Summary of Stag Drilling Environment Plan Permit WA-15-L

GF-70-PLN-I-00005.02

Rev 2

Rev No.	Date	Owner	Reviewer	Approver	Revision Notes
0	22-Jun-2018	Operations Superintendent	HSE Manager	General Manager	Issued to NOPSEMA. Based on Stag Field Drilling Environment Plan Permit WA-15-L accepted by NOPSEMA on 12 June 2018.
1	11-Jul-2018	Operations Superintendent	HSE Manager	General Manager	Revised in response to comments from NOPSEMA.
2	16-Jul-2018	Operations Superintendent	HSE Manager	General Manager	Revised in response to comments from NOPSEMA.

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ABBREVIATIONS

Abbreviation	Description
AFZ	Australian Fishing Zone
ALARP	as low as reasonably practicable
AMP	Australian Marine Parks
AMSA	Australian Maritime Safety Authority
API	American Petroleum Institute
APPEA	Australian Petroleum Production and Exploration Association
AUV	Autonomous underwater vehicle
CALM	Catenary Anchor Leg Mooring
CMMS	Computerised Maintenance Management System
CPF	Central Production Facility
DBCA	Department of Biodiversity, Conservation and Attractions
DEC	Department of Environment and Conservation (now DBCA)
DEWHA	Department of the Environment, Water, Heritage and the Arts (now DoEE)
DoEE	Department of the Environment and Energy
DPaW	Department of Parks and Wildlife (now DBCA)
DPIRD	Department of Primary Industries and Regional Development (previously Department of Fisheries)
DSWEPaC	Department of Sustainability, Environment, Water, Population and Communities (now DoEE)
dwt	Dry weight tonnes
EMBA	Environment that may be affected
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EP	Environment Plan
ESD	Emergency Shut-Down system
ESP	Electric Submersible Pump
FSO	Floating Storage and Offtake
HVAC	Heating ventiliation air conditioning (system)
IMR	Integrity, maintenance and repair
KEFs	Key Ecological Features
kL	Kilolitre

Abbreviation	Description
LAT	Lowest astronomical tide
mg/L	Milligrams per litre
mmscfd	Million Standard Cubic Feet per Day
NEBA	Net Environmental Benefit Assessment
NES	National Environmental Significance
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NORMs	Naturally Occurring Radioactive Materials
NWS	North-West Shelf
NWSTF	North-West Slope Trawl Fishery
OCNS	Offshore Chemical Notification Scheme
OIM	Offshore Installation Manager
OIW	Oil-in-water
OPEP	Oil Pollution Emergency Plan
OPGGS Act	Offshore Petroleum and Greenhouse Gas Storage Act 2006
OPGGS (E) Regs	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
OPMF	Onslow Prawn Managed Fishery
PAH	Polycyclic aromatic hydrocarbons
PW	Produced water
ROV	Remote Operated Vehicle
SBFTF	Southern Bluefin Tuna Fishery
WA	Western Australia
WSTF	Western Skipjack Tuna Fishery
WTBF	Western Tuna and Billfish Fishery

1. INTRODUCTION

Jadestone Energy (Australia) Pty Ltd (Jadestone Energy) is the titleholder of the Stag Field Production and Export Facility (Stag Field) in permit area WA-15-L. Jadestone proposes the plug and abandonment (P&A) of an existing water injector well and drilling of a new production well at the Stag Facility (**Figure 1-1**).

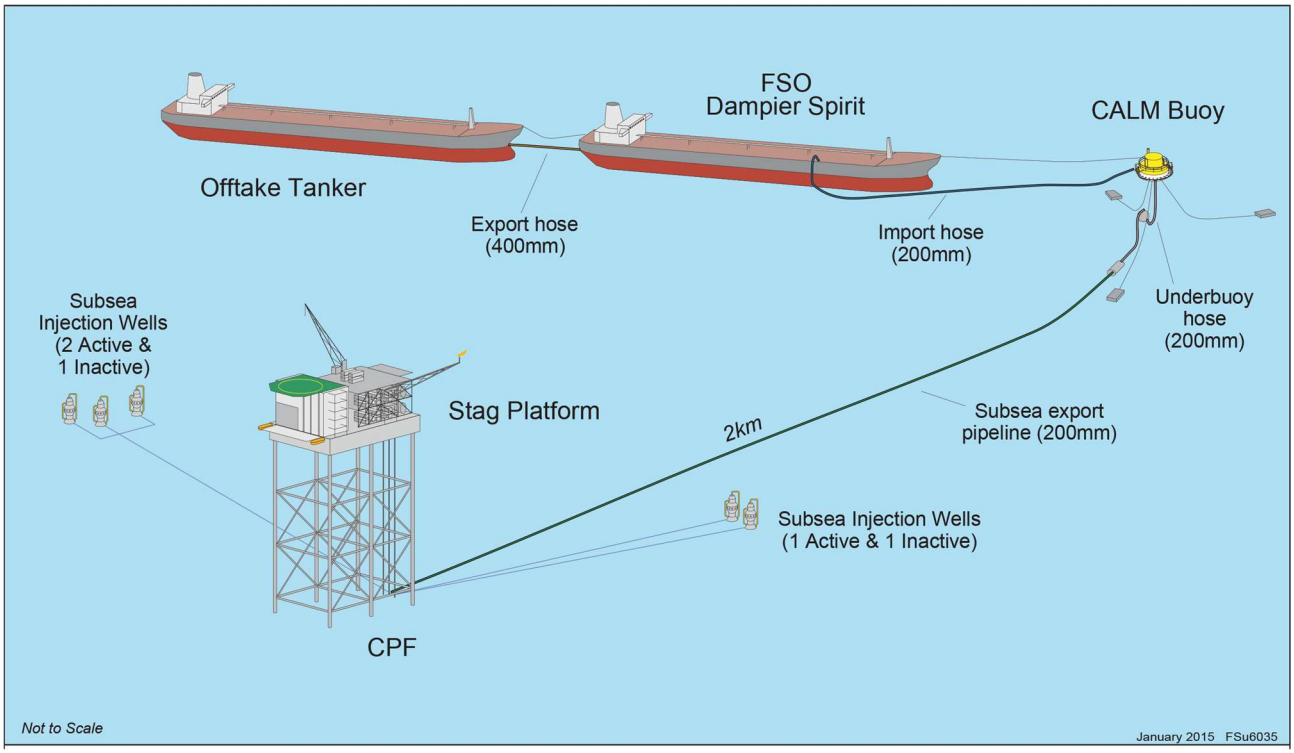

Figure 1-1: Schematic of the Stag Field

1.1 Titleholder

Jadestone Energy (Australia) Pty Ltd is the titleholder for petroleum activities covered under this EP within WA-15-L.

Jadestone Energy's Australian office is located at:

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ACN 613 671 819

1.2 Contact Person

Jadestone Energy's contact for the activity is:

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1.3 Purpose of EP Summary

The overall purpose of the Stag Field Drilling Environment Plan (GF-70-PLN-I-00005) (the EP) is to comply with statutory requirements of the Commonwealth *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (OPGGS (E) Regulations) and to ensure that the activity is planned and conducted in line with Jadestone Energy's environmental policies and standards.

The EP was assessed and accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) on 12 June 2018. This EP Summary has been prepared in accordance with the requirements of Regulation 11 (4) of the OPGGS (E) Regulations, and with the guidance of the NOPSEMA Guideline N-04750-GL1566 Rev. 1, Environment Plan Summaries.

2. DESCRIPTION OF THE ACTIVITY

2.1 Proposed Activity

The location of the proposed P&A of the existing 14H water injector well, and drilling of the new 49H production well, is at the Stag Central Production Facility (CPF) platform, within permit WA-15-L (Table 2-1; Figure 2-1).

Table 2-1: Tophole Location of the Drilling Activity

Activity	Latitude	Longitude
P&A of water injector well 14-H	20° 16.5' S	116° 15.433' E
Drilling of production well 49-H		

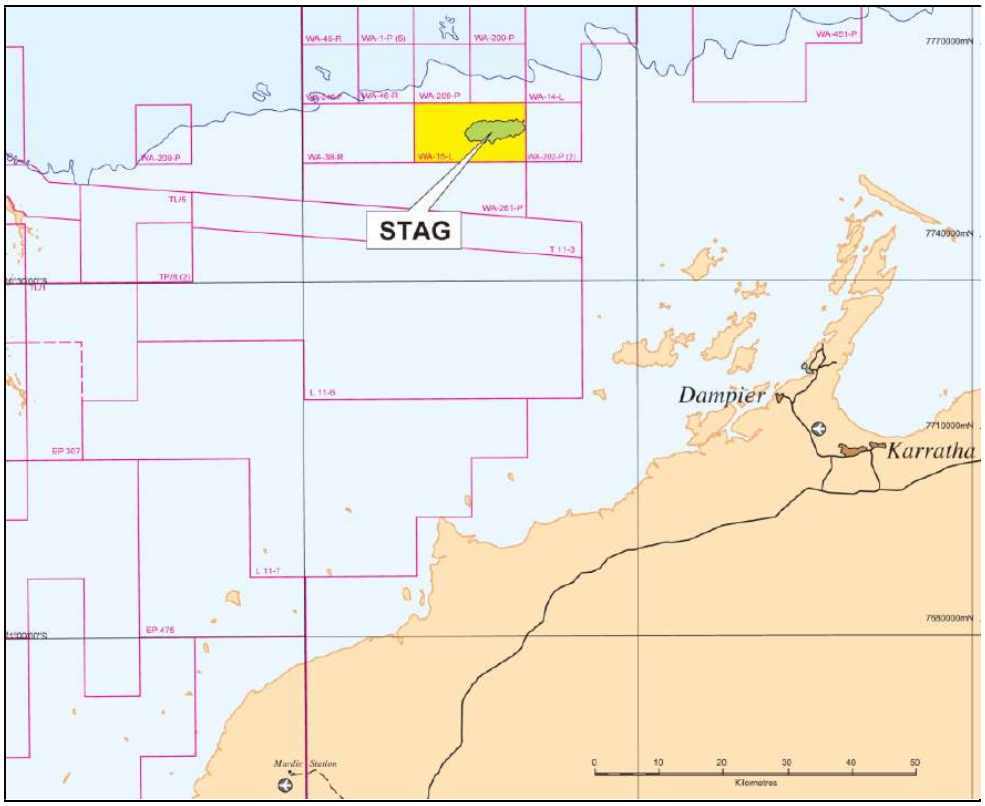

Figure 2-1: Location of the Stag Field

Well activities will be undertaken by a mobile offshore drilling unit (MODU), specifically a jack-up drilling rig. At the time of EP preparation, the drilling rig that will undertake the activities had not been confirmed.

2.2 Activity Duration and Timing

The drilling program is expected to take up to 35 days to complete the P&A and new production well activities at the Stag platform. In the event the drill target for Stag 49-H finds the area to have been swept of oil and a side track is required, a further 15 days will be needed to complete the well (i.e. up to 50 days in total).

