Wheatstone Project

Start Up and Operations Environment Plan Summary

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Contents

Tables

Figures

Appendices

Appendix Tables

1.0 Introduction

1.1 Purpose

The Wheatstone Start-Up and Operations Environment Plan Summary (this Summary) summarises the Wheatstone Start-Up and Operations Environment Plan (the EP) accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) on 31 August 2016. In accordance with the requirements of Regulations 11(3) and 11(4) of Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (Table 1-1) this Summary has been prepared with reference to the Environment Plan Summaries Guideline (NOPSEMA, 2016).

Table 1-1: EP Summary Requirements

EP Summary Requirement	Reference
(i) the location of the activity	Section 1.3
(ii) a description of the receiving environment	Section 3.0
(iii) a description of the activity	Section 2.0
(iv) details of environmental impacts and risks	Section 4.0
(v) a summary of the control measures for the activity	Section 4.0
(vi) a summary of the arrangements for ongoing monitoring of the titleholder's environmental performance	Section 5.0
(vii) a summary of the response arrangements in the oil pollution emergency plan	Section 6.0
(viii) details of consultation already undertaken, and plans for ongoing consultation	Section 7.0
(ix) details of the titleholder's nominated liaison person for the activity	Section 7.3

1.2 Scope

The EP scope detailed in this Summary includes activities, impacts and risks associated with the start-up and operation of Wheatstone/Iago field infrastructure, the Wheatstone platform and the Wheatstone trunkline in Commonwealth Waters (the petroleum activity) in Commonwealth Waters.

Petroleum activities in State Waters are subject to regulatory assessment under separate legislation administered by the Department of Mines and Petroleum (DMP), and are not detailed in this Summary.

The platform will receive third-party hydrocarbons from WA-49-L via WA-26-PL. Chevron is not the registered titleholder for WA-49-L and WA-26-PL and therefore the field production infrastructure is not included in the scope of the EP or this Summary.

1.3 Location

The Wheatstone Platform (WA-3-IL), gas fields (WA-46-L, WA-47-L, and WA-48-L) and the Iago gas fields (WA-46-L and WA-48-L) are located in Commonwealth Waters off the Pilbara coast of WA (Figure 1-1). Additionally, the platform (WA-3-IL) will receive fluids from the Julimar Development Project (JDP) WA-49-L, located south west of WA-48-L, described in the Woodside Energy Julimar Pty Ltd EP.

Approximate water depths in the offshore licence areas range between 150 and 280 m for the Wheatstone field and between 70 and 120 m for the Iago field. A schematic detailing the layout of subsea infrastructure is provided in Figure 1-2. The platform is in water approximately 71 m deep. The trunkline generally extends along the outer

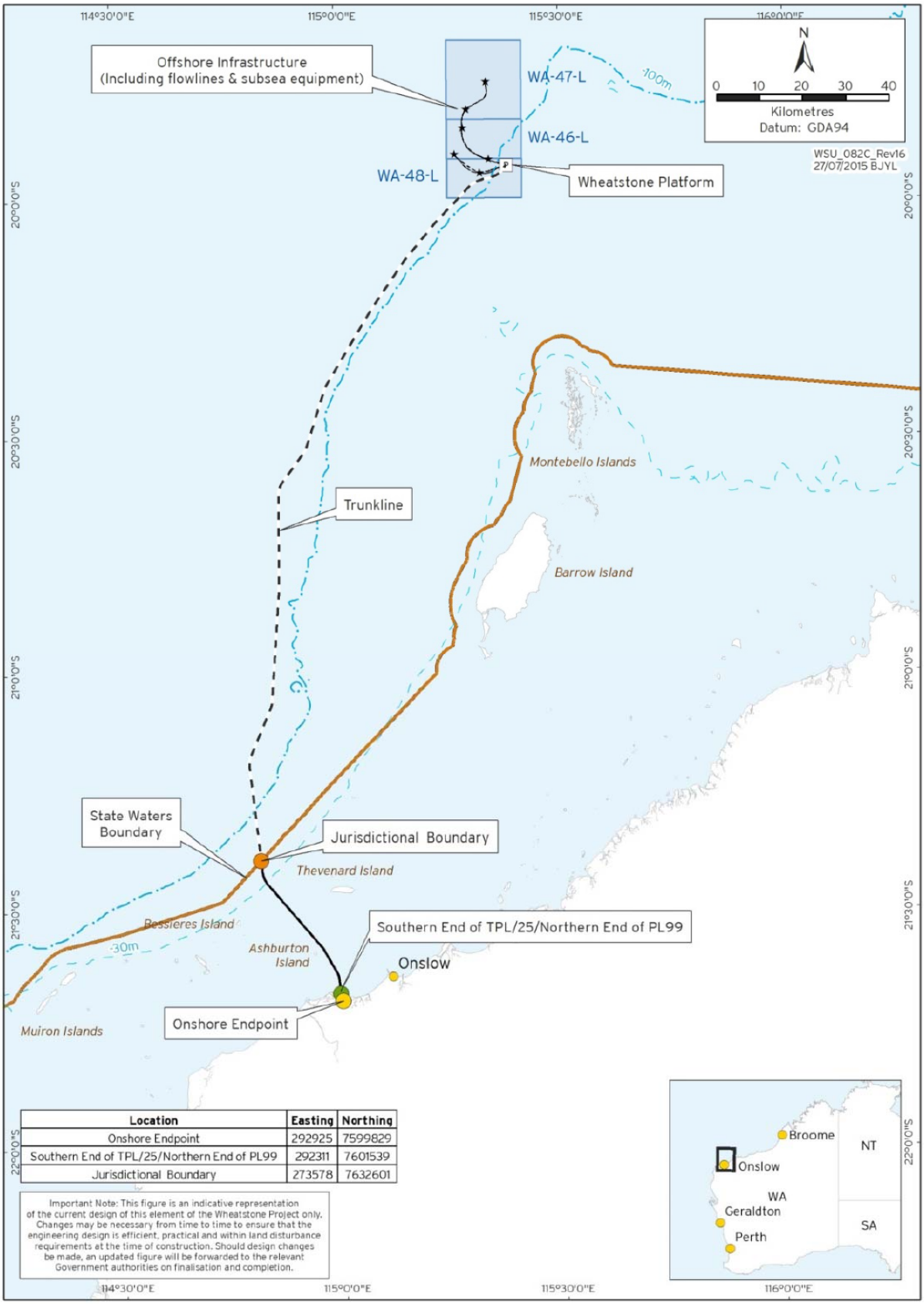
continental shelf at approximately the 110 m isobath, and crosses the shore through a microtunnel at Ashburton North approximately 12 km south-west of Onslow on the Pilbara coast. The section of the trunkline in Commonwealth Waters (WA-25-PL) is approximately 185 km long and runs from the platform to the State Waters boundary.

The information in this Summary relates to the infrastructure located in Commonwealth Waters only, as outlined in Table 1-1.

Table 1-2: Wheatstone Facilities and Infrastructure Coordinates

Infrastructure	Titles	Easting	Northing
Platform	WA-3-IL	115° 23′ 02.22″E	19° 55′ 45.78″ S
Trunkline (Start at platform)	WA-25-PL	115° 23′ 02.22″ E	19° 55′ 45.78″ S
Trunkline (End at State Waters Boundary)	WA-25-PL	114° 48′ 57.496″E	21° 23′ 40.718″ S

The platform is approximately 50 km north of the Montebello Islands, while the trunkline is approximately 46 km west of Barrow Island and the Montebello Islands.



Location	Easting	Northing
Onshore Endpoint	292925	7599829
Southern End of TPL/25/Northern End of PL99	292311	7601539
Jurisdictional Boundary	273578	7632601

Important Note: This figure is an indicative representation of the current design of this element of the Wheatstone Project only. Changes may be necessary from time to time to ensure that the engineering design is efficient, practical and within land disturbance requirements at the time of construction. Should design changes be made, an updated figure will be forwarded to the relevant Government authorities on finalisation and completion.

Figure 1-1: Project Location

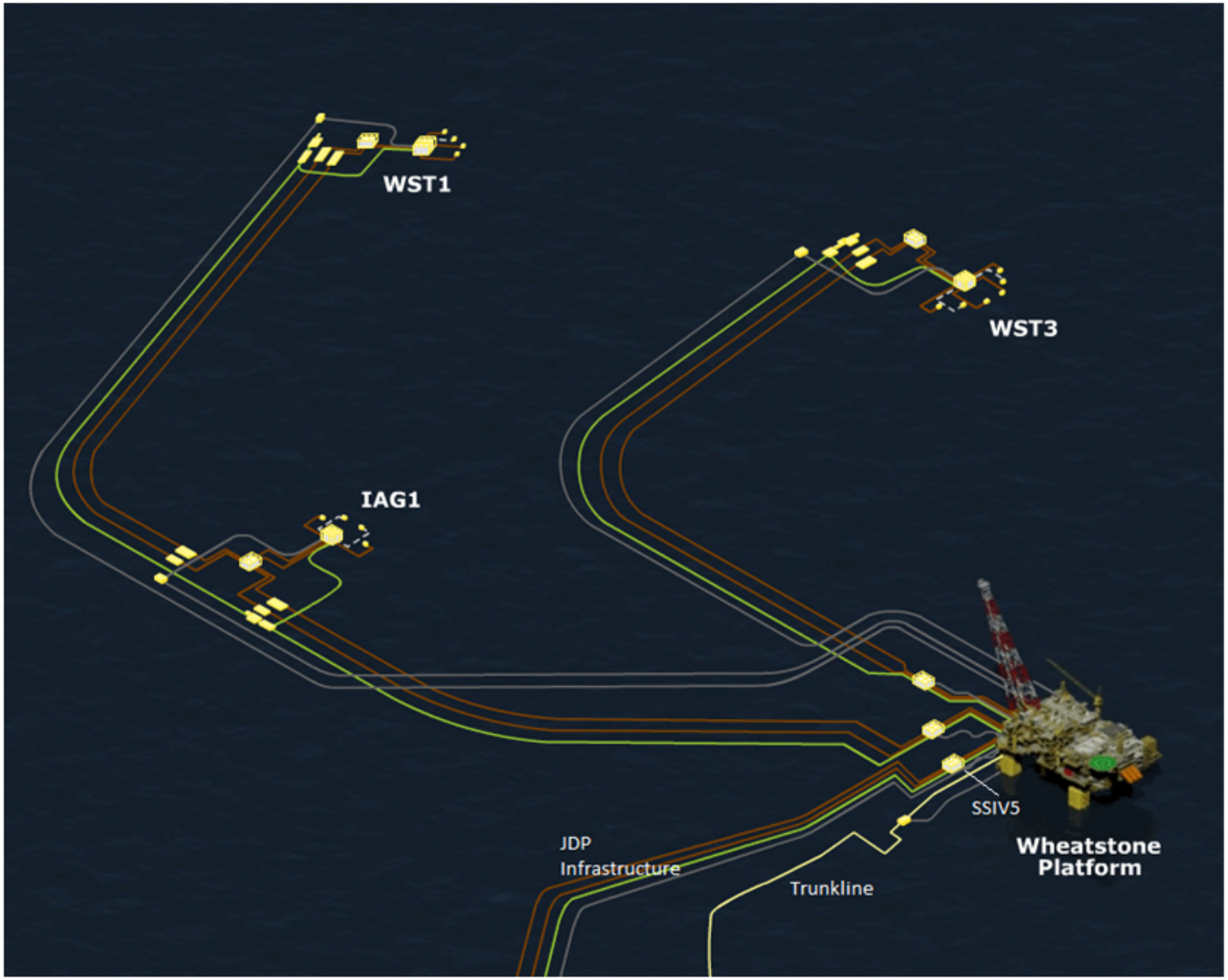


Figure 1-2: Schematic detailing the layout of subsea infrastructure

2.0 Description of Activity

This EP summary includes the following primary activities:

- Operations (including start-up)
- Inspection, maintenance and repairs (IMR)
- Field support - Platform supply vessels, helicopters for personnel transfers, and IMR vessels.

Start-up activities are planned to commence in 2016, with operation expected to continue for approximately 30 years. This timing and duration is indicative and dependent, in part, on offshore facilities' demands, and thus is subject to change. Inspection, maintenance and repair activities are expected to be infrequent but may occur at any time during start-up and operation.

2.1 Operations (including start-up)

Before steady-state production, initial start-up and testing of the platform systems and equipment occurs. Initially, the trunkline may be used to transport "buy-back" gas from the mainland to the offshore platform for an initial low intensity pre-start-up period. This may last approximately one year prior to produced gas-condensate hydrocarbons being introduced to the trunkline from the platform for transport to the mainland. Should this occur, inert nitrogen preservation gas within the trunkline is expected to be displaced and purged at the platform. Alternatively, the nitrogen will be purged to the onshore gas plant if buy-back gas is not required.

Following start-up, production is gradually ramped up to steady-state capacity and sustained operations. The gradual ramp-up period may last between approximately six months and one to two years. Operation of the Wheatstone/Iago field infrastructure and the trunkline is controlled remotely and monitored from the offshore platform and if required from the onshore gas plant.

2.1.1 Platform Maintenance

Platform maintenance preserves the safety, reliability, and integrity of the facility and maintains efficient conditions. Maintenance and inspection is extensive, and includes risk-based inspection, predictive maintenance, condition monitoring, and generic maintenance. Activities can include breaking containment of vessels, opening lines, topping up and changing over fluids, draining water systems, testing valve function, changing filters, localised surface abrasive blasting and painting, general cleaning, and pressure cleaning.

2.2 Inspection Maintenance and Repair (IMR) activities

2.2.1 Inspections

Subsea inspections provide assurance that infrastructure is being maintained and operated according to design and proactively identify maintenance or repair activities that may be required. Inspection generally involves an IMR vessel travelling along the route of the subsea system with a remotely operated vehicle (ROV) (and in some cases, divers). Inspections using vessels are typically conducted every one to three years during early operations, with the frequency likely to decrease over time during steady state operations, depending on inspection results. Inspection techniques may include general visual inspections, cathodic protection surveys using ROV, side-scan sonar using the vessel's transducer or autonomous underwater vehicle, and wall thickness measurements using ROV-deployable tools.

Intelligent pigging (IP) to inspect the trunkline condition will be performed within two years from start-up and then approximately five years thereafter. Following the second IP survey, a risk based inspection (RBI) assessment shall be carried out which will determine required frequency of subsequent IP operations.

Conditioning (cleaning or batch) pigging is required before an IP inspection run and requires a pig train to sweep any potential corrosive products and debris from the pipeline to ensure that the pipeline is in suitable condition for a subsequent IP inspection. Batch pigging may also be required to distribute chemicals (e.g. corrosion inhibitor). Pigs are launched from the platform through the trunkline to the onshore pig receiver.

The monoethylene glycol (MEG) risers will require scheduled inspections by tethered intelligent pig for integrity management due to the inability to externally inspect areas of concern. Tethered pigging will be performed within 12 months of start-up and 12 months thereafter. Following the second intelligent pigging survey an RBI assessment will be carried out, which will determine required frequency of subsequent intelligent pigging operations on the MEG risers.

In exceptional circumstances, pigging may also be conducted on the flowlines, with temporary pig launchers used on the flowlines and pigs received at the platform.

2.2.2 Maintenance and Repair

Maintenance and repair activities are typically conducted in response to inspection findings, engineering analyses, and/or external events. The activities are likely to be performed by ROV from the IMR vessel (or similar) used for inspections, or in exceptional circumstances may require the use of a larger vessel. IMR activities may involve:

- Equipment change-outs
- Cathodic protection system maintenance
- Valve function testing
- Marine growth and calcareous deposit removal
- Stabilisation (i.e. installing mattresses, grout bags, rocks, frond mats or trenching)
- Excavation for intervention to access buried or partly buried infrastructure.
- Pipeline clamping

Maintenance and repair activities are expected to be infrequent, and the exact frequency of maintenance activities will depend on the results of inspections.

2.3 Field Support - Vessel and Helicopter Operations

Platform supply vessels will transfer miscellaneous items including chemicals and diesel to the platform via the platform cranes or bunkering. A safety standby vessel, capable of launching a fast rescue craft to recover personnel from the sea, may be present to support the platform. A heavy-lift vessel may also be required for several weeks to remove the additional living quarters. For occasional major maintenance campaigns, an accommodation vessel may be required for short periods.

Typically, a survey-type vessel (or similar) will be used for IMR. In exceptional circumstances, depending on the type of IMR activity, additional vessels may be used. Vessels will typically use dynamic positioning but in certain circumstances, anchoring may be required. Vessels are expected to return to port to bunker, although may occasionally bunker at sea. Vessels will discharge a variety of wastewater streams to

the ocean including sewage, food, cooling water, brine and bilge water, and may also incinerate waste.

The platform is serviced by helicopters, which are used for passenger transfers/crew changes and delivering minor supplies. Only helicopter operations conducted within 500 m of the platform are covered under this EP; transit activities are managed under existing arrangements.

3.0 Description of the Environment

Table 3-1 summarises particular values and sensitivities including Matters of National Environmental Significance under the EPBC Act, associated with the Operational Area (where the petroleum activities described in this Plan will take place), as well as the broader environment that may be affected (EMBA). The EMBA by the activities covered in this EP has been determined by modelling the potential worst-case spills from the petroleum activities, as described in Table 4-1.

Table 3-1: Particular Values and sensitivities

Values	Operational Area (Cth)	Broader EMBA	Description
Marine Habitats			
Ridgeline habitat (and the associated sponges, gorgonians and demersal fish of the ridgeline)	x	x	• The shelf of the North-west Marine Region contains several terraces and steps. The most prominent of these features occurs as an escarpment along the North West Shelf (NWS) and Sahul Shelf at a depth of 125 m, known as the ancient coastline. Parts of the ancient coastline, particularly where it exists as a rocky escarpment, are thought to provide biologically important habitats such as fish communities in areas otherwise dominated by soft sediments • The platform ridgeline is not an isolated area of hard substratum, as there are additional areas of hard substratum to the north-east and south-east, outside the operational area. The platform hard substratum may support higher amounts of benthic fauna (such as sponges and soft corals), relative to soft substratum.
Seagrass and macroalgae habitats		x	• Seagrasses and macroalgae, which are characteristic of sand habitats and reefs, are unlikely to occur within the Commonwealth Waters of the operational area. • Significant seagrass habitats and macroalgal communities in the broader EMBA include areas of the Exmouth Gulf and the Ningaloo Coast, and the seagrass meadows in the Shark Bay World Heritage Area.
Coral and reef communities		x	• Coral reef communities are present in the broader EMBA and are significant features of the Ningaloo Coast, waters surrounding Barrow Island and the Montebello Islands, the Dampier Archipelago, the Abrolhos Islands, and offshore shoals such as the Rowley Shoals.
Marine Fauna			
Whale migration.	X	X	• Humpback Whale migration traverses the Operational Area and EMBA. Usage is seasonally high from July to October. Exmouth Gulf and Shark Bay are important rest areas. • Pygmy Blue Whale migration also traverses offshore waters in the EMBA. Usage is seasonally high from April to August, and from September to November.
Dugong aggregations		X	• Significant aggregations of Dugongs occur in shallow areas along the Pilbara Coast, in Exmouth Gulf and Shark Bay. • Dugongs are not considered a particular value or sensitivity of the operational area, though they may occur there occasionally.

Values	Operational Area (Cth)	Broader EMBA	Description
Marine turtles		X	• Marine turtle species may transit through and forage in the operational area including the Green Turtle, Hawksbill Turtle, Flatback Turtle, Loggerhead Turtle, and Leatherback Turtle. Marine turtle nesting is not expected in the operational area. • Key sites in the EMBA for marine turtle nesting and/or interesting (including Green Turtle, Hawksbill Turtle, Flatback Turtle, Loggerhead Turtle, and Leatherback Turtle) include the Ningaloo Coast, Exmouth Gulf, the Pilbara Coast, Barrow Island, the Montebello Islands, the Dampier Archipelago, and Shark Bay.
Seabirds and shorebirds		X	• Important breeding and foraging areas for several species of migratory seabirds and shorebirds are located in the Muiron Islands off the Ningaloo Coast, Exmouth Gulf, Barrow/Montebello/Lowendal Islands, the Dampier Archipelago, parts of the Pilbara Coast, the Abrolhos Islands and Shark Bay.
Whale sharks	X	X	• Whale Shark aggregations occur primarily around the Ningaloo Coast, Barrow and Montebello Islands, and in offshore Commonwealth Waters. Whale sharks may be present in the operational area, but only in low numbers. • Ningaloo Marine Park is noted internationally for the annual aggregation of Whale Sharks.
Fish communities	X	X	• Significant fish communities are associated with large-scale key ecological features (KEFs), including: • Continental slope demersal fish communities • Ancient coastline at 125 m depth contour • Other KEFs in the broader EMBA include Exmouth Plateau; Glomar Shoals; canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula; Commonwealth Waters adjacent to Ningaloo Reef; and Mermaid Reef and Commonwealth waters surrounding the Rowley Shoals
Socioeconomic			
Commercial fishing	X	X	• Permits for several State and Commonwealth fisheries overlap the operational area and EMBA.
Commercial shipping	X	X	• Shipping lanes for local and international vessels traverse the operational area and EMBA.
Aquaculture		X	• Production of pearls, pearl oysters or other shellfish occurs in Exmouth Gulf, the Dampier Archipelago and Shark Bay. Pearling licences are held, but are not active, in the Montebello Islands.
Tourism and recreation		x	• The Ningaloo Coast, Pilbara Coast, Dampier Archipelago, Shark Bay and the Abrolhos Islands are all popular tourist destinations and offer nature-based tourism, wildlife appreciation tours, beach recreation, snorkelling, scuba diving and recreational fishing.
Cultural heritage			
Historical sites and artefacts		X	• No Aboriginal cultural heritage sites or artefacts are known to be present in the operational area or broader EMBA. • Historic shipwrecks are noted in the Gascoyne and Shark Bay Areas but not within the operational area.

4.0 Environmental Impacts and Risks

Aspects associated with the petroleum activity have been subjected to an impact and risk assessment to understand the potential environmental impacts and risks associated with the activity and reduce impacts and risks to as low as reasonably practicable (ALARP) and an acceptable level.

An Environmental Risk Assessment Workshop was undertaken to evaluate impacts and risks arising from the petroleum activities described in Section 2.0. The risk assessment also considered emergency events related to spills and spill response activities. The environmental impact identification and risk assessment process comprised the following components:

- Identification of petroleum activities and emergency conditions (including spill response activities)
- Identification of particular environmental values and sensitivities within the EMBA
- Identification of relevant aspects with the potential to pose a hazard to identified particular values within the EMBA
- Evaluation of the potential consequences to the identified values and sensitivities without controls
- Identification of control measures to reduce the potential likelihood of the consequence occurring
- Evaluation of the likelihood of the consequence occurring with planned and confirmed safeguards in place
- Quantification of the risk ranking with controls in place
- Determination of whether the potential environmental impacts and risks are ALARP after considering the effectiveness of the identified controls
- Determination of whether the potential environmental impacts and risks are acceptable

Control measures were identified during the Environmental Risk Assessment Workshop to reduce identified risks to ALARP and an acceptable level. Control measures were considered in terms of both preventing the impact occurring, and mitigating the severity of the consequence drawing on the hierarchy of controls, identified as elimination, substitution, isolation, engineering, and administration and procedures.

The risk assessment was undertaken in alignment with the processes outlined in Australian Standard/New Zealand Standard (AS/NZS) ISO 31000:2009 Risk Management and HB 203:2012 Managing Environment-Related Risk, using the Chevron Integrated Risk Prioritisation Matrix (Appendix A). The matrix uses consequence and likelihood of the consequence (with safeguards in place) rankings of 1 to 6, which when combined, provide a risk level of between 1 (highest risk) and 10 (lowest risk). The risk levels have been grouped into three broader levels; high (1 to 4), medium (5 and 6), and low (7 to 10) which are relevant to the assessment as to whether potential risks and impacts have been reduced to ALARP and an acceptable level.

4.1 Determination of ALARP

Control measures were identified for each hazard with the aim of eliminating the hazard, or minimising the risk to ALARP. Chevron Australia's hierarchy of control was used to determine the control measures that could be practicably implemented and those that could not. The hierarchy of control is:

- eliminate the hazard
- substitute the hazard
- engineer to change design, install a physical barrier, or isolate
- administrative – establish a procedure, training, or instruction.

Where it is demonstrated that the 'cost' of implementing further control measures is disproportionate to the benefit gained, the control measure will not be implemented, and the risk is considered ALARP. 'Cost' includes financial cost, time or duration, effort, occupational health and safety risks, or environmental impacts associated with implementing the control.

4.2 Risk Acceptance Criteria

Impacts and risks are considered acceptable once all reasonably practicable alternatives and additional measures have been taken to reduce the potential consequence and likelihood to ALARP.

The environmental impacts and risks associated with implementing the petroleum activities or the control measures necessary for timely response to an emergency condition described in this Plan were determined to be acceptable if:

- The level of environmental risk is assessed to be between six and 10 on the risk matrix; or
- The level of environmental risk is assessed to be ALARP; and
- The activity (and associated potential impacts and risks) complies with relevant legislation, industry standards/guidelines, and corporate policies, standards, and procedures specific to the operational environment.

A summary of the sources of risk, analysis and evaluation for the Project, using the methodology described above in Section 4.0 are detailed in Table 4-1. A detailed assessment of impacts and control measures in place to manage the activity are provided in Appendix B.

