to reduce the likelihood of mooring failure or anchor drag.</li> </ul>
<b>Accidental introduction of invasive marine species (IMS)</b>	<ul style="list-style-type: none"> <li>MODU/vessels transiting to the Operational Area may be subject to marine fouling whereby organisms attach to the MODU/vessel hull.</li> <li>IMS could be present as biofouling on the MODU/vessel hull or on immersible equipment (survey equipment, ROV, etc.) and could be translocated to the Operational Area.</li> <li>Organisms can also be drawn into ballast tanks during onboarding of ballast water.</li> </ul>	<ul style="list-style-type: none"> <li>It is not credible for IMS to be introduced and establish on the seabed or subsea structures in the Operational Area as these deep waters are not conducive to the settlement and establishment of IMS.</li> <li>There is potential for the transfer of IMS between vessels albeit remote likelihood given the limited interaction between vessels in the Operational Area.</li> </ul>	<ul style="list-style-type: none"> <li>Ballast water and biofouling will be managed according to regulatory requirements, including the Australian Ballast Water Management Requirements, and the Australian Biofouling Management Requirements, as applicable.</li> <li>Woodside's IMS risk assessment process will be applied to project vessels and immersible equipment entering the Operational Area.</li> </ul>

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<b>Unplanned interaction with marine fauna</b>	<ul style="list-style-type: none"> <li>Vessel movements have the potential to result in collisions between MODU/project vessel (hull and propellers) and marine fauna.</li> <li>The factors contributing 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.</li> </ul>	<ul style="list-style-type: none"> <li>Vessel disturbance presents a potential threat to marine mammals, marine reptiles and fish, sharks and rays.</li> <li>The risk of vessel collision with marine fauna is present year-round but is elevated seasonally for species during migration periods. Given the short duration of activities within the Operational Area, and the slow speeds at which project vessels operate during installation (if not stationary), collisions are considered highly unlikely.</li> </ul>	<ul style="list-style-type: none"> <li>Comply with regulatory requirements for interactions with marine fauna to reduce the likelihood of a collision occurring.</li> </ul>

## Feedback

If you would like to comment on the proposed activities outlined in this information sheet, or would like additional information, please contact Woodside before **17 February 2023** via:

**E: [Feedback@woodside.com.au](mailto:Feedback@woodside.com.au)**

**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](http://www.woodside.com/sustainability/consultation-activities)**.

Please note that stakeholder feedback will be communicated to the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) as required under legislation. Woodside will communicate any material changes to the proposed activity to affected stakeholders as they arise.

Please note that your feedback and our response will be included in our Environment Plan for the proposed activity, which will be submitted to NOPSEMA for acceptance in accordance with the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (Cth)*.

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