While the timing of the drilling activities will be a function of rig availability, the preferred timing will be between May and October of 2018, however the activities may occur outside of this window, and may wind up occurring in 2019.

2.3 Operational Area

The Operational Area for the drilling activity is defined as the area within a 3 Nm radius Cautionary Zone that extends around the tophole location of the well activity, which is located at the Stag CPF. The location for the drilling activity is provided in Table 2-1.

The location of the activity is on the North-West Shelf (NWS) off Western Australia (WA), approximately 60 km north-west of Dampier (Table 2-2, Figure 2-1).

Table 2-2: Distances from Stag Facility to Key Regional Features

Regional Feature	Distance from Stag CPF
Dampier Archipelago	32 km (17.3 Nm)
Closest Montebello Island	75 km (40.5 Nm)
Varanus Island	82 km (44.3 Nm)
Barrow Island	96 km (51.8 Nm)
Glomar Shoals	100 km (54 Nm)

There is a restricted zone of 500 m radius around the facilities present at location: MODU, CPF, CALM buoy, pipeline and the floating, storage and offtake (FSO) tanker. Vessels operating within the restricted zone must not exceed a speed of five (5) knots.

There is also a cautionary area as designated by AMSA of 3 nautical mile radius charted around the facilities, with the centre located 1,365 m due north of the CPF which will also encompass the MODU while on location. Other vessels may transit the Cautionary Area during the activity.

2.4 P&A of Water Injector well 14H

Stag-14H, an existing water injector well, will be abandoned with the existing 762 mm conductor recovered as well as the tubing string recovered from the well. A series of cement plugs set within the wellbore to isolate the reservoir from the environment and casing strings cut and recovered from below the seabed will be used. Cement plug integrity will be verified in accordance with Jadestone's Well Engineering Standards.

2.5 Drill New Production Well 49H

Stag 49H will be drilled as a production well from the Stag CPF, in the slot recovered through the abandonment of Stag-14H.

A new 762 mm conductor will be run and grouted in place. The top-hole section of the well will be drilled with seawater and bentonite sweeps through the conductor with fluid and cuttings discharged direct to the sea. On reaching section target depth (TD), the drill string will be retrieved from the hole and surface casing shall be run in the hole. The surface casing will be cemented. After cementing of the surface casing, a well head will be installed at surface (at the mezzanine level of the Stag CPF) and a high-pressure riser and blow-out preventer (BOP) will then be installed on the wellhead. The BOP will be function and pressure tested on initial installation and at regular intervals thereafter.

The intermediate hole section(s) will then be directionally drilled with water based mud (WBM) above the reservoir with a closed fluid system, that is, drilling fluid complete with cuttings will be returned to the rig for processing with the cuttings removed from the drilling fluid via the shale shakers and discharged overboard; cleaned mud is returned to the mud tanks for reuse. At section TD, the drill string will be retrieved and the relevant casing string run in the hole. The casing will be cemented and the Christmas tree installed on to the wellhead.

The production hole section will then be drilled horizontally through the reservoir with WBM with a closed fluid system. At section TD, the drill string will be retrieved and sand screens will be run in the hole.

In the event the reservoir has been swept of oil, a side track will be drilled. In this instance, the well will be plugged back to the surface casing shoe and the intermediate and production hole sections shall be redrilled as per the process described above targeting a different section of the reservoir.

Wireline logging may be undertaken during the time of drilling and completing the wells.

The upper completion will then be run and installed in the well and the well will then be connected directly to the Stag production process.

2.6 Drilling discharges

2.6.1 Cement

The majority of cement will remain downhole although minor volumes will be discharged at the mudline (seabed surface), and at sea surface.

A small amount of cement will discharge at seabed surface with installation of the surface hole string. At the end of 49-H drilling activity, waste cement (surplus waste bulk cement) will be blown overboard. Up to one silo (approximately 40 m^3) will be discharged.

2.6.2 Drilling fluids

Top hole well sections will be drilled with seawater and pre-hydrated (bentonite) gel (PHG) sweeps with returns of both drilling fluid and cuttings being direct to the environment. On completion of the tophole section, drilling fluids, up to one mud pit (maximum volume of 80 m^3) will be discharged overboard in a single event.

Intermediate hole section/s will be drilled with a polymer water-based mud (WBM). The WBM typically consists of between 92–98% fresh or saline water. The remaining 2–8% of the WBM is made up of drilling fluid additives that are either completely inert in the marine environment, naturally occurring benign minerals, readily biodegradable organic polymers with a fast rate of biodegradation in the marine environment or products in low concentrations with a very low potential for environmental impact. The same mud will be utilised for all intermediate hole sections. If the residual intermediate hole section drilling fluid can be used for drilling the reservoir section(s), they will be retained and reformulated; however, if they are not suitable for use they will be discharged (up to 80 m^3).

Reservoir hole section/s will be drilled with a water-based drill-in fluid mud (WBM). The drill-in fluid is formulated to be non-damaging to the reservoir and minimise losses with the reservoir through the bridging of pore throats with sized calcium carbonate. The WBM typically consists of between 92–98% fresh or saline water. The remaining 2–8% of the WBM is made up of drilling fluid additives that are either completely inert in the marine environment, naturally occurring benign minerals, readily biodegradable organic polymers with a fast rate of biodegradation in the marine environment or products in low concentrations with a very low potential for environmental impact. On completion of the reservoir hole section, residual mud will be discharged overboard in a single event (up to 80 m^3).

In the event the drilling target is reached and the area is found to have been swept (i.e. there is inadequate oil present to meet production requirements) a second drill target will be reached with a side track. The side track will commence from below the 340mm surface casing and therefore the side track activity will be a repeat of the intermediate and reservoir hole section descriptions provided above.

2.6.3 Chemical selection

Chemicals associated with drilling fluids will be selected and approved using Jadestone's Chemical Selection Evaluation and Approval Procedure (JS-70-PR-I-00033). The procedure prioritises the use of environmentally low risk chemicals by undertaking a risk assessment of the product. Chemicals proposed for the activity are rated according to the Chemical Hazard and Risk Management (CHARM) process. Chemicals will be rated Gold and Silver, or non-CHARM rated D/ E. To achieve these rankings, the chemicals have the least potential for environmental impact.

All products and chemicals used during the drilling activities will be assessed and approved using this process prior to use.

2.6.4 Cuttings

Cuttings will be removed at surface from the recirculating mud by shale shakers, desanders, desilters and centrifuges for very fine particles. The solids removed from the mud are discharged overboard. Some components of the drilling fluid will remain adhered to the discharged drill cuttings. Cuttings will be discharged to sea surface, or may be discharged just under the sea surface (a couple of metres) using a discharge pipe.

2.6.5 Loss of circulation

In intermediate and reservoir hole sections drilled with a closed fluid system, lost circulation is a major problem as it depletes the stock of drilling fluid available on the rig. As a result, lost circulation encountered while drilling with closed fluid systems will attempt to be cured. To cure losses there is a choice of options available, depending on loss rates. Conventional additives, such as calcium carbonate or fibres, are used for seepage or partial losses. When total losses occur, it may be necessary to pump cement, cross link polymers or gunk pills to heal the loss zones. Some lost circulation material may be brought back to the surface and discharged to sea, so as not to contaminate the mud system.

2.7 Well Control

Jadestone ensures control of its wells through a number of measures: well design, drilling procedures, mud selection, personnel training and equipment maintenance and testing. Wells are drilled in accordance with Jadestone's Well Engineering Standards.

BOPs are installed to ensure that wells will have sufficient barriers maintained during drilling, suspension and abandonment activities. All well control equipment, casings and wellhead equipment is tested to maximum anticipated surface pressure (MASP).

2.8 Well Testing

No well testing will be conducted as part of this activity.

2.9 Well Logging

Logging is a continuous measurement of formation properties. Measurements can include drilling parameters, geological sampling, electrical and sonic properties, active and passive nuclear measurements, dimensional measurements of the wellbore, formation fluid sampling, formation pressure measurement, and others.

2.10 Waste

Operational discharges from the MODU and support vessels will include:

- Drilling fluid on cuttings residual from drilling operations;
- Waste cement;
- Waste dry bulk solids;
- Deck drainage;
- Putrescible waste and sewage;
- Oily water;
- Cooling water from operation of engines;
- Desalination plant effluent (brine) and backwash water discharge;
- Ballast water; and
- Solid waste.

2.11 Emissions

As the drilling activities will be continuous 24-hour operations, light will be continuously emitted from the MODU to the environment for up to 50 days.

Noise associated with the operation of machinery and engines will be generated by the MODU and support vessels. No vertical seismic profiling or side scan sonar will be undertaken during the drilling activities.

Gaseous emissions will be made to the environment due to the combustion of hydrocarbons during the operation of equipment and machinery on the MODU and support vessels for the duration of the drilling activities. No flaring will occur associated with the drilling activities.

2.12 Vessel Operations

The MODU will be assisted by up to four support vessels. A variety of vessels will be used, including anchor handling and MODU support. During the drilling activities, support vessels will anchor within a 3 Nm radius around the Stag facility. Support vessels to be used during the drilling activities will be sourced from Dampier and local NW ports wherever possible.

Support vessels will transfer supplies to the MODU and receive waste and excess materials while on location.

The MODU and support vessels have marine VHF and satellite phones to maintain communications. At least one support vessel will remain on location for the duration of each of the activities to ensure the maintenance of 500 m exclusion zone around the MODU.

2.13 Helicopter Operations

Crew changes for personnel aboard the MODU will involve transfer by helicopter between the MODU and the regional airport at Karratha. These flights will occur several times a week dependent on the progress of the drilling program and logistical constraints.

On occasion, crew changes for MODU personnel may be via CPF helicopter service from the CPF helideck while the MODU is at the CPF for the drilling activities to be completed there. If this occurs, personnel are escorted from the MODU to the CPF by production personnel.

3. DESCRIPTION OF THE ENVIRONMENT

This description of the environment describes aspects of the physical environment within the Operational Area and the EMBA, and ecological attributes including habitats, matters protected by the Environmental Protection and Biodiversity Conservation (EPBC) Act, Australian Marine Parks (AMP), State waters marine reserves, and marine fauna as well as values and sensitivities of the socio-economic environment.

The environmental values and sensitivities within two areas related to the activity have been evaluated:

1. The Operational Area – defined by a 3 nm radius around the existing Stag CPF and drilling location; and
2. The Environment that May Be Affected (EMBA) – defined as the modelled spatial extent of the worst case credible spill scenario.