Table 4-1: Potential Environmental Impacts and Risks

Source of Environmental Impact or Risk (Hazards)	Potential Environmental Impacts and Risks (Consequences)	Consequence	Likelihood	Residual Risk	Reference
Hydrocarbon System					
Physical Presence of Infrastructure Subsea hydrocarbon system infrastructure has the potential to cause a disturbance/disruption to commercial trawl fisheries.	• Localised avoidance of the trunkline infrastructure by commercial trawl fisheries • Damage to trawling gear (worst case) • Short-term disruption to trawling	Incidental (6)	Unlikely (4)	Low (9)	Table A-1
Planned Discharges Intermittent discharges of control fluids from drill centres during operations may result in changes to water quality and the potential to impact marine habitats and fauna.	• Localised and short-term changes to water quality • Localised and short-term impacts to transient marine fauna and fish communities	Incidental (6)	Remote (5)	Low (10)	Table A-2
Spills A release from the hydrocarbon system can result in changes to water quality resulting in potential impacts to marine habitats and fauna. (Worst case <58 m^3 of condensate)	• Water quality • Localised and short-term impacts to transient marine fauna and fish communities.	Incidental (6)	Unlikely (4)	Low (9)	Table A-3
Platform					
Physical Presence of Infrastructure Platform has the potential to cause disturbance/disruption to other marine users by creating a navigational hazard to commercial shipping and fishing vessels.	• Localised avoidance of the Platform infrastructure by commercial shipping and fishing vessels • Disruption to commercial fishing.	Incidental (6)	Unlikely (4)	Low (9)	Table A-4

Source of Environmental Impact or Risk (Hazards)	Potential Environmental Impacts and Risks (Consequences)	Consequence	Likelihood	Residual Risk	Reference
Air Emissions Operation of flare and gas turbines resulting in pollutants and greenhouse gas emissions.	• Reduction in air quality around the Platform • Increase in greenhouse gases to the atmosphere	Incidental (6)	Unlikely (4)	Low (9)	Table A-5
Planned Discharges Discharge of Produced Water (PW) from the Platform.	• Localised changes to water and sediment quality • Localised and short-term impacts to transient marine fauna and fish communities • Potential impact to ridgeline habitat and associated fauna	Moderate (4)	Unlikely (4)	Low (7)	Table A-6
Planned Discharges Discharge of wastewater from the platform (Cooling water, Sewage, Greywater, Brine and Food).	• Localised and short-term changes to water quality • Localised and short-term impacts to transient marine fauna and fish communities • Localised and short-term impacts to ridgeline habitat and associated fauna	Incidental (6)	Remote (5)	Low (10)	Table A-7
Light Emissions from platform lighting system and flare system.	• Potential to affect behavioural patterns of marine fauna, notably marine turtles and seabirds • Affects choice of nesting sites and orientation/navigation to the sea for post-nesting females and hatchlings	n/a	n/a	Not Credible	n/a
Noise Platform topsides facilities	• Changes to marine fauna, including physical, perceptual, and behavioural changes	n/a	n/a	Not Credible	n/a
Spills Release of fluids from the platform in to the ocean.	• Localised and short-term changes to water quality • Localised and short-term impacts to transient marine fauna and fish	Incidental (6)	Unlikely (4)	Low (9)	Table A-8

Source of Environmental Impact or Risk (Hazards)	Potential Environmental Impacts and Risks (Consequences)	Consequence	Likelihood	Residual Risk	Reference
	communities				
Inspection, Maintenance and Repairs					
Seabed Disturbance IMR stabilisation and excavation to ensure the integrity of the subsea hydrocarbon system.	• Localised and short term loss disturbance of seabed habitats	Incidental (6)	Unlikely (4)	Low (9)	Table A-9
Planned discharges Release of minor quantities of MEG, production fluids, acid-water mix, and control fluids during IMR activities.	• Localised and short-term changes to water quality • Localised and short-term impacts to transient marine fauna and fish communities • Localised and short term impacts to ridgeline habitat and associated fauna	Incidental (6)	Rare (6)	Low (10)	Table A-10
Noise - Side-scan sonar	• Localised and short-term impacts to transient marine fauna	n/a	n/a	Not Credible	n/a
Spills Release of fluids to the ocean from the IMR activities.	• Localised and short-term changes to water quality • Localised and short-term impacts to transient marine fauna and fish communities	Incidental (6)	Unlikely (4)	Low (9)	Table A-11
Field Support- Vessel and Helicopter Operations					
Physical Presence The presence and movement of vessels has the potential to cause disturbance to other marine users, including commercial fishing operators and commercial shipping vessels.	• Localised avoidance of vessels by commercial shipping and fishing	Incidental (6)	Remote (5)	Low (10)	Table A-12

Source of Environmental Impact or Risk (Hazards)	Potential Environmental Impacts and Risks (Consequences)	Consequence	Likelihood	Residual Risk	Reference
Physical Presence Vessel movements within the operational area have the potential to result in the injury or mortality of fauna through direct contact.	• Localised and short-term impacts to transient marine fauna	Incidental (6)	Remote (5)	Low (10)	Table A-13
Noise The operation of vessels as part of ongoing field support activities.	• Changes to transient marine fauna, including physical, perceptual, and behavioural changes	n/a	n/a	Not Credible	n/a
Noise The operation of Helicopters transferring personnel to/from the platform.	• Changes to transient marine fauna, including startle responses or avoidance behaviour	n/a	n/a	Not Credible	n/a
Light Vessels will use safety and navigational lighting, which will emit some light to the area surrounding the vessels.	• Localised and short-term impacts to transient marine fauna	n/a	n/a	Not Credible	n/a
Introduced Marine Pests Presence and movement of vessels facilitates introduction of IMPs into the marine environment from hull biofouling, or ballast water.	• Competition with native fauna and flora, introduction of diseases and pathogens, changes in predation pressures, reduction of native biodiversity, and alteration of natural habitats	Moderate (4)	Remote (5)	Low (8)	Table A-14
Air Emissions Vessels performing petroleum activities at the platform or performing IMR activities	• Reduction in air quality around the Platform • Increase in greenhouse gases to the atmosphere	n/a	n/a	Not Credible	n/a
Planned Discharges Vessel activities various waste streams discharged to the ocean; sewage, food, CW, brine, and	• Short term localised changes to water quality with the potential for impacts to marine fauna	Incidental (6)	Rare (6)	Low (10)	Table A-15

Source of Environmental Impact or Risk (Hazards)	Potential Environmental Impacts and Risks (Consequences)	Consequence	Likelihood	Residual Risk	Reference
treated bilge water.					
Waste The platform and vessel activities will include the storage and handling of waste, which could be accidentally released to the environment.	• Potential to impact fauna by toxicity or ingestion/entanglement	Incidental (6)	Remote (5)	Low (10)	Table A-16
Spills A release of <1 m^3 (diesel or chemicals) from vessels.	• Localised and short-term changes to water quality • Localised and short-term impacts to transient marine fauna and fish communities	Incidental (6)	Remote (5)	Low (10)	Table A-17
Emergency Response Condition					
Loss of Containment - 90 day loss of well containment from a completed and producing well.	• Impacts to transient marine fauna from widespread, but short-term exposures of hydrocarbons on the sea's surface • Localised and short-term effects on fish communities and fisheries from exposure to entrained and dissolved hydrocarbons • Impacts to marine habitats such as mudflats, seagrass, macroalgae, coral reefs and mangroves • Impacts to nesting and foraging habitats (Birds and turtles) • Loss of tourism and recreation	Moderate (4).	Unlikely (4)	Low (7) (based on shoreline exposure impacts to coral, mangroves and mudflats).	Table A-18
Loss of Containment - Trunkline rupture caused by equipment failure, anchoring, dropped objects from vessels, or damage by natural events.	• Impacts to transient marine fauna from widespread, but short-term exposures of hydrocarbons on the sea's surface • Localised and short-term effects on fish communities and fisheries from exposure to entrained and dissolved hydrocarbons • Impacts to marine habitats such as	Moderate (4).	Unlikely (4)	Low (7) (based on shoreline exposure impacts to coral,	Table A-19

Source of Environmental Impact or Risk (Hazards)	Potential Environmental Impacts and Risks (Consequences)	Consequence	Likelihood	Residual Risk	Reference
	mudflats, seagrass, macroalgae, coral reefs and mangroves • Impacts to nesting and foraging habitats (birds and turtles) • Loss of tourism and recreation			mangroves and mudflats).	
Loss of Containment - Vessel marine diesel oil (400 m^3) from vessel collision (loss of dynamic positioning (DP), navigational error, or weather).	• Impacts to transient marine fauna from widespread, but short-term exposures of hydrocarbons on the sea's surface • Localised and short-term effects on fish communities and fisheries from exposure to entrained and dissolved hydrocarbons	Minor (5)	Unlikely (4)	Low (8) (based on shoreline exposure impacts to mangroves and mudflats.	Table A-20
Loss of Containment - Vessel intermediate fuel oil (IFO) (600 m^3) from vessel collision (loss of DP, navigational error, or weather.	• Impacts to transient marine fauna from widespread, but short-term exposures of hydrocarbons on the sea's surface • Localised and short-term effects on fish communities and fisheries from exposure to entrained and dissolved hydrocarbons • Impacts to marine habitats such as mudflats, seagrass, macroalgae, coral reefs and mangroves • Impacts to nesting and foraging habitats (Birds and turtles) • Loss of tourism and recreation	Major (3)	Remote (5)	Low (7) (based on shoreline exposure impacts to mangroves)	Table A-20
Application of dispersant	• Impacts to transient marine fauna from widespread, but short-term exposures on the sea's surface • Localised and short-term effects on fish communities and fisheries from exposure • Impacts to marine habitats such as	Minor (5)	Unlikely (4)	Low (8)	Table A-21

Source of Environmental Impact or Risk (Hazards)	Potential Environmental Impacts and Risks (Consequences)	Consequence	Likelihood	Residual Risk	Reference
	mudflats, seagrass, macroalgae, coral reefs and mangroves				

5.0 Management Approach

The implementation strategy in the Plan identifies the systems, practices, and procedures used to ensure the environmental impacts and risks of the activities are continuously reduced to ALARP and the environmental performance outcomes and standards are met.

The implementation strategy of the Plan has been developed in line with Chevron Australia's Operational Excellence Management System (OEMS), which is aligned to ISO 14001:2004. Key components of the OEMS are described in the table below.

5.1 Operational Excellence Management System and Relevant Procedures

Chevron Australia's operations are managed in accordance with the OEMS, which is a comprehensive management framework that supports the corporate commitment to protect the safety and health of people and the environment.

Table 5-1: Elements of OEMS

OEMS Element Description of Processes / Procedures	OEMS Element Description of Processes / Procedures
Facilities Design and Construction	To design and construct facilities to prevent injury, illness and incidents and to operate reliably, efficiently and in an environmentally sound manner
Safe Operations	Operate and maintain facilities to prevent injuries, illness, and incidents (risk management)
Management of Change	Manage both permanent and temporary changes to prevent incidents
Reliability and Efficiency	Provide a systematic approach to operating and maintaining facilities so as to sustain integrity and prevent incidents
Third Party Services	Systematically improve third-party service performance through conformance to Operational Excellence
Environmental Stewardship	Strive to continually improve environmental performance and reduce impacts from our operations
Incident Investigation	Investigate and identify root causes of incidents to reduce or eliminate systemic causes to prevent future incidents
Community and Stakeholder Engagement	Stakeholder Engagement Reach out to the community and engage in open dialogue to build trust
Emergency Management	Prevention is the first priority, but be prepared to respond immediately and effectively to all emergencies involving wholly owned or operated Chevron assets
Compliance Assurance	Verify conformance with Operational Excellence requirements in applicable company policy and government laws and regulations, including demonstration of compliance with environmental performance objectives and standards provided in the Plan

An annual OEMS assessment identifies gaps and evaluates the effectiveness of OE processes and performance against established objectives. Part of this assessment involves assessing the effectiveness of controls in continuing to reduce impacts and risks to ALARP and acceptable levels.

5.2 Management of Change

The Chevron's Management of Change for Facilities and Operations – ABU Standardised OE Process (OE-04.00.01) manages changes to facilities, operations, products, and the organisation so as to prevent incidents, support reliable and efficient operations, and prevent unacceptable risks from being introduced into Chevron's business.

This process will be followed to document and assess the impact of changes to activities described in Section 2.0 in conjunction with ABU HES Risk Management process OE-03.01.01. These changes will be addressed to determine if there is potential for any new or increased environmental impact or risk not already provided for in the EP. If these changes do not trigger relevant petroleum regulations, as detailed below, the EP will be revised and changes recorded within the EP without resubmission.

The EP must be resubmitted to NOPSEMA and/or DMP for acceptance/approval prior to:

- the commencement of any new activity, or any significant modification to, change, or new stage of an existing activity, not provided for in this EP
- a change in instrument holder for, or operator of, the activity
- the occurrence of a significant new environmental impact or risk, or significant increase in an existing environmental impact or risk, not provided for in the EP
- the occurrence of a series of new environmental impacts or risks, or a series of increases in existing environmental impacts or risks, which, taken together, amount to the occurrence of a significant new environmental impact or risk, or a significant increase in an existing environmental impact or risk, not provided for in the EP.

A significant modification is likely to be one that changes the basis upon which the EP was accepted. A significant modification to the activity is a significant modification to the petroleum activity.

The ABU MOC OE Process is described as part of the environmental management system for the activity to ensure that for the duration of the activity the environmental impacts and risks of the activity continue to be identified and reduced to as low as reasonably practicable.

5.3 Monitoring

5.3.1 Platform Wastewater Discharges Monitoring Framework

Considering the nature and scale of the platform discharges, and the potential risks and impacts, the PW discharge is the focus of the Waste Water Discharges Monitoring Framework; however, potential contaminants from other discharges are also included, where relevant.

The Framework ensures the nature, extent, and potential effect of the PW and other discharges are assessed, and helps determine changes to water quality, sediment quality and benthic habitats in relation to applied environmental quality criteria (EQC).

The Framework comprises several monitoring program components, as shown in Table 5-2 below:

Table 5-2: Platform Wastewater Discharges Monitoring Framework – Monitoring Programs

Monitoring Program	Objectives	Frequency
Topsides monitoring	• To use data collected topsides from Produced Water (PW) and Cooling	• Continuous o PW and CW - Discharge volume

	Water (CW) discharge, combined with modelling, to assess whether ANZECC guidelines are likely to be exceeded beyond the predicted mixing zone(s) and for how long this has or will continue to occur (duration)	(online flow meter) o TPH (online analyser) • Daily o PW - TPH (platform laboratory analysis, typically using a Horiba or similar) • Weekly o Platform drainage - TPH (platform laboratory analysis, typically using a Horiba or similar) • Quarterly o PW- Characterisation (samples collected on platform and analysed on Platform or at an onshore laboratory). o CW- Hypochlorite concentration, and temperature • Additional monitoring as a result of trigger actions
Field sampling (water quality, sediment & benthic habitats)	• The field sampling program will be used to establish baseline levels of contaminants and conditions for future comparisons during Operations when the discharges occur.	• Baseline (before PW is discharged) • 5 yearly • Additional field sampling as a result of trigger actions or water quality and/or sediment assessments
Model verification	• Verify through field sampling that topside monitoring combined with modelling provides a reliable prediction of the extent of the mixing zones for PW and CW discharges. • Reconfirm through 5 yearly field sampling that topside monitoring combined with modelling provides a reliable prediction of the extent of the mixing zones for PW and CW discharges.	• Post start up (once conditions are stable) • Additional model verification as a result of a trigger actions
WET testing	• Will feed into the review process to help define triggers that are appropriate for the sensitivity of local organisms. The tests will generate a suite of statistics, which will enable the discharge criteria to be validated or amended if required, based on actual and relevant toxicity results, as well as provide additional information to assess trigger/contingency plans.	• Post start up (once conditions are stable, expected approximately 3 to 6 months from start-up) (multi species test, indicatively 8 species) • Quarterly for the first 2 years of operations (3 species surrogate WET test) • 3 yearly after the first 2 years of operations (multi species test, indicatively 8 species) • Additional WET testing as a result of trigger actions or chemical changes

5.3.2 Platform Air Emissions Monitoring Program

Table 5-3 lists the components of the platform air emissions monitoring program.

Table 5-3: Air Emissions Monitoring Program

Monitoring Program	Frequency	Description	Review
Greenhouse Emissions (e.g. from flaring, fuel gas and diesel combustion and fugitive emissions)	Ongoing	Recording and reporting of emissions as required by the *National Greenhouse and Energy Reporting Act 2007*	Tracking of compliance against limits established in line with the *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015*
Criteria Pollutant Emissions (e.g. from flaring, fuel gas and diesel combustion and fugitive emissions)	Ongoing	Recording and reporting of emissions as required by the National Pollutant Inventory.	Annual review of criteria pollutants against NEPM standards.
Flare Monitoring and Optimisation	Ongoing	Continuous monitoring and recording of flaring volumes.	Regular monitoring of performance against flaring performance standard.

5.4 Environment Plan Review

Chevron's Management of Change process will be followed to document and assess the impact of changes to the petroleum activities described in the Plan. These changes will be addressed to determine if there is potential for any new or increased environmental impact or risk not already provided for in the Plan. Where required, the Plan will be resubmitted to NOPSEMA for approval in accordance with Regulation 17 of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009.

In accordance with the Regulations, Chevron Australia will also submit a proposed revision of the Plan every five years from the date of Plan is acceptance.

An additional review of the EP and/or OPEP will be undertaken following:

- an emergency event
- the identification of additional response strategies to emergency events
- the identification of deficiencies within the EP or OPEP following the review of emergency response exercises or other activities.

5.5 Compliance Assurance

The Compliance Assurance Audit Program ABU Standardised Operational Excellence Procedure (OE-12.01.19) addresses the establishment of audit programs to verify the effectiveness of controls and the extent to which requirements are met by Chevron. A multi-tiered Wheatstone Health, Environment and Safety (HES) Assurance Program/Schedule will be implemented for the duration of the activities described in the EP, including tools, processes, and procedures to deliver and verify compliance with EP requirements and ensure the environmental performance outcomes and standards in the EP are being met.

Routine audits and inspections of Project activities will be undertaken in accordance with the Program/Schedule, which will be regularly reviewed and updated to ensure effective verification of environmental compliance requirements. The Program/Schedule will include the timeframes, location and scope of the audits. Audit protocols and

inspection checklists will be followed for all audits and inspections, and actions will be tracked until closure.

The Compliance Assurance Management of Instances of Potential Non-Compliance Procedure (OE-12.01.18) applies to instances where the requirements of this EP have not been met. This process is used if audit findings identify that activities within the scope of this EP are not being implemented in accordance with the risk and impact control measures stated in Appendix B.

Audit findings and corrective actions are recorded and tracked within a Chevron compliance assurance database for timely closure of actions. Audit findings that identify a breach of an EPO or performance standard will be reported in accordance with the EP.

6.0 Oil Pollution Emergency Plan (OPEP)

The Emergency Management Process provides organisational structures, management processes, and the tools necessary to respond to emergencies and to prevent or mitigate emergency and/or crisis situations; respond to incidents in a safe, rapid, and effective fashion; and restore or resume affected operations of strategic importance.

The system used to organise Chevron's emergency management teams (EMTs) is based on the Incident Command System (ICS) and is compatible with the Australasian Inter-service Incident Management System (AIIMS). This system is compatible with the National Plan for Maritime Environmental Emergencies (National Plan), with an incident management system consistent with the AIIMS.

The ERO comprises the groups listed in Table 6-1; this table also describes the major functions of teams during an emergency.

Table 6-1: Chevron Emergency Management Teams

Type of Team	Membership	Description
On-site Response Teams (ORTs)	Site personnel who work at the facility or operation where a spill may occur.	• Conducts and coordinates response tasks on site • Establishes staging areas and field command posts • Communicates site conditions and resource needs to EMT.
Emergency Management Teams (EMTs)	Personnel with senior or specialist roles. • Installation EMT (Level 2) • Asset EMT (Level 3)	• Incident management for emergency events • Performs major spill management functions • Sets strategic goals for incident • Sets tactical objectives for ORT • Acquires resources to supplement ORT • Briefs and liaises with government • Operates from EMT Command Centre.
Crisis Management Teams (CMTs)	Chevron ABU Management personnel.	• Provides business continuity management for Level 3 incidents • Does not directly manage emergency response strategies or tactics • Liaises between EMT and Chevron Corporation; provides assistance with media outreach, shareholder issues, and corporate concerns.

The OPEP adopts a tiered response philosophy to emergency response, which is consistent with that adopted by the National Marine Oil Spill Contingency Plan (2005).

The OPEP acts as an operational document to ensure an appropriate response to the emergency events (worst-case credible spill scenarios) described in the EP (Table 4-1). Smaller spills will be monitored, evaluated, and cleaned up as part of routine duties, where relevant and appropriate to the nature and scale of the spill and will not require activation of the OPEP.

Modelling of the worst case scenario (and other smaller credible spill scenarios) are the basis of the EMBA which is described in Section 3.0.

The OPEP is designed to be an operational document to ensure a rapid and appropriate response in the unlikely event of an oil spill and provides guidance on:

- Response activation
- Specific response options to be adopted for scenarios specific to the petroleum activity

- Practical information required to undertake a rapid and effective response
- External notification and reporting
- Coordination of external resources.

When an oil spill occurs, the observer and the observer's immediate supervisors are to follow predefined procedures to alert on-site personnel and Chevron personnel of the incident. Figure 6-1 outlines the alert procedures and initial response actions.

The initial response to a spill is likely to include immediate source control activities (where safe to do so). The objective of source control is to reduce the amount of product released to the environment, thereby minimising the environmental impact. Source control is the initial action for all emergency events and is described in the vessel response procedures and/or platform/trunkline/flowline isolation/emergency operating procedures and therefore is not fully described as part of the initial response activities.

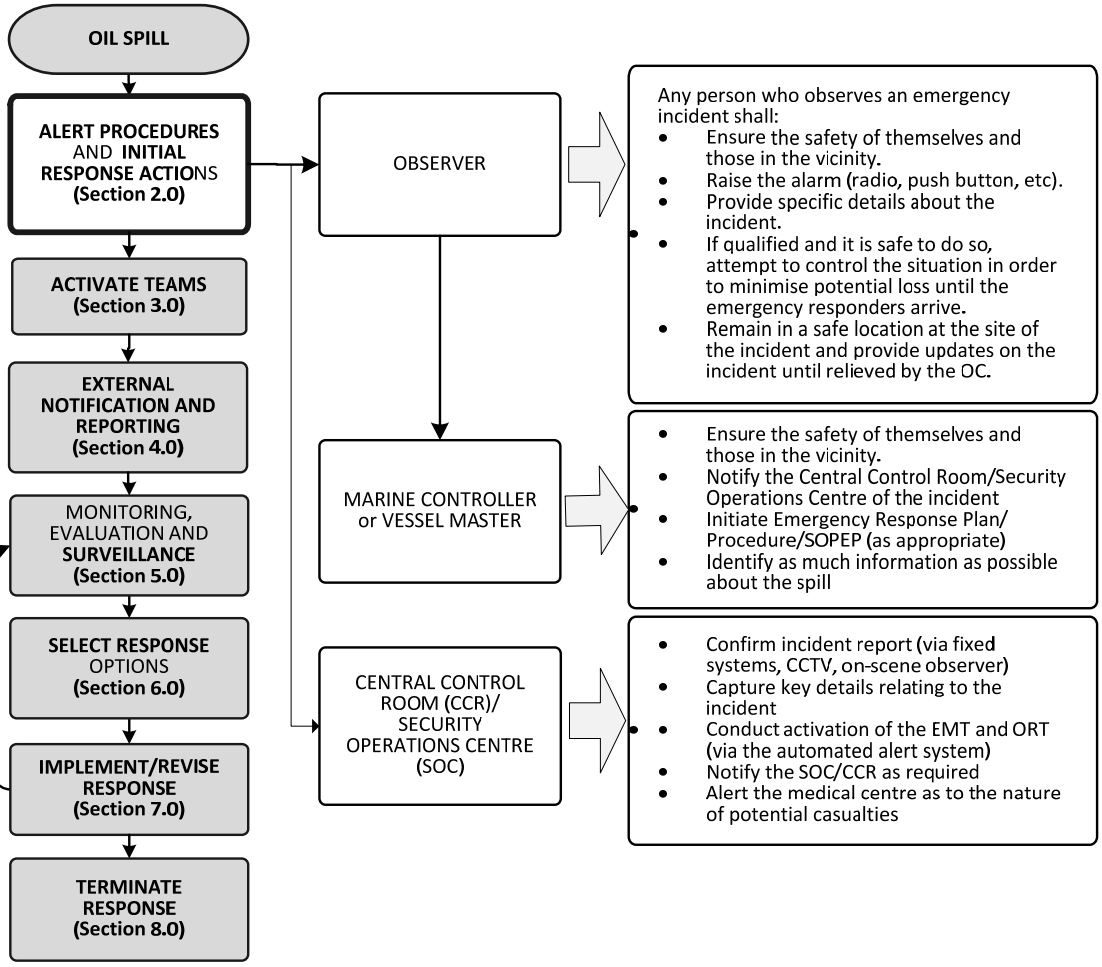


Figure 6-1: Alert Procedures and Initial Response Actions Guide

A key component of emergency management is the collation of relevant data and information (including inputs from MES activities and operational monitoring), which then contributes to an assessment of the net environmental benefit of the selected response options and tactics. The Net Environmental Benefit Analysis (NEBA) is undertaken by considering the whole response effort, taking into account priorities for protection and sensitivity of the receptors at risk and assessing this against the environmental benefit gained.

A Strategic NEBA based on the scenarios identified was conducted, and is summarised in the OPEP. The Strategic NEBA takes into account: personnel, asset, environment and reputation risks; worst-case impacts including shoreline loadings, length of shoreline contacted, and surface exposure; predicted time to impact; identified values and sensitivities, including their regional importance and distribution; and the response options available.

The assessment of risk and impact at the time of a spill as part of the emergency management process is referred to as an Operational NEBA (as per the OPEP). The Operational NEBA generally involves consideration of several factors associated with each response option, including:

- the potential effectiveness of each response option in managing the environmental risks associated with each emergency event and the documented evidence supporting the applicability assessment
- the feasibility of implementing each response option (i.e. is it reasonably practicable to implement the response in a timely manner to manage the environmental risks associated with each emergency event)
- the trade-offs (benefits and drawbacks) associated with each response option.

Oil spill response may include a single response technique or a combination of techniques and will take into account a range of considerations including the location, nature, and scale of a spill and the ecological and socioeconomic receptors that are at risk. An overview of techniques is provided in Table 6-2.

Table 6-2: Oil Spill Response Techniques

Oil spill response technique	Description
Source control	Source control (SC) is the primary response option for drilling related emergency spills scenarios. Source control involves physical or mechanical control. For the purposes of a drilling campaign, source control applies to both condensate spills in the event of a LOWC and diesel spills in the event of a vessel collision. May include: • Capping the well at source where possible followed by the drilling of a relief well to achieve a final well kill at depth. • Where capping is not possible, a dynamic kill of the well is achieved by either bull heading through the existing wellbore or through the drilling of a relief well(s). • Capturing the flow of hydrocarbon from the well at the wellhead.. • Engineering controls aboard vessel – stripping pumps, shutoff valves & divert to other tanks
Monitor, evaluate and surveillance (MES)	MES of an oil spill assists in determining whether further action is required, helps inform the decision-making for prioritisation of protection of sensitive receptors, and provides valuable information for conducting NEBA, coordinating other response options, and continually assessing the effectiveness of those spill response options. May include one or more of the following: • Fate and Weathering Modelling (FM) – uses computer modelling and computational techniques to estimate the weathering of an oil spill • Trajectory Modelling (TM) – uses computer models and computational techniques to estimate the speed and direction of movement, weathering spread patterns, and impacts of an oil spill • Tracking Buoy Deployment (TB) – uses a buoy deployed to the

Oil spill response technique	Description
	water surface to track the movement of an oil slick • Visual Observation (from aircraft and/or vessels) (VO) –trained observers on aircraft or vessels use standard references to characterise oil slicks. Visual observation is the most common surveillance and reconnaissance tactic • Remote Sensing (RS) – uses remote sensing technologies to identify oil slicks.
Natural recovery	Oiled shorelines are left untreated and the oil naturally degrades over time
Chemical dispersants	The objective of the application of surface chemical dispersants to on-water oil slicks is to enhance the breakdown of oil into smaller droplets and enhance dispersion into the water column. The use of surface dispersants depends on the particular parameters of an incident resulting in an oil spill and the resources at risk of exposure. The Chevron Surface Dispersant Spraying: Technical Standard Guidance Note will assist EMTs in carrying out dispersant operations, and aims to ensure: • an appropriate NEBA is completed prior to dispersant application • written DoT authorisation has been received prior to surface dispersant application (if in State Waters) • appropriate selection of surface dispersant and field testing has been undertaken prior to surface dispersant application • oil is chemically dispersed appropriately to enhance natural biodegradation.
Containment and recovery	Containment and recovery involves concentrating floating surface oil so that it can be recovered. Several different tactics are available to contain and recover oil on water including • Containment Booming – a fixed-booming strategy used on water to contain and concentrate oil to make it easier to recover using skimmers • Passive Recovery – uses sorbent materials to pick up spilt oil from on water • Marine Recovery – on-water recovery of oil that is already contained or concentrated • Free-oil Recovery – uses active booming techniques to corral small slicks and recover them • Transfer and Storage of Oily Liquids – is an important component of any containment and recovery activity that collects oil and oily liquids
Shoreline protection	Shoreline protection and deflection involves a number of shoreline and nearshore tactics to protect sensitive receptors before a spill reaches identified high priority sites. Typical tactics used for pre-impact shoreline protection and TRG implementation include: • Shoreline Containment – uses fixed booming tactics to corral and concentrate oil for recovery • Exclusion Booming – uses a boom as a barrier to exclude spilt oil from specific areas • Diversion Booming – uses a boom to divert the flow of oil to a specific site where it can be recovered • Deflection Booming – uses a boom to redirect the flow of oil away from an area • Berms (Bunds), Dams, and Dikes – uses embankments and

Oil spill response technique	Description
	other physical barriers to exclude oil from sensitive areas and sometimes to concentrate it for recovery • Shoreside Recovery* – uses skimming systems to remove pooled oil from the shoreline to reduce impacts to sensitive receptors • Passive Recovery – uses sorbent materials to collect oil and remove it from the environment. As a pre-impact tactic, sorbents are deployed ahead of the oil to prevent it from contacting sensitive receptors • Free-oil Recovery – uses marine skimming systems to remove oil from the water surface before it reaches the shoreline • Non-oiled Debris Removal – removes debris from the shoreline to reduce potential contamination and reduce the waste stream. * This is more typically a shoreline clean-up tactic and also likely to form part of the Shoreline Clean-up Response Option.
Shoreline clean-up	Shoreline clean-up is used to assess the extent and severity of shoreline oiling, and apply clean-up tactics to remove as much oil as possible. Shoreline clean-up occurs after impact but aims to reduce the overall adverse impacts from a spill by removing oil from contaminated shorelines to prevent its remobilisation and/or cross-contamination (e.g. by foraging fauna). Tactics that may be used alone or in combination to clean up oiled shorelines, include: • Shoreline Assessment – uses the Oiled Shoreline Assessment process to evaluate shoreline segments, establish clean-up priorities, and identify suitable tactics. Typically, this should be the first step in any shoreline clean-up response • Natural Recovery – oiled shorelines are left untreated and the oil naturally degrades over time • Manual and Mechanical Removal – removes oil and contaminated materials using machinery, hand tools, or a combination of both • Washing, Flooding, and Flushing – uses water, steam, or sand to flush oil from impacted shoreline areas • Sediment Reworking and Surf washing – uses various methods to accelerate natural degradation of oil by manipulating the sediment.
Oiled wildlife response	Effects on the health of wildlife contacting oil from a spill are varied and will depend on the oil type, duration of exposure and type of wildlife affected, the species life histories, habitat utilisation, and feeding strategies. Oiled wildlife response involves a number of activities aimed at capturing and treating wildlife that have been oiled, establishing exclusion areas, preventing further contamination of animals that have not been oiled, rehabilitating oiled wildlife, and collecting and disposing of deceased wildlife. Supporting information on these activities is contained in the Oil Spill Response – Oiled Wildlife Guidance Note. A series of Oiled Wildlife Response Plans (prepared by AMOSC and Department of Parks and Wildlife) provide the minimum standard required in WA
Waste management	Waste management is a critical support function during a spill response to manage the collection, storage, transportation, recovery, and/or disposal of liquid and solid wastes.