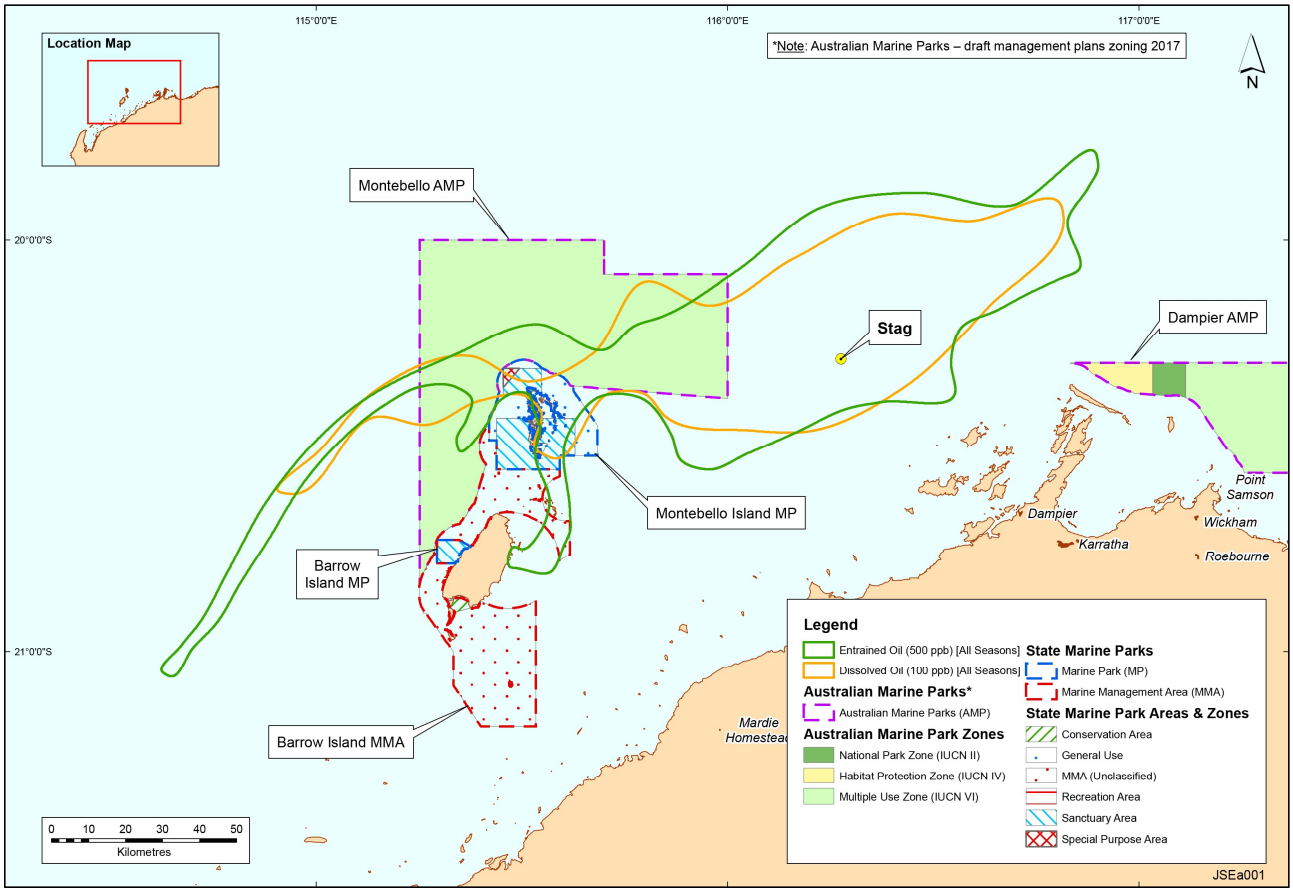

Figure 3-1: Location of the drilling activity and EMBA for Worst Case Scenario Hydrocarbon Spill

3.1 Benthic Habitats

3.1.1 Operational Area

The sediments within the Operational Area are dominated by sand sized particles, with medium sand comprising the largest fraction. There were no clear trends in particle size distribution (PSD) with increasing distance from the CPF in sediment samples collected by Oceanica (2015). Most sediment was grey in colour, and contains shells and other biota present.

The majority of samples taken by Oceanica (2015) had no vegetation present and no obvious odour. This is consistent with results from a survey by CSIRO in 2001 (IRC 2001) who reported unconsolidated fine-medium and medium-coarse sands with patches of coral rubble (CSIRO 2001).

Apache Energy Ltd conducted sampling of the infauna within the Stag Field prior to development drilling as a baseline for comparison to the post-development (Kinhill 1997; 1998). This study confirmed that the benthic biota within the vicinity of Stag is comparable to that found over similar substratum and at similar depths over the wider region (Ward and Rainer 1988; Woodside 1988; Rainer 1991). The unconsolidated sediments in this habitat were found to support a diverse infauna, consisting predominantly of mobile burrowing species, which include molluscs; crustaceans (crabs, shrimps and smaller related species); polychaete, sipunculid and platyhelminth worms; asteroids (sea stars); echinoids (sea urchins), and other small infaunal animals. Similar results were obtained in a more contemporary study by Oceanica (2015), who reported prawns, polychaetes, tube polychaetes, amphipods and bryozoans in sediment samples collected.

There is small spatial variability in the infaunal assemblages (e.g. crustaceans, molluscs, ostracods, bivalves, polychaete worms and amphipods) surrounding the Stag Facility and this is typical of soft sediments in the surrounding areas (IRCE 2001, Oceanica 2015).

While there are no significant benthic primary producers (benthic photosynthetic organisms) associated with the soft sediment habitat within the Operational Area, some small patches of algae were found by Oceanica (2015). The subsea infrastructure such as the CPF platform and CALM buoy mooring are likely to provide attachment points with sufficient light availability for algae as well as other filter feeding organisms (e.g. hydroids, bryozoans and molluscs). Pipelines have been shown to have a high abundance of commercially important fish, including snapper and grouper, as well as the presence of thousands of larval fish and juveniles suggesting the pipelines may actually enhance fish stocks (McLean et al., 2017). Although little is known about the habitat preference of syngnathids and pipefish, it is unlikely that they would occur in the operational area, with research showing a preference for coral reefs in tropical areas (Foster & Vincent 2004, Scales 2010).

Sediment and water quality data within the Operational Area was collected and analysed initially as a baseline study by Kinhill in 1997. The following characteristics were described:

- Water quality: temperature 29.6–30.7^{o}C at surface and 29.3–29.6^{o}C seabed;
- Salinity 33.3–33.9 ppt;
- Oxygen 4.49 – 6.2 mg/L;
- Organic content 40% sediment;
- Sediment particle size was spatially (and temporally) variable;
- No hydrocarbons in marine sediments;
- Metals (barium, cadmium, chromium, copper, lead and zinc were low (below detection limits);
- Infauna 67.8 individuals/kg; and
- There was a higher number of polychaete worms, crustaceans, echinoderms and molluscs in baseline than subsequent surveys (attributed to drilling and change in PSD).

3.1.2 Environment that may be affected (EMBA)

A range of benthic habitats occur within the EMBA including benthic primary producer habitats (i.e. photosynthetic organisms) such as macroalgal beds, seagrass meadows and hard corals which are distributed in shallow subtidal and intertidal waters, as well as intertidal water/ shoreline distributed habitats such as

mangroves and salt marshes. Benthic primary producers are important components of ecosystems as they provide the source of energy driving food webs, and provide shelter for a diverse array of organisms.

Subtidal habitats within the EMBA include unconsolidated sediment, which is the most common subtidal habitat on the North-West Shelf, and rocky substrate (e.g. outcropping limestone pavement). Subtidal rocky substrate typically supports a mosaic benthic community which may comprise benthic primary producers such as macroalgae and hard corals in the photic zone. In deeper waters and/or where light is limited, hard substrate may have a community dominated by habitat-forming filter feeding organisms such as various soft corals, sponges and hydroids.

Other intertidal and shoreline habitats in the EMBA include intertidal sand/ mud flats, intertidal rocky reefs, rocky shorelines and sandy beaches. There are numerous sandy beaches within the EMBA, on both offshore islands and the mainland, that are important nesting sites for a number of protected marine turtle species.

Habitat diversity is highest in shallower waters where light availability promotes the occurrence of benthic primary producers, and in areas where hard substrate provides attachment points for a greater diversity of habitat forming organisms. Within the EMBA benthic habitat diversity is therefore highest within shallow waters around offshore islands (including Montebello/ Barrow/ Lowendal and Dampier Archipelago).

3.2 Summary of Habitats Within the Operational Area and EMBA

Table 3-1 summarises the habitats that may be affected by routine events within the Operational Area as well as unplanned events that may arise within a larger EMBA.

Table 3-1: Environmental Values and Sensitivities for Habitats within the Operational Area and EMBA

Habitats	Environmental value	Sensitivities within the Operational Area	Sensitivities within the EMBA
Subtidal Benthic Habitats			
Soft sediments and benthic fauna	Support a diverse infauna consisting predominantly of mobile burrowing species that include molluscs, crustaceans (crabs, Shrimps and smaller related species), polychaetes, sipunculid and platyhelminth worms, asteroids (sea stars), echinoids (sea urchins) and other small animals. Biological activity occurs throughout the year.	**Yes –** Soft sediment is the dominant habitat.	**Yes –** Soft sediment is the Dominant subtidal habitat throughout the EMBA.
Hard coral habitat	Food source for some fish species; Integral source of carbonate sediments; large component of primary productivity and habitat to regional marine ecology Peak coral spawning occurs March–April Coral spawning also occurs October–November.	**No**	**Yes –** Important coral localities: Dampier Archipelago, Barrow/ Montebello/ Lowendal Island group.

Habitats	Environmental value	Sensitivities within the Operational Area	Sensitivities within the EMBA
Macroalgae beds	Primary producers; dugong and turtle feeding habitat; support a diverse and abundant fauna of small invertebrates that are the principal food source for many inshore tropical fish species Produce reproductive structures and then senesce each winter (May–September).	**No**	**Yes –** Macroalgal habitat prevalent within shallow waters (photic zone) associated with primarily rocky substrate along the mainland coast and associated with offshore islands.
Seagrasses meadows	Primary producer; dugong feeding habitat Throughout the year they are growing or shedding fronds.	**No**	**Yes –** Seagrasses occur within the photic zone along the Dampier Archipelago, Barrow/ Montebello/ Lowendal Island group.
Hard substrates and epiflora/ fauna	Support higher diversity of Epifauna than soft sediment habitats and provide surfaces for attachment of fauna (e.g. hard coral, soft corals, sponges) and macroalgae.	**No**	**Yes –** Hard substrates occur throughout the EMBA. Filter feeding epifauna can occur across a range of depths. Benthic primary production associated with hard substrate restricted to shallow photic zone.
Intertidal Shoreline Habitats			
Mangroves	An important primary producer habitat along shorelines of the Pilbara mainland and islands. Important habitat for birds, molluscs, crustaceans, juvenile fish; bird watching hide. Important for shoreline stabilisation and nutrient recycling.	**No**	**Yes –** Along mainland coastline between Onslow coast to Karratha; Montebello and Lowendal Islands south eastern and southern shores of Barrow Island and in sheltered pockets on the offshore islands of the Dampier Archipelago.
Sandy beaches	Shorebird foraging/ breeding habitat; turtle nesting habitat. Crested tern nesting post-wet season; turtle nesting October to February; hatchling emergence November to April.	**No**	**Yes –** Sandy beaches occur throughout the region. Important sites occur at Dampier, as well as on many of the numerous islands including Barrow Island and within the Dampier Archipelago.