Oil spill response technique	Description
	Waste management requirements and tactics differ depending on the particular parameters of an incident and the response options and tactics deployed. For this reason, an incident-specific Waste Management Plan will be prepared in the event of an oil spill to address and document the methods and procedures for waste management in response to an incident. The overall objective of the WMP is to ensure the safe and efficient handling and disposal of all wastes generated by oil spill response, recovery, and clean-up activities, with an aim to: • identify the types and quantities of wastes generated as a result of the spill • establish and support the operation of temporary waste management areas • source and deploy appropriate waste receptacles and resources • facilitate the safe and efficient labelling, transport, and tracking of oiled wastes to appropriate waste management areas and facilities • facilitate the appropriate storage, treatment, and recovery and/or disposal of waste • prevent further contamination of clean areas • ensure wastes are managed in accordance with relevant Commonwealth and State regulations, and in consultation with relevant authorities.

6.1.1 Operational and Scientific Monitoring

The Operational and Scientific Monitoring Plan (OSMP) provides a flexible framework for defining environmental monitoring requirements and implementation. The OSMP provides clear initiation triggers for the individual components for the operational or scientific monitoring scopes based upon activation of the ERO and/or results from MES tactics and operational monitoring where appropriate. Table 6-3 describes the particular values and sensitivities identified within the EP with the impacts and risks associated with the emergency events, and how these relate to the specific components of the OSMP.

Table 6-3: Key Components of the Monitoring Program

Particular EP Values and Sensitivities	OSMP Receptor Group	Relevant OSMP Section
Fish communities and commercial fishing	Fish	• OPS8: Fish Tainting • SCI7: Fish Effects Impact Study
Birds (nesting, foraging, aggregation)	Birds	• OPS6: Rapid Seabird and Shorebird Assessment • SCI4: Seabird and Shorebird Impact Study
Turtles (nesting, internesting, foraging, aggregation)	Shorelines and Coastal and Intertidal Habitat	• OPS5: Rapid (Oiled) Shoreline Assessment • SCI3: Coastal and Intertidal Habitat Impact Study
Whale migration	Marine Megafauna	• OPS7: Rapid Marine Megafauna Assessment • SCI5: Marine Megafauna Impact Study
Mangroves and mudflats	Shorelines and	• OPS5: Rapid (Oiled) Shoreline Assessment

Particular EP Values and Sensitivities	OSMP Receptor Group	Relevant OSMP Section
	Coastal and Intertidal Habitat	• SCI3: Coastal and Intertidal Habitat Impact Study
Coral and reef communities	Benthic Habitat	• SCI6: Benthic Habitat Impact Study
Seagrass habitats	Benthic Habitat	• SCI6: Benthic Habitat Impact Study
Dugongs (aggregation)	Marine Megafauna	• OPS7: Rapid Marine Megafauna Assessment • SCI5: Marine Megafauna Impact Study

6.1.2 Response Capability

Chevron's ABU Oil Spill Equipment Register provides spill responders with an accurate listing of the equipment type and quantity available, and the storage location. The register also includes equipment from other providers that Chevron has access to, including from the Australian Maritime Safety Authority (AMSA), the Australian Marine Oil Spill Centre (AMOSC), the Western Australian Department of Transport (DoT), and Oil Spill Response Limited (OSRL).

Chevron Australia undertakes emergency response exercises to ensure emergency response preparedness. The objective for the exercises is to test and maintain the capability to respond to emergency events. The proposed exercises aim to test:

- notification, activation, and mobilisation of the ORT and EMT
- efficiency and effectiveness of equipment deployment
- efficiency and effectiveness of communication systems
- Wheatstone's ability to effectively operate within an emergency response organisation.

The OPEP will be tested at least annually and updated if required, as detailed above (Section 5.4).

7.0 Stakeholder Consultation

Chevron Australia has developed a specific Stakeholder Consultation Plan (Appendix C) that describes:

- stakeholder identification and analysis
- log of stakeholder engagement including information provided to stakeholders, Chevron Australia responses and ongoing consultation requirements
- full text of consultation.

7.1 Consultation Undertaken

Relevant stakeholders were identified through a stakeholder analysis process to ensure persons or organisations that may potentially be affected by Wheatstone Start-up and Operations were consulted (Table 7-1).

No objections or claims about adverse impacts relating directly to the petroleum activity were raised. Some feedback and clarifications were received and Chevron responded to ensure queries were adequately addressed and resolved.

Table 7-1: Stakeholders Engaged for Wheatstone Start-Up and Operations Activities

Stakeholder	Stakeholder Type
Buurabalayji Thalanyji Aboriginal Corporation	Potentially affected party
Kuruma Marthudhunera	Potentially affected party
Yaburara and Coastal Mardudhunera Aboriginal Corporation	Potentially affected party
AECOM	Response organisation (monitoring)
Apache Energy Ltd	Response organisation
Australian Marine Oil Spill Response Centre	Response organisation
Barrow Island Emergency Management Coordinator	Internal stakeholder – Emergency response
WA Department of Transport - OSRC Unit	Response organisation
Environmental Resources Management	Response organisation (monitoring)
Intertek Geotech	Response organisation
Jacobs (Australia) Pty Ltd	Response organisation (monitoring)
Oil Spill Response Limited	Response organisation
ToxFree	Response organisation (waste management)
URS	Response organisation (monitoring)
Apache Energy Ltd (now Quadrant Energy)	Interested party
BHP Macedon	Interested Party
KUFPEC	Interested party
Vermilion Energy	Interested party
Woodside Burrup Pty Ltd	Interested party
Australian Fisheries Management Authority	Government agency
Aquarium Specimen Collectors Association of WA	Interested party
Australian Southern Bluefin Tuna Industry Association	Interested party

Stakeholder	Stakeholder Type
Commonwealth Fisheries Association	Interested party
WA Department of Fisheries	Government agency
Pearl Producers Association	Potentially affected party
Professional Specimen Shell Fishermen's Association	Interested party
Western Australian Fishing Industry Council	Interested party
North West Slope Trawl Fishery (State)	Potentially affected parties
Onslow Prawn Fishery (State)	Potentially affected parties
Mackerel Managed Fishery (State)	Potentially affected parties
Marine Aquarium Fish (State)	Potentially affected parties
Pilbara Line Fishery (State)	Potentially affected parties
Pilbara Trap Managed Fishery (State)	Potentially affected parties
Pilbara Trawl Fishery (State)	Potentially affected parties
Professional Specimen Shell Fishermen Association	Interested and potentially affected parties
Western Skipjack Tuna Fishery (Commonwealth)	Interested and potentially affected parties
Western Tuna and Billfishery (Commonwealth)	Interested and potentially affected parties
Charter Boat Owners and Operators Association	Interested and potentially affected parties
RecFishWest	Interested party
Exmouth Game Fishing Club	Potentially affected party
Nickol Bay Sport Fishing Club	Potentially affected party
Onslow Visitor Centre	Interested party
Port Hedland Game Fishing Club	Potentially affected party
Australian Hydrographic Service (AHS)	Government agency
Australian Maritime Safety Authority (AMSA)	Government agency
Department of Broadband, Communication and the Digital Economy	Government agency
Department of Defence	Government agency
WA Department of Parks and Wildlife	Government agency
WA Department of Transport - Harbour Master	Government agency
WA Department of Transport - Navigational Safety	Government agency
WA Department of Transport - Pilbara Office	Government agency
Pilbara Ports Authority	Government agency
Shire of Ashburton	Government agency
Shire of Roebourne	Government agency
Onslow Chamber of Commerce	Interested party
Onslow Community Reference Group	Interested party
Onslow Salt Pty Ltd	Interested party
Stations in the region - Mindaroo	Interested party
Stations in the region - Peedamulla	Interested party
Stations in the region – Urala	Interested party

7.2 Ongoing Consultation

In accordance with the Stakeholder Consultation Plan, Chevron Australia will maintain communications with identified stakeholders as required to ensure they are informed of any aspects associated with Wheatstone Start-up and Operations that may potentially affect their respective interests within the area. Specifically, Chevron Australia will:

- provide response organisations with a copy of the OPEP
- notify the Australian Hydrographic Service of activities and infrastructure for inclusion in Marine Notices
- maintain communication with the Onslow CRG during regular meetings
- engage with the WA Department of Fisheries, Australian Fisheries Management Authority, Marine Tourism WA, and RecFishWest on a regular basis.
- Additionally, Chevron Australia can continue to be contacted about the petroleum activities described in this Summary via the contact details provided in Section 7.3.

7.3 Nominated Titleholder Details

Chevron Australia Pty Ltd (Chevron) is the nominated titleholder and operator on behalf of the titleholders for the Wheatstone trunkline. Contact details for Chevron are as follows:

Table 7-2: Nominated Titleholder Contact Details

Company Name	Chevron Australia Pty Ltd
Contact Person	Paul Reynolds
Business Address	250 St Georges Terrace, Perth WA, 6000
Telephone Number	+61 8 9216 4000
Email Address	ABUEnvPlanInfo@chevron.com

8.0 Acronyms and Abbreviations

Table 8-1 defines the acronyms and abbreviations used in this document.

Table 8-1: Acronyms and Abbreviations

Acronym / Abbreviation	Definition
AAQ	Ambient Air Quality
AHS	Australian Hydrographic Service
ALARP	As low reasonably practicable
AMSA	Australian Maritime Safety Authority
ANZECC	Australian and New Zealand Environment and Conservation Council
AS/NS	Australian Standard/New Zealand Standard
DoF	Department of Fisheries
DMP	Department of Mines and Petroleum
DotE	Commonwealth Department of the Environment
EMBA	Environment that may be affected
the EP	Wheatstone Start-Up and Operations Environment Plan
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
Hz	Hertz
IFO	Intermediate fuel oil
IMR	Inspection, maintenance and repairs
km	Kilometre
m	Metre
MES	Monitoring, evaluation, and surveillance
mm	Millimetre
MSRE	Marine safety, reliability, and efficiency
NEPM	The National Environmental Protection Measure for Ambient Air Quality
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
OCNS	Offshore Chemical Notification Scheme
OEMS	Chevron Australia's Operational Excellence Management System
OIW	Oil in water
OPEP	Chevron Australia's Oil Pollution Emergency Plan
OSPAR	Oslo and Paris Conventions for the Protection of the Marine Environment of the North-East Atlantic, 'OSPAR Convention'
PLONOR	Poses Little or No Risk (to the Environment)
PW	Produced water
ROV	Remotely operated vehicle
this Summary	Wheatstone Start-Up and Operations Environment Plan Summary

Acronym / Abbreviation	Definition
WQ	Water Quality

Appendix A : Chevron Integrated Risk Prioritisation Matrix

Appendix Figure A-1: Chevron Integrate Risk Prioritisation Matrix

Chevron Integrated Risk Prioritization Matrix

For the Assessment of HES & Asset Risks from Event or Activity

Likelihood Descriptions & Index (with confirmed safeguards)

Likelihood Descriptions		Likelihood Indices	Legend
Consequence can reasonably be expected to occur in life of facility	1	Likely	6 5 4 3 2 1
Conditions may allow the consequence to occur at the facility during its lifetime, or the event has occurred within the Business Unit	2	Occasional	7 6 5 4 3 2
Exceptional conditions may allow consequences to occur within the facility lifetime, or has occurred within the OPCO	3	Seldom	8 7 6 5 4 3
Reasonable to expect that the consequence will not occur at this facility. Has occurred several times in industry, but not in OPCO	4	Unlikely	9 8 7 6 5 4
Has occurred once or twice within industry	5	Remote	10 9 8 7 6 5
Rare or unheard of	6	Rare	10 10 9 8 7 6

Decreasing Likelihood

Legend applies to identified HES risks (see guidance documents for additional explanations)

1, 2 , 3, 4 - Short-term, interim risk reduction required. Long term risk reduction plan must be developed and implemented.

5 - Additional long term risk reduction required. If no further action can be reasonably taken, SBU management approval must be sought to continue the activity.

6 - Risk is tolerable if reasonable safeguards / management systems are confirmed to be in place and consistent with relevant requirements of the Risk Mitigation Closure Guidelines.

7, 8, 9, 10 - Manage risk. No further risk reduction required. Risk reduction at management / team discretion.

Consequence Descriptions & Index (without safeguards)

Decreasing Consequence/Impact

Consequence Descriptions	Consequence Indices	6 Incidental	5 Minor	4 Moderate	3 Major	2 Severe	1 Catastrophic
Safety		**Workforce:** Minor injury such as a first-aid. *AND* **Public:** No impact	**Workforce:** One or more injuries, not severe. *OR* **Public:** One or more minor injuries such as a first-aid.	**Workforce:** One or more severe injuries including permanently disabling injuries. *OR* **Public:** One or more injuries, not severe.	**Workforce:** (1-4) Fatalities *OR* **Public:** One or more severe injuries including permanently disabling injuries.	**Workforce:** Multiple fatalities (5-50) *OR* **Public:** multiple fatalities (1-10)	**Workforce:** Multiple fatalities (>50) *OR* **Public:** multiple fatalities (>10)
Health (Adverse effects resulting from chronic chemical or physical exposures or exposure to biological agents)		**Workforce:** Minor illness or effect with limited or no impacts on ability to function and treatment is very limited or not necessary *AND* **Public:** No impact	**Workforce:** Mild to moderate illness or effect with some treatment and/or functional impairment but is medically managable *OR* **Public:** Illness or adverse effect with limited or no impacts on ability to function and medical treatment is limited or not necessary.	**Workforce:** Serious illness or severe adverse health effect requiring a high level of medical treatment or management *OR* **Public:** Illness or adverse effects with mild to moderate functional impairment requring medical treatment.	**Workforce** (1-4): Serious illness or chronic exposure resulting in fatality or significant life shortening effects *OR* **Public:** Serious illness or severe adverse health effect requiring a high level of medical treatment or management.	**Workforce** (5-50): Serious illness or chronic exposure resulting in fatality or significant life shortening effects *OR* **Public** (1-10): Serious illness or chronic exposure resulting in fatality or significant life shortening effects.	**Workforce** (>50): Serious illness or chronic exposure resulting in fatality or significant life shortening effects *OR* **Public** (>10): Serious illness or chronic exposure resulting in fatality or significant life shortening effects.
Environment		Impacts such as localized or short term effects on habitat, species or environmental media.	Impacts such as localized, long term degradation of sensitive habitat or widespread, short-term impacts to habitat, species or environmental media	Impacts such as localized but irreversible habitat loss or widespread, long-term effects on habitat, species or environmental media	Impacts such as significant, widespread and persistant changes in habitat, species or environmental media (e.g. widespread habitat degradation) .	Impacts such as persistant reduction in ecosystem function on a landscape scale or significant disruption of a sensitive species.	Loss of a significant portion of a valued species or loss of effective ecosystem function on a landscape scale.

The above legend applies only to HES risks, where risk levels 1-6 are actionable and mandatory.
For risks that may result in facility damage, business interruption, loss of product, the "Assets" category below should be used.
Asset risk reduction is at the discretion of management. Under no circumstances may a direct or indirect translation of Asset loss to HES consequences, or between any discrete categories of HES consequences be inferred.

Consequence Descriptions & Index (without safeguards)

Consequence Descriptions	Consequence Indices	6 Incidental	5 Minor	4 Moderate	3 Major	2 Severe	1 Catastrophic
Assets (Facility Damage, Business Interruption, Loss of Product)		Minimal damage. Negligible down time or asset loss. Costs < $100,000.	Some asset loss, damage and/or downtime. Costs $100,000 to $1 Million.	Serious asset loss, damage to facility and/or downtime. Costs of $1-10Million.	Major asset loss, damage to facility and/or downtime. Cost >$10 Million but <$100 Million.	Severe asset loss or damage to facility. Significant downtime, with appreciable economic impact. Cost >$100MM but <$1billion.	Total destruction or damage. Potential for permanent loss of production. Costs >$1billion

This matrix is endorsed for use across the Company.
It is not a substitute for, and does not override any relevant legal obligations.
Under no circumstances should any part of this matrix be changed or modified, adapted or customized.
This matrix identifies health, safety, environmental and asset risks and is to be used only by qualified and competent personnel.
Where applicable it is to be used within the Riskman2 structure and governance of an OE Risk Management Process. If applied outside of these Processes, it is also mandatory to manage identified intolerable risks and comply with the Risk Mitigation Closure Guidelines.

Appendix B : Potential Environmental Impacts, Risks and Control Measures

Appendix Table B-1 Hydrocarbon System – Physical Presence – Risk Assessment

Hazard
The physical presence of the subsea hydrocarbon system infrastructure has the potential to cause a disturbance/disruption to commercial trawl fisheries.
Potential Consequence
Trawl fishing activity near the infrastructure is minimal, with fewer than five vessels (annually) potentially operating near the hydrocarbon system. The spatial extent of the hydrocarbon system infrastructure represents only a small portion of the three trawl fishery licence areas that intersect the infrastructure, estimated to be less than 1% of the fishing areas. The identified values in the receiving environment potentially intersecting the spatial extent of the infrastructure include the Onslow Prawn Fishery (which had one vessel operating in 2013) intersecting the flowlines and trunkline , the North West Slope Trawl Fishery (one active vessel in 2012–2013) intersecting the flowlines and the Pilbara Trawl Fishery (three operational vessels in 2013) intersecting the trunkline . The potential impacts of the infrastructure on trawling vessels includes: disruption to fishing caused by the need for vessels to avoid the infrastructure, which is an incidental and short-term disturbance; and physical damage to trawling gear that contacts the hydrocarbon system, with potential short-term disruptions to trawling activities. Given that the spatial extent of the infrastructure takes up only a small portion of the extensive fishing grounds; that very few vessels operate in the operational area; that the potential disturbance is related to localised avoidance, or at worst, damage to trawling gear resulting in short-term disruptions to activities; only localised and short-term impacts can occur. Therefore, the potential consequence to other marine users from the physical presence of the hydrocarbon system is ranked as incidental (6).
Likelihood and Residual Risk Summary

Likelihood	The likelihood of the physical presence of the hydrocarbon system causing disturbance to other marine users (particularly trawl fisheries) is inherently low, as the subsea infrastructure is in areas of only low commercial trawl fishing activity, and covers only a small percentage of the extensive licence areas. The likelihood is further reduced through the communications controls that ensure other marine users are aware of the location of infrastructure. Therefore interactions are not reasonably expected to occur. The likelihood of the physical presence of the hydrocarbon system causing disturbance/disruption to other marine users is ranked as unlikely (4).
Residual Risk	The residual risk of the physical presence of the hydrocarbon system causing disturbance/disruption to other marine users is ranked as low (9).

Control Measures
• Stakeholder Consultation Plan implemented to ensure other marine users are informed of the presence of the hydrocarbon system. • AHS (or equivalent) informed of infrastructure locations before Startup and Operations activities commence. s (or equivalent) informed of infrastructure locations before Start-up and Operations activities commence

Appendix Table B-2 Hydrocarbon System – Discharges – Risk Assessment

Hazard
Intermittent discharges of control fluids from drill centres during operations may result in changes to water quality and the potential to impact marine habitats and fauna.
Potential Consequence
Drill centres IAG-1 and WST-3 are located closest to areas of environmental sensitivity (ancient coastline and demersal fish communities respectively). The most prominent terrace of the ancient coastline is at the 125 m contour, however biologically important habitats tend to be found in areas of rocky escarpment rather than soft sediments. Extensive ROV footage in the area of IAG-1, which is located at approximately 119 m depth, shows that the drill centre is located on soft sediments and sessile benthic organisms have not been noted. ROV footage of WST-3 also confirms the drill centre is also located in a soft-sediment location absent of sessile benthic organisms. The continental slope demersal fish communities occupy two distinct biomes associated with the upper slope (water depth of 225 – 500 m) and the mid-slope (750 – 1000 m). The location of WST-3 is at a water depth of approximately 240 m and therefore releases from the drill centre have the potential to intersect a small percentage area of the upper slope demersal fish communities. The control fluids typically contain water, ethylene glycol and dimethylamino-methylpropanol (highly soluble alcohol), the latter two being of low toxicity and bioaccumulation potential. Ethylene glycol is on the OSPAR PLONOR list as posing little or no risk to the environment. Under a worst-case scenario, the proprietary additives in the control fluids may have bioaccumulation and biodegradation potential. However, proprietary chemicals usually constitute around 1-5% of the total discharge (i.e. < 0.75 L in a typical discharges of 15 L) and the fluid toxicity rating classifications are typically 'slightly toxic' as ranked by aquatic toxicologists, with a lethal concentration (LC50) of 1000-10,000 mg/L. Due to the small volumes (ranging from approximately 0.001 - 0.03 m^3 per discharge), the presence of open ocean local and regional tides and currents, rapid dispersion of fluids is expected to occur and the spatial extent of the discharges is expected to be limited to a small area in the water column around the valves. Based on nearfield dilution modelling, which considers currents, water column depth, discharge height above seabed, physical characteristics of the typical control fluids, and flow rates, a dilution of over 1:500 is anticipated within close proximity to the valve and before any fluids contact any seabed habitats. This means that any contaminants of concerns (already a low concentration) within the control fluids are diluted more than 500 times before they can interact with any benthic habitats. Given the absence of sessile benthic organisms around the drill centres, and the high dilution and dispersion of the fluids prior to contacting the seabed, and that the small volumes of proprietary chemicals usually constitute around 1-5% of the total discharges, impacts to benthic habitats are not predicted. Given the limited spatial extent of the water quality changes, low toxicity fluids, rapid dispersion and dilution, concentrations are not expected to persist for long enough to result in lethal impacts to marine species (i.e. the laboratory condition of LC50 of 1000-10,000 mg/L for 96 hrs. is not expected to occur). Therefore, with limited potential for exposure to lethal fluid concentrations, the potential worst-case acute impacts to fish are most likely to be sub-lethal, and limited to a small number of fish, if they remain in the immediate vicinity of the valves during the discharge. Further, given the rapid dilution and dispersion conditions, low bioaccumulation potential and the high biodegradability of the typical control fluids, and intermittent frequency of discharges, bioaccumulation in the receiving environment and chronic

impacts to benthic habitats, fish or other fauna are not expected.

The discharges are small in volume and not continuous, the fluid is of low toxicity and is predicted to disperse and dilute rapidly in the open ocean environment, and long-term or widespread impacts at a population or community level are not expected. The potential worst-case consequence of control fluid discharges to marine habitats, communities and fauna is assessed as being highly localised and short-term, and is therefore ranked as incidental (6).

Likelihood and Residual Risk Summary	
Likelihood	The control fluid discharges are low volume, infrequent, non-continuous, short duration, have only a small percentage of toxic components, have a limited spatial extent in the water column, therefore the likelihood of marine fauna intersecting with and being physically affected by the discharges is remote. The potential likelihood for control fluid discharges resulting in impacts to marine habitats and fauna is remote (5).
Residual Risk	The residual risk for control fluid discharges resulting in impacts to marine habitats and fauna is low (10).

Control Measures

- Prior to use, subsea control fluids are subject to the Chevron chemical selection process ABU Hazardous Material Approval Procedure (HMAP), and meet a D–E ranking according to the OCNS

Appendix Table B-3 Hydrocarbon System – Spills – Risk Assessment

Hazard

A release from the hydrocarbon system can result in changes to water quality resulting in potential impacts to marine habitats and fauna.

Potential Consequence

Marine Assessment

A subsea release from the hydrocarbon system will result in the spread of surface and water column hydrocarbons in the marine environment. Given the volumes potentially released and the nature of the condensate (volatile and promoting rapid evaporation at the surface), the spatial extent of the release is expected to be patches in both the water column and on the surface of the offshore area surrounding the release (i.e. around the wells and flowlines), with no shoreline contact predicted.

The receiving marine environment may include environmental values such as migrating whales, whale sharks, and fish communities, which can potentially be exposed to the water quality changes caused by the released fluids.

The potential impacts of the water quality changes to marine fauna values relate primarily to toxicity of the volatile fraction dissolved or entrained in the water column, and the vapours from fresh condensate at the water's surface. Exposure of hydrocarbons to cetaceans can occur via inhalation of vapours when surfacing, or ingestion of hydrocarbons when feeding. Inhalation of vapours could result in irritation to mucous membranes in the nose, throat, and eyes leading to inflammation and infection. Typically, such impacts are associated with 'fresh' spills, with the risk of impact declining rapidly as the fluid weathers (>24 hours). Sharks and

other fishes have the potential for exposure to hydrocarbons via the entrained and dissolved fractions, with potential effects including damage to the lining of the stomach and intestine, as well as effects to motility, digestion, and absorption.

Therefore, if a hydrocarbon system spill coincided with the migration of cetaceans such as Humpback Whales, exposure to a proportion of the migrating population could occur as the whales breach the surface to breathe, with impacts related to direct physical contact with a slick or entrained oil, and ingestion and inhalation of vapours. However, given the rapid evaporation of the condensate at the surface, the potential for impacts would be limited to a relatively short period following the release, and physical impacts would be limited to individuals only, rather than a population-level effect, with only localised and short-term effects.

A hydrocarbon release may result in patches of low entrained hydrocarbon exposure to fish communities of the ridgeline, ancient coastline and continental slope. However, only small proportions of the fish habitats may potentially be exposed to the hydrocarbons, given the small volume (approximately 58 m^3), and that much of the condensate would float rapidly towards the surface rather than spread horizontally, which is particularly relevant to the demersal fish of the continental slope and ridgeline. Whale sharks may also be in the area at the time of a release, although only in low numbers. Impacts at a population viability level to fish communities and whale sharks are not predicted, given the low exposure thresholds, that condensate would float rapidly to the surface and evaporate at the surface, the mobile nature of the fish, the transient nature of whale sharks, and the open-ocean setting, therefore only short-term and localised impacts to fish can occur.

A condensate release near the ridgeline, could result in a portion of the ridgeline habitat being exposed to low threshold entrained hydrocarbons, however given the low volumes (approximately less than 58m^3) and that much of the condensate would float rapidly towards the surface rather than spread horizontally across the ridgeline, only a small part of the habitat and associated benthic organisms (gorgonians and sponges) could be contacted. If gorgonians are contacted, the affected colonies might exhibit acute impacts and sub-lethal signs of stress, such as sclerite sloughing. Hydrocarbons, in the form of PAHs, are also known to inhibit larvae settlement of at least one species of sponge. However this effect is unlikely to be long lasting from a one-off release of condensate at the ridgeline, as residual oil adhering to the substratum would break down due to physical weathering and microbial activity. A short-term release of condensate is not predicted to result in chronic impacts to gorgonians, sponges and other organisms on the ridgeline, however acute impacts may occur to a small section of the habitats, therefore ranked as localised short term effects to this habitat, ranked as incidental (6).

Given the limited spatial extent of the potential changes to water quality, and potential for only a small proportion of the ridgeline to be contacted, the short-term duration of the water quality changes (due to the nature and volatility of the fluids and predicted rapid evaporation), that only low exposure thresholds are predicted, the potential exists for short-term and localised impacts to marine habitats and fauna. Therefore, the potential consequence to marine habitats and fauna from a release from the hydrocarbon system is ranked as incidental (6).

Likelihood and Residual Risk Summary	
Likelihood	It is possible that a leak from the Wheatstone or Iago wells could occur during Start-up and Operations. Analysis of well control incidents in the US Gulf of Mexico, reported that between 1980 and 2011, 14 incidents occurred, with generally small spill volumes (<50 bbl). Using publicly available risk data from the International Association of Oil and Gas

	Producers (IOGP), the risk of rupture of the flowlines is 1.48 × 10-4/km per year. Because these statistics are based on incident history, largely for North Sea and European operations, their use is conservative for the Project given the remote location of the hydrocarbon system in an open offshore area and the reduced risks associated with potential third-party interference. Inspection activities will be undertaken to assess the condition of the hydrocarbon system to then inform maintenance and repair activities, to maintain the condition of the asset. Particular events or exceptional circumstances that may cause conditions to change may trigger additional inspections or a review of inspection frequency. Given the low probability of a release scenario and the preventive and mitigation control measures in place, the likelihood of hydrocarbon system spills causing impacts to fauna and habitats occurring is ranked as unlikely (4).
Residual Risk	The residual risk of a hydrocarbon system spill resulting in impacts to fauna and habitats is ranked as low (9).