Habitats	Environmental value	Sensitivities within the Operational Area	Sensitivities within the EMBA
Mud flats	Support a diverse assemblage of vertebrates and invertebrates, macroalgae and seagrass. Biological activity occurs throughout the year.	**No**	**Yes –** Found throughout the EMBA.
Rocky shorelines	Foraging area for shorebirds. Invertebrates found in the vertical splash zone; roosting areas for seabirds. Biological activity occurs throughout the year.	**No**	**Yes –** Found throughout the EMBA.

3.3 Marine Fauna

Table 3-2 summarises the fauna that may be affected by routine events at the Stag Field within the Operational Area as well as unplanned events that may arise within a larger EMBA.

Table 3-2: Summary of Environmental Sensitivities for Marine Fauna within the Operational Area and EMBA

Marine fauna		Operational Area	EMBA
Plankton	Plankton	Yes - Phytoplankton and zooplankton present. Higher concentrations occurring during the winter months (June to August) and lower in summer months (December to March).	Yes - Phytoplankton and zooplankton present. Higher concentrations occurring during the winter months (June to August) and lower in summer months (December to March).
Invert-ebrates	Benthic	Yes – primarily infaunal species	Yes – will contain both mobile and sessile epifauna and infaunal
	Pelagic	Yes – includes squid, salps and jellyfish	Yes – includes squid, salps and jellyfish
Fish	Demersal and/ or pelagic fish	Yes – Both demersal and pelagic fish species present. Stag Facility infrastructure likely attracts a greater diversity and abundance of fishes than would naturally occur on the soft sediments within the operational area. Offshore soft sediment habitat generally supports a lower diversity than other benthic habitats that provide greater structure and feeding opportunities (e.g. rocky and coral reef, seagrass and macroalgae, mangroves).	Yes - Diverse assemblage of demersal and pelagic species distributed throughout. Shallow water primary producer habitats close to mainland shorelines and offshore islands (e.g. seagrass, macroalgae, hard coral and mangroves) support high abundance and diversity of fishes.
	Whale shark	Yes - Could transit through, particularly around the time of aggregation at Ningaloo Reef (late March to June).	Yes - Will transit through. Main period of the whale shark aggregation off Ningaloo Reef is late March to June, with the largest numbers generally recorded in April.

Marine fauna		Operational Area	EMBA
	Grey nurse shark	Yes - Could occur as the operational area is within depth range (<200 m) but presence is unlikely since there is lack of natural structured habitat. Operational area is flat bare sand.	Yes – Likely occurs as residents in some areas where habitat favourable (e.g. near inshore rocky and coral reefs between depths of 10–45 m).
	White shark	Yes - Could transit through although unlikely to be present for extended durations since white sharks are highly mobile species that follow seasonal feeding opportunities (e.g. whale migrations, pinniped colonies) in primarily coastal waters.	Yes – Likely to transit through and feed where feeding opportunities present (e.g. whale migrations, pinniped colonies) in primarily coastal waters.
	Other shark/ ray species	Yes - Could transit through.	Yes - Could transit through.
	Sawfish	No - Given their preference for shallower estuarine and coastal waters, they are unlikely to be encountered.	Yes - Could occur in estuaries and nearby coastal mangrove areas and shallow waters.
Marine mammals	Humpback whale	Yes - Peak northern migration around July. Peak southern migration around Aug/ September. Greater likelihood of individuals during northern as opposed to southern migration May transit through as within depth range of migration routes	Yes - EMBA overlaps known migration routes and presence is reliable during migration season.
	Pygmy Blue whale	Yes - Northern migration in April-August and southern migration Oct - Dec. May transit through although migration routes believed to occur in deeper waters	Yes - EMBA overlaps migration routes in water depths of 500–1,000 m.
	Dugongs	No – Given their preference for shallower waters near seagrass meadows dugongs are unlikely to be encountered.	Yes - Dugongs occur within the EMBA associated with seagrass meadow habitat in coastal waters of offshore islands.
	Cetacean – various whales and dolphins	Yes – A number of whale and dolphin species may transit through. Whales are likely to be transiting during migrations while dolphins may be part of resident coastal populations.	Yes - Could occur transiting through but not expected in large numbers as they are either infrequently recorded in Australian waters or primarily migrating through deeper waters. Dolphins may be feeding/ aggregating in shallow coastal waters of offshore islands.
Marine Reptiles	Marine Turtles	Yes - May transit through although unlikely to be encountered in large numbers (with the exception of the flatback turtle, activity location is outside internesting areas, ~35km from nearest nesting beach at Dampier Archipelago)	Yes - For all species except Leatherback turtle nesting beaches and breeding/ feeding areas occur within the EMBA on offshore islands.

Marine fauna		Operational Area	EMBA
	Sea snakes and kraits	No – Not likely to be encountered given the water depth and distance from shore	Yes - May be encountered in shallow waters habitats where feeding habitat is found.
Avifauna	Wetland/ Shorebirds	No – Given the distance offshore, shorebirds or wetland birds are unlikely to be present.	Yes – May occur along shorelines and wetlands feeding or nesting. Shorebirds also use Montebello/ Lowendal/ Barrow Islands.
	Seabirds	Yes – May utilise the waters for feeding and may be attracted to the Operational Area by increased abundance of pelagic fish or as resting habitat.	Yes – May occur, either feeding, migrating or utilising coastal islands as nesting habitat.

3.4 Threatened and Migratory Species

A search of the EPBC Act Protected Matters Database identified 34 threatened species as occurring or having habitat within the EMBA, while a search identified 18 threatened species as occurring or having habitat within the Operational Area, all of which were common with those species found to occur in the greater EMBA.

A summary of threatened and migratory species within the Operational Area and EMBA is provided in **Table 3-3**.

Table 3-3: Marine Fauna and Management Considerations in the Operational Area and EMBA

Class	Common Name (where found)	Scientific Name	EPBC Act Status	WC Act	Cons Advice	Recovery Plan	Threat Abatement Plan	BIA	Identified /relevant risks	Section in EP
Threat abatement plan for the impacts of marine debris on vertebrate marine life (DEWHA 2009)										
Sharks and Fish	Whale shark (operational area, EMBA)	*Rhincodon typus*	V; M	OPF (S7)	Yes (2015)	Ceased 2010		EMBA	Fishing Tourism Marine debris Climate change	**7.8**
	White shark (operational area, EMBA)	*Carcharodon carcharias*	V; M	V (S3)	No		Marine debris			
	Green sawfish (operational area, EMBA)	*Pristis zijsron*	V; M		No					
	Grey nurse shark (west coast population) (operational area, EMBA)	*Carcharias taurus*	V	V (S3)	No		Marine debris			
	Dwarf sawfish (operational area, EMBA)	*Pristis clavata*	V	P1	No					
	Shortfin mako (operational area, EMBA)	*Isurus oxyrinchus*	M		No	No				

Class	Common Name (where found)	Scientific Name	EPBC Act Status	WC Act	Cons Advice	Recovery Plan	Threat Abatement Plan	BIA	Identified /relevant risks	Section in EP
	Longfin mako (operational area, EMBA)	*Isurus paucus*	M		No	No				
	Reef Manta Ray (operational area, EMBA)	*Manta alfredi*	M		No	No				
	Giant Manta Ray (operational area, EMBA)	*Manta birostris*	M		No	No				
The Action Plan for Australian Mammals 2012 (Woinarski et al. 2014) Threat abatement plan for the impacts of marine debris on vertebrate marine life (DEWHA 2009)										
Marine mammals	Sei whale (EMBA)	*Balaenoptera borealis*	V, M	E (S2)	Yes (2015)	Ceased in 2015	Marine debris		Climate change Noise Habitat degradation Pollution Fisheries Vessel strike	**7.2, 7.8**
	Fin whale (EMBA)	*Balaenoptera physalus*	V, M	E (S2)	Yes (2015)	Ceased 2015	Marine debris		Climate change Noise Habitat degradation Pollution Fisheries Vessel strike	

Class	Common Name (where found)	Scientific Name	EPBC Act Status	WC Act	Cons Advice	Recovery Plan	Threat Abatement Plan	BIA	Identified /relevant risks	Section in EP
	Humpback whale (operational area, EMBA)	*Megaptera novaeangliae*	VM		Yes (2015)	Ceased 2015	Marine debris	EMBA	Noise Vessels Pollution	
	Blue whale (operational area, EMBA)	*Balaenoptera musculus*	EM	E (S2)	No		Marine debris	EMBA	Noise Vessels	
	Southern right whale (EMBA)	*Eubalaena australis*	EM	V (S3)	No		Marine debris		Noise Habitat disturbance vessels	
	Bryde's whale (operational area, EMBA)	*Balaenoptera edeni*	M			No				
	Sperm whale (EMBA)	*Physeter macrocephalus*	M	V		No				
	Killer whale	*Orcinus orca*	M			No				
	Spotted bottlenose dolphin (Arafura/Timor Sea populations) (operational area, EMBA)	*Tursiops aduncus*	M			No				

Class	Common Name (where found)	Scientific Name	EPBC Act Status	WC Act	Cons Advice	Recovery Plan	Threat Abatement Plan	BIA	Identified /relevant risks	Section in EP
	Indo-Pacific humpback dolphin (operational area, EMBA)	*Sousa chinensis*	M			No				
	Dugong (EMBA)	*Dugong dugon*	M	OPF (S7)		No				
Marine reptiles	Recovery Plan for Marine Turtles in Australia (2017) Threat abatement plan for the impacts of marine debris on vertebrate marine life (DEWHA 2009)									
	Hawksbill turtle (operational area, EMBA)	*Eretmochelys imbricata*	VM	V S3		Yes (2017)		EMBA		**7.8, 7.2, 7.1**
	Flatback turtle (operational area, EMBA)	*Natator depressus*	VM	V S3		Yes (2017)		EMBA	Light Vessel interaction	
	Green turtle (operational area, EMBA)	*Chelonia mydas*	VM	V S3		Yes (2017)	Marine debris	EMBA		
	Loggerhead turtle (operational area, EMBA)	*Caretta caretta*	EM	E S2		Yes (2017)	Marine debris	EMBA		
	Leatherback turtle	*Dermochelys coriacea*	EM	V S3		Yes (2017)	Marine debris	EMBA	Marine debris vessel interaction	