Control Measures

- Commissioning and testing of the hydrocarbon system, including wells, trees, manifolds, flowlines and trunkline, is conducted according to industry standards prior to the introduction of hydrocarbons
- Handover of custody of the wells to be undertaken in accordance with Well Handover processes
- Producing Well Integrity Performance Standards are met throughout Start-up and Operations
- IMR of the hydrocarbon system will, include but is not limited to:
  - a post-start-up inspection of the subsea hydrocarbon system within 24 months of start-up; and
  - monthly inspections of the onshore PL99 pipeline licence area.
- Monitoring of hydrocarbon system pressure, temperature, flow rates and fluid composition against acceptable criteria and limits
- CCR operators will be trained and competent
- SIMOPS activities, heavy lifting activities, and activities with potential for dropped objects, managed in accordance with the permitting and management requirements
- Mooring procedures developed and vessel anchoring and mooring activities will be undertaken in accordance with them
- Isolation valves tested to verify valve integrity and functionality prior to the introduction of hydrocarbons
- The isolation steps of the source control / isolation procedures are implemented within 30 minutes if a spill is detected from the hydrocarbon system
- Stakeholder Consultation Plan implemented to ensure other marine users are informed of the presence of the hydrocarbon system
- AHS (or equivalent) informed of infrastructure locations before Start-up and Operations activities commence

Appendix Table B-4 Platform – Physical Presence – Risk Assessment

Hazard
The physical presence of the platform has the potential to cause disturbance/disruption to other marine users by creating a navigational hazard to commercial shipping and fishing vessels.
Potential Consequence
The spatial extent of the platform is approximately 120 m × 77 m, and therefore is a small obstacle in the extensive fishing and shipping areas. The receiving environment includes the socioeconomic values of commercial shipping and commercial fishing. Several designated commercial fishing areas intersect the platform location; however, fishing activity is low, with few fishing vessels operating in the area. The platform is located outside major shipping lanes and marine traffic density around the platform is low. The potential impacts of the platform to other marine users include the requirement to avoid the infrastructure, which is an incidental and short-term disturbance that is common in the marine industry. Despite the platform being present for a long duration, given the limited vessel activity near the platform, the frequency of potential interaction is minimal. Because of the small footprint of the infrastructure relative to the wider fishing and shipping areas, low density of shipping traffic, low levels of commercial fishing, and the relative ease of avoidance by vessels common to the marine industry, the potential impacts are localised with only isolated vessels potentially deviating away from the platform, with no broader impacts to socioeconomic receptors. Therefore, the potential disturbance/disruption impacts to other marine users from the physical presence of the platform is ranked as incidental (6).
Likelihood and Residual Risk Summary

Likelihood	The likelihood is inherently low because the platform is located outside major shipping lanes and in areas of low commercial fishing activity, and is further reduced through the controls described; therefore impacts are not reasonably expected to occur for this facility. The likelihood of the physical presence of the platform causing disturbance/disruption to other marine users is ranked as unlikely (4).
Residual Risk	The residual risk of the physical presence of the platform causing disturbance/disruption to other marine users is ranked as low (9).

Control Measures
• Platform radar, navigational lighting, and audio navigational equipment is commissioned and tested during the installation phase, in accordance with commissioning test procedures • Platform radar, navigational lighting and audio navigational equipment is maintained in accordance with manufacturers' specifications as detailed in the CMMS • Stakeholder Consultation Plan implemented to ensure other marine users are informed of the presence of the hydrocarbon system • AHS (or equivalent) informed of infrastructure locations before Start-up and Operations activities commence

Appendix Table B-5 Platform – Air Emissions – Risk Assessment

Hazard
Platform operations generate emissions of: • criteria pollutants (oxides of nitrogen, carbon monoxide and particulate matter) resulting in air quality changes within the air shed local to the platform • greenhouse gases that contribute to the global concentrations of these gases in the atmosphere
Potential Consequence
Air Emissions (excluding greenhouse) Impacts from air emissions (criteria pollutants – including oxides of nitrogen, carbon monoxide and particulate matter) depend on discharge volume, frequency, duration of exposure, as well as the location and nature of the receiving environment. Air quality changes as a result of emissions of criteria pollutants are limited to the air shed local to the platform. Atmospheric emissions dispersion modelling was conducted to quantify and assess impacts from air emissions from the platform. The modelling was conducted using a Gaussian, steady-state plume model and was based on the worst case scenario of full compression (i.e. maximum discharge volumes) (Ref. 169). It used 1 year of meteorological data to capture the majority of weather conditions and extended to an approximate grid of 25 km by 25 km surrounding the platform. Nitrogen dioxide, carbon monoxide and particulate matter (with an aerodynamic diameter less than 10 microns, i.e. PM 10) were modelled using conservative emission rates in a screening approach. Nitrogen dioxide emissions from the facility were modelled on the assumption that all NOx are present as NO_2. This assumption is conservative because the conversion of NO to NO_2 will be limited by the available O_3, allowing only a fraction of the available NO to react (approx. 15 to 20%). The modelling took into account the platform design (including naturally dispersive characteristics of the gas turbine exhausts and flare), the lack of background pollution, and the expected level of pollutants in the discharge. The modelling predicted maximum ambient concentrations to be substantially below the NEPM AAQ standards. The modelling demonstrates the concentrations of oxides of nitrogen, carbon monoxide and PM10 particulate matter are well below NEPM AAQ standards indicating there will be no significant degradation of ambient air quality. The potential consequence of the air emissions from the platform causing air quality changes is therefore ranked as incidental (6). Greenhouse Greenhouse gas emissions from the platform, once the compression turbines are fully operational, are anticipated to average approximately 330,000 tonnes per year. Chevron has not been able to identify any peer reviewed literature that suggests a single source of greenhouse gas emissions such as the platform, is responsible for causing localised environmental harm. The link between individual greenhouse gas emitters and injury caused by climate change has been tested in the United States District Court and no causal link was found. Consequently the greenhouse gas emissions from the platform are not expected to cause local or regional environmental impacts in either the short or long term.

These emissions will however contribute to the global concentrations of these gases in the atmosphere. These emissions are required to be reported under the National Greenhouse and Energy Reporting Act (Cwth) 2007 and from July 2016 will be capped in accordance with the National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule (Cwth) 2015.

Likelihood and Residual Risk Summary	
Likelihood	The platform systems have been designed to optimise efficiency and limit emissions. The turbines exhausts and flares have been designed to aid the dispersion of emissions from those sources. It is reasonable to expect that with the platform design, the lack of background pollution, the expected level of emissions to air, the efficient maintenance, competent operation and monitoring of emissions; the likelihood of air emissions causing significant air quality changes is considered unlikely (4).
Residual Risk	The residual risk of platform operations producing air emissions causing air quality changes is low (9).

Control Measures

- The energy efficient design features (including the WHRUs, valves and flanges, seawater lift pumps, aero derivative turbines, condensate export pumps) are installed, tested and commissioned according to the relevant Commissioning Test Procedures prior to hydrocarbon production
- The compressors, power generators, flaring system, WHRUs and seawater lift pumps are maintained in accordance with manufacturer's specifications
- Personnel operating the flare, power generation and compressor systems (respectively) have relevant training and competencies
- Platform Air Emissions Monitoring Program implemented
- Flare monitoring and minimisation program implemented

Appendix Table B-6 Platform – Discharges (Produced Water) – Risk Assessment

Hazard

PW discharges from the platform may result in changes to water and sediment quality with the potential to impact marine habitats and fauna.

Potential Consequence

As per the 'Modelling Results' described, the spatial extent of water quality changes associated with the PW discharge is expected to be limited to the discharge zone. At the boundary of the discharge zone, concentrations are predicted to meet a minimum dilution factor 100% of the time, and all contaminant concentrations are predicted to be under ANZECC WQ trigger guidelines. Within the discharge zone, contaminants may be at concentrations above the ANZECC WQ guidelines.

The PW plume is dynamic and moving constantly depending on the tides, currents, winds, and internal waves and the discharges largely remain in the upper water column due to the positively buoyant characteristics of the discharge. In terms of the spatial extent for seabed interaction, the modelling predicts the plume may reach the seabed only once substantially diluted (well beyond 100,000 times and therefore well below ANZECC trigger guidelines.

Any particulate fallout from the PW plume is predicted to occur only within the immediate

vicinity of the platform, and sediments are predicted to meet the ANZECC sediment triggers at the discharge zone boundary.

Based on the spatial extent of the water quality changes and potential interaction with the seabed, identified environmental values and sensitivities that may be exposed to PW include the ridgeline benthic habitats, ridgeline fish communities, and migrating whales and foraging whale sharks. Although there is no evidence to suggest the level of diversity is greater in the platform area than the remaining area of the ridgeline (Ref. 6), the hard substratum habitats at the platform ridgeline are included in this assessment. Section 3.1.1.2 describes habitats at the platform. The ancient coastline is approximately 4.3 km away, and outside the potential extent of the PW plume, and therefore not described further.

Potential impacts to the identified environmental values and sensitivities depend on the nature of the contaminants in the PW discharge:

The aquatic toxicity of MEG is very low; ethylene glycol is on the OSPAR list of substances that are considered to pose little or no risk to the environment once released, and is not expected to result in adverse impacts to habitats or fauna.

Dispersed oil can be ingested by marine fauna, leading to toxicity-related impacts similar to dissolved oils, causing adverse health impacts to marine biota. Dissolved oils generally have a high toxicity, due to constituents such as BTEX, polycyclic aromatic hydrocarbons (PAHs), and phenols (such as alkyl phenols), amongst others. Fish and shellfish are particularly sensitive to oil exposure, and certain toxins can bioaccumulate. BTEX (particularly benzene and xylene) can have an acute toxic effect on aquatic life, however are less of a concern than PAHs and APs, since they evaporate rapidly from seawater, therefore the assessment below is for PAHs and APs.

A variety of metals may be present in PW in varying concentrations, including aluminium, antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, tin, and zinc. Some metals can cause adverse impacts to the marine environment, while others are a necessary component to maintain life with some being essential at low quantities, but potentially toxic at high levels. Mercury and its compounds can have high acute (short-term) and high chronic (long-term) toxicity on marine fauna. Particulate mercury is highly reactive and consequently is rapidly oxidised in the marine environment through either chemical or bacterial processes to form complexes of mercury that can be highly toxic and that can bioaccumulate.

A range of process chemicals may be present in very low concentrations in the PW discharge however are not expected to change the risk profile of the treated PW outside the discharge zone.

Whales, Whale Sharks, and Fish Communities

Fish communities of the ridgeline may be exposed to the water quality changes, while migrating whales and foraging whale sharks may occasionally also intersect the discharge zone.

As the plume is dynamic and moving constantly depending on the tides, currents, winds and internal waves, transient biota such as migrating whales or whale sharks, are unlikely to be exposed to contaminant concentrations for extended durations. Given the limited spatial extent of water quality changes (approximately 850 m), the infrequent and short duration of the potential interaction of these fauna with the PW plume, and that only a small proportion of the migrating/foraging population can intersect the discharge plume, the potential impacts to these fauna are short-term and localised. The consequence assessment is therefore targeted at the fish communities of the ridgeline.

Of the contaminants present in the PW discharge, hydrocarbons such as PAHs, Alkylphenols (AP), and metals in their concentrated forms have the potential for acute and chronic affects to marine biota.

Fish (including those associated with the ridgeline habitat), may be exposed to low concentrations of hydrocarbons (including APs and PAHs) in the water column within the discharge zone. However, the plume is strongly buoyant, with a dilution of 100,000 is reached whilst the plume is still a surface plume, and interaction with the seafloor will only occur after vertical mixing of this plume, which will show a dilution in excess of 100,000 times. For example, TPH discharged at 30 mg/L will be diluted below 3µg/L (i.e. below reporting limits for total recoverable hydrocarbons of 250 µg/L used by the National Measurements Institute and chronic low reliability trigger criteria of 7 µg/L suggested by Tsvetnenkobefore contacting the seabed. Further, some fish are able to metabolise and excrete hydrocarbons, potentially reducing physiological effects to fish exposed to PW hydrocarbons.

It is not predicted that PW hydrocarbons will have long lasting and permanent impacts on fish populations, as described below. For example, Bakke et al. reported that APs and PAHs in PW are rapidly metabolised in Atlantic cod (Gadus morhua). Similarly, King et al reported hydrocarbon-degrading bacteria in the liver and bile of fish collected from their study on the NWS. Bakke et al., who reviewed individual, population and ecosystem level biological responses to PW further concluded that the spatial scale of impact from PW discharge was insufficient to impact populations of marine organisms. Reed and Hetland reported that north Atlantic species of demersal fishes exposed to APs associated with PW was too low to impact the reproductive viability of the stocks of these species. King et al. found that populations of two species of fish (Carangoides sp. and Plectropomus sp.) near a platform discharging PW into the NWS, Australia, may have been exposed to chronic, low levels of hydrocarbon pollution. However, they suggested that this result is inconclusive given that there was evidence that 'impact' and reference populations of these species, at the Montebello Islands, were being exposed to hydrocarbons seeping naturally into the marine environment.

In summary, based on the review of available literature, and considering the nature of the PW hydrocarbon contaminants, the substantial dilution before the plume reaches the seabed and associated ridgeline fish communities, it is predicted there will be no acute and chronic impacts to fish populations on the ridgeline or other adjacent habitats.

Fishes can also bioaccumulate heavy metals through food and via water, but uptake by individuals and by different species of fish is dependent on many factors including the metal's form (inorganic versus organic), water chemistry and behavioural traits (feeding, range) of the fish species in the receiving environment reviewed acute and chronic toxicity of metals relating to a variety of fish species and found mercury (inorganic and methyl) and copper to be the most toxic. Some heavy metals, such as mercury are persistent and can bioaccumulate; however some fish species may be able to metabolise metals potentially reducing the risk of accumulating lethal concentrations .

The long-term effects of metals on fish populations is not straightforward to predict given most studies examining the toxicity of metals on fishes were laboratory based and often characterized by treatment concentrations that free ranging fish in the wild are unlikely to be exposed to for even short durations. Further, given the size of the mixing zone relative to available habitat and the wide distribution of most fish species in the region it is unlikely a sufficient number of fish will be exposed to concentrations over a duration that would illicit a population level response. For this reason, the ecosystem function of fishes in the area is not predicted to be impacted.

In summary, exposure of contaminants such as metals to fish communities, could result in localised toxic effects on individual fish, but with no ecosystem function changes or chronic level impacts to fish populations. The potential consequences of water quality changes from the PW discharge are localised and long-term impacts to individual marine fauna, ranked as

minor (5).

Ridgeline Habitat

As described in the 'Modelling Results' section above, the PW discharge plume is buoyant and will move towards the surface soon after discharge. In the unlikely event dissolved contaminants in the plume contact the seabed; dilutions are predicted to be beyond 100,000 times). For example, TPH discharged at 30 mg/L will be diluted below 3µg/L (i.e. below reporting limits for total recoverable hydrocarbons of 250 µg/L used by the National Measurements Institute and chronic low reliability trigger criteria of 7 µg/L suggested by Tsvetnenko before contacting the seabed. Particulate fallout from the PW discharge may deposit on the seabed. Based on the modelling results, for the spatial extent of seabed/sediment interaction, any particulate fallout from the PW plume is predicted to occur predominately within the vicinity of the platform, and metals deposition is predicted to meet the ANZECC sediment triggers at the discharge zone boundary for initial conditions.

Seabed adjacent to the platform area appears to have only an occasional coverage (2–10% cover) of an array of benthic sessile invertebrates, and there is no evidence to suggest the level of diversity is greater in the platform area than the remaining area of the ridgeline. However, the platform ridgeline habitats are considered in this assessment to take into account that hard substratum can provide habitats that generally support higher amounts of benthic fauna. The ridgeline habitat includes gorgonians, sponges and fish that may be exposed to very diluted PW (with metals in the water column) and the particulate metals depositing at the seabed. The potential impacts of PW on demersal fish populations associated with ridgeline are described above in the 'Whales, Whale Sharks, and Fish Communities' sub-section above.

Habitat Connectivity

The potential for produced water to reduce connectivity of organisms is based on the conservative premise of a 850 m discharge boundary, which, in the worst case that all benthic organisms and habitats within the mixing zone were affected, would cover the width of the ridgeline, potentially fragmenting this habitat in two. Given the positive buoyancy of the produced water, any diluted constituents are highly unlikely to contact the sea floor, and only heavy particulate matter, such as metals, has the potential to sink and directly impact organisms. As such, the potential to impact benthic organisms is reduced, and connectivity of pelagic organisms that are largely transitory is highly unlikely to be impacted. It is not considered possible that pelagic species could be fragmented, since they are mobile and largely transitory.

Marine organisms maintain connectivity among populations via movement of individuals at different life-history stages. In the marine environment the most prevalent mechanism of movement is the movement of gametes from broadcast spawning taxa with oceanographic currents (Coleman and Ayre 2007). Due to the broadcast spawning strategy and pelagic larval stage of most marine organisms, they have less reliance on habitat continuity to maintain population connectivity than terrestrial species, which can be affected by habitat fragmentation at even small scales (e.g., Sale et al 2006; Nakajimaa et al 2009). Evidence of maintained connectivity among fragmented habitats in marine organisms can be seen in deeper sea populations separated by thousands of kilometres (Beedesse et al 2013, Teixera et al 2011). These principles of connectivity are considered in the design of marine reserves, and established literature suggest that connectivity among reserves is maintained even when they are separated by distances of 10s of kilometres (McCook et al 2009, Palumbi 2003).

Broadcast spawners release gametes into open water for fertilization and larvae development. Gametes and larvae are transported with oceanographic currents, which can influence population structure (Mullineaux et al 2005, Kim et al 1994). Broadcast spawning corals, such as those in the sub-class Hexacorralia, can maintain high levels of genetic connectivity among

populations separated by up to 25 km (Nakajima et al 2009), with the average dispersal distance of mobile and sessile invertebrates being between 25 and 150 kms (Palumbi 2003). Gorgonians, a dominant taxa on the ridgeline, are largely broadcast spawners.

Not all marine species are broadcast spawners with a pelagic larval stage, and examples include species that brood eggs or embryos. Brooders do not broadcast spawn gametes, but instead take some level of parental care of eggs and embryos, either through nesting, guarding, substrate spawning or similar such mechanisms. Some taxa, such as some gorgonians (Andras et al 2013) and fish are brooders and have a more limited dispersal range compared to broadcast spawning species (Coleman and Ayre 2007). However, even brooding invertebrates, such as some gorgonians can maintain connectivity over distances on the order of kms (Mokhtar-Jamaï et al 2011).

Therefore, even in the worst case that 850 m of benthic habitat and species around the platform are affected by produced water (likely a significant overestimate since PFW is buoyant, and modelling indicates high levels of dilution close to the platform), there are unlikely to be any significant effects of the produced water on marine organism connectivity due to fragmentation. When considering the potential for Wheatstone platform to fragment a 850 m section of the ridgeline, the fragmented distance is minor compared to dispersive capability of taxa, even brooders.

Toxic Effects

Corals and other marine invertebrates, including bivalves, can take up contaminants, such as heavy metals, via seawater or through feeding. In some locations, such as the NWS, this may occur independent of human activity because oil seeps naturally from the seafloor or there is metal bearing substratum. For corals, the uptake of heavy metals through feeding can involve polyp capture of particulate matter, contaminants adhering to sediment or in plankton. A review of literature was undertaken to better understand the potential risk of acute and chronic impacts to the non-mobile fauna (e.g. gorgonians and sponges) on the ridgeline from PW contaminants.

In terms of contaminants, the review focused on heavy metals and PAHs that may accumulate in some organisms. There are a limited number of toxicological studies relating to sponges and gorgonians, and especially to taxa found in the lower euphotic zone or relating to sea fans without zooxanthellae. The effects of contaminants on shallow water zooxanthellae corals are better understood, but extrapolations of these findings to deepwater non-zooxanthellae corals may be uninformative.

The literature suggested that acute impacts to gorgonians and sponges from contaminants, under the applied experimental treatments, are non-lethal, at least for adult colonies. Non-lethal responses associated with heavy metals and hydrocarbons included sclerite sloughing, mucus secretion and tissue necrosis in gorgonians. Physiological responses, such as change in respiration rates, were also apparent in at least one species of gorgonian as a result of thermal stress. In terms of sponges, PAHs and heavy metals may inhibit the settlement of larvae.

The long-term or chronic effects of heavy metals and other contaminants on these organisms are not well documented and are difficult to predict. One reason for this is that most experiments assessing the effects of contaminants occur over weeks or months. In contrast, discharges will normally last years or decades. Experimental treatment levels (concentrations) may also be unrealistic high over ecologically relevant spatial scales. Another reason is that most reported field based studies investigating marine community level responses to discharges relating to semi-enclosed water bodies, such as bays, or coastal waters. In terms of PW at the platform, discharge will be in waters >70 m deep and in a dispersive, open water environment nearly 140 km off the mainland.

Some organisms may accumulate heavy metals and PAHs independent of human actions. For

instance, oil seeps in the NWS might be contributing hydrocarbon into marine waters and thus organisms are exposed naturally to chronic concentrations of hydrocarbons. It is unclear if this would increase or decrease their sensitivity to exposure of hydrocarbons from other sources. Some gorgonians and other marine organisms are known to accumulate heavy metals and other contaminants. However, there is potential for gorgonians to eliminate heavy metals through mucus secretion and other mechanisms and azooxanthellate hard corals, such as Tubastraea, can incorporate metals into skeleton without suffering obvious signs of stress.

Although heavy metals and PAHs can potentially result in sub-lethal and lethal effects to individual corals under experimental conditions, it is unclear if discharges of PW, especially in deep water and dispersive marine environment will have a population or ecosystem level response. This will depend on the total population at risk from PW discharge. If impacts remain localised (i.e. within the predicted mixing zone) it is a reasonable assumption that population and ecosystem level responses are not predicted. As mentioned previously, modelling has predicted that gorgonians and sponges inside the discharge zone may be exposed to contaminants above ANZECC guidelines and that the populations outside will remain unaffected by PW discharge. This prediction is supported in part, by Burns *et al* who investigated the dispersion and fate of PW discharge from a platform in waters 20-24 m deep off the NWS. Using bioaccumulation assessments of oysters and water quality modelling, the authors concluded that potential biological impacts from oil would remain largely within 900 m of the discharge point. They also noted that due to degradation and dissipation processes there was no long term buildup of contaminants in sediment. Similarly Bakke et al, who reviewed individual, population and ecosystem level biological responses to PW in Norway waters, also concluded that the spatial scale of impact from PW discharge was insufficient to impact populations of marine organisms.

In summary, heavy metals associated with PW have the greatest potential for acute and chronic toxicity effects on marine biota. PAHs can have chronic toxic effects but are less persistent compared with some metals. Over the years, the deposition of metals around the platform could have toxic effects on marine biota associated with the ridgeline. However, if metals are taken-up by gorgonians and sponges, the effects will not necessarily lead to lethal effects in adults. Some organisms, such as gorgonians, have the capacity to metabolise heavy metals and other contaminants such as PAHs. However some metals, depending on the concentration, may inhibit larvae settlement.

For the potential impacts to the ridgeline marine habitat, a precautionary approach has been taken by classifying the potential worst case impact as 'localised but irreversible habitat loss', caused by acute and chronic impacts from exposure of the PW contaminants to gorgonians and sponges. This conservative ranking has been adopted here given the present uncertainty over the constituents and their concentrations in the PW, and lack of operating history. This ranking will be reviewed following the additional monitoring conducted. Therefore, the potential impact from PW discharge to the ridgeline habitat is ranked as moderate (4).

Likelihood and Residual Risk Summary	
Likelihood	The detailed consequence assessment above considered the potential acute and chronic impacts to marine fauna and habitats, in particular the potential impact to the ridgeline habitat. Given the size of the mixing zone relative to ridgeline habitat, and the wide distribution of most fish species in the region it is unlikely sufficient number of fish will be exposed to concentrations of metals or hydrocarbons over a duration that would illicit a population level response. For this reason the ecosystem function of fishes in the area is not likely to be impacted. In terms of the spatial scale of the effects of PW, such impacts to the ridgeline habitat will be localised to the discharge zone. This prediction is based on a

	modelling study and supported, in part, by published literature that suggests measurable effects from PW discharge do not generally extended beyond 1000 m of the discharge. Considering the spatial extent of any water and sediment quality changes and the literature available on the potential impacts of metals and hydrocarbons on sponges and gorgonians, only a small part of the ridgeline habitat can be exposed, thereby limiting the potential for widespread impacts to the ridgeline habitat. For this reason the function of the ridgeline habitat is unlikely to be impacted. Given the numerous controls in place to manage PW, and the predicted extent of the discharge, the likelihood of PW causing water or sediment quality changes resulting in the ridgeline habitat (and ecosystem function of the habitat) to be irreversibly damaged, and/or acute or chronic damage to marine habitats and fauna beyond the PW discharge zone, is ranked as unlikely (4).
Residual Risk	The residual risk of PW causing marine water or sediment quality changes, resulting in damage to marine habitats and fauna, is ranked as low (7).

Control Measures
• Chemicals discharged through the PW system are assessed using the Chevron chemical selection process - ABU Hazardous Material Approval Procedure (HMAP) • PW is treated through the PW treatment system so that the concentration of PW discharge does not exceed 30 mg/L TPH (daily average)* • TPH concentration is measured routinely by the laboratory when the online analyser is offline or not measuring accurately • Online analyser used to continuously monitor TPH trends • PW Operating Manual tiered response and Produced Water – High Oil Content Procedure is implemented • PW treatment system is operational and maintained in accordance with manufacturers' specifications • Personnel taking samples and analysing samples are competent • The laboratory TPH analysis methodology verified by a NATA certified independent laboratory • PW sampling equipment and laboratory analysis equipment is routinely calibrated • Online analyser is routinely maintained and calibrated • The Platform Waste Water Discharges Monitoring Program is implemented • PW is treated through the PW treatment system so that the concentration of PW discharge does not exceed 100 mg/L TPH (average concentration per 24 hours) during well clean ups

* Note: With the exception of initial well clean-ups.

Appendix Table B-7 Platform – Discharges (Wastewater) – Risk Assessment

Hazard
Water and wastewater system discharges have the potential to change water quality and cause impacts to marine fauna.
Potential Consequence
Cooling Water The potential effects of CW discharge on marine biota can include chlorine toxicity and increased water temperatures.

The CW plume is strongly buoyant and will not be in contact with the seabed (and associated biota) prior to extensive dilution. The residual chlorine in the plume dilutes more than the 67 times required to meet the ANZECC management guidelines before the plume first reaches the sea surface, diluting more than 10,000 times before potentially contacting the seabed in the far field.

The CW plume temperatures are predicted to be close to ambient conditions well within the near-field. Based on the predicted spatial extent of the CW plume, migrating cetaceans, foraging whale sharks and ridgeline habitats (sponges, gorgonians and fish) may be exposed to water quality changes, including chlorine toxicity and increased water temperatures, as assessed below.

Chlorine

The effect of chlorine on some marine organisms is well known, given its use as a biocide. Sublethal effects of chlorine on marine biota include growth reduction in some invertebrate larvae, alteration of membrane permeability, modification of blood composition, and reduction in primary producer productivity.

Capuzzo et al. used a laboratory-based study to determine lethal concentrations of free chlorine on juvenile Atlantic fishes. They found that free chlorine resulted in 100% mortality at levels ranging from 0.55 mg/l to 0.65 mg/l, depending on the species. Abarnou and Miossec reviewed the effects of chlorine on fishes and reported that herring (Clupea harengus) was the most sensitive with a LC50 of 0.06 mg/l for larvae over a 96hr period. The lethal concentrations reported by Capuzzo et al. and Abarnou and Miossec would be more consistent with end of pipe concentrations at the caisson. Such concentrations are not predicted at the ridgeline given it is about 40 m below the discharge point and that the receiving environment is highly dispersive, with CW diluting more than 10,000 times before potentially contacting the seabed in the far field. Further, Abarnou and Miossec suggested that mobile organisms, such as fishes, may detect and avoid areas with low levels of chlorine.

The effect of chlorine on gorgonians and sponges is not well known. Pastorok and Bilyard reported non-lethal responses of hard coral larvae to chlorine exposure for 7 hr. Baldwin reported applying chlorine bleach directly to hard corals would induce infection and bleaching, but this concentration is unrealistically high in relation to discharges associated with CW. In terms of vertical movement, dilution is predicted to be from diluting more than 10,000 times before potentially contacting the seabed, thus no measurable effects from chlorine are predicted for marine biota on the ridgeline even within the mixing zone.

Overall, given the highly dispersive nature of the receiving environment, the rapid dilution of chlorine following discharge and that its reactive compounds do not persist long in the marine environment, chlorine is not expected to result in chronic level impacts to fish and invertebrate populations.

Therefore, given the low concentrations, rapid dilution in the receiving ocean environment, and sporadic interaction of migrating cetaceans and foraging whale sharks in the area, the positive buoyancy of the plume (therefore being substantially diluted prior to reaching the ridgeline habitats and demersal fish), acute or chronic effects are not predicted.

Temperature

Water temperature changes have the potential to cause behavioural changes of marine fauna (including attraction or avoidance), minor stress, and potential mortality for prolonged exposure. However the platform CW is not expected to result in chronic level impacts to fish and invertebrate populations. Water temperatures of the CW plume may be slightly above ambient temperatures, but within 250 m predicted to be within 3^{o}C of ambient. The discharge plume temperature drops rapidly in the receiving environment, and it is expected that most

pelagic fish species, or cetaceans and whale sharks passing through the small plume would not suffer adverse impacts given their likely short duration in the plume. The plume is strongly buoyant, and therefore demersal fish are only predicted to be exposed to close-to ambient temperatures.