Class	Common Name (where found)	Scientific Name	EPBC Act Status	WC Act	Cons Advice	Recovery Plan	Threat Abatement Plan	BIA	Identified /relevant risks	Section in EP
	(operational area, EMBA)									
	Short-nosed seasnake (operational area, EMBA)	*Aipysurus apraefrontalis*	CE	CE (S1)		No				**7.8**
Birds	Curlew Sandpiper (operational area, EMBA)	*Calidris ferruginea*	CE Mw	V S3		No			Loss wetlands human disturbance habitat loss pollution	**8.4, 8.5**
	Bar-tailed Godwit (menzbieri) (EMBA)	*Limosa lapponica menzbieri*	CE Mw	V S3		No				
	Eastern Curlew (operational area, EMBA)	*Numenius madagascariensis*	CE Mw	V S3		No			Loss wetlands human disturbance habitat loss pollution	
	Red Knot (operational area, EMBA)	*Calidris canutus*	E Mw	V S3		No			Habitat loss Disturbance	
	Southern giant-petrel (operational area, EMBA)	*Macronectes giganteus*	E Mw	P4		Yes		EMBA		

Class	Common Name (where found)	Scientific Name	EPBC Act Status	WC Act	Cons Advice	Recovery Plan	Threat Abatement Plan	BIA	Identified /relevant risks	Section in EP
	Australian fairy tern (operational area, EMBA)	*Sternula nereis nereis*	V	V	Yes (2011)	No		EMBA	Habitat disturbance Predation Oil spills	**8.5**
	Bar-tailed Godwit (baueri) (EMBA)	*Limosa lapponica baueri*	V M	V S3						
	Common noddy (operational area, EMBA)	*Anous stolidus*	M	LC		No				
	Fork-tailed swift (EMBA)	*Apus pacificus*	M	LC		No				
	Streaked shearwater (operational area, EMBA)	*Calonectris leucomelas*	M	LC		No				
	Lesser frigatebird (operational area, EMBA)	*Fregata ariel*	M	LC		No				
	Great frigatebird (EMBA)	*Fregata minor*	M	LC		No				
	Wedge-tailed shearwater	*Puffinus pacificus*	M	LC		No		EMBA		

Class	Common Name (where found)	Scientific Name	EPBC Act Status	WC Act	Cons Advice	Recovery Plan	Threat Abatement Plan	BIA	Identified /relevant risks	Section in EP
	(EMBA)									
	Bridled tern (EMBA)	*Sterna anaethetus*	M	LC		No				
	Lesser crested tern (EMBA)	*Sterna bengalensis*	M	LC		No				
	Caspian tern (EMBA)	*Sterna caspia*	M	LC		No				
	Roseate tern (EMBA)	*Sterna dougallii*	M	LC		No				
	Common sandpiper (operational area, EMBA)	*Actitis hypoleucos*	M	LC		No				
	Sharp-tailed sandpiper (operational area, EMBA)	*Calidris acuminata*	M	LC		No				
	Pectoral Sandpiper (operational area, EMBA)	*Calidris melanotos*	M	LC		No				
	Oriental Plover (EMBA)	*Charadrius veredus*	M	LC		No				
	Hooded Plover (EMBA)	*Thinirnis rubricollis*	M	LC		No				

Class	Common Name (where found)	Scientific Name	EPBC Act Status	WC Act	Cons Advice	Recovery Plan	Threat Abatement Plan	BIA	Identified /relevant risks	Section in EP
	Oriental Pratincole (EMBA)	*Glareola maldivarum*	M	LC		No				
	Osprey (operational area, EMBA)	*Pandion haliaetus*	M	LC		No				
	Crested Tern (EMBA)	*Thalasseus bergii*	M	LC						
	Common Greenshank (EMBA)	*Tringa nebularia*	M	LC						

Key EPBC: WC Act; V = Vulnerable; OPF = Other Protected Fauna; CE = Critically Endangered; P1 = Priority Flora and Fauna List; M = Migratory marine; S = Schedule; LC = Least Concern

3.5 Protected Areas

3.5.1 Australian Marine Parks & Key Ecological Features

Table 3-4 summarises the habitats that may be affected by routine events during the activity as well as accidental events that may arise within a larger EMBA.

Table 3-4: Summary of Environmental Values and Sensitivities

Protected matter	Environmental value	Sensitivities overlapped	
		Operational Area	EMBA
Commonwealth Marine Parks			
Montebello AMP	Contains foraging areas adjacent to important breeding/nesting areas for migratory seabirds and turtles and foraging areas for migratory whale sharks. Part of the migratory pathway of	**No**	**Yes –** sensitivity is for species (e.g. whales, turtles and whale sharks) that use waters within the reserve and therefore susceptible to oiling.
Key Ecological Features			
Ancient coastline at 125 m depth contour	Where the ancient submerged coastline provides areas of hard substrate it may contribute to higher diversity and enhanced species richness relative to soft sediment habitat. May facilitate increased availability of nutrients in particular locations off the Pilbara coast. This enhanced productivity may attract opportunistic feeding by larger marine life including humpback whales, whale sharks and large pelagic fish.	**No**	**Yes –** sensitivity is for species (e.g. whales, turtles, seabirds and whale sharks) that may be in high abundance above feature and therefore susceptible to oiling.
Continental Slope Demersal Fish Communities	High endemism and diversity of demersal fish species	**No**	**Yes –** oil will not directly impact demersal fish species although may interact with demersal fish larvae and eggs over a larger area.
Glomar Shoals	Representative of shallow water terrace habitats of the outer shelf that attract aggregations of marine life	**No**	**Yes –** entrained oil arising from a sub-surface release predicted to reach Glomar Shoal at concentrations of 500 ppb.

3.5.2 State Marine Reserves

Table 3-5 summarises the State marine reserves that may be affected by unplanned events that may arise within a larger EMBA. No State Marine Reserves occur within the Operational Area.

Table 3-5: Summary of Environmental Values and Sensitivities for State Marine Reserves

State Marine Reserves	Environmental value	KPIs	Operational Area	EMBA
Montebello Island Marine Park	Comprise over 100 islands, with habitats including rocky shorelines, coral reefs, mangroves, intertidal flats, extensive sheltered lagoonal waters, and shallow algal and seagrass reef platform. Contains important nesting/breeding and foraging sites for turtles, nesting and resting areas for migrating shorebirds, seabird nesting areas, dugong foraging areas, globally-unique mangrove communities, and highly diverse fish and invertebrate assemblages.	Coral reef communities Mangrove communities Macroalgae and seagrass Turtles Fin fish Water quality	**No**	**Yes –** oil could potentially reach shoreline, intertidal and shallow subtidal habitats as well as Marine species using these habitats (e.g. turtles, seabirds, shorebirds, dugongs)
Barrow Island Marine Park	Includes Biggada Reef, an ecologically significant fringing reef, and Turtle Bay, an important turtle aggregation and breeding area. Includes representative areas of seagrass, macroalgal and deep water habitat.	Coral reef communities Mangrove communities Macroalgae and seagrass Turtles Fin fish Water quality	**No**	**Yes –** oil could potentially reach shoreline, intertidal and shallow subtidal habitats as well as marine species using these habitats (e.g. turtles)
Barrow Island Marine Management Area	Includes most of the waters around Barrow Island, the Lowendal Islands and the Barrow Island Marine Park. Includes Bandicoot Bay Conservation Area on the southern coast of Barrow Island created to protect benthic fauna and seabirds. It includes the largest intertidal sand/ mudflat community in the reserves and is an important feeding area for migratory birds. Includes significant breeding and nesting areas for marine turtles, important coral reefs and unique mangrove communities.		**No**	**Yes –** oil could potentially reach shoreline, intertidal and shallow subtidal habitats as well as marine species using these habitats (e.g. turtles and migratory shorebirds)

3.6 Socio-Economic Environment

Table 3-6 outlines those socioeconomic values that may be affected by routine events at the Operational Area as well as unplanned events that may arise within a potentially larger area (EMBA).

Table 3-6: Summary of Socio-economic Values and Sensitivities

Socio-economic values	Sensitivities within the Operational Area	Sensitivities within the EMBA
Commonwealth fisheries		
North-West Slope Trawl	**No –** Not within Operational Area, restricted to depths >200 m	**Yes –** Limited effort within EMBA seaward of 200 m isobaths. Oil could disrupt fishing activity and potentially contact eggs and larvae of target species although no direct contact with target species.
Western Skipjack	**No –** No effort on the NWS	**No –** No effort on the NWS
Western Tuna and Billfish	**No –** No effort on the NWS	**No –** No effort on the NWS
State fisheries		
Onslow Prawn Managed Fishery	**No –** Effort within coastal areas; no effort on the NWS	**Yes –** oil may reach shallow coastal waters and shorelines (most likely in Area 3 of fishery) affecting fishery habitat and fishing activity
Pearl Oyster Managed Fishery/ Aquaculture	**No –** None within Operational Area	**Yes –** Pearl farming occurs within the EMBA at Montebello Islands. Oil could interfere with the production process or impact on pearl oysters directly through reduced water quality.
Pilbara Demersal Scalefish Fishery (Line, Trawl and Trap)	**No –** None within Operational Area	**Yes –** oil spill may disrupt fishing effort
Recreational fishery	**No –** None within Operational Area	**Yes –** oil and gas activities within the EMBA could be disrupted by an oil spill.
Oil and gas	**Yes –** Jadestone's Stag Facility within operational area.	**Yes –** oil and gas activities within the EMBA could be disrupted by an oil spill.
Shipping	**No –** No designated shipping route within operational area with nearest located ~ 5 km northwest, other vessels may wish to transit the area although shipping traffic excluded from the Operational Area	**Yes –** Shipping route is located within the EMBA. Shipping activities could be disrupted by an oil spill.
Tourism	**No –** None within or near the Operational Area	**Yes –** Tourist activities within coastal areas of EMBA could be disrupted and

Socio-economic values	Sensitivities within the Operational Area	Sensitivities within the EMBA
		longterm impact to tourism could occur if tourist areas (e.g. coral reefs, beaches) are impacted by oil.

4. CONSULTATION WITH RELEVANT PERSONS

4.1 Consultation Process

Jadestone prepared a Consultation Plan for the activity addressing Jadestone's consultative process:

1. Spatial definition of activity components.
2. Identification of relevant persons.
3. Provision of information to relevant persons.
4. Opportunity to respond.
5. Assessment and close out of responses.

4.2 Assessment of Concerns, Objections and Claims

As a result of applying this process, a list of relevant persons was generated (refer **Table 4-1**).

Engagement with the relevant persons as listed identified no concerns, objections or claims about the proposed activity. Some feedback and clarification was received. This feedback along with records of all engagement and an assessment of each consultative activity is provided in **Table 4-2**.

The information packages distributed, and copies of full transcripts exchanged between Jadestone and relevant persons is provided in **Appendix A**.

4.3 Ongoing Consultation

Ongoing consultation to ensure relevant persons are aware of activities includes:

- Relevant persons provided a minimum 4-week period to respond to proposed planned activities;
- If there is a potential change in the risks or impacts to relevant persons due to planned activities relevant persons are to be consulted prior to the activity commencing; and
- Relevant persons provided information 4 weeks prior to commencement of activities to provide a specified timeframe and assets that will be present for the drilling activities including commercial fishing license holders.

Table 4-1: Relevant Persons and their Values/ Sensitivities Identified for the Activity

Relevant persons	Classification	Value/ Sensitivity Represented	Level of engagement
Federal bodies			
Department of Environment and Energy	Government	Matters of National Environmental Significance	Inform
Australian Maritime Safety Authority	Government/ Response organisation	Shipping	Collaborate
Australian Fisheries Management Authority (AFMA)	Government	Commonwealth commercial fisheries	Inform
Commonwealth Fisheries Association	Interested party	Commonwealth commercial fishing industry	Inform
State bodies			
Western Australian Department of Transport	Government/ Response organisation	Spill response	Collaborate
WA Department of Mines, Industry Regulation and Safety	Government	State waters regulations	Inform
Department of Primary Industries and Regional Development	Government	State commercial & recreational fisheries	Consult
Department Biodiversity, Conservation and Attractions	Government	State parks & reserves	Inform
WAFIC	Interested party	Fisheries	Inform
RecFishWest	Interested party	Recreational fishers	Inform
Spill responders			
Australian Marine Oil Spill Centre (AMOSC)	Response organisation	Spill response	Collaborate
Federal Ministers			
Hon Josh Frydenberg Minister for Environment & Energy	Government	Political portfolio/ electorate	Inform
Senator the Hon Matt Canavan Minister for Resources and Northern Australia	Government	Political portfolio/ electorate	Inform

Relevant persons	Classification	Value/ Sensitivity Represented	Level of engagement
State Ministers			
Hon. Bill Johnston MLA Minister for Mines and Petroleum	Government	Political portfolio/ electorate	Inform
Hon. Ben Wyatt MLA Minister for Finance, Energy, Aboriginal Affairs	Government	Political portfolio/ electorate	Inform
Hon. Dave Kelly MLA Minister for Water, Fisheries, Forestry, Innovation and ICT, Science	Government	Political portfolio/ electorate	Inform
Hon. Stephen Dawson MLC Minister for Environment	Government	Political portfolio/ electorate	Inform
State Shadow Ministers			
Hon. Bill Marmion MLA Shadow Minister for Mines and Petroleum, Innovation and Disruptive Technologies, Defence Issues, Science	Government	Political portfolio/ electorate	Inform
Hon. Dr Steven Thomas MLC Shadow Minister for Environment, Water, Emergency Services	Government	Political portfolio/ electorate	Inform

Table 4-2: Assessment of Merit of Concerns, Objections and Claims

Stakeholder	Stakeholder type	Engagement logistics	Engagement purpose	Stakeholder response	Jadestone response	Status and ongoing communications
Federal bodies						
Department of Environment and Energy	Government	Consultation package, provided via email on 27 February 2018.	Make aware of proposed drilling activity.	No objection or concern has been raised in relation to drilling activity.	This stakeholder has not provided a response to consultation and given the nature of the activity, on assessment Jadestone does not expect a response to be provided.	Informed and updated
Australian Marine Safety Authority	Government	Consultation package, provided via email on 27 February 2018.	Make aware of proposed drilling activity.	No objection or concern has been raised in relation to drilling activity.	Response received advising of shipping activity within the region of the proposed activity between October and December 2017.	Informed and updated
Australian Fisheries Management Authority	Government	Consultation package, provided via email on 26 February 2018.	Make aware of proposed drilling activity.	No objection or concern has been raised in relation to drilling activity.	This stakeholder has not provided a response to consultation and given the nature of the activity, on assessment Jadestone does not expect a response to be provided.	Informed and updated
Commonwealth Fisheries Association	Interested Party	Consultation package, provided via email on 26 February 2018.	Make aware of proposed drilling activity.	No objection or concern has been raised in relation to drilling activity.	This stakeholder has not provided a response to consultation and given the nature of the activity, on assessment Jadestone does not	Informed and updated

Stakeholder	Stakeholder type	Engagement logistics	Engagement purpose	Stakeholder response	Jadestone response	Status and ongoing communications
					expect a response to be provided.	
State bodies						
WA Department of Transport	Government	Hardcopy of OPEP provided 9 March 2018 by courier.	Receive advice on proposed spill response and preparedness arrangements for spill scenarios defined.	No response provided as yet.	Jadestone expects that DoT will revert with comments and/ or acceptance of the OPEP	Awaiting response.
WA Department of Mines, Industry Regulation and Safety	Government	Consultation package, provided via email on 26 February 2018.	Make aware of proposed drilling activity.	No objection or concern has been raised in relation to drilling activity.	A response from Stan Bowes at DMIRS has been received acknowledging receipt of the information package. DMIRS requests notification of commencement and cessation notifications be sent to petroleum.environment@dmirs.wa.gov.au	Informed and updated Commitment to notify included in Implementation Strategy
WA Department of Primary Industries and Regional Development	Government	Consultation package, provided via email on 26 February 2018.	Make aware of proposed drilling activity.	No objection or concern has been raised in relation to drilling activity.	A response from Hans Kemps at DPIRD has been received acknowledging receipt of the information package. DPIRD notes that they rely on the Regulator to ensure risks and impacts are managed and therefore do not intend to	Informed and updated

Stakeholder	Stakeholder type	Engagement logistics	Engagement purpose	Stakeholder response	Jadestone response	Status and ongoing communications
					comment on ongoing activities; and that the Department is to be consulted in the event of decommissioning.	
Department Biodiversity, Conservation and Attractions	Government	Consultation package, provided via email on 27 February 2018.	Make aware of proposed drilling activity.	No objection or concern has been raised in relation to drilling activity.	A response was provided from DBCA advising of additional organisational representatives to be contacted. These subsequent emails were then sent on the 27th of February 2018	Informed and updated
WAFIC	Interested party	Consultation package, provided via email on 26 February 2018.	Make aware of proposed drilling activity.	No objection or concern has been raised in relation to drilling activity.	A response was provided from WAFIC advising of issues and advice raised with the format and content of the information package provided. A follow up call and email was placed with the WAFIC representative however no subsequent response has been received. JE has updated the fisheries information provided in Section 5.9 of the EP and will provide customised information pertinent to fishers as advised in WAFIC's email in future consultation activities.	Informed and updated

Stakeholder	Stakeholder type	Engagement logistics	Engagement purpose	Stakeholder response	Jadestone response	Status and ongoing communications
RecFishWest	Interested party	Consultation package, provided via email on 26 February 2018.	Make aware of proposed drilling activity.	No objection or concern has been raised in relation to drilling activity.	This stakeholder has not provided a response to consultation and given the nature of the activity, on assessment Jadestone does not expect a response to be provided.	Informed and updated
Spill responders (other)						
Australian Marine Oil Spill Centre	Response organisation	Email sent to AMOSC 9 March 2018.	Make aware of proposed drilling activity.	No objection or concern has been raised in relation to drilling activity.	This stakeholder has responded confirming that JE does not need to submit the OPEP to AMOSC for review.	Informed and updated
Federal Ministers						
Hon Josh Frydenberg Minister for Environment & Energy	Government	Consultation package, provided via email on 26 February 2018.	Make aware of proposed drilling activity.	No objection or concern has been raised in relation to drilling activity.	This stakeholder has not provided a response to consultation and given the nature of the activity, on assessment Jadestone does not expect a response to be provided.	Informed and updated
Senator the Hon Matt Canavan Minister for Resources and Northern Australia	Government	Consultation package, provided via email on 26 February 2018.	Make aware of proposed drilling activity.	No objection or concern has been raised in relation to drilling activity.	This stakeholder has not provided a response to consultation and given the nature of the activity, on assessment Jadestone does not	Informed and updated

Stakeholder	Stakeholder type	Engagement logistics	Engagement purpose	Stakeholder response	Jadestone response	Status and ongoing communications
					expect a response to be provided.	
State Ministers						
Hon. Bill Johnston MLA Minister for Mines and Petroleum	Government	Consultation package, provided via email on 26 February 2018.	Make aware of change of ownership and no change in risk profile	No objection or concern has been raised in relation to operating activities.	This stakeholder has not provided a response to consultation and given the nature of the activity, on assessment Jadestone does not expect a response to be provided.	Informed and updated
Hon. Ben Wyatt MLA Minister for Finance, Energy, Aboriginal Affairs	Government	Consultation package, provided via email on 26 February 2018.	Make aware of change of ownership and no change in risk profile	No objection or concern has been raised in relation to operating activities.	This stakeholder has provided an automated response acknowledging receipt of the package. Given the nature of the activity, Jadestone does not expect another response to be provided by this person.	Informed and updated
Hon. Dave Kelly MLA Minister for Water, Fisheries, Forestry, Innovation and ICT, Science	Government	Consultation package, provided via email on 26 February 2018.	Make aware of change of ownership and no change in risk profile	No objection or concern has been raised in relation to operating activities.	This stakeholder has provided an automated response acknowledging receipt of the package. Given the nature of the activity, Jadestone does not expect another response to be provided by this person.	Informed and updated
Hon. Stephen Dawson MLC	Government	Consultation package, provided	Make aware of change of ownership and no	No objection or concern has been	This stakeholder has provided an automated response acknowledging receipt of the	Informed and updated

Stakeholder	Stakeholder type	Engagement logistics	Engagement purpose	Stakeholder response	Jadestone response	Status and ongoing communications
Minister for Environment		via email on 26 February 2018.	change in risk profile.	raised in relation to operating activities.	package. Given the nature of the activity, Jadestone does not expect another response to be provided by this person.	
Shadow Ministers						
Hon. Bill Marmion MLA Shadow Minister for Mines and Petroleum, Innovation and Disruptive Technologies, Defence Issues, Science	Government	Consultation package, provided via email on 26 February 2018.	Make aware of change of ownership and no change in risk profile.	No objection or concern has been raised in relation to operating activities.	This stakeholder has not provided a response to consultation and given the nature of the activity, on assessment Jadestone does not expect a response to be provided.	Informed and updated
Hon. Dr Steven Thomas MLC Shadow Minister for Environment, Water, Emergency Services	Government	Consultation package, provided via email on November 28, 2016.	Make aware of change of ownership and no change in risk profile.	No objection or concern has been raised in relation to operating activities.	This stakeholder has not provided a response to consultation and given the nature of the activity, on assessment Jadestone does not expect a response to be provided.	Informed and updated

5. ENVIRONMENTAL HAZARDS AND CONTROLS

5.1 Risk Evaluation Summary

The impact and risk assessment process undertaken for the drilling activity identified nine aspects associated with planned activities, and seven hazards associated with unplanned or accidental events that may arise during the activity.