Elevated water temperatures are known to have detrimental effects on corals and sponges. Declines in respiration and bleaching in zooxanthellae sea fans have been reported and sponges may suffer mortality associated with elevated temperatures. However, the CW discharge from the platform is not predicted to result in thermal stress to gorgonians and sponges because water temperature above ambient are not anticipated to contact the ridgeline, due to the plume buoyancy and rapid dilution in a deep and open water dispersive environment.

Given the limited spatial extent of the CW plume, rapid dilution in the open ocean environment, the transient nature of the fauna receptors and their likely resilience to slight temperature changes, and the limited duration and frequency of intersecting the discharges, impacts to fauna values are short term and localised.

A worst-case scenario of CW chlorine impacts is conservatively included as short-term and localised consequences to marine fauna, such as individual fish intersecting the plume within metres of the discharge prior to substantial dilution. The potential consequence of the CW discharge resulting in water quality changes effecting marine fauna is ranked as incidental (6).

Drainage

Drainage discharges can include low volumes of fluids discharged during rainfall events, periodic discharge of the fire foam, or minor maintenance discharges. These intermittent discharges can result in water quality changes immediately surrounding the release, with the potential spatial extent of changes to water quality are within a few metres around the platform.

The impacts of deck drainage can include a decline in water quality and may be directly toxic to marine organisms, with impacts varying depending on volumes and type of contaminants. Migrating cetaceans and fish may be present near the release, and individuals may be exposed to diluted concentrations if they pass through the small discharge plume, with short-term superficial effects, and no acute or chronic impacts predicted.

Given the predicted low volumes and flowrates, and discharge height above seabed and neutral buoyancy the water quality changes are not predicted to contact the ridgeline prior to extensive dilution by open ocean currents and tides.

Only small quantities of contaminants could potentially enter the marine environment through deck drainage, quickly dispersing and degrading. Even a discharge with relatively high concentrations of contaminants may have only negligible physical impacts on the typically transient marine fauna that coincide with the discharge and chronic impacts are not predicted. The potential consequence of deck drainage discharges to marine fauna is ranked as incidental (6).

Sewage and Food

The impacts of sewage on the marine environment include impacts on water quality, including eutrophication, increased turbidity, increased pathogens, and decreased biological oxygen demand, with the associated impacts on marine biota. Discharge of macerated food wastes to the ocean can cause some temporary localised nutrient enrichment of the surface waters around the discharge point and have the potential to attract marine fauna that feed on the material.

At a discharge depth of 40 m, the sewage effluent is buoyant, typically diluted by a factor of approximately 2000 by the time it reaches the surface of the water column. It is further diluted before potentially remixing vertically in the column and contacting the seabed, and no detectable impacts to marine sediment quality are forecast for sewage. For food discharges, based on the forecast biodegradability and the depth of discharges in the open-ocean currents, the discharges are expected to be rapidly diluted and dispersed by ambient currents, and no detectable impacts to marine sediment quality are forecast.

In the unlikely event that non-diluted sewage and food do reach the seabed, no measurable effect on gorgonians and sponges living on the ridgeline are predicted. Although suspended solids (e.g. particulate organic material) from the discharge might be captured and consumed by gorgonians and other suspension feeders, this is unlikely to have a measurable effect. Particulate organic material is a natural food source of gorgonians and in some species, detritus is the primary food type. Fabricius and Alderslade also noted that matter is not automatically taken up by gorgonians because the tentacles will test and reject material if unsuitable. Further, it is unlikely nutrients will accumulate leading to eutrophication because discharge will be into a dispersive, open water environment and water depths at the ridgeline are >70 m. Non-diluted sewage and food is not predicted to result in chronic level impacts to populations of fishes and invertebrates.

Given the small volumes of wastewater and food waste, and that the receiving environment is expected to promote rapid dispersion, and any water quality changes are predicted to be highly localised, and the discharges are not expected to adversely affect marine habitats and fauna, with a worst-case consequence being localised behavioural changes for fish. The potential consequence is ranked as incidental (6).

Likelihood and Residual Risk Summary	
Likelihood	With the numerous controls in place, the expected volumes, concentrations, and types of fluids discharged, rapid dispersion, and the predicted limited spatial extent of water quality changes (mainly from buoyant fate of the discharges), the likelihood of water and wastewater discharge streams causing physical changes to marine fauna and/or damage to habitats is ranked as remote (5).
Residual Risk	The residual risk of water and wastewater systems discharge streams causing physical changes to marine fauna and/or damage to habitats is ranked as low (10).

Control Measures

- The seawater system hypochlorite dosing package is tested and calibrated during initial start-up in accordance with commissioning procedures
- The seawater system (continuous dosing) meets the residual chlorine discharge limit
- Maintenance systems is in accordance with manufacturers' specifications
- Operators are trained and competent
- The oily water system is tested and calibrated to meet the 15 mg/L discharge concentration in accordance with commissioning procedures
- Oily water is treated through the oil-water treatment system to meet the 15 mg/L discharge concentration
- Response to alarms (for the Slops Water Secondary Treatment Package) are in accordance with Hazardous and Non Hazardous Drains Systems Operating Manual
- Spill kits and drip trays are available on the platform
- Discharged food waste is macerated through the food waste system to particle sizes ≤25 mm
- Firefighting foam is selected based on the Chevron chemical selection process - ABU Hazardous Material Approval Procedure (HMAP)

Appendix Table B-8 Platform – Spills – Risk Assessment

Hazard
A release of fluids to the ocean from the platform can cause water quality changes with the potential to impact marine fauna.
Potential Consequence
Due to the rapid evaporation and weathering of the hydrocarbons identified, the spatial extent of the release would be at and around the platform, and no shoreline loading is predicted. Given the potential volumes released, and that any surface and entrained hydrocarbons are more likely to be present in discrete patches rather than as a continuous slick, the extent of exposure to marine values is generally limited to patches around the platform. Therefore, only values that intersect with this location, at the time of (or immediately after) the spill would potentially be impacted by the water quality changes; these include migratory cetaceans, whale sharks, and fish communities. The potential effects of exposure to hydrocarbons is summarised here: Toxicity: of the volatile fraction dissolved or entrained in the water column; and of the vapours from fresh condensate at the water's surface. Exposure of hydrocarbons to cetaceans can occur via inhalation of vapours when surfacing, or ingestion of hydrocarbons when feeding. Inhalation of vapours could result in irritation to mucous membranes in the nose, throat, and eyes leading to inflammation and infection. Typically, such impacts are associated with 'fresh' spills, with the risk of impact declining rapidly as the fluid weathers (>24 hours). Sharks and fish have the potential for exposure to hydrocarbons via the entrained and dissolved fractions, with potential effects including damage to the lining of the stomach and intestine, as well as effects to motility, digestion, and absorption. Therefore, if a platform spill coincided with the migration of cetaceans such as Humpback Whales, exposure to a proportion of the migrating population could occur as the whales breach the surface to breathe, with impacts related to direct physical contact with a slick or entrained oil, and ingestion and inhalation of vapours. However, given the rapid evaporation of the condensate at the surface, the potential for impacts would be limited to a relatively short period following the release, and physical impacts would be limited to individuals only, rather than a population-level effect, with only localised and short-term effects. A release may result in low entrained exposure to fish communities of the ancient coastline, ridgeline and continental slope; however, only a small section of the fish habitats may be exposed to the patches of hydrocarbons at low thresholds. Whale sharks may also be in the area at the time of a release, although only in low numbers. Impacts at a population viability level to fish communities and whale sharks are not predicted, given the low exposure thresholds, the mobile nature of the fish, transient nature of whale sharks, and the open-ocean setting, therefore only short-term and localised impacts to fish can occur. The potential for impacts to whales and fish would be limited to a relatively short time following the surface release, and even if the spill coincided with whale migration, impacts would be limited to individuals rather than a population. Impacts at a population viability level to whale sharks and fish communities are not predicted given the low exposure levels, the highly mobile nature of the fish, and the open-ocean setting. The potential consequences to marine fauna from a spill from the platform are ranked as

incidental (6).
Likelihood and Residual Risk Summary

Likelihood	The various prevention and mitigation controls outlined above ensure the likelihood of platform operational spills are minimised, with impacts to marine fauna and habitats ranked as unlikely (4).
Residual Risk	The residual risk of platform operations spills resulting in impacts to marine fauna and habitats is ranked as low (9).

Control Measures

- Platform hydrocarbon processing systems are tested and commissioned (including leak testing) during the installation phase in accordance with commissioning test procedures, prior to hydrocarbon introduction
- Platform isolation valves are tested and commissioned during the installation phase in accordance with commissioning test procedures, prior to hydrocarbon introduction
- High-level alarms of platform storage tanks are operational and routinely tested in accordance with manufacturers' specifications
- Platform radar, navigational lighting, and audio navigational equipment is commissioned and tested during the installation phase, in accordance with commissioning test procedures
- Platform radar, navigational lighting and audio navigational equipment is maintained in accordance with manufacturers' specifications
- Riser protection guards are installed as per platform basis of design
- Inspection and maintenance of platform hydraulic hoses, storage tanks, cranes, and hydrocarbon processing systems are in accordance with manufacturers' specifications
- Spill kits and drip trays are available on the platform
- Personnel are made aware of the chemical storage and deck spill response requirements during the induction process
- Crane operators meet training and competency requirements
- Personnel involved in bunkering meet MSRE training and competency requirements.
- Isolation valves are tested to verify valve integrity and functionality prior to the introduction of hydrocarbons
- Isolation steps of the source control / isolation procedures are implemented if a release is detected from the platform hydrocarbon processing systems
- MSRE requirements are implemented for vessels and crew undertaking bunkering and transfers
- Stakeholder Consultation Plan implemented to ensure other marine users are informed of the presence of the hydrocarbon system
- AHS (or equivalent) informed of infrastructure locations before Start-up and Operations activities commence

Appendix Table B-9 IMR - Seabed disturbance – Risk Assessment

Hazard
IMR activities can disturb the seabed with the potential to impact on benthic habitat.
Potential Consequence
Upstream of the platform (i.e. between the platform and the well locations) IMR activities will include planned maintenance. As benthic habitats upstream of the Platform mostly comprise unvegetated, soft, and unconsolidated sediments with a low but varying degree of benthic

invertebrate habitation, seabed disturbance from IMR activities conducted on infrastructure upstream of the Platform are not considered to pose any credible hazards to benthic habitats and communities.

Planned IMR activities along the Trunkline are limited to various inspections which are not expected to result in seabed disturbance. In the unlikely event that inspection of the Trunkline identifies the need for maintenance or repair, and the location coincides with a habitat types that may support some levels of benthic communities, small (scale of metres) and localized impacts on these habitats can be expected.

Considered here is the potential for unplanned maintenance and repair activities associated with the Trunkline to impact on benthic habitats via either:

- physical disturbance or removal, and/or
- Increasing turbidity.

Physical disturbance or removal

The Trunkline is designed and was installed for maintenance-free operation for at least a 30-year period. If required, maintenance or repair activities undertaken along the Trunkline could intersect areas supporting more complex habitats. IMR stabilisation and excavation are unplanned, infrequent activities, only performed if inspections indicate action must be taken to ensure the integrity of the subsea hydrocarbon system. These activities would be targeted to the specific area above or adjacent to the infrastructure, resulting in only a small area being affected (typically several metres), and would generally be on previously disturbed parts of the seabed (given that infrastructure installation occurred during previous scopes, with some disturbance to the seabed and associated habitats around the infrastructure).

For the purpose of risk assessment, a worst case disturbance along a 100 m section of the Trunkline within Undulating and Complex habitat was considered. This disturbance would represent only 0.2% of the approximately 53 km of those habitat types mapped along the Trunkline. If this activity (e.g. stabilization) were to occur annually in the first few years, and reducing to approximately five yearly thereafter, related disturbance would only equate to <2% of those habitat types. As discussed above such small scale impacts are not expected to affect ecosystem function or connectivity of communities.

Increased turbidity

The potential for maintenance and repair activities to increase turbidity is based on the possibility of sediment resuspension as a result of ROV thruster wash or placement of rock, mattresses or grout bags during stabilisation of the Trunkline.

ROV thrusters can resuspend unconsolidated material, including sediments, and restrict visibility and operation of the ROV in the immediately vicinity. For this reason, ROV operators aim to minimise thruster wash by reducing use of thrusters adjacent to unconsolidated material, and operating at a height above the sea floor that reduces resuspension. Any turbidity associated with ROV activities is likely to be contained close to the activity, and not result in large turbidity plumes as are seen with activities such as dredging.

Impacts of increased turbidity on marine organisms as a result of dredging have been extensively examined by Chevron Australia during construction phases of Gorgon and Wheatstone LNG projects. Specifically capital dredging for both projects and rock placement along Wheatstone Trunkline have been undertaken, and extensive monitoring programs of water quality and benthic receptors have tracked changes in water quality and organism response. Turbidity monitoring programs implemented during construction activities indicate plumes are highly localised and result in only short term exposures. Post-installation

monitoring indicates no changes above natural variation.

Dredging for the Gorgon capital project moved approximately 7 M m^3 of sand and calcrete material, while Wheatstone capital project moved approximately 31 M m^3 of sand and underlying rock. Both projects described alterations to water quality as a result of dredging), however, neither project detected any significant impacts of dredging and altered water quality on coral assemblages (coral cover of whole assemblage), and on non-coral assemblages including filter feeder (sponges cover etc), macroalgae (cover), and seagrass (cover, seed and shoot density. A small effect of dredging on Porites massive coral was detected at sites immediately adjacent to the 7 M m^3 dredge project , with Porites appearing sensitive due to their growth form. Results of these surveys have been published or provided to regulators (. The nearest coral reef receptors are >1 km to the Trunkline, and in state waters. Given the monitoring results from previous large-scale construction dredging activities, any changes to the water column turbidity from IMR activities are expected to be minor (small increases to ambient turbidity), localised (to within meters of the site), and highly unlikely to affect marine benthic communities.

A worst-case consequence may be localized and/or short-term effects to complex benthic habitats, and is therefore ranked as incidental (6).

Likelihood and Residual Risk Summary	
Likelihood	There are no maintenance or repair interventions planned for the Trunkline during operations. Therefore with the controls in place, the potential likelihood of seabed disturbance from IMR activities impacting complex habitat is unlikely (4).
Residual Risk	The residual risk for IMR seabed disturbance resulting in impacts to complex habitats is low (9).

Control Measures

- IMR activities undertaken only when necessary (in accordance with pre-determined IMM Acceptance Criteria)
- ROV inspection footage used to determine presence of environmental receptors in proximity to maintenance or repair activity
- Pre- and Post-maintenance or repair field survey undertaken to allow quantification of seabed disturbance
- Campaign-specific pre-mobilisation Hazard Identification and Risk Assessment (HIRA) undertaken prior to maintenance or repair activity commencing
- IMR activity specific work procedures developed and implemented

Appendix Table B-10 IMR – Discharges – Risk Assessment

Hazard

IMR discharges can cause water quality changes with the potential to impact marine fauna.

Potential Consequence

The release of minor quantities of MEG, production fluids, acid-water mix, and control fluids during IMR activities may result in a localised and temporary reduction in water quality around the discharge.

Discharge of small volumes of these fluids are predicted to disperse and dilute rapidly while floating rapidly towards the surface. The spatial extent is likely to be limited to the water

column, and only in a range of metres from the discharge point.

IMR discharges along the trunkline, where no maintenance activities are planned, are expected to be limited to typical minor hydraulic releases from ROVs during routine inspections and potentially minor discharges of acid-water mix, if required to remove calcareous marine growth from the single SSIV located approximately 100m downstream of the platform prior to pigging. A typical acid–water mix discharge may comprise 20 L, however, a 200 L discharge (representing a more conservative estimate), would be expected to quickly dilute and neutralise as it reacts with the calcareous material being removed from the subsea infrastructure. Given this, and with pigging expected to occur within two years of start-up and five yearly thereafter, any potential risks and impacts are expected to be highly localised and short term.

Maintenance activities are planned only for subsea infrastructure upstream of the platform. Depending on the location along the hydrocarbon system that the IMR activity occurs, environmental values that may be present in the vicinity of water quality changes include fish communities (ancient coastline and continental slope) and ridgeline habitats.

The potential effects of production fluids exposure can include acute toxic effects to marine fauna such as fish that intersect the discharge. However, given the short-term duration and low frequency of the discharges, the potential effects are limited to a matter of minutes after the release, to a small area in the water column, and therefore only to individuals that may intersect the discharge.

Adult fish exposed to low hydrocarbon thresholds are likely to metabolise the hydrocarbons and excrete the derivatives, with studies showing that fish can metabolise petroleum hydrocarbons and that accumulated hydrocarbons are released from tissues when the fish is returned to hydrocarbon-free sea water. Several fish communities in these areas are demersal (continental slope and ridgeline) and therefore more prevalent towards the seabed where concentrations of entrained hydrocarbons will be lower, and any impacts are expected to be highly localised. Subsurface hydrocarbons could potentially result in acute exposure to marine biota such as juvenile fish, larvae, and planktonic organisms, although impacts are not expected cause population-level impacts. No adverse effects are expected at a community level.

A small discharge on the ridgeline, would generally float rapidly towards the surface rather than spread horizontally across the ridgeline. In the event seabed biota (such as gorgonians) of the ridgeline were contacted by condensate, the affected colonies might exhibit sub-lethal signs of stress, such as sclerite sloughing. Hydrocarbons, in the form of PAHs, are also known to inhibit larvae settlement of at least one species of sponge. It is unlikely a short-term 'pulse' release of condensate (or other chemicals) would result in chronic impacts to gorgonians, sponges and other organisms on the ridgeline.

A worst-case consequence may be adverse effects to a small number of fish that may intersect the discharge; or localised effects to biota on the ridgeline, with no adverse effects to fauna communities. Therefore, the potential consequence to marine fauna is ranked as incidental (6).

Likelihood and Residual Risk Summary	
Likelihood	IMR discharges are very low volume, rare, non-continuous, and expected to disperse rapidly with only a rare chance of exposure to marine fauna. With the controls in place, the potential likelihood of IMR fluid discharges resulting in impacts to marine fauna is rare (6).

Residual Risk	The residual risk for IMR discharges resulting in impacts to marine fauna is low (10).

Control Measures

- Subsea fluids planned for discharge are subject to the Chevron chemical selection process - ABU Hazardous Material Approval Procedure (HMAP)
- ROV inspection footage used to determine presence of environmental receptors in proximity to maintenance or repair activity
- Isolation steps are included in the equipment change-out procedures and implemented, prior to works involving a discharge
- Campaign-specific pre-mobilisation Hazard Identification and Risk Assessment (HIRA) undertaken prior to maintenance or repair activity commencing
- IMR activity specific work procedures developed and implemented

Appendix Table B-11 IMR – Spills – Risk Assessment

Hazard

IMR spills can change water or sediment quality with the potential to impact habitats and fauna.

Potential Consequence

Marine

Given the potential volumes (<1 m^3), the extent of water quality changes are only likely to be a few metres in the water column around the release, prior to dispersion and dilution. The potential spills from an ROV performing IMR activities would have negligible changes to water quality, with no identified potential consequences to environmental values.

Depending on the location of the IMR activities along the hydrocarbon system, the environmental values in the vicinity can include fish communities. Interaction of fish immediately after the fluid release has the worst-case potential of acute effects on individuals.

Because a release would disperse and dilute rapidly, the potential consequence is limited to a short time after the release. The potential consequences to marine fauna from of a change of water quality from an ROV release could be localised and short-term impacts to individual fish. No adverse effects to fish communities are predicted. Therefore, the potential consequence is ranked as incidental (6).

Likelihood and Residual Risk Summary

Likelihood	IMR activities are expected to be infrequent, with small volumes of hydraulic fluids or hydrocarbon fuel spills potentially being released. With the controls in place, the likelihood of spills impacting habitats and fauna is ranked as unlikely (4).
Residual Risk	The residual risk of IMR activities resulting in spills impacting habitats and fauna is low (9).

Control Measures

- ROVs are maintained in accordance with manufacturers' specifications

Appendix Table B-12 Field Support – Physical Presence (Marine Users) – Risk Assessment

Hazard
The presence and movement of vessels has the potential to cause disturbance to other marine users, including commercial fishing operators and commercial shipping vessels, by creating a temporary obstacle requiring avoidance.
Potential Consequence
The spatial extent of the potential hazard from platform vessels, is limited to the area immediately surrounding the platform, while IMR vessels may travel along the entire hydrocarbon system, albeit infrequently (approximately every one to three years, and likely to decrease depending on RBI results during early years). The platform is located outside major shipping lanes and therefore the marine traffic density is low. Several commercial fishing licenses transect the operational area, although fishing activity is low. The effect of the physical presence of the vessels is that other marine users are required to avoid the vessels, which is routine practice in the marine industry, with the potential to cause only an incidental nuisance and disruption to other marine users. Because the operational area around the platform is small, IMR vessel usage is infrequent, the level of commercial fishing is low, shipping traffic is low, and the number of vessels used for the start-up and operations activities is minimal, only short-term and localised disruptions to other marine users can occur. The potential impact to commercial shipping and fishing is ranked as incidental (6).
Likelihood and Residual Risk Summary

Likelihood	The number of vessels used is low, and the shipping and fishing traffic in the area is reported to be low. With the controls in place, any interactions are not reasonably expected to occur. The likelihood of the physical presence and movement of vessels impacting other marine users is ranked as remote (5).
Residual Risk	The residual risk for physical presence of vessels impacting other marine users is ranked as low (10).

Control Measures
• Vessels will meet the crew competency, navigation equipment, and radar requirements of the MSRE process • Stakeholder Consultation Plan implemented to ensure other marine users are informed of vessel presence

Appendix Table B-13 Field Support – Physical Presence (Fauna) – Risk Assessment

Hazard
Vessel movements within the operational area have the potential to result in the injury or mortality of fauna through direct contact.
Potential Consequence
Slow-moving species, including cetaceans, are susceptible to vessel strikes within the operational area, as they have restricted capacity to rapidly alter course or direction.

Numerous large cetaceans (such as Humpback Whales and Pygmy Blue Whales) migrate through the Operational Area and are therefore at risk of contact with vessels, with the potential for injury or mortality to individuals.

Petroleum activities undertaken using vessels at the platform typically occur when the vessel is stationary such as transferring supplies to and from the platform. While IMR vessel usage is infrequent (typically every 1-3 years), short term (for several weeks at a time), and typically occurs when the vessel is either stationary or moving at very slow speeds (<6 knots).

Data collected by the U.S. National Oceanic and Atmospheric Administration on vessel collisions with cetaceans indicated that the mean vessel speed, which resulted in injury or mortality to a whale, was 18.6 knots and rarely less than 10 knots. Therefore, the potential for a vessel moving at the slow speeds expected while undertaking petroleum activities, to strike and injure a whale is expected to be highly unusual. Therefore, the level of vessel movements in the operational area is considered relatively low (i.e. a slow moving or stationary vessel at the platform, or a slow-moving vessel infrequently conducting IMR along the infrastructure route). Although vessels will intersect migratory routes, the potential worst-case impacts is limited to highly infrequent and isolated incidents of injury or mortality to individual fauna, with no potential impacts at a population level. The potential impacts to marine fauna from vessel movements is determined to be localised and short term, and is therefore ranked as incidental (6).

Likelihood and Residual Risk Summary	
Likelihood	Given the limited presence and slow movement of vessels within the operational area, the risk of vessels impacting marine fauna through vessel strikes is low. Petroleum activities for vessels at the platform typically occur when the vessel is stationary, while IMR vessel usage is infrequent, short term, and stationary or at very slow speeds. Over several years of offshore installation activities undertaken by Chevron on the NWS, and despite frequent vessel movements, no upstream installation incidents relating to interaction with marine fauna from vessel strike had been confirmed at the time of submission of this EP. The number of vessels is considered low, and although cetaceans may transit the operational area, the likelihood of the physical presence and movement of vessels impacting marine fauna with the described controls in place is considered remote (5).
Residual Risk	The residual risk of the physical presence of vessels impacting marine fauna is considered low (10).

Control Measures

- A caution zone shall be established around observed cetaceans, in accordance with EPBC Regulations 2000 Division 8.1.
- Submit a CSMFIMP to (DotE) and Office of the WA Environmental Protection Authority (OEPA), unless otherwise approved by the Chief Executive Officer
- IMR undertaken during peak whale migration period (July – October) shall have a minimum of one Marine Fauna Observer (MFO) on duty during daylight hours

Appendix Table B-14 Field Support – Introduced Marine Pests – Risk Assessment

Hazard
An introduction of IMP from vessels has the potential to cause impacts to marine habitats and fauna.
Potential Consequence
Potential impacts associated with the introduction of marine pests include competition with native fauna and flora, introduction of diseases and pathogens, changes in predation pressures, reduction of native biodiversity, and alteration of natural habitats. Biofouling refers to the attachment of marine organisms to any part of a vessel or fluid-filled spaces/niches, or any equipment attached to or on board the vessel. Australia has mandatory ballast water management requirements to reduce the risk of introducing harmful aquatic organisms into Australia's marine environment through ballast water from international vessels. All saltwater ports and coastal waters outside Australia's territorial seas are deemed as a 'high risk' of introducing exotic marine pests into Australia as a result of the exchange of ballast water. The ridgeline and other benthic habitats and communities are potentially at risk from IMP. The ecological consequence of IMP on marine communities, including gorgonian and sponge communities, can vary greatly. Species such as the green algae Caulerpa taxifolia (a native species of tropical Australia) have the ability to displace native species over a wide area in shallow marine environments, whereas other IMP species may have negligible effect because they fill a niche not previously occupied by a native species or do not spread beyond the location of introduction. However, predicting the ecological consequences of IMP in areas of deep water and open tropical marine environments, which characterise the environment of the platform, is not straight forward. Kahng and Grigg reported a non-native species of azooxanthellate gorgonian (Carijoa riisei) over-growing and killing black coral (genus Antipathes) in waters ranging from 30 to 120 m off Hawaii. Like many of the other introduced marine species in Hawaii, this species may have been introduced via the aquaculture or aquarium industries. There is some evidence that diverse tropical marine communities, such as found in north-western Australia, may naturally be more resistant to invasion compared with temperate communities. If IMPs were introduced in the operational area around the platform, trunkline route or drill centres, and/or transferred to shallow water habitats around the trunkline, it could result in long-term and widespread effects on marine habitats and associated communities, and is ranked as moderate (4).
Likelihood and Residual Risk Summary

Likelihood	It has been estimated that 4000 species of invertebrate, algae, and other marine creatures are transported around the world every day in ballast water. An assessment of the relative contribution of vectors to the introduction and translocation of IMP species in Australia reports that around 250 non-indigenous marine species have been identified in Australia, of which more than 75% have been introduced through biofouling. At least 60 species are known to be established in WA with DoF listing 84 species as introduced pests in WA (Oct 2014). The probability of an IMP becoming established is influenced by the last port of call of the vessel and the duration of stay in the recipient port as well as the presence of appropriate environmental conditions for that species (e.g. water depth and habitat at the platform. Effective management of ballast water and hull biofouling is communicated to the marine industry through the Commonwealth Department of Agriculture and the controls described above will reduce the

	likelihood of the introduction of IMPs. Therefore, the likelihood of vessel ballast water or hull biofouling resulting in IMP establishment causing impacts to marine habitats and fauna is ranked as remote (5).
Residual Risk	The residual risk of the vessel ballast water and hull conditions with IMPs impacting marine habitats and fauna is ranked as low (8).

Control Measures

- Marine vessels greater that 400 GT with an anti-foul coating are to maintain an up-to-date international antifouling coating certification in accordance with Protection of the Sea (Harmful Anti-fouling Systems) Act 2006 and/or the International Convention on the Control of Harmful Anti-fouling Systems on Ships.
- Vessels and aircraft entering into the Australian territorial sea from outside Australian territory will arrive at a first point of entry and complete pre-arrival reporting (unless Excepted under Biosecurity Determination 2016), in accordance with the Biosecurity Act 2015
- In accordance with Australian Ballast Water Requirements, vessels coming from overseas will not discharge high-risk ballast water inside Australia's territorial sea (the area within 12 nautical miles of the Australian coastal baseline).
- In accordance with the IMPRAP, before entering the operational area in WA State Waters, non-trading vessels undergo a risk assessment to determine the risk of IMP translocation via biofouling consistent with Condition 12 (MS 873).

Appendix Table B-15 Field Support – Discharges – Risk Assessment

Hazard

Vessel discharges to the marine environment can cause changes to water quality with the potential for impacts to marine fauna.

Potential Consequence

Modelling of domestic waste (10 m^3/day) indicates that discharges were rapidly diluted in the upper (less than 10 m) water layer with no elevations in water quality monitoring parameters (e.g. total nitrogen, total phosphorous, and selected metals) above background levels at monitoring stations 50 m away. The discharge of oily bilge water could also create a localised change to water quality around the discharge. Given the location of vessel activities, the spatial extent of the discharges are localised (centred around the platform [where the platform vessels will operate]) and infrequent along the hydrocarbon infrastructure for IMR vessels, and will depend on the IMR activities being undertaken. Based on low predicted volumes of CW and brine, and rapid dilution and dispersion, the discharge is not a credible hazard to receptors and is not described further.

Within the receiving environment, environmental values such as fish communities and migrating cetaceans may intersect the discharges.

Discharge of sewage and putrescible wastes may affect water quality through nutrient enrichment; however, no physical impacts are predicted from the water quality changes, with worst-case consequences being localised and temporary.

The discharge of bilge water could introduce potentially hazardous substances (mixture of water, oily fluids, lubricants, cleaning fluids that accumulate in the lowest part of the vessel) into the marine environment. Given the highly mobile nature of the fauna receptors, the potential exposure is likely to be limited to individuals shortly after the discharges. To account

for the uncertainty of the exact volume and nature of the bilge water constituents, a worst-case consequence was adverse physical impacts from the toxicity of the substances, with individual fauna receptors potentially affected, with no adverse effects on communities or populations

Considering the nature of the products discharged, the location of the discharges in an open-ocean setting with predicted rapid dilution and dispersion, with only transient fauna potentially intersecting the discharges, only short-term and localised impacts to marine fauna can occur. Therefore, the potential consequence of vessel wastewater discharges on marine fauna is ranked as incidental (6).

Likelihood and Residual Risk Summary	
Likelihood	Vessel discharges associated with field support activities are routine and are managed via adherence to MARPOL 73/78 requirements. With the controls in place and the potential volumes, concentrations, and types of discharges, the likelihood of vessel discharges causing water quality changes resulting in damage to habitats and fauna is rare (6).
Residual Risk	The residual risk of vessels discharges causing water quality changes resulting in damage to habitats and fauna is low (10).

Control Measures

- Where discharge via these systems will occur, vessel inspection confirms oil-water separator, sewage treatment, and food waste treatment systems are present in accordance with MSRE standards, where required
- Oily bilge water will be retained on board for controlled disposal at a port reception facility, or (except for the Port of Ashburton) discharged to marine environment only when the concentration is <15 ppm in accordance with MARPOL 73/78, Annex I
- Offshore discharge of sewage from vessels will be in accordance with these MARPOL Annex IV requirement
- Consistent with the requirements of Annex V of MARPOL 73/78, food waste will only be discharged:
    - macerated to no greater than 25 mm and when the marine vessel is at least 3 nm from the nearest land or within 500 m of the Platform; or
    - unmacerated when the marine vessel is at least 12 nm from the nearest land.

Appendix Table B-16 Field Support – Waste – Risk Assessment

Hazard

Inappropriate handling and storage of waste may lead to a release to the environment, with the potential to impact fauna by toxicity or ingestion/entanglement.

Potential Consequence

Impacts from an accidental release of hazardous wastes from the platform or from vessels would be limited to the immediate area surrounding the release. Hazardous wastes include oil-/chemical-contaminated products, produced sand, batteries, light bulbs, certain spent chemicals, certain laboratory and medical wastes, and other similar products (including liquid waste from the closed drains system). Hazardous wastes released to the ocean can cause localised decline in water quality, with either direct or indirect effects on marine organisms including physiological damage through ingestion or absorption through the skin. Non-hazardous wastes released to the marine environment, such as plastics, have the potential to

cause injury or death to isolated marine fauna through ingestion or contact.

The receiving environment includes fauna values such as fish communities, migrating cetaceans, whale sharks, and turtles. Fish and turtles have been known to mistake plastic for jellyfish, and rope can entangle fauna such as birds and marine mammals.

The potential impact of inappropriate handling, storage, treatment, or disposal of waste resulting in a release to the environment may cause localised impacts to marine fauna. Therefore, the potential consequence from the release of waste is ranked as incidental (6).

Likelihood and Residual Risk Summary	
Likelihood	With the control measures in place to manage wastes generated during the Project, the likelihood of wastes causing physical impacts to fauna is ranked as remote (5).
Residual Risk	The residual risk of wastes causing physical impacts to fauna is ranked as low (10).

Control Measures

- Waste Management Plan is developed and implemented
- Platform and vessel personnel are made aware of the waste management storage and handling requirements through the induction process
- Hazardous wastes are to be stored in designated waste storage areas with secondary containment for liquid waste
- Platform waste storage areas are inspected and maintained to ensure the mechanical and structural integrity of these systems is maintained
- Spill kits available on vessels and the platform
- Crane operators meet the training and competency requirements

Appendix Table B-17 Field Support – Vessel Spills – Risk Assessment

Hazard

A spill from vessels can cause a change in water quality with the potential to impact marine fauna.

Potential Consequence

A loss of containment of bulk storage from vessels resulting in the release of <1 m^3 (diesel or chemicals) to the marine environment was identified as the largest representative discharge for this grouping of spill and leak scenarios.

Given the low potential volumes, a loss of containment would likely include a small spatial extent on the water surface and some entrainment in the water column.

Identified environmental values that may occur in the operational area and therefore near a release include migratory whales, whale sharks, and fish communities.

Given the small volumes, and that only individual fauna passing directly though the released substance may be temporarily affected, the potential consequence is localised. Therefore, the potential consequence of field support vessel releases impacting marine fauna is ranked as incidental (6).

Likelihood and Residual Risk Summary	
Likelihood	The small volumes of non-persistent hydrocarbon spills identified, and the risks of operations are well understood. Given the control measures in place the likelihood of the spills resulting in impacts to marine fauna is ranked as remote (5).
Residual Risk	The residual risk vessel spills resulting in impacts to marine fauna is ranked as low (10).

Control Measures

- Vessels have SOPEP as per MSRE process
- Vessels will have spill kits available on board in accordance with SOPEP
- Personnel are made aware of the chemical storage and deck spill response requirements during the induction process

Appendix Table B-18 Emergency Event – Hydrocarbon System Loss of Containment – Risk Assessment

Hazard

Shoreline Exposure

A hydrocarbon system release can result in hydrocarbons depositing on the shore, with the potential for causing impacts to habitats and fauna.

Hydrocarbon volumes ashore of 100–1000 g/m^2 (moderate exposure) have the potential to result in a coating of shoreline habitats such as mudflats and coral habitats, while volumes ashore >1000 g/m^2 (high exposure) during the mangrove growing season would be required to impact marsh or mangrove plants significantly Volumes ashore >100 g/m^2 (moderate exposure) are potentially an acute threshold for marine fauna such as benthic epifauna invertebrates living in intertidal habitats.

Potential Consequence

Shoreline Exposure

As per the modelling, potential spatial extent of a hydrocarbon system release is widespread, and shoreline contact was predicted at several IAAs (Ningaloo, Exmouth, Pilbara, Barrow-Montebello, and Shark Bay). For the LOWC event, the Barrow-Montebello IAA has the highest volumes and potential extent of hydrocarbons ashore. For the Trunkline release, the potential maximum volumes ashore are typically higher than the LOWC event (with the exception of Barrow-Montebello exposure), with the Pilbara IAA having the highest volumes and extent ashore.

Particular values in these IAAs that may be affected by shoreline exposure from a hydrocarbon release include marine habitats (coral, mangroves, and mudflats), marine fauna (turtles and birds), and socioeconomic (tourism and recreation).

Marine fauna that use shorelines for nesting and breeding, along with intertidal vegetation (such as mangrove communities), have a higher risk of being impacted by shoreline hydrocarbon accumulation. Light hydrocarbons have a tendency to penetrate into sediments such as mudflats, while vegetation such as mangroves can trap oil in sheltered sections. Impacts to mudflats and mangroves can be long term if trapped oil does not degrade rapidly or if it becomes buried in sediments. Light hydrocarbons have a tendency to penetrate into sediments such as mudflats, while vegetation such as mangroves can trap oil in sheltered

sections.

The effects and consequences of shoreline hydrocarbon exposure on the various values are provided in the assessments below.

Coral Reefs

Modelling predicts that intertidal coral reefs in the Ningaloo and Barrow-Montebello IAAs have the potential to be exposed to shoreline hydrocarbons at moderate and high loading thresholds. The coral reef marine values in these IAAs are regionally significant. The most significant reefs around Barrow Island are Biggada Reef (west coast), Dugong Reef (southeast coast), and Batman Reef (southeast coast), with fringing reefs to the west and south-west of the Montebello Islands . The Ningaloo coast has extensive fringing coral reefs. Direct contact of hydrocarbons to intertidal coral can cause smothering, resulting in a decline in metabolic rate and may cause varying degrees of tissue decomposition and death. A range of impacts may also result from toxicity, including partial mortality of colonies, reduced growth rates, bleaching, and reduced photosynthesis.

Therefore, the potential consequence can be direct smothering and toxic effects to sections of coral reef in the above-mentioned IAAs. Given the potential volumes ashore, and extent of moderate and high shoreline loading thresholds potentially contacting the regionally significant coral reefs of the Barrow-Montebello IAA from a LOWC event, widespread and long-term effects can occur. The potential consequence to coral from shoreline exposure caused by a hydrocarbon release is ranked as moderate (4).

Turtles

The Ningaloo, Exmouth, Pilbara, Barrow-Montebello, Gascoyne and Shark Bay IAAs include important nesting habitats for turtles , and modelling predicts the spatial extent of shoreline exposure to include these IAAs at moderate and high shoreline loading thresholds.Turtles are potentially vulnerable to the effects of oil at all life stages including eggs, hatchlings, juveniles, and adults. Turtles can be exposed to hydrocarbons externally through contact, or internally (by ingesting oil, consuming prey containing oil, or inhaling volatile compounds). Shoreline hydrocarbons can impact turtles at nesting beaches when they come ashore, with exposure to skin and cavities such as eyes, nostrils, and mouth. Eggs may also be exposed during incubation potentially resulting in increased egg mortality and detrimental effects on hatchlings. Hatchlings may be particularly vulnerable to toxicity and smothering as they emerge from the nests and make their way over the intertidal area to the water.

Turtle nesting habitats have the potential to be exposed to shoreline hydrocarbons shortly after a trunkline release before sufficient weathering of volatiles has occurred. While the LOWC release takes longer to reach shorelines, the potential volumes and extent ashore at Barrow-Montebello are greater. Therefore impacts may occur to nesting adult turtles and hatchlings as they traverse the intertidal area, resulting in potential smothering and acute impacts to a number of hatchlings over a nesting season. Toxicity impacts may also occur to hatchlings and adults, particularly in the hours following the release.

Given the extent of the shoreline exposure potentially intersecting turtle habitats, acute effects may occur particularly to hatchlings; however, the risk of impacts to turtle population viability are not expected. Therefore consequences to turtles from shoreline loading at the affected IAAs have the potential to be widespread and short term, and are ranked as minor (5).

Birds

Ningaloo, Exmouth and Barrow-Montebello IAAs include important bird nesting sites and rookeries, and modelling predicts the spatial extent of shoreline exposure to include these

IAAs, which may be exposed to moderate and high exposure to shoreline hydrocarbons.

Birds coated in hydrocarbons can suffer from damage to external tissues including skin and eyes, as well as internal tissue irritation in their lungs and stomachs. Toxic effects may also result where the product is ingested as the bird attempts to preen its feathers.

Shorebirds foraging and feeding in intertidal zones, particularly in mudflats and intertidal areas of the IAAs are at potential risk of exposure to shoreline hydrocarbons, potentially causing acute affects to numerous birds. Although numerous birds may be exposed, impacts to bird population viability are not predicted, and the impacts to birds in the affected IAAs from shoreline loading have the potential to be widespread but short term. Therefore, the potential consequence is ranked as minor (5).

Tourism and Recreation

Modelling predicts the spatial extent of shoreline exposure to include the Ningaloo, Shark Bay and Pilbara IAAs, which include tourism and recreation values.

The Ningaloo IAA includes the Ningaloo Marine Park, which is a key tourist destination of local, state, national, and international significance and a major component of the local economy, while the Pilbara and Shark Bay IAA also include key coastal tourism areas. Shoreline loading can impact the visual amenity of coastal areas and limit beach access for users, impacting tourism and recreation activities.

Small areas of the values in these IAAs may be exposed to shoreline loading, which could potentially result in short-term and localised disturbance to marine tourism and recreation activities; ranked as incidental (6).

Mangroves and Mudflats

Regionally significant mangrove communities in the Exmouth, Pilbara and Barrow-Montebello IAAs, and intertidal mudflats of the Exmouth IAA, can be contacted by shoreline hydrocarbons.

Shoreline hydrocarbons can have smothering and toxic effects on mangroves and intertidal mudflats. Acute and chronic impacts to the health of mangrove communities can occur via smothering of the pneumatophores and exposure to the toxic volatile fraction of the hydrocarbons. Intertidal mudflats can trap oil due to the sheltered conditions and large surface area for oil absorption, potentially causing toxicity impacts to infauna. Intertidal mudflats are very sensitive to oil pollution, as the oil enters lower layers of the mudflats where a lack of oxygen prevents decomposition of the oil.

The mangrove communities and intertidal mudflats can be contacted by shoreline hydrocarbons within hours of a trunkline release, before sufficient weathering of the volatile components has occurred.

There is potential for acute and chronic toxic impacts to mangrove communities and infauna of the mudflats, as well as smothering impacts of mangroves from weathered residues.

Given the value and sensitivity of mangrove and mudflat communities in these IAAs, and the potential for shoreline contact before sufficient weathering occurs from a trunkline release, and the potential volumes and extent of exposure from a LOWC event, there is the potential for long-term and widespread consequences, which are ranked as moderate (4).

The potential consequence to coral reefs and mangrove and mudflats are identified as the worst-case consequence to receptors for the shoreline condensate exposure hazard.

Hazard

Surface Exposure
Literature reviews regarding the effects of oil on aquatic birds and marine mammals indicates the concentration of surface oil at which wildlife can be affected ranged between 10 g/m^2 and 25 g/m^2. Therefore 10 g/m^2 was selected to define the moderate exposure zone and 25 g/m^2 the high exposure zone. A hydrocarbon layer 25 g/m^2 thick (high exposure) could be harmful for birds that contact a surface hydrocarbon slick. A hydrocarbon concentration greater than 10 g/m^2 (moderate exposure) could impart a lethal dose to intersecting wildlife (including marine mammals).
Potential Consequence
Surface Exposure
As per the modelling spatial extent of the hydrocarbon release is widespread, and surface contact was predicted at several IAAs (Ningaloo, Pilbara, Barrow-Montebello and Offshore) following a release. The particular values and sensitivities of the IAAs potentially at risk from surface exposure include marine fauna (whale migration and resting, Dugongs aggregating, turtles foraging, birds foraging and diving), and socioeconomic values (tourism and recreation). Whales Whales passing through surface hydrocarbon slicks can be physically impacted through contact, ingestion, and inhalation. Baleen whales skim the surface to feed and may ingest hydrocarbons, potentially fouling baleen fibres. Direct contact may result in skin and eye irritation, burns to mucous membranes of eyes and mouth, and increased susceptibility to infection. Whales are vulnerable through the inhalation of evaporated volatiles if they surface in the slick. For the short period that they persist, vapours from the spill are a significant risk to cetacean health, with the potential to damage mucous membranes of the airways and the eyes, which will reduce the health and potential survivability of an animal. Inhaled volatile hydrocarbons are transferred rapidly to the bloodstream and may also accumulate in tissues. Whales migrate through the Ningaloo, Pilbara, Barrow-Montebello, and Offshore IAAs, and if the spill coincided with the migration, exposure to moderate and high thresholds to a proportion of the migrating population may occur. Typically, impacts would be associated with fresh spills or leaks with the risk of impact declining rapidly as the fluid weathers (>24 hours). Therefore, the potential for environmental impacts would be limited to a relatively short period following the release, and only to a proportion of the migrating population that surface in the affected areas, resulting in short-term and localised consequences, with no long-term population viability effects. Therefore, the potential impacts of surface exposure to whales from a hydrocarbon release is ranked as incidental (6). Dugongs Along with other marine mammals, Dugongs breach the surface to breathe and may be impacted during surfacing. Significant aggregations of Dugongs are known to frequently occur in the shallow areas of the Pilbara IAA, which will be exposed to high surface thresholds. Inhalation soon after the release (0 to 48 hours) may affect numerous individuals, as the fluids may not have had sufficient time to weather. However, given the rapid evaporation at the surface, the potential impacts are predicted to be short term, with no impacts at a population

level. Therefore, the potential impacts of surface exposure to Dugongs from a hydrocarbon release is ranked as incidental (6).

Turtles

Turtles can be exposed to hydrocarbons as they surface, resulting in direct contact with the skin, eyes, and other membranes, as well as the inhalation of vapours or ingestion. Several aspects of turtle biology and behaviour place them at particular risk, including a lack of avoidance behaviour, indiscriminate feeding in convergence zones, and large pre-dive inhalations. Oil effects on turtles can include impacts to the skin, blood, digestive and immune systems, and increased mortality due to oiling.

Turtles may be present in the nesting and foraging areas of Ningaloo, Pilbara, and Barrow-Montebello IAAs and exposed to moderate and high surface thresholds in these areas. Surfacing turtles at all life stages may be exposed; however, the surface slick is likely to be in patches, rather than a continuous slick and subjected to weathering once the lighter, more toxic hydrocarbon fractions have been volatilised. Therefore, the potential for environmental impacts would be limited to a relatively short period following the release, and only to a proportion of the population in the affected areas; impacts are not predicted to affect turtle populations in any of the IAAs, and the potential impacts are widespread and short term; ranked as minor (5).

Tourism and Recreation

The Ningaloo and Pilbara IAAs have tourism and recreation values that can be affected by surface hydrocarbon exposure. A visible sheen may be observed in these IAAs shortly after the release before sufficient weathering has occurred, and waxy residue may persist in nearshore areas. This has the potential to reduce the visual amenity of the area for tourism, and discourage recreational activities, with short-term and localised consequences, which are ranked as incidental (6).

Birds

Birds that rest at the water's surface or surface-plunging birds are particularly vulnerable to surface hydrocarbons. Damage to external tissues including skin and eyes can occur, along with internal tissue irritation in lungs and stomachs. Acute and chronic toxic effects may result where the product is ingested as the bird attempts to preen its feathers.

Bird nesting and foraging occurs in the Ningaloo, Pilbara, and Barrow-Montebello IAAs where surface exposure can occur at moderate and high thresholds. Although the offshore area can also have high exposure zones, only limited numbers of individual birds can potentially be affected, rather than congregations of birds. Given the high sensitivity of birds to surface hydrocarbon phases, a hydrocarbon release has the potential to cause widespread, short-term impacts, which are ranked as minor (5). The consequences to birds from surface exposure is the worst-case consequence to receptors for the surface exposure scenario.

Hazard
Entrained/Dissolved Exposure
Marine fauna with gills are expected to have higher exposure to dissolved-phase contaminants. Potential effects from exposure to dissolved aromatic hydrocarbons include damage to the lining of the stomach and intestine, as well as effects to motility and digestion. French-McCay indicates that an average 96-hour LC50 of 50 ppb and 400 ppb could serve as an acute lethal threshold to 5% and 50% of biota, hence, these thresholds were used to represent the moderate and high exposure zones, respectively. Marine habitats such as coral reefs, seagrass, and macroalgae are not acutely impacted at entrained exposure levels of 960–

9600 ppb.hrs (low). Acute impacts to average sensitive species are expected at 9600–48 000 ppb.hrs (moderate) based on conservative predictions. Acute impacts to most species are expected at entrained exposure thresholds greater than 48 000 ppb.hrs (high).

To indicate potential zones of acute exposure, which is more meaningful over shorter durations, a threshold of 100 ppb (the equivalent of moderate exposure) was set, along with a second threshold of 500 ppb (high exposure), to cover the range of thresholds outlined in ANZECC WQ guidelines. The dissolved exposure threshold of 576–4800 ppb.hrs (low) is based on very sensitive species. The dissolved exposure threshold 4800–38 400 ppb.hrs is based on acute exposure to 5% of average sensitive species, which is the moderate threshold and used in this consequence assessment.

Potential Consequence
Entrained/Dissolved Exposure

Modelling predicts the spatial extent of moderate-high exposure from a LOWC to include the Gascoyne, Ningaloo, Exmouth, Pilbara, Argo-Rowley, Barrow-Montebello, Offshore IAAs.

Particular values that may intersect the entrained/dissolved exposure include fauna (Dugongs, whales, turtles, white sharks, whale sharks and fish communities), socioeconomic (commercial fisheries and aquaculture), habitats (coral reefs, seagrass and macroalgae).

Dugongs

The spatial extent of water column hydrocarbons includes the Pilbara IAA, which has seagrass and macroalgae meadows that provide a feeding habitat for Dugongs, which are known to aggregate in the shallow waters of this IAA. Damage to patches of seagrass meadows from the toxic effects of hydrocarbons, can have impacts on Dugong feeding (temporary displacement from affected seagrass), although impacts are not expected to have population-level consequences.

Entrained exposure may have direct physical effects on Dugongs, particularly in the immediate aftermath of a hydrocarbon release, in which hydrocarbons can reach the Pilbara waters relatively quickly prior to weathering. A number of Dugongs could be impacted through ingestion and skin contact if they come into direct contact with areas of moderate or high exposure, with consequences ranked as localised, short-term impacts; ranked as incidental (6).

Whales

Migrating whales may also be exposed to hydrocarbons in the water column in the Gascoyne, Ningaloo, Pilbara, Argo-Rowley, Barrow-Montebello, and Offshore IAAs.

Exposure to entrained hydrocarbons can result in physical exposure as well as ingestion. Such impacts are associated with 'fresh' condensate with the risk of impact declining rapidly as the condensate weathers. Therefore, the potential for environmental impacts would be limited to a relatively short period following the release and would need to coincide with migration to result in consequences to a large number, but is not anticipated to result in long-term population viability effects.

A proportion of the migrating population of whales in affected IAAs could be affected for a single migration event, which could result in short-term and localised consequences, ranked as incidental (6).

Turtles

Turtles have the potential to be exposed to moderate and high thresholds of entrained hydrocarbons in the Gascoyne, Ningaloo, Exmouth, Pilbara, and Barrow-Montebello IAAs.

Turtles can be impacted where condensate is fresh, with direct oiling of eyes and other membranes when swimming , although the risk of impacts decrease as the volatiles weather.

Given the rapid weathering of the volatile components, condensate spills have the potential for localised, short-term impacts to turtles, with no potential impacts at a population level in any IAA; ranked as incidental (6).

Whale Sharks and White Sharks

Ningaloo Reef is important for whale shark aggregation and moderate exposure of entrained hydrocarbons may occur in the Ningaloo IAA, with the potential to cause acute impacts to a number of individuals. Whale sharks are also known to forage in the Argo-Rowley, Barrow-Montebello, Gascoyne and Offshore IAAs. The 'indicative distribution' and 'known distribution' of White sharks suggest that a small section (north-western part) of distribution areas, may intersect moderate entrained thresholds.

Whale sharks, sharks and fish have the potential for exposure to hydrocarbons via the entrained and dissolved fractions. Potential effects include damage to the liver and lining of the stomach and intestine, as well as toxic effects on embryos.

Although these concentrations will be lower toxicity (because the volatile components evaporate within days), the physical presence of persistent components of the hydrocarbons have the potential to accumulate within the gills. Therefore, the potential impacts to whale sharks and white sharks are localised and long term; ranked as incidental (6).

Fish Communities

Fish community values include the ancient coastline, the continental slope demersal fish and ridgeline fish communities.

Adult fish exposed to low hydrocarbon thresholds are likely to metabolise the hydrocarbons and excrete the derivatives, with studies showing that fish can metabolise petroleum hydrocarbons and that accumulated hydrocarbons are released from tissues when the fish is returned to hydrocarbon-free sea water. Several fish communities in these areas are demersal and therefore more prevalent towards the seabed where concentrations of entrained hydrocarbons will be lower, and any impacts are expected to be highly localised.

The Dampier Archipelago IAA includes sawfish breeding grounds; however, only low exposure to entrained hydrocarbons in the west of the IAA is predicted, and is not expected to have impacts beyond short-term and localised impacts to individuals.

Subsurface hydrocarbons could potentially result in acute exposure to marine biota such as juvenile fish, larvae, and planktonic organisms, although impacts are not expected cause population-level impacts. There is the potential for localised and short-term impacts to fish communities; ranked as incidental (6).

Commercial Fisheries and Aquaculture

Several commercial fisheries operate in the IAAs, therefore overlapping the spatial extent of the water column hydrocarbon predictions.

Although low exposures have the potential to impact on the recruitment of targeted commercial and recreational fish species, no known important spawning areas have been

identified that have the potential to be impacted. Consequently, any acute impacts are expected to be limited to small numbers of juvenile fish, larvae, and planktonic organisms, which are not expected to affect population viability or recruitment. Impacts from entrained/dissolved exposure are unlikely to manifest at a fish population viability level. The consequence to commercial fisheries is assessed as localised and short term, and ranked as incidental (6).

Modelling predicts low and moderate entrained exposure throughout the Exmouth IAA, which may lead to impacts on aquaculture and filter feeders depending on depth and sensitivity. There is the potential for localised and short-term impacts to aquaculture, and ranked as incidental (6).

Coral

Condensate modelling predicts moderate entrained exposure along the waters of the Barrow-Montebello, Argo-Rowley and Ningaloo IAAs. Wave-induced turbulence associated with waves breaking over coral reef crests will increase the entrainment of hydrocarbons into the water column.

Exposure of entrained hydrocarbons to shallow subtidal corals has the potential to result in lethal or sub-lethal toxic effects, resulting in acute impacts or death at moderate to high exposure thresholds. Dissolved hydrocarbons are known to cause high coral mortality via direct physical contact.

Given the predicted times for shoreline exposure (approximately 1.6 days for Ningaloo and approximately 2.2 days for Barrow-Montebello) it is expected that some weathering of the volatiles will have occurred prior to exposure; however, exposure to parts of the coral reefs may have acute toxic impacts, resulting in damage to parts of these values. Contact with coral reefs may lead to reduced growth rates, tissue decomposition, and poor resistance and mortality of sections of reef . Entrained exposures have the potential for localised and long-term impacts to coral reefs in the IAAs; ranked as minor (5).

Ridgeline

A condensate release from an area of the trunkline near the ridgeline, could result in a portion of the ridgeline habitat being exposed to hydrocarbons. Given much of the condensate would float rapidly towards the surface rather than spread horizontally across the ridgeline, only a small part of the habitat and associated benthic organisms (gorgonians and sponges) could be contacted.

If gorgonians are contacted by moderate-high condensate exposure, the affected colonies might exhibit acute impacts and sub-lethal signs of stress, such as sclerite sloughing Hydrocarbons, in the form of PAHs, are also known to inhibit larvae settlement of at least one species of sponge. However this effect is unlikely to be long lasting from a one-off release of condensate at the ridgeline as residual oil adhering to the substratum would break down due to physical weathering and microbial activity. A short-term release of condensate is not predicted to result in chronic impacts to gorgonians, sponges and other organisms on the ridgeline, however acute impacts may occur to a small section of the habitats, therefore ranked as localised short term effects to this habitat, ranked as incidental (6).

Seagrass and Macroalgae

Seagrass and macroalgae meadows make up the most important benthic habitats of the Pilbara IAA and Exmouth IAA, and may be exposed to water column hydrocarbons in the event of a hydrocarbon release.

Dissolved and entrained hydrocarbons have the potential to effect macroalgae and seagrass

through toxicity impacts. However, a layer of mucilage is present on most species, preventing the penetration of toxic aromatic fractions. Seagrasses do not appear to be significantly vulnerable to oil impacts as 50–80% of their biomass is in their rhizomes, which are buried in sediments and thus less likely to be adversely impacted by hydrocarbons. Seagrasses may be subjected to photosynthetic stress because of exposure to oil; however, full recovery has been documented in relative short timeframes i.e. <10 hours after the exposure period.

Acute, and therefore potentially lethal, exposure may occur as the result of exposure at moderate and high thresholds from a hydrocarbon release. Given that the exposure is predicted to be in patches rather than a continuous plume, impacts to seagrass and macroalgae are anticipated to be long term (plants can regrow within one or two years) and localised, without threatening large regions. Therefore, consequences from dissolved/entrained exposure are ranked as minor (5).

Given the potential zones of exposure, the nature of the relevant values that may be impacted, consequences to seagrass, macroalgae, and coral habitats, is the worst-case potential consequence scenario for entrained/dissolved exposure.

Hazard
Air Exposure
A spill resulting from a LOWC has the potential to impact air quality, through VOC's associated with rapid evaporation of spilled hydrocarbons, and greenhouse gases that contribute to the global concentrations of these gases in the atmosphere.
Potential Consequence
Air Exposure
The release of gases into the atmosphere can result in a localised change to air quality around the release. Given the remote location of the drill centres and significant distance to the nearest sensitive air shed, values and sensitivities are not predicted to be affected by the air quality changes. The potential consequence to local air quality is short term and localised, therefore ranked as incidental (6). The LOWC event will also release greenhouse gases, in particular methane, which can contribute to the global concentrations of greenhouse gases in the atmosphere (Ref. 13). Greenhouse gas emissions are not expected to cause local or regional environmental impacts in either the short or long term.