Table 5-1: Summary of Environmental Impact and Risk Assessment Rankings

Planned Activities		
Aspect		**Residual Consequence Ranking**
1. Light emissions		A
2. Noise emissions		A
3. Atmospheric emissions		A
4. Operational discharges		A
5. Drilling discharges		A
6. Physical disturbance		A
7. Interaction with other users		A
8. Interaction with fauna		A
9. Spill response activities		A
Unplanned Events		
Hazard	**Pre-treatment Ranking**	**Residual Ranking**
1. Marine pest introduction	M	L
2. Solid waste	L	L
3. Non-hydrocarbon liquids	L	L
4. Unplanned release of hydrocarbons	L	L
5. Dropped objects	M	L

5.2 Environmental Impacts, Risks and Control Measures

A summary of environmental impacts and risks and their control measures for planned activities (**Table 5-2**) and unplanned events (**Table 5-3**), are provided below.

5.2.1 Planned Events

Table 5-2: Summary of Environmental Impacts, Risks and Controls for Planned Activities

Aspect	Potential Impacts	Consequence	Management Controls	Effectiveness of Controls
1. Light emissions	Light emitted from the MODU and support vessels during 24 hour operations for a period of up to 50 days at the Stag Facility	Negligible	Lighting meeting safety requirements for the performance of work activities will be maintained during the activity.	Emissions of light from the MODU and vessels are managed to levels as low as reasonably practicable to minimise light impacts to marine fauna
2. Noise emissions	Noise is generated by the MODU, vessels and helicopters. Highest noise levels are likely to occur during supply boat operations, and MODU mobilisation/ demobilisation, during which vessels use thrusters to move into position. During drilling operations, it is intended that support vessels will anchor rather than hold station using thrusters, and the MODU will maintain station using legs (JUP). No vertical seismic profiling or side scan sonar will be used. While the location of the proposed drilling activities occurs within the identified migratory route of humpback whales, the noise emissions associated with the drilling activity are not expected to impact humpback whales during their migration. Based on the information gathered from the literature, and information provided in the Conservation Advice for Humpback Whales, no impacts to humpback whales – behavioural or physiological – are expected from the drilling activity.	Negligible	Support vessels and helicopters comply with relevant parts of Part 8 of EPBC Regulations. Planned maintenance, routine inspections and surveys of machinery and equipment.	Noise emissions from the MODU and vessels are managed to levels as low as reasonably practicable to reduce impacts to marine fauna.

Aspect	Potential Impacts	Consequence	Management Controls	Effectiveness of Controls
3. Atmospheric emissions	The use of marine-grade diesel to power engines, generators and mobile and fixed plant and equipment will result in emissions of greenhouse gases (GHG) and non-GHG. Vessels and the MODU may utilise ozone-depleting substances (ODS). There will be no incineration on the MODU during the activity. No flaring will occur due to the drilling activities.	Negligible	International air pollution prevention certificates and planned maintenance.	No unplanned emissions to the atmosphere
4. Operational discharges	A localised reduction in water quality, including a temporary increase in nutrient concentrations, temperature and salinity will be associated with discharges including domestic discharges, deck drainage and bilge water, cooling water, desalination brine, and ballast water.	Negligible	International pollution prevention certificates MARPOL requirements Planned maintenance of systems and equipment	Liquid discharges from the MODU and vessels are managed to levels as low as reasonably practicable. No unplanned discharges of liquid wastes
5. Drilling discharges	Drilling discharges to the marine environment will be made, including fluids, cuttings and cement (slurry and dry bulk solids). Depending on the stage of drilling, discharges will occur at sea surface and at seabed. While there are drilling discharges to sea surface immediately around the MODU and from vessels, the impact and risk assessment process indicates that discharges will not result in significant impacts to marine fauna. Water quality and benthic impacts will be highly localised and restricted to the area surrounding the MODU and immediately around the surface hole location, respectively. The resultant potential impacts from drilling discharges made to sea surface and at seabed are expected to be minor. The	Negligible	Chemical Selection and Approval Procedure Cuttings management system Inventory control instructions	Drilling discharges from the MODU are managed to levels as low as reasonably practicable. No unplanned discharges of drilling liquids

Aspect	Potential Impacts	Consequence	Management Controls	Effectiveness of Controls
	Operational Area contains sandy habitats that are widely represented at a regional scale on the NWS.			
6. Physical disturbance	Spudding and anchoring of MODU/ vessels will disturb up to 2,010 m^2 of seabed, which is expected to be soft sediment habitat. This will result in the mortality of flora and sessile fauna within this footprint and potentially the mortality of benthic infauna associated with the habitat. Following removal of the MODU, the soft sediment will be left indented, but will remain a viable habitat that would be expected to recolonise with benthic species within weeks to months following removal of the disturbance. Disturbances to seabed will occur at a depth of 50 m. This depth is greater than published maximum expected dive depths for flatback turtles (40 to 45m). As such, anchoring and mooring activities are not expected to displace inter-nesting flatback individuals or result in a modification of their behaviour. As such, the activity is aligned with the intent of the Flatback Turtle Recovery Plan 2017–2027, in particular with regard to habitat modification leading to displacement of individuals or modification of their behaviour.	Negligible	MODU move procedure Standby vessel mooring instruction	Seabed disturbance due to mooring and positioning are managed to an extent that is as low as reasonably practicable. No mooring or anchoring outside designated areas.
7. Interaction with other users	The presence of the 500m Restricted Zone (the Operational Area) creates a localised disturbance for other users of the area including commercial and recreational fishers, and shipping traffic	Negligible	AMSA hydrographic charts AMSA marine notices Stakeholder consultation	Disturbance to other users localised to the Restricted Zone only.
8. Interaction with fauna	The physical presence of infrastructure and the movement of vessels and helicopters may result in physical and behavioural impacts to marine fauna.	Negligible	Vessels operating within the restricted zone must not exceed a speed of five (5) knots.	As vessels will travel at <5 knots risk to megafauna is considered low and acceptable; with minimal vessel activity in

Aspect	Potential Impacts	Consequence	Management Controls	Effectiveness of Controls
	The Operational Area overlaps the humpback whale 'species core range', is adjacent to the whale shark BIA and overlaps the flatback turtle inter-nesting BIA.		Online inductions Incident reporting procedure	the area, the risk of mortality from a low-speed vessel strike is low.
9. Spill response activities	There is the potential for spill response activities to exacerbate or create additional environmental impacts. Impacts to the environment from implementing source control, monitoring and evaluation, oiled wildlife response and scientific monitoring include those operational impacts from vessels and aircraft. In addition, implementing oiled wildlife response may cause additional distress, habitat disturbance, physical and behavioural impacts, separation and increased predation to wildlife if not undertaken correctly.	Negligible	Oil pollution emergency plan includes: Light spill onto shorelines and coastal waters is reduced to ALARP during spill response Noise emissions reduced to ALARP during spill response Spill response vessel emissions meet MARPOL requirements Impacts from spill response operational discharges are reduced to ALARP Prevention of secondary contamination of oily waste and litter during spill response Disturbance to habitats, fauna and culturally sensitive areas during spill response is reduced to ALARP Additional impacts from dispersant application are reduced to ALARP	The mutual interests of responding and protecting sensitive receptors from further impact due to response activities is managed through the use of the net environmental benefit analysis during response strategy planning in preparedness arrangements as well as during a response

Aspect	Potential Impacts	Consequence	Management Controls	Effectiveness of Controls
			Reduce disruption to other users of marine and coastal areas and townships during spill response is reduced to ALARP	

5.2.2 Unplanned Events

Table 5-3: Summary of Environmental Impacts, Risks and Controls for Unplanned Events

Hazard	Potential Impacts	Risk	Management Controls	Effectiveness of Controls
1. Marine Pest Introduction	The introduction and establishment of marine pests can result in a localised impact on native marine fauna and flora.	Low	DAWR/ WA DPIRD approvals including: Vessel Contractors are required to conduct an IMS risk assessment for support vessel(s) that have been sourced from outside Western Australia. Where applicable, the Contractor will use the WA Department of Fisheries 'Vessel Check' process. All vessels from international waters have a valid DAWR certificate In accordance with marine pest management guidelines (as enforced under the WA Fish Resources Management Act 1994; and Fish Resources Management Regulations 1995): • Vessels must be clean before entering WA waters; and • Any suspected or confirmed marine pests are reported to DPIRD. Prior to arrival in Australia Ballast management plan All ballast transfers and exchanges made during the voyage need to be recorded.	Reduce risk of introduced marine species from vessels and equipment used in water.
2. Solid waste	Non-hydrocarbon solids such as plastics have the potential to smother benthic environments and harm marine fauna through entanglement or ingestion. Release of hazardous solids (e.g. wastes) may result in the pollution of the immediate receiving environment.	Low	Waste management procedures including; Waste Management Plan which directs: • Solid waste materials are stored in fit for purpose storage containers and/or lifting skips, labelled and equipped with lids / covers to prevent loss of material during storage and handling.	Reduce the risk of release of solid waste to the marine environment to minimise any potential disturbance/ impacts.

Hazard	Potential Impacts	Risk	Management Controls	Effectiveness of Controls
			• Hazardous solid wastes will be managed in accordance with Marine Orders – Part 94 (Marine Pollution Prevention – Packaged Harmful Substances), Navigation Act 2012 and Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (Part III) requirements, and Environmental Protection Regulations (controlled waste) Silos controlled with PSV	
3. Non-hydrocarbon liquids	Non-hydrocarbon liquids, in particular chemical formulations, may be accidentally released to the marine environment. Potential impacts include temporary and highly localised decline in water quality with limited potential for toxicity to marine fauna due to the temporary exposure and low toxicity resulting from rapid dilution in the marine environment.	Low	Hazardous substances and dangerous goods standards SDS for chemical management Chemical selection procedure	Reduces the risk of spills and leaks (discharges) to the sea by controlling the storage, handling and clean up.
4. Hydrocarbon spill	Accidental loss of fuel and other hydrocarbons (to the marine environment may result in a reduction of water quality and potential impacts to local marine fauna and flora including; chemical (e.g. toxic) and physical (e.g. coating of emergent habitats, oiling of wildlife at sea surface and ingestion).	Low	MODU Move Procedure Seabed study Marine Operating Manual SIMOPs Plan Emergency Pipeline Repair Procedure MODU Refuelling Procedure Competent personnel	Risk of spills and damage to assets and equipment reduced to as low as reasonably practicable.

Hazard	Potential Impacts	Risk	Management Controls	Effectiveness of Controls
5. Dropped objects	Damage or loss to marine habitats may occur due to objects dropped during offloading/ backloading activities. The Operational Area is within a habitat critical to survival for flatback turtles	Low	Competent personnel Lifting Operations Procedure Facility, MODU, Vessel Safety Cases	Management controls implemented to reduce the risk of dropped objects to the marine environment, and thereby damage to the seabed.

6. HYDROCARBON SPILL RESPONSE ARRANGEMENTS

6.1 Credible Worst Case Hydrocarbon Spill

The credible worst case hydrocarbon spill scenarios for the Stag Field identified in Table 6-1.