Likelihood and Residual Risk Summary	
Likelihood	The loss of containment data for the offshore pipelines incident database was used as a guide to evaluate the likely frequency of the loss of containment from an individual pipeline, thus informing the likelihood of consequence. Using publicly available risk data from the IOGP, the risk of rupture of the condensate export pipeline is 1.48 × 10-4/km per year. Because these statistics are based on incident history, largely for North Sea and European operations, their use is conservative given the geographically remote location of the trunkline (predominantly in an open-ocean offshore area) and the reduced risks associated with potential third-party interference. An assessment of LOWC incidents was undertaken using SINTEF records, which indicate that from a total of 626 recorded LOWC incidents between 1955 to 2012, only one Level 3 LOWC during operations (in 1972) was recorded. This was caused from external interference by a vessel with the well and subsequent failure of the SCSSV.

	Analysis of all well control incidents in the US Gulf of Mexico, reported that between 1980 and 2011, 14 incidents occurred, with generally small spill volumes (<50 bbl) King and King advise that past well failures cannot accurately forecast future well failures. King and King reason that well failure frequency is specific to a set of wells that operate under the same conditions, are of similar design, construction quality, age, and era of construction. Advances in industry best practice and current preventive barrier standards further indicate that past LOWC events during steady-state flow are unable to be used reliably in forecasting future well failure events. This is attested by Vinzant and Vick who suggest that reliability of SCSSVs has also increased [since the 1970s] through advances in design and validation testing. The identified control measures to prevent a loss of containment from the hydrocarbon system include a series of checks, handover processes, monitoring, and IMR to verify the condition and integrity of the system, prior to and during Start-up and Operations. Monitoring is continuous and inspection activities will occur at risk-based intervals to assess the physical state of the hydrocarbon system to then inform maintenance (including corrosion management strategies) and repair activities to maintain the condition of the asset. Particular events or exceptional circumstances may also trigger additional inspections or a review of inspection frequency. Control measures have also been identified to reduce the likelihood of external interference to further reduce the likelihood of a loss of containment by communicating with stakeholders and managing vessel and SIMOPs activities. With the preventative controls in place, the likelihood of a major loss of containment from the trunkline is considered highly unlikely and the likelihood of a major LOWC is considered remote. Source control measures halt the flow of hydrocarbons and reduce the overall volume of hydrocarbons released into the environment. The identified spill response measures are implemented to reduce the spill volumes, exposures and impacts to sensitive environmental receptors, achieve a net environmental benefit, and therefore reduce the risks. Given the low likelihood of a release occurring from a LOWC or a trunkline rupture, the likelihood of a spill occurring and subsequently resulting in the described worst-case consequences, with the various prevention and mitigation measures in place, is ranked as follows: Shoreline exposure impacts to intertidal corals, turtles, birds, tourism and recreation, mangroves and mudflats (incidental to moderate consequence rankings). In the event that a LOWC spill has already occurred, the likelihood of shoreline contact at moderate thresholds in the IAAs listed in the shoreline exposure table above, under all three seasonal conditions assessed ranged from 0-20% for the IAAs, with the exception of Barrow-Montebello which had a maximum probability of 40%. The implementation of source control, offshore response strategies (e.g. containment and recovery, surface and subsea dispersant application), and shoreline protection and clean-up is expected to reduce the potential for shoreline exposure and impacts. The likelihood of the described consequences occurring during Start-up and Operations is conservatively ranked as unlikely (4). Surface exposure impacts to marine mammals, turtles, birds, tourism and recreation (incidental to minor consequence rankings). In the event that a spill has already occurred, implementation of source control and spill response strategies (e.g. containment and recovery, surface and subsea dispersant application) is expected to reduce the potential surface exposures and impacts. The likelihood of the described consequences occurring during Start-up and Operations is conservatively ranked as unlikely (4).

	Entrained/dissolved exposure impacts to marine fauna, fish communities, seagrass, macroalgae, corals, commercial fishing and aquaculture (incidental to minor consequence rankings). In the event that a spill has already occurred, implementation of source control and spill response strategies (e.g. subsea dispersant application which facilitates the dissolution of soluble hydrocarbons) is expected to reduce potential entrained/dissolved exposures and impacts. The likelihood of the described consequences occurring during Start-up and Operations is conservatively ranked as unlikely (4). The likelihood of a LOWC event resulting in air quality changes is ranked as unlikely (4). Overall, the likelihood of a hydrocarbon system loss of containment occurring and resulting in the described incidental to moderate consequences occurring with the prevention and mitigation controls in place is considered unlikely (4).
Residual Risk	The worst-case residual risk for a hydrocarbon system loss of containment scenario is ranked as low (7) (based on shoreline exposure impacts to coral, mangroves and mudflats).

Control Measures

- Commissioning and testing of the hydrocarbon system, including wells, trees, manifolds, flowlines and trunkline, is conducted according to industry standards prior to the introduction of hydrocarbons
- Handover of custody of the wells to be undertaken in accordance with Well Handover processes
- Producing Well Integrity Performance Standards are met throughout Start-up and Operations.
- IMR of the hydrocarbon system will, include but is not limited to:
  - a post-start-up inspection of the subsea hydrocarbon system within 24 months of start-up; and
  - monthly inspections of the onshore PL99 pipeline licence area
- Monitoring of hydrocarbon system pressure, temperature, flow rates and fluid composition against acceptable criteria and limits
- CCR operators will be trained and competent
- SIMOPS activities, heavy lifting activities, and activities with potential for dropped objects, managed in accordance with the permitting and management requirements
- Mooring procedures developed and vessel anchoring and mooring activities will be undertaken in accordance with them
- Isolation valves tested to verify valve integrity and functionality prior to the introduction of hydrocarbons
- The isolation steps of the source control / isolation procedures are implemented within 30 mins if a spill is detected from the hydrocarbon system
- Stakeholder Consultation Plan implemented to ensure other marine users are informed of the presence of the hydrocarbon system
- AHS (or equivalent) informed of infrastructure locations before Start-up and Operations activities commence
- Emergency response activities will be implemented in accordance with the OPEP
- Operational and scientific monitoring will be implemented in accordance with the Operational and Scientific Monitoring Plan (OSMP)
- Implement spill response procedures as detailed in Emergency Spill Event Analysis

Appendix Table B-19 Emergency Event – Vessel MDO Loss of Containment – Risk Assessment

Hazard	
Shoreline, Surface and Entrained Exposure	
A vessel MDO release can result in shoreline, surface, and entrained exposure and has the potential to damage marine habitats and fauna, and disrupt socioeconomic receptors.	
Potential Consequence	
Shoreline, Surface and Entrained Exposure	
Due to similar volatile hydrocarbon properties, weathering, fate, and characteristics between MDO and trunkline condensate fluids. The predicted worst-case consequences are slightly lower for the MDO loss of containment due to smaller potential spill volumes and shorter release duration. The MDO release does not result in any moderate or high entrained exposures, in contrast to the trunkline condensate release. The vessel MDO release does include shoreline contact at the Ningaloo, Pilbara, and Barrow-Montebello IAAs, and surface moderate and high exposure at Ningaloo, Pilbara, Barrow-Montebello, and Offshore IAAs.	
Likelihood and Residual Risk Summary	
Likelihood	Based on industry data, vessel failures are considered rare (73 groundings and 37 collisions reported from a total of 1200 marine incidents in Australian waters between 2005 and 2012). In addition, the operational area where IMR activity is proposed is not considered high in terms of vessel traffic density, further reducing the likelihood of a collision. As most vessel collisions involve the loss of containment of a forward tank, which are generally double-lined and smaller than other tanks, the loss of the maximum credible volume used in this scenario is unlikely. Additionally, a loss of containment due to collision or grounding typically results in a hole below the waterline; however, the hydrostatic pressure of the surrounding sea and lower density of hydrocarbon fuels often creates a 'water plug', further reducing volumes. Given the tropical climate of the operational area, and enhanced evaporation rates due to warm water and air temperatures, MDO released at the surface will spread quickly and thin rapidly to low thickness levels, further increasing the rate of evaporation. Based on modelling undertaken, the likelihood of shoreline contact of moderate and high thresholds impacting the Ningaloo and Barrow-Montebello IAAs is between 1 and 9% and for the Pilbara coast IAAs up to about 20%. Thus, the greatest likelihood of worst consequences is likely to occur close to the source of the spill in the Pilbara IAA as neither the middle or outer locations predict any shoreline contact. Considering the nature of the MDO (i.e. rapid weathering), the inherent low likelihood of a grounding or a collision occurring, the safeguards in place, and enactment of the OPEP, the potential likelihood of the worst-case consequences occurring is ranked as: • shoreline exposure to mangroves and mudflats (consequence of 4); occurrence is remote (5) • surface exposure to birds (consequence of 5); occurrence is remote (5).

Residual Risk	The worst-case residual risk for a vessel loss of containment (MDO) scenario is ranked as low (8) (based on shoreline exposure impacts to mangroves and mudflats).

Control Measures

- Implement spill response procedures as detailed in Emergency Spill Event Analysis
- SIMOPS Plan is implemented for primary vessels working within 500 m of each other in the operational area
- Emergency response activities will be implemented in accordance with the OPEP
- Operational and scientific monitoring will be implemented in accordance with the Operational and Scientific Monitoring Plan (OSMP)
- Vessels will meet the crew competency, navigation equipment, and radar requirements of the MSRE process
- SIMOPS activities, heavy lifting activities, and activities with potential for dropped objects, will be managed in accordance with the permitting and management requirements

Appendix Table B-20 Emergency Event – Vessel IFO Loss of Containment – Risk Assessment

Hazard

Shoreline Exposure

A vessel IFO release can result in shoreline exposure and has the potential to damage marine habitats and fauna, and disrupt socioeconomic receptors.

The hazards to specific receptors from shoreline hydrocarbon loading not repeated in detail here The degree to which fauna populations are impacted by shoreline accumulations of hydrocarbons will be affected by the distribution/type of hydrocarbons and the degree of weathering that has occurred either at sea or upon stranding on shorelines.

Potential Consequence

Shoreline Exposure

Particular values and sensitivities in the IAAs that may be affected by shoreline exposure from an IFO release are marine habitats (coral, mangroves and mudflats), marine fauna (turtles and birds) and socioeconomic (tourism and recreation).

Coral Reefs

Coral reefs in the Ningaloo, Barrow-Montebello, and Dampier Archipelago IAAs have the potential to be exposed to moderate and high shoreline exposure levels. Physical exposure at these levels can cause smothering impacts on intertidal coral reefs (including at Ningaloo and the Muiron Islands), reduced growth rates, tissue decomposition, and poor resistance. These reefs are regionally and internationally significant, and although not irreversible, exposure may have the potential for widespread effects on sensitive coral habitats; ranked as moderate (4).

Turtles

The Ningaloo, Pilbara, Barrow-Montebello, Gascoyne, Dampier Archipelago, and Argo-Rowley IAAs include important nesting, internesting, foraging, and aggregation habitats for marine turtles, which have the potential to be exposed to areas of high shoreline loading. Direct physical impacts can occur to adult turtles and hatchlings that come into contact with the hydrocarbons, through both toxicity and smothering. Given the predicted loading and

potential extent of shoreline hydrocarbons, impacts on a population level are not predicted at any IAA, although numbers over a nesting season may be affected. The potential impacts to turtles are widespread and short term; ranked as minor (5).

Birds

The Ningaloo, Exmouth, Barrow-Montebello, and Argo-Rowley IAAs include important bird nesting sites and rookeries. Birds foraging in the intertidal areas of these IAAs that are present at the time of a condensate spill are at risk of direct toxicity impacts, as well as smothering, which may result in lethal effects where the product is ingested when birds attempt to preen feathers. Given the relatively persistent nature of IFO, that several important shorelines within the IAAs may be contacted, and the vulnerability of birds to hydrocarbons, shoreline loading may result in widespread and short-term impacts to birds; ranked as minor (5).

Tourism and Recreation

The Ningaloo, Pilbara, and Dampier Archipelago IAAs include key coastal tourism and recreation areas that may be impacted by shoreline loading, potentially causing short-term and localised disruptions to marine tourism and recreation activities in these IAAs; ranked as incidental (6).

Mangroves

Mangrove communities in the Pilbara, Barrow-Montebello, and Dampier Archipelago IAAs may be contacted by high shoreline loading, resulting in acute and chronic impacts to mangrove plants. Exposure of mangroves to high hydrocarbon loadings of the relatively persistent and heavy fuel type would likely have long-term effects to the affected areas of the wider mangrove habitats, potentially involving extended time frames (years) for recovery.

Due to the sensitivity of mangroves and the regional significance of the habitats in each of the IAAs, the consequence can be widespread with persistent effects on these habitats, and is ranked as major (3). This is the potential worst-case consequence scenario for the shoreline IFO exposure hazard.

Hazard
Surface Exposure
A vessel IFO release can result in surface exposure and has the potential to damage marine habitats and fauna, and disturb socioeconomic receptors.
Potential Consequence
Surface Exposure

A vessel IFO release can result in surface exposure, which can impact marine fauna (whales, Dugongs, turtles, birds) and socioeconomic (tourism and recreation) values.

Whales

Migratory whales traverse through the Gascoyne, Ningaloo, Exmouth, Barrow-Montebello, Pilbara, and Offshore IAAs, and resting also occurs in the Exmouth and Barrow-Montebello IAAs. If the spill coincided with the northerly or the southerly migration, exposure to moderate and high thresholds may occur to a proportion of the migrating population. Exposure can occur via inhalation of vapours when surfacing, or ingestion of hydrocarbons when feeding at the surface. Potential consequences can be short term and localised, with no

long-term population viability effects; ranked as incidental (6).

Dugongs

Significant aggregations of Dugongs are known to occur in the shallow areas of the Pilbara IAA, typically feeding on seagrass. Individuals that surface in the affected areas of the IAA may be impacted. The potential impacts are predicted to be short term and localised, with no impacts on a population level; ranked as incidental (6).

Turtles

Turtles may be present in the nesting and foraging areas of the Ningaloo, Gascoyne, Pilbara, and Barrow-Montebello IAAs and exposed to moderate and high surface thresholds. Inhalation of vapours and direct oiling of eyes and other membranes can occur if they surface through the hydrocarbons; however, the slick will be patchy rather than continuous. Surface exposure near turtle nesting beaches or rookeries may also cause smothering impacts to hatchlings, with an increase in mortality over the nesting season. Impacts to turtle populations is not predicted. The potential impacts are short term and widespread; ranked as minor (5).

Tourism and Recreation

The Ningaloo and Pilbara IAAs have tourism and recreation values that can be affected by surface IFO exposure. A visible sheen may be observed in these IAAs shortly after the release and before sufficient weathering has occurred. This sheen has the potential to reduce the visual amenity of the area for tourism and discourage recreational activities, with short-term and localised consequences, which are ranked as incidental (6).

Birds

Surface exposure to floating hydrocarbons has the potential to result in acute or chronic effects to birds, particularly those resting on, or diving through, the water's surface. The Ningaloo, Exmouth, and Barrow-Montebello IAAs include important bird habitats, which may be exposed to high surface exposure, resulting in smothering and acute and chronic toxicity. Given the sensitivity of seabirds to surface spills and the prevalence of birds in the affected IAAs, IFO releases have the potential to cause widespread and long-term impact to birds; ranked as moderate (4). This is the potential worst-case scenario for the surface IFO exposure hazard.

Likelihood and Residual Risk Summary	
Likelihood	Given the low anticipated frequency of heavy-lift or similar activities, the inherent low likelihood of a grounding or a collision occurring, the safeguards in place, and enactment of the OPEP, the potential likelihood of the predicted worst-case consequences occurring are remote (i.e. a spill would need to occur during a migratory bird season). Additional likelihood details relating to vessel releases are are not repeated here. Based on modelling undertaken, the likelihood of shoreline contact of moderate to high thresholds impacting the Ningaloo, Dampier Archipelago, and Argo-Rowley IAAs is between 1% and 4%, and for the Pilbara and Barrow-Montebello IAAs from 8% to 17%. Based on this, the greatest likelihood of worst-case consequences is likely to occur close to the source of the spill in either the Pilbara or Barrow-Montebello IAAs. Given the probability of a vessel IFO release scenario and the prevention and mitigation measures in place, the likelihood of worst-case consequences occurring is ranked as:

	shoreline exposure to mangroves (consequence of Major – 3) is ranked as remote (5) surface exposure to birds (consequence of Moderate – 4) is ranked as remote (5).
Residual Risk	The worst-case residual risk for a vessel IFO loss of containment scenario is ranked as low (7) (based on shoreline exposure impacts to mangroves).

Control Measures

- Implement spill response procedures as detailed in Emergency Spill Event Analysis.
- SIMOPS Plan is implemented for primary vessels working within 500 m of each other in the operational area
- Emergency response activities will be implemented in accordance with the OPEP
- Operational and scientific monitoring will be implemented in accordance with the Operational and Scientific Monitoring Plan (OSMP)
- Vessels will meet the crew competency, navigation equipment, and radar requirements of the MSRE process
- SIMOPS activities, heavy lifting activities, and activities with potential for dropped objects, will be managed in accordance with the permitting and management requirements

Appendix Table B-21 Emergency Response – Discharges – Risk Assessment

Hazard

The application of chemical dispersants has the potential to reduce marine water quality with the potential to cause impacts to marine fauna and habitats.

Potential Consequence

The application of chemical dispersants (to respond to hydrocarbon release emergency event scenarios), will result in dispersant and hydrocarbons in the water column, potentially affecting marine fauna and habitats.

Dispersant applied at the well (in response to a LOWC) can result in a dispersant/oil mix in the water column with a spatial extent considered similar to the entrained/dissolved exposure for the untreated LOWC scenario.

Dispersant applied at the surface is targeted to surface slicks of condensate (or MDO) and IFO within the EMBA, typically in offshore waters distant from coastal areas, and on moderate-high thresholds. This application results in a decrease in surface hydrocarbons and an increase in dispersant/oil in the water column with a rapid dilution of dispersant/oil mix.

Dispersant combined with dispersed oil in the water column can be acutely toxic to marine biota . The source of impact from dispersants is primarily from the transfer of toxic oil from the water's surface to the water column, and a review of literature indicates that toxicity from exposure to chemically dispersed hydrocarbons relates more to the toxicity of the oil product and its increased bioavailability in the water column, than to the toxicity of the dispersant. Therefore this consequence assessment utilises the information provided in the entrained/dissolved exposure consequence assessments where appropriate.

Chevron has identified a short list of four dispersants based on predicted effectiveness (that will be confirmed via dispersant efficacy testing), along with availability and inclusion on the National Plan OSCA Register as these products have passed efficiency and toxicity testing and

are permitted for use within Australian waters. These dispersants are Slickgone NS, Slickgone EW, Corexit 9527 and Finassol 52.

Slickgone NS is ranked slightly toxic to practically non-toxic on the IMO/GESAMP classification defined in the GESAMP Hazard Evaluation Procedure for Chemical Substances Carried by Ships. GESAMP is an advisory body consulting with specialised experts nominated by the Sponsoring agents (IMO, FAO, UNESCP-IOC, WHO, WMO, IAEA, UN and UNEP). Its principal task is providing scientific advice concerning the prevention, reduction and control of the degradation of the marine environment to the sponsoring agencies (GESAMP 2002).

According to the AMSA guidelines – Dispersant Type, Suitability, Application and Constituent Guide, Slickgone NS is typically effective on group III and IV oils (Specific Gravity 0.85-1.0) which includes IFO. The MSDS for Slickgone NS lists the EC50 (effective concentration) as EC50 2.6 mg/L for the species of crustacean (Allorchestes compressa) which is the most sensitive species tested.

Slickgone EW is ranked non-toxic under the IMO/GESAMP system. The MSDS for Slickgone EW lists the EC50 (effective concentration) as EC50 22.1 mg/L for the species of crustacean (Paravocalanus crassisostris) which is the most sensitive species, which is less toxic than Slickgone NS.

Corexit 9500 MSDS lists the lethal dose LC 50 toxicity for Artemia sp. as LC50 20.7 mg/L. Corexit 9500 is known to have similar toxicity to Corexit 9527 and 9554). The predicted concentration of 0.8 mg/L for the largest spill scenario is below the cited toxicity levels of LC50 20.7 mg/L and for Corexit 9500 and the 1.1 mg/L trigger limit set for Corexit 9527 (similar to Corexit 9500) under the National Water Quality Guidelines for protection of 95% of all marine species. Generally, acute toxicity is dose dependent, therefore if rates of dispersant application and rates of dilution result in the dispersed oil not exceeding acutely toxic levels, then impacts from dispersed oil can be minimised.

Based on the above, the dispersants assessed are not considered as posing a significant environmental risk, and if applied correctly, can provide an environmental benefit through reduction of surface and shoreline hydrocarbons reaching sensitive coastal and shoreline values and sensitivities. For example, if dispersant is applied in the open ocean in areas of lower (ecological, socio political and/or economic) sensitivity where effects of dispersant/oil mix within the water column are likely to be minimal, metocean processes may aid chemical and physical dilution. Thus, the amount of surface oil shoreline contact and the damage to identified receptors that interface with the water surface and shoreline can be reduced. In the context of the biogeography of the NWS and the representation of species and habitats across the EMBA, the application of dispersants is not considered to be of significant environmental risk.

Dispersants and fuel oils are individually toxic substances and when dispersant is applied to an oil spill the combined dispersant / oil mixture may also have an acutely toxic effect. Research on the toxic effects of oil / dispersant mixture on fish and crustacean larvae found that the median lethal concentration for total petroleum hydrocarbons was approximately 4.0 mg/L compared to the chemically enhanced hydrocarbons where it ranged from approximately 22 mg/L to 62 mg/L. For dispersant exposures alone, the median lethal concentration ranged from 17mg/L to 50 mg/L . The differences in the relative toxicity among the tests indicated that the majority of petroleum hydrocarbons in the chemically enhanced test are in less acutely toxic forms than the components that dominate the untreated tests . In a review of literature related to oil spill dispersants it was found that dispersant toxicity is less than the toxicity of dispersed oil. As a result of the dispersant action, the increased toxicity of chemically dispersed oil can be attributed to the increase in PAHs in the water column, large increase in droplets and increase portioning of more toxic oil components from surface or sediment into the water column.

As described above, dispersant application has the potential to increase in-water concentrations of hydrocarbons including soluble, aromatic compounds. While these elevated concentrations will generally be localised and of short duration (as a result of 3-dimensional dilution), impacts may occur on sensitive species in the water column immediately after dispersant application and prior to dilution through the water column. In particular, larval fish, invertebrates, and plankton in near-surface waters in the immediate area of a dispersed slick may experience increased acute impacts in areas where the in-water hydrocarbon concentrations exceed toxic thresholds.

In addition, if a slick was dispersed in shallow water there is also potential for increased in-water hydrocarbons to impact on corals and fish, with seagrass, and macroalgae and mangroves also potentially slightly more sensitive to chemically dispersed hydrocarbons than untreated oil. However, the use of dispersant is subject to the controls outlined in the OPEP which includes avoiding dispersant application in shallow waters (>20m water depth required).

For some species and habitats, the use of chemical dispersants could reduce the severity of hydrocarbon impact. Dispersing oil into the water column reduces the quantity of oil on the surface, subsequently reducing the amount of oil that can strand and smother any species which come into contact, i.e. species such as turtles, birds and mangroves. Generally, dispersants are used in open water to ensure sufficient water exchange. However, species present within the water column such as whales, dugongs, dolphins and sharks, and biological processes such as coral spawning, could be negatively affected by the increased concentration of dispersed oil in the water column. Therefore the NEBA process needs to be followed to determine if dispersant application will reduce the overall impact to the environment.

Marine Habitats and Fauna

Dispersant application at the well, or on surface waters in the EMBA has the potential to increase in-water concentrations of hydrocarbons including soluble aromatic compounds. Although these elevated concentrations will generally be of short duration (as a result of three-dimensional dilution), impacts may occur on values and sensitivities in the water column.

The predicted spatial extent of the entrained/dissolved moderate-high thresholds from a LOWC includes the Gascoyne, Ningaloo, Exmouth, Pilbara, Argo-Rowley, Barrow-Montebello and Offshore IAAs, and the potential extent of the dispersant-oil mix from subsurface application is conservatively assessed as the same region. The surface application of dispersants is within the EMBA, typically to disperse moderate and high thresholds of surface IFO, and potentially condensate (typically only in the offshore area, distant from coastlines).

Therefore based on the potential application of dispersants to respond to emergency events, particular values that may intersect the entrained/dissolved exposure of the dispersant-oil mix include fauna such as Dugongs, whales, turtles, whale sharks and fish communities, and habitats such as coral, mangroves and seagrass.

The assessment is considered representative of the potential consequence for the entrained oil-dispersant mix in this section, and therefore is not repeated in detail. The sensitivity range of most species is such that, except in the immediate area and for only a short time following dispersant application, exposure and impacts are expected to be minimal.

A minor point of difference is that the application of dispersant to high surface thresholds of IFO will result in a reduction of hydrocarbons at the surface, and increase in entrained hydrocarbons in particular areas where dispersant is sprayed. Based on the predicted extent of surface IFO exposure, this could result in spraying (and entrained oil-dispersant exposure) in the Gascoyne, Pilbara and Barrow-Montebello IAAs associated with the response to an IFO release. Again however, the consequence to the habitats and fauna values in these IAAs are also already assessed (for the entrained/dissolved exposure section for a hydrocarbon system

loss of containment) and not repeated.

It is noted that subtidal corals are at greater risk of toxicity from chemically dispersed than untreated hydrocarbons, and that seagrasses are also potentially slightly more sensitive to chemically dispersed hydrocarbons than untreated oil . Therefore these values are selected for assessment. Sensitive coral reef communities are located in the Barrow-Montebello, Ningaloo, Pilbara and Offshore IAAs, while seagrass meadows are located in the Pilbara IAA.

Exposure of entrained hydrocarbons to shallow subtidal corals has the potential to result in lethal or sublethal toxic effects, resulting in acute impacts or death at moderate to high exposure thresholds. Dissolved hydrocarbons are known to cause high coral mortality via direct physical contact. The oil-dispersant mix therefore has the potential to cause reduced growth rates, tissue decomposition, and poor resistance and mortality to sections of reef in the IAAs. Exposure to parts of the coral reefs may have acute toxic impacts, resulting in damage to parts of these values, with potential for localised and long-term impacts to coral reefs in the IAAs.

Dissolved and entrained hydrocarbons have the potential to effect macroalgae and seagrass through toxicity impacts. However, a layer of mucilage is present on most species, preventing the penetration of toxic aromatic fractions. Seagrasses may be subjected to photosynthetic stress as a result of exposure to oil; however, full recovery has been documented in relative short time frames i.e. <10 hours after the exposure period. Acute, and therefore potentially lethal, exposure may occur as the result of oil-dispersant exposure at moderate and high thresholds. Given that the exposure is predicted to be in patches rather than a continuous plume, impacts to seagrass and macroalgae in the Pilbara IAA are anticipated to be long term (plants can regrow within one or two years) and localised, without threatening large regions.

A 30-year study of the net environmental benefit of dispersant use on seagrass, corals, and mangroves concluded that there is greater support for the net environmental benefit of nearshore dispersant use on tropical ecosystems. Although dispersant use resulted in short-term impacts, long-term disruption has not been observed and the area has returned to pre-impact condition. Specifically for mangrove areas, long-term negative effects of non-dispersed oil include impacts on flora and fauna components of the ecosystem; however, the study found that these effects could be reduced by the use of dispersants in nearshore environments. The use of dispersant results in medium and long-term effects that are similar to the control conditions observed. In relation to seagrass meadows and coral reef communities, although the dispersed oil site observed negative effects on the associated fauna, relatively few effects were observed on the seagrass and coral habitats. Seagrass density was observed as higher than baseline at the dispersed oil site and nearly double that of the non-treated oil site.

Investigations have also shown dispersant application close to shore where the plume is likely to move into shallow water is likely to improve protection for large fauna, birds, saltmarsh and mangroves, although may increase impacts on invertebrates. Because toxic impacts are related not only to the concentration of hydrocarbons, but also the duration of exposure, dispersion that prevents hydrocarbons from intertidal habitats may have long-term benefits, even where there are short-term impacts. This finding is particularly relevant to the IFO scenario in this EP, whereby the heavier fuel may result in longer term exposure in intertidal habitats.

Therefore while the application of dispersant in areas closer to shorelines, may result in increased entrained exposure to marine habitats with potentially toxic impacts, there may be a reduction in the amount of surface oil which would otherwise be repeatedly brought ashore on subsequent tides, i.e. resulting in repeat and persistent exposure to habitats such as mangroves.

Typically, the surfactant allows stabilised oil droplets to form that do not easily adhere to mangrove roots, seagrass blades, sediments, rocks, etc. This in turn allows the dispersed oil

to remobilise from the impacted area under the influence of wind, tides, and waves. Therefore, the resultant exposure time of dispersed oil is significantly shorter than for non-dispersed oil.