Table 6-1: Credible Worst Case Oil Spill Scenarios for the Stag Field

Hydrocarbon	Release point	Credible Worst Case
Stag crude oil	At surface	Damage to conductors: 68 m^3
	Subsea	Damage to subsea export pipeline = 309 m^3

6.2 Net Environmental Benefit Analysis

Net Environmental Benefit Analysis (NEBA) is a structured approach used by the spill response community and stakeholders to select spill response strategies that will effectively remove oil, are feasible to use safely in particular conditions, and will reduce the impact of an oil spill on the environment.

The NEBA process is used during pre-spill planning (Strategic NEBA) and during a response (Operational NEBA). A Strategic NEBA is an integral part of the contingency planning process and is used to ensure that response strategies for scenarios are well informed. An Operational NEBA is used to ensure that evolving conditions are understood, so that the response strategy can be adjusted as necessary to manage individual response actions and end points.

Balancing trade-offs may involve differing and conflicting priorities, values and perceptions of the importance of sensitive receptors. There is no universally accepted way to assign perceived value or importance and is not a quantitative process. Overall, the NEBA process provides an estimate of potential environmental effects which are sufficient to allow the parties to compare and select preferred combinations of response strategies to reduce environmental impacts to ALARP.

6.3 Evaluation of Spill Response Strategies

The evaluation of the suitable response strategies was conducted based on the credible spill scenarios. Key considerations evaluated were:

- The properties and weathering profile of the oil;
- The philosophy of the responses, that is, what is aim of the response based on the hydrocarbon properties. In the case of Stag crude: prevention of shoreline contact and application of chemical dispersant to entrain and enhance biodegradation;
- The Net Environmental Benefit of undertaking the response strategy;
- The nature and scale of the maximum credible worst case scenario; and
- The potential safety and environmental aspects and impacts involved with the selected responses.

Spill response strategies considered for the mitigation of hydrocarbon, including summary of benefits and decision to adopt or reject are outlined in Table 7-2.

Table 6-2: Strategies Adopted for Spill Response

Strategy	Description
Source control	Support vessel and MODU SOPEPs
	Emergency Pipeline Repair Plan
Operational Monitoring	Surveillance used to monitor and evaluate trajectory and fate of spill; to determine effectiveness of response; and identify and report on any potential/ actual contacts with sensitive receptors.
Shoreline clean-up	During a spill response, clean-up of the oiled shorelines will be implemented using suitable methods, provided it will be beneficial to the environment based on the NEBA performed on the affected areas based on actual site conditions.
Oiled wildlife response (OWR)	Responding to an oiled wildlife incident will involve an attempt to prevent wildlife from becoming oiled and/or the treatment of animals that do become oiled.
Scientific Monitoring	This is the main tool for determining the extent, severity and persistence of environmental impacts from an oil spill and allows operators to determine whether their environmental protection outcomes have been met (via scientific monitoring activities). This strategy also evaluates the recovery from the spill.

6.4 Oil Spill Response Arrangements and Capability

Jadestone Energy has adequate arrangements and capability in place to implement the oil spill control measures proposed to manage a significant oil pollution emergency in a timely manner. In the event of a spill, initial actions will be undertaken by the OIM/Vessel Master in line with the vessel's Shipboard Oil Pollution Emergency Plan (SOPEP) and/or Stage Incident Response Plan. Should the spill require further action, the IMT in Jadestone Energy (Perth) will mobilise, in accordance with the Oil Pollution Emergency Plan (OPEP).

Oil spill response equipment and resources are a combination of Jadestone Energy, AMOSC, AMSA, DoT, National Plan (NatPlan), and other operator resources available through the AMOSPlan mutual aid arrangements. Under the MOU between AMSA and Jadestone Energy, AMSA will provide all resources available through NatPlan to support a Jadestone Energy spill response. The DoT coordinates the State Response Team (SRT) oil spill response personnel and equipment resources. The DoT will work with Jadestone Energy in an oil spill response and will lead the response where the spill is within State waters. Where oil contacts shorelines managed by the Commonwealth government, Jadestone Energy will work with the Department of the Environment to establish shoreline clean-up priorities, activities and termination criteria.

In the event of an oiled wildlife response, Jadestone Energy will activate the West Australian Oiled Wildlife Response Plan (WAOWRP) and work with Department of Biodiversity, Conservation and Attractions (DBCA) in determining resources and capability requirements. DBCA and Industry (AMOSC) Oiled Wildlife Advisors (OWAs) ensure minimum standards for oiled wildlife response, as outlined within the WAOWRP, are met and ensure timely mobilisation of appropriate resources (equipment and personnel) through communication with the wildlife logistics team. Jadestone Energy has access to:

- AMOSC core group responders;
- DBCA staff and approved volunteers/SMEs;
- Additional local resources under current contracts and suppliers; and

During and post-spill scientific response monitoring activities require resources external to Jadestone Energy and include specialist technical capabilities. Jadestone Energy has contracts in place for obtaining primary

control support agency for scientific response monitoring activities. If additional support is required, the primary contractor has MOUs with other service providers to support scientific response monitoring activities.

Response planning and preparedness undertaken in accordance with:

- NatPlan (AMSA, 2014)
- AMOSCPlan (AMOSC, 2014)
- WestPlan MOP (2010)

A summary of the management controls and performance standards in place to maintain preparedness to implement response arrangements in the event of an oil pollution emergency is provided in Table 6-3.

Table 6-3: Spill Response Preparedness

Management Control	Performance Standards
Contracts valid and maintained to ensure access to competent personnel and appropriate equipment to support spill response	Contracts for the supply of personnel and materials meeting the minimum requirements of spill response planning in place and current with competent service providers and suppliers
AMOSC Master Services Contract (MSC) and AMSA Memorandum of Understanding (MOU) maintained and valid for life of the EP	AMOSC membership allowing access to mutual aid arrangements for spill response crew and equipment via a Master Services Contract (MSC) AMSA MOU (access to NRT and resources)
Response personnel competent and trained in accordance with Jadestone Energy Training and Competency Management System and OPEP	Assessment of proposed / rostered response personnel as being competent and trained according to the requirements of response roles
Jadestone Energy Audit Manual includes emergency response and spill preparedness	Scheduled audit of Jadestone Energy's emergency response and spill preparedness
Spill response exercise and training completed in accordance with Jadestone Energy Incident Management Team Response Plan to maintain spill preparedness	Training and exercising current and completed as required by the Incident Management Team Response Plan
OPEP risk register maintained to ensure spill response is appropriate to nature and scale of risk	Spill response planning and preparedness aligned with nature and scale of risk
MODU and Vessels Shipboard Oil Pollution Emergency Plan valid and tested to ensure ability to respond to spills	In line with MARPOL Annex 1, support vessels over 400 gross tonnage will have a current Shipboard Oil Pollution Emergency Plan (SOPEP)/ Shipboard Marine Pollution Emergency Plan (SMPEP) and International Oil Pollution Prevention (IOPP) certificate
Oil Spill Response Arrangements maintained to ensure ability to respond to spills	Provides current information for Jadestone Energy spill response resources and matches risk
Personnel aware of roles and responsibilities in the event of a response in accordance with Stag Incident Response Plan	Instructs offshore response roles and responsibilities and training requirements.

7. MANAGEMENT APPROACH

7.1 Management system

The Stag drilling activity will be managed in compliance with all measures and controls detailed within the EP accepted by NOPSEMA under the OPGGS (E) Regulations, other environmental legislation and Jadestone Energy's Management System.

As described in the EP, the implementation strategy includes relevant details on the following:

- Business management system;
- HSE Policy;
- Roles and responsibilities;
- Competencies and training;
- Risk management;
- Environmental performance requirements;
- Communication requirements including stakeholder management;
- Continuous improvement; and
- Management of change.

7.1.1 Monitoring

Table 7-1 details the quantitative records that are maintained for all emissions and discharges during routine or emergencies within the Operational Area as per Regulation 14(7) of the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009*.

Table 7-1: Summary of Routine Monitoring

Measurement	Frequency	Monitoring Strategy	Record
Volume of drilling discharges	Daily	Volumes used determined from change in inventory	Daily report
Ballast water discharges	Intermittently – discharge events recorded as they occur	Discharges determined from ballast water record log	Ballast water records
Quantity (kms^3) Gas emissions	Continuous	Metering on the MODU	Greenhouse Gas reporting Daily report
Volumes of the following waste types are recorded: • General and putrescible waste • Hazardous waste • Timber/ wood • Recyclables • Cardboard/ paper • Scrap metal • Metal drums & containers • Batteries (lead acid) • Plastic drums and containers	Logged on MODU when transferred via vessel to shore then to licensed waste facility. Vessel also records volumes on manifest	Invoicing process checks vessel manifest against waste disposal records of service provider, and evidence of disposal	Waste records Garbage Record Books

7.1.2 Audits

Audits will be in accordance with Jadestone's Audit Manual (JS-90-PR-G-00003). Auditing is Jadestone management's primary tool for:

- Determining whether management systems are suitable, available where required, implemented and effective in accomplishing the documented policies and objectives of the organisation;
- Verifying conformance with legal and contractual requirements;
- Obtaining and maintaining confidence in the capability of suppliers; and
- Contributing to the improvement of the Business Management System (BMS).

At least one audit ('pre-start inspection') of the MODU by Jadestone's HSE Manager will be completed prior to commencement of the activity.

7.2 Management of Non-conformance

Non-conformances from audits, inspections, regular monitoring or response testing are communicated immediately to the OIM and tracked and monitored by the General Manager until closed.

Opportunities for improvement and corrective actions from reviews, audits, inspections, monitoring and testing activities are documented and tracked to closure.

7.3 Management of Change

Jadestone's Change Management Procedure (MoC) [JS-90-PR-G-00017] provides a process that will determine whether a proposed change driven internally by the organisation, triggers the requirements of Regulation 17, which may result in a revision and resubmission of an EP to NOPSEMA. The procedure describes a system for identifying, tracking, responding, progressing and closing out change requests or queries raised by any party involved in Jadestone Energy activities.

The Change Management Procedure also directs and instructs activity owners on external drivers of change including environmental regulatory and stakeholder requirements, including (but not limited to):

- Changes to legislation;
- Provision of new or now relevant technical/ scientific information;
- Changes in the management arrangements/ plans for protected areas or species; or
- Receipt of new information from relevant persons relating to a proposed or existing activity.

The Change Management Procedure provides for proper consideration of temporary or permanent changes to activities, including an impact and risk assessment, approved and communicated to all appropriate stakeholders together with providing a record of the change.

7.4 Performance Review

A report evaluating the performance of the activity will be prepared and submitted within 3 months after completion of the activity. The report must contain sufficient information to determine whether or not environmental performance outcomes and standards in the EP were met. The report will include:

- An overview of the activities undertaken;
- Summary of environmental incidents;
- Summary of changes that occurred to planned activities; and
- Summary of audits conducted.

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