Summary

In summary, both subsurface application (at the well) and surface application at targeted areas within the EMBA can result in a dispersant-oil mix in the water column, with toxic effects to fauna and habitats. Based on the potential spatial extent of the oil-dispersant mix, particularly in relation to sensitive marine habitats, there is the potential for localised short-term toxic effects to marine fauna in the water column.

In relation to sensitive marine habitats (such as corals and seagrass), acute toxic impacts can occur to parts of these marine values, with the potential consequence of localised long-term degradation to these habitats.

Therefore the worst case consequence of dispersant application to habitats and fauna is ranked as minor (5).

Likelihood and Residual Risk Summary	
Likelihood	The use of dispersants is subject to the controls and application criteria as outlined in the OPEP and thus may only be applied to spills distant from coastal receptors under appropriate environmental conditions. Where these criteria are met, and with the selection of a National Plan OSCA registered dispersant, the likelihood of the described consequences occurring was determined to be unlikely (4).
Residual Risk	The residual risk for chemical dispersant activities resulting in impacts to marine fauna and habitats is low (8).

Control Measures

- Oil spill response equipment is maintained in accordance with manufacturers' specifications
- Dispersant application conducted in accordance with the Oil Spill Response: Chemical Dispersants Technical Standard
- Chevron Australia will complete dispersant efficacy testing with National Plan Oil Spill Control Agents on condensate to inform dispersant selection and use processes and/or understand the effectiveness of dispersants on condensate

Appendix C : Stakeholder Consultation Plan

Wheatstone Project

Stakeholder Consultation Plan Start-Up and Operations

Document ID:	WS2-COP-00003	**Revision ID:**	3.0
Revision Date:	16 Dec 2015		
Information Sensitivity:	[redacted]		

Table of Contents

List of Tables

1.0 Introduction

1.1 Purpose

The purpose of this Stakeholder Consultation Plan is to satisfy the consultation requirements as described in relevant Commonwealth and State Petroleum Regulations in relation to the Wheatstone Start-up and Operations Environment Plan (EP) - WS2-COP-00001.

1.2 Background

As part of Chevron Australia's (Chevron) ongoing stakeholder engagement strategy, and in compliance with Petroleum Regulations, the consultative process between Chevron, the appropriate authorities and other relevant interested parties are described in this Plan.

Consultation included activities associated with the Wheatstone Project – start-up and operations, as well as inspection/maintenance/repair, field support and drilling/intervention activities.

Stakeholders included in this section are the service providers and organisations that have been consulted regarding response and monitoring activities they would provide as part of Chevron's oil spill response strategy.

1.3 Scope of this Plan

Chevron is required to consult with relevant authorities and other relevant interested persons or organisations in relation to these activities and is required to demonstrate an appropriate level of consultation. The sections of this Plan that address these requirements and describe the process to be followed for managing responses include:

- a summary of each response made by a relevant person (Table 3.1)
- a summary Communication and Engagement Plan (Table 3.2) including completed and ongoing consultation. (Note: details of completed and ongoing communication is also summarised in Table 3.1).
- an assessment of the merits of any objection or claim about the adverse impact of each activity to which the EP relates (Table 3.3)
- a statement of Chevron's response, or proposed response, if any, to each objection or claim (Table 3.3) and
- a copy of the full text of any response by a relevant person (See Stakeholder Responses in Section 4.2)

Section 2.0 describes how relevant stakeholders were identified.

2.0 Stakeholder Identification and Analysis

The process to identify relevant stakeholders (authorities, persons and organisations) included a review of:

- previous consultation undertaken for the Wheatstone Project
- social / commercial receptors within the region that may be affected
- applicable legislation to identify regulatory agencies
- previous correspondence between Chevron Australia and commercial fishing license holders in State and Commonwealth fisheries whose licences overlap the Chevron Australia active permit areas
- relevant authorities or organisations that may be involved in the event of an emergency condition
- relevant authorities or organisations representing key stakeholder groups

Relevant stakeholders were grouped by stakeholder type to determine the appropriate level of consultation (Table 2.1). The level of consultation was based on:

- the level of interaction the stakeholder may have during the start-up and operations phase of the Wheatstone project.
- the level of potential impact the stakeholder may be exposed to during the start-up and operations phase.
- the level of information required by the stakeholder to demonstrate that potential risks and impacts are reduced to as low as reasonably practicable (ALARP) during conducting petroleum activities.
- the level of information requested from historical correspondence and agreed consultation from previous EP communications.

The stakeholder types and appropriate level of consultation are outlined in Table 2.1.

Table 2.1 Stakeholder Type and Level of Consultation

Stakeholder Type	Definition	Level of consultation
Interested	Stakeholders that have an interest in the area where the activities are to occur	• Stakeholder contacted and provided with Fact Sheet and map • Chevron contact details provided should the stakeholder wish to consult further • Further follow up (if required) with schedule / location requirements (based on agreed engagement)
Potentially Affected	Stakeholders that may be potentially impacted by the activities	• Stakeholder contacted and provided with Fact Sheet and map • Chevron contact details provided should the stakeholder wish to consult further • Further follow up with schedule / location requirements (based on agreed engagement)
Response Organisations	Stakeholders involved in response activities for unplanned	• Contact stakeholder providing details in accordance with organisation consultation guidelines (where applicable), or an overview of activity with the Fact sheet and Map provided

Stakeholder Type	Definition	Level of consultation
	events	• Encourage stakeholder feedback and confirmation of spill response support capability • Chevron contact details provided should the stakeholder wish to consult further
Government Agency	Government agencies that are or may become involved in the activities	• Contact stakeholder providing details in accordance with organisation consultation guidelines (where applicable), or an overview of activity with the Fact sheet and Map provided • Encourage / seek stakeholder feedback • Contact details provided should the stakeholder wish to consult further

Chevron will communicate with identified stakeholders as required, ensuring they are informed of any aspects of the Wheatstone Project Start-up and Operations activities that may potentially affect their activities.

Refer the Stakeholder Engagement Log – Status and Ongoing Communications (Table 3.1) and for an overall summary of engagement see the Communication and Engagement Plan (Table 3.2).

3.0 Stakeholder Engagement Outcomes

Chevron commenced consultation with relevant stakeholders prior to the development and submission of the Wheatstone Project Start-up and Operations EP. Stakeholder feedback includes activities associated with the Wheatstone Project – Start-up and Operations as well as maintenance and drilling activities. Stakeholder feedback is in relation to general activity as well as activities specific to EP WS2-COP-00001.

Consultation undertaken specifically for this Plan, including any requirements for ongoing consultation, are in the Stakeholder Engagement Log (Table 3.1) with an overall summary contained within the Communication and Engagement Plan (Table 3.2).

Stakeholder responses were assessed; any relevant feedback made during the engagement process has been addressed within this Plan. Stakeholder responses deemed not relevant to Wheatstone Start-up and Operations activities or unjustified have been addressed by return response to the stakeholder who raised the issue.

A record of all stakeholder responses received are detailed in the Stakeholder Engagement Log (Table 3.1), with full text responses from stakeholders included in Section 4.0. Section 3.3 summarises specific concerns, objections or claims and includes an assessment of the merits of each. Table 3.3 details Chevron's responses to these concerns, objections or claims.

3.1 Stakeholder Engagement Log

Consultation undertaken specifically for this Plan, including any requirements for ongoing consultation are in the Stakeholder Engagement Log (Table 3.1).

Table 3.1 Stakeholder Engagement Log

Engagement
Stakeholder Engagement Log

Chevron

Project Name		WHS Start-up and Operations
Creation Date		01-Jun-14
Last Updated		15-Dec-15

ENGAGEMENT DETAILS						
ABORIGINAL STAKEHOLDERS	**Stakeholder Type**	**Engagement Logistics**	**Engagement Purpose**	**Stakeholder Response**	**Chevron Response**	**Status and Ongoing Communications**
Buurabalayji Thalanyji Aboriginal Corporation (BTAC)	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Advise potentially affected party	No reply	N/A	Informed and updated
Kuruma Marthudhunera (KMAC)	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Advise potentially affected party	No reply	N/A	Informed and updated
Yaburara and Coastal Mardudhunera Aboriginal Corporation (YACMAC)	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Advise potentially affected party	No reply	N/A	Informed and updated
EMERGENCY RESPONSE	**Stakeholder Type**	**Engagement Logistics**	**Engagement Purpose**	**Stakeholder Response**	**Chevron Response**	**Status and Ongoing Communications**
AECOM	Response organisation monitoring	Who: [redacted] When: September 2014 How: Email Outcome: Consulted	Advise project / EP scope to enable stakeholder to assess against their spill response / monitoring capability	Email acknowledged, capability reconfirmed, advised new contact details	New contact details acknowledged	Informed and updated
Apache Energy Ltd	Response organisation	Who: [redacted] When: September 2014 How: Email Outcome: Consulted	Mutual Aid Agreement	Email acknowledged, information included in their emergency response (mutual aid) systems	N/A	Informed and updated

Australian Marine Oil Spill Response Centre (AMOSC)	Response organisation	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Advise project / EP scope and OPEP content to enable stakeholder to assess against their spill response capability	Reviewed OPEP, requested Chevron cross-check the AMOSC on-line portal for current equipment/service; queried range of dispersants; queried range of agencies for termination end points	Suggested considerations raised internally at Chevron Noted to AMOSC use of OSCA listed dispersants to align with the National Plan Final regulator approved OPEP to be sent to AMOSC (Agreed engagement)	Informed and updated Final regulator approved OPEP to be sent to AMOSC
Barrow Island Emergency Management Coordinator	Internal Stakeholder - Emergency Response	Who: [redacted] When: September 2014 How: Email Outcome: Updated	Advise potentially affected party	Email acknowledged	N/A	Informed and updated
Department of Transport (DoT) - OSRC Unit	Response organisation	Who: Oil Spill Response Coordination (OSRC) Unit When: October 2014 How: Email Outcome: Consulted	Advise project / EP scope and OPEP content to enable stakeholder to assess against their spill response capability	No reply	N/A	Informed and updated Final regulator approved OPEP to be sent to Department of Transport OSRC Unit
Environmental Resources Management (ERM)	Response organisation - monitoring	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Advise project / EP scope to enable stakeholder to assess against their spill response / monitoring capability	No reply	N/A	Informed and updated Chevron has previously re-confirmed response agreements
Intertek Geotech	Response organisation	Who: [redacted] When: September 2014 How: Email Outcome: Consulted	Advise project / EP scope to enable stakeholder to assess against their spill response / monitoring capability	No reply	N/A	Informed and updated Chevron has previously re-confirmed response agreements
Jacobs (Australia) Pty Ltd (Formerly SKM)	Response organisation	Who: [redacted] When: September 2014 How: Email Outcome: Consulted	Advise project / EP scope to enable stakeholder to assess against their spill response / monitoring capability	No reply	N/A	Informed and updated Chevron has previously re-confirmed response agreements
Oil Spill Response Limited (OSRL)	Response organisation	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Advise project / EP scope and OPEP content to enable stakeholder to assess against their spill response / monitoring capability	Confirmed looks good from an OSRL commitment front	N/A	Informed and updated Final regulator approved OPEP to be sent to OSRL

ToxFree	Response organisation-waste management	Who: [redacted] When: September 2014 How: Email Outcome: Consulted	Advise project / EP scope to enable stakeholder to assess against their spill response capability	No reply	N/A	Informed and updated Chevron has previously re-confirmed response agreements
URS	Response organisation-monitoring	Who: [redacted] When: September 2014 How: Email Outcome: Consulted	Advise project / EP scope to enable stakeholder to assess against their spill response / monitoring capability	No reply	N/A	Informed and updated Chevron has previously re-confirmed response agreements
TITLE HOLDERS / NEIGHBOURS/ OPERATORS IN THE AREA	**Stakeholder Type**	**Engagement Logistics**	**Engagement Purpose**	**Stakeholder Response**	**Chevron Response**	**Status and Ongoing Communications**
Apache Energy Ltd	Interested party	Who: [redacted] When: September 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated
BHP Macedon	Interested party	Who: [redacted] When: September 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated
KUFPEC	Interested party	Who: [redacted] When: September 2014 How: Email Outcome: Informed and updated	Advise interested party	Email acknowledged	N/A	Informed and updated
Vermilion Energy	Interested party	Who: [redacted] When: September 2014 How: Email Outcome: No issues	Advise interested party	Email acknowledged, no comments or further questions No direct impact on Vermilion Operations and Assets	N/A	Informed and updated
Woodside Burrup Pty Ltd	Interested party	Who: [redacted] When: September 2014 How: Email Outcome: Consulted	Advise interested party	Email acknowledged	N/A	Informed and updated

FISHERIES - GOVERNMENT & COMMERCIAL	Stakeholder Type	Engagement Logistics	Engagement Purpose	Stakeholder Response	Chevron Response	Status and Ongoing Communications
Australian Fisheries Management Authority (AFMA)	Government agency	Who: [redacted] When: September 2014 How: Email Outcome: Informed and updated	Define potential interaction with Commonwealth fisheries and relevant interested stakeholders	AFMA recommended continued consultation with the fisheries involved	Chevron confirmed ongoing consultation with fisheries As operations are estimated to continue for approximately thirty years, Chevron intention to provide updates on Wheatstone activities during operations to AFMA, and also to seek two-way feedback (especially in relation to possible changes in Commonwealth fishery activity in the area) on a 6 monthly basis and as required was confirmed	Consulted Ongoing 6 monthly engagement Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Aquarium Specimen Collectors Association of WA	Interested party	Who: [redacted] When: September 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact Association members
Australian Southern Bluefin Tuna Industry Association	Interested party	Who: [redacted] When: September 2014 How: Email Outcome: Consulted	Advise interested party	Email acknowledged	N/A	Consulted
Commonwealth Fisheries Association	Interested party	Who: [redacted] When: September 2014 How: Email Outcome: Informed and updated	Define potential interaction with Commonwealth fisheries and relevant interested stakeholders	No reply	N/A	Consulted Agreed engagement is to inform the Association who in turn on send to their member base, members to then contact Chevron directly if there are any queries etc Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact Association members
Department of Fisheries, Western Australia (The Department)	Government agency	Who: [redacted] When: October 2014 How: Email Outcome: Informed and updated	Define potential interaction with WA state fisheries and relevant interested stakeholders	To allow us to provide up-to-date advice, we request that the WA Department of Fisheries (the Department) is notified a minimum of three months prior to the commencement of any new activities described in the Project Overview. Once notified, the Department will determine if there have been any significant changes to the	The fact sheet and map were developed by Chevron Australia Pty Ltd (Chevron) to be inclusive of activities being undertaken during the operations phase, and covered by environment plans. Significant modifications to the activity or new stage of the activity not covered within the environment plan will be assessed in accordance with the Regulations to determine whether new or increased environmental impacts or risks exist and whether further consultation, revision and/or resubmission is required. Chevron notes the Department's request to be notified a minimum of three months prior to the commencement of	Consulted Chevron to notified the Department prior to the commencement of new activities.

				information provided and would expect that any objections or claims resulting from these changes are resolved prior to commencement of any activity	new activities. Any objections or claims raised in relation to the activity will be dealt with appropriately and in accordance with the Regulations.	
				The Wheatstone project has the potential to affect fish populations and the operations of fishers who harvest these resources. Because of this potential impact, the Department recommends that Chevron Australia Pty Ltd (Chevron) should consult with the Western Australian Fishing Industry Council (WAFIC), RecFishWest and individual licensed fishers regarding the overall proposal, including methods, and incorporate comments from this consultation in all existing and new EP submissions. Chevron will need to provide specific start and finish dates; the spatial extent of proposed activities (including any exclusion zones); and information on identified specific fishing interests, including previous consultation with individual licensed fishers. Should there be any objections or claims during the consultation process, the Department requests that these matters are addressed to the satisfaction of the regulator prior to the commencement of the activity.	Chevron consults directly with WAFIC, RecFishWest and individual fishery licence holders. They have received the Fact Sheet outlining the overall project. WAFIC will also receive a summary of the feedback that Chevron has received from the commercial fishing sector and the Department. Comments from consultation with the above parties and relevant feedback from previous consultations with individual licensed fishers will be considered in the EP. The Department, WAFIC, RecFishWest and individual fishery licence holders will be advised of the commencement and completion of activities in the EP and any relevant exclusion zone information. This will be quite limited information considering it is a long term operations EP. Any objections or claims will be addressed to the satisfaction of the regulator prior to the commencement of start-up and operations activity.	Notify the Department, WAFIC, RecFishWest, Marine Tourism WA and charter boat operators and individual fishery licence holders of the commencement and completion of activities in the EP, rig move notices and any relevant exclusion zone information.
				The Department advises that the following commercial fishing interests exist in the proposed area: • Pearl Oyster Managed Fishery • Beche de Mer Fishery • Onslow Prawn Managed Fishery	The following commercial fisheries (State and Commonwealth) and fisheries stakeholders have been contacted, contact being licence holder direct (agreed engagement): • Pearl Oyster Managed Fishery (agreed engagement via the Pearl Producers Association) • Onslow Prawn Managed Fishery • Mackerel Managed Fishery • Pilbara Trawl Managed Fishery (included in consultation,	

				• Mackerel Managed Fishery • Pilbara Trawl Managed Fishery • Pilbara Trap Managed Fishery • Pilbara Line Fishery • Pilbara Development Crab Fishery • Marine Aquarium Managed Fishery • Specimen Shell Managed Fishery	note no active trawl fishing in any areas of the Wheatstone region) • Pilbara Trap Managed Fishery • Pilbara Line Fishery • Marine Aquarium Managed Fishery • Specimen Shell Managed Fishery • Western Tuna and Billfish • Western Skipjack Tuna • North West Slope Trawl The above stakeholders have received the Fact Sheet outlining the overall project and will be advised of the commencement and completion of activities, rig move notices and any relevant exclusion zone information.	
					Beche de Mer licence holders were not consulted. None of 6 licensed vessels fished for beche-de-mer in 2013. Industry has advised they are adopting a rotational fishing strategy for both the traditional sandfish Holothuria scabra fishery and recently discovered deepwater redfish A. echinites fishery. Fishing activity within the Western Australian fisheries is in a resting phase. In addition, the water depths for the Wheatstone operational area are beyond diving and wading depths required for this fishery. The fishing fleet is also based in the Northern Territory, therefore engagement or interaction with Chevron activities is considered to be highly unlikely. Fletcher, W.J. and Santoro, K. (eds). (2014). Status Reports of the Fisheries and Aquatic Resources of Western Australia 2013/14: The State of the Fisheries Department of Fisheries, Western Australia, pp 218 - 220 http://www.fish.wa.gov.au/Documents/sofar/status_reports_of_the_fisheries_and_aquatic_resources_2013-14.pdf	
					Pilbara Development Crab licence holders were not consulted. Crabbing activity along the Pilbara coast is centred largely on the inshore waters from Onslow through to Port Hedland, with most commercial and recreational activity occurring in and around Nickol Bay. Nickol Bay is not in the vicinity of this activity. Onslow Prawn fishers also retain crab as a by-product. Onslow Prawn licence holders have been consulted. Fletcher, W.J. and Santoro, K. (eds). (2014). Status Reports of the Fisheries and Aquatic Resources of Western Australia 2013/14: The State of the Fisheries Department of Fisheries, Western Australia, pp 222 – 224 http://www.fish.wa.gov.au/Documents/sofar/status_reports_of_the_fisheries_and_aquatic_resources_2013-14.pdf	

				Customary, recreational and charter fishing may also occur within the proposed area of activities.	**Customary fishing** – Chevron has consulted with aboriginal stakeholder groups, and understands that there is no customary fishing in the proposed area of activities. Customary fishing in the wider region is usually limited to recreational fishing from the beaches or in near shore areas up to a couple of kilometres from the mainland. **Recreational fishing** – Chevron has consulted with RecFishWest and fishing clubs in the area (agreed engagement) - Exmouth Game Fishing Club, Nickol Bay Sport Fishing Club, Onslow Visitor Centre and Port Hedland Game Fishing Club. **Charter fishing** - Chevron has consulted Marine Tourism WA (Marine Tourism WA on-sends to its member base) as well as Apache Charters, Blue Juice Charters, Coral Bay Discoveries, Heron Charters, Montebello Island Safaris, Pelican Charters, Point Samson Charters and Top Gun Charters. The above customary, recreational and charter fishing stakeholders have received the Fact Sheet outlining the overall project. Recreational and Charter fishing stakeholders will be advised of the commencement and cessation of major operations activities, rig movements and any relevant exclusion zone information.	
				Research indicates that Seismic surveys may alter fish behaviour during spawning and pre-spawning periods. The Department requests that Chevron specifically includes strategies in the EP to minimise impacts of its activities on fish spawning. It is preferable to avoid the times of the year that the following key fish species may be spawning within your proposed area of activities: • Blacktip shark – Nov – Dec • Goldband snapper – Jan – April • Rankin Cod – Aug – Oct • Red Emperor – Jan, Mar • Pink Snapper – May – Jul • Sandbar shark – Oct – Jan • Spanish mackerel – Aug - Nov	There are no seismic activities associated with the Wheatstone start-up and operations EP. The EP includes an impact assessment on values (including the potential impacts to fisheries, fish and fish habitat) and considers measures to ensure impacts associated with start-up and operations activities are reduced to as low as reasonable practicable (ALARP) in accordance with relevant legislation and regulations.	
				In the event of an spill or discharge of any pollutant into the environment. The Department requests that its spill response officer is contacted by phone (0430 070	The request from the Department has been noted and Chevron can confirm that the Department of Fisheries is listed in the Chevron Emergency Management Team contact list and reflects the contact details provided by the Department.	

				159) and by email (environment@fish.wa.gov.au) within 24 hours of Chevron reporting the incident to the appropriate authority		
				When developing the Pollution Emergency Plans (PEPs), the Department requests that Chevron collects baseline marine data to compare against any post-spill monitoring to determine the nature and extent of any impacts. This data should be made available to the Department on request.	Chevron has an activity and scenario-specific Oil Pollution Emergency Plan (OPEP) and an Oil Spill Monitoring Program (OSMP) as part of each EP. These documents are subject to DMP and NOPSEMA assessment. The OSMP includes a range of spill impact monitoring techniques, including, where practicable, the use of pre-impact baseline data and spatial reference/control site comparisons. It also outlines the baseline data which Chevron may use for comparison in the event of a spill from this activity.	
				In accordance with the Fish Resources Management Regulations 1995 (reg. 176(1) - the Department requires that all vessel managers and operators of immersible equipment minimise the risk of translocating pests and diseases into or within WA waters. Vessel hulls, sea chests and niche areas must be "clean" before each voyage The Department's policy requires that the suspected or confirmed presence of any marine pest or disease be reported within 24 hours by email (biosecurity@fish.wa.gov.au) or telephone (FishWatch tel. 1800 815 507) – including any organism listed in the Western Australian Prevention List for Introduced Marine Pests The above information to be forwarded directly to all vessel operators associated with the project	The EP specifies controls to minimize the risk of translocating pests and diseases into or within WA waters for vessels associated with the petroleum activity. This includes requirements for all relevant vessels to have a QPAR or Certificate of Pratique. Chevron can confirm that recordable and reportable incidents outlined within the EP will be reported in line with the petroleum regulations to DMP and NOPSEMA.	
				Chevron to consult / re-consult with the Department, WAFIC, RecFishWest and individual fishers in potentially affected fisheries there months prior to the commencement of any activity.	Significant modification to the activity or a new stage of the activity, not covered within the environment plans will be assessed in accordance with the Regulations to determine whether new or increased environmental impacts or risks exist and whether further consultation, revision and/or resubmission is required. Chevron will consult with the Department as required through this process.	Chevron to consult with the Department as required

Pearl Producers Association (PPA)	Interested party	Who: [redacted] When: September 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	Queried the pipeline route and possible interaction with pearl oyster fishery areas as it comes into the coast.	Reconfirmed previous communication noting "no issues" for both the Wheatstone Platform and Trunkline activities. Noted the Trunkline was complete and provided a summary of construction, noted it did not go through Mangrove Passage	Consulted Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact Association members
Professional Specimen Shell Fishermen's Association	Interested party	Who: [redacted] When: September 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact Association members
Western Australian Fishing Industry Council (WAFIC)	Interested party	Who: [redacted] When: October/November 2014 How: Email Outcome: Informed and updated	Define potential interaction with Commonwealth and WA State fisheries and relevant interested stakeholders	No reply	Summary of stakeholders engaged and feedback from the WA Department of Fisheries and commercial fisheries sector was sent to WAFIC As operations are estimated to continue for approximately thirty years, Chevron intention to provide updates on Wheatstone activities during operations to WAFIC, and also to seek two-way feedback on a 6 monthly basis and as required was confirmed	Consulted Ongoing 6 monthly engagement Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
FISHERIES - COMMONWEALTH & STATE	**Stakeholder Type**	**Engagement Logistics**	**Engagement Purpose**	**Stakeholder Response**	**Chevron Response**	**Status and Ongoing Communications**
A Raptis and Sons North West Slope Trawl	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Informed and Updated	Define potential interaction with amenity user	No reply	N/A	Consulted Active commercial fisher North West Slope Trawl fish between 200 and 700 metres water depth, Chevron to advise (if) there are any exclusion zones in this water depth range and to advise of any significant activity over and above operations which may potentially impact other ocean users
AustFish Onslow Prawn	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Informed and Updated	Define potential interaction with amenity user	No reply	N/A	Consulted Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users

Austral Fisheries North West Slope Trawl	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Informed and Updated	Define potential interaction with amenity user	No reply	N/A	Consulted Active commercial fisher North West Slope Trawl fish between 200 and 700 metres water depth, Chevron to advise (if) there are any exclusion zones in this water depth range and to advise of any significant activity over and above operations which may potentially impact other ocean users
Australian Coral Farms Marine Aquarium Fish	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Informed and Updated	Define potential interaction with amenity user	No reply	N/A	Consulted Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Ben Mitchell Marine Aquarium Fish	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Informed and Updated	Define potential interaction with amenity user	No reply	N/A	Consulted Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Blaslov Fishing Pty Ltd Western Skipjack & Western Tuna and Billfish	Interested party	Who: [redacted] When: October 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated Inactive License holder Agreed engagement is to keep them informed of Chevron activities in their license area, ongoing communication not required
Caroline M Fisheries Mackerel Fishery	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Agreed engagement, he will reply on a needs basis only Active commercial fisher Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users

Cowdenbeath Nominees Pty Ltd Western Tuna and Billfish	Interested party	Who: [redacted] When: October 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated Inactive License holder Agreed engagement is to keep them informed of Chevron activities in their license area, ongoing communication not required
C R and J F Cooper Mackerel Fishery	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Active commercial fisher Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Direction Fisheries Onslow Prawn	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Fat Marine Pty Ltd Pilbara Line	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Active commercial fisher Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Haysito Holdings Mackerel Fishery & Pilbara Line	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Active commercial fisher Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
K J Lockwood and M N Manifis T/as Western Offshore Fishing Charter Pilbara Trap	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Active commercial fisher Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users

K R Fisheries Onslow Prawn	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Chevron to advise (if) there are any exclusion zones and to advise of any new activity which may potentially impact other ocean users
M G Kailis Onslow Prawn, Pilbara Line, Pilbara Trawl	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Active commercial fisher Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Old Brown Dog Pty Ltd Pilbara Trap	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Active commercial fisher Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Onslow Seafoods Onslow Prawn	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Chevron to advise (if) there are any exclusion zones and to advise of any new activity which may potentially impact other ocean users
Peltown Pty Ltd Western Tuna and Billfish	Interested party	Who: [redacted] When: October 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated Inactive License holder Agreed engagement is to keep them informed of Chevron activities in their license area, ongoing communication not required
Peter Gillooly Western Tuna and Billfish	Interested party	Who [redacted] When: October 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated Inactive License holder Agreed engagement is to keep them informed of Chevron activities in their license area, ongoing communication not required

RNR Fisheries Pilabara Line	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Active commercial fisher Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Robert and Leigh James Mitchell Pilbara Line	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Active commercial fisher Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Seafresh Holdings North West Slope Trawl, Onslow Prawn Pilbara Trawl	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Active commercial fisher North West Slope Trawl fish between 200 and 700 metres water depth, Chevron to advise (if) there are any exclusion zones in this water depth range and to advise of any significant activity over and above operations which may potentially impact other ocean users
Simon Hawke Marine Aquarium Fish	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Simon is also a contact for Aquarium Specimen Collectors Association of WA Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Tasmanian Seafoods Onslow Prawn, Western Skipjack Tuna, Western Tuna and Billfish	Interested party	Who: [redacted] When: October 2014 How: Email Outcome: Informed and Updated	Advise interested party	No reply	N/A	Informed and updated Inactive License holder Agreed engagement is to keep them informed of Chevron activities in their license area, ongoing communication not required

Trevor Sutcliffe Specimen Shell	Interested party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Trevor is also the contact for Professional Specimen Shell Fishermen's Association Agreed engagement is to keep them informed of Chevron activities in their license area
Tuna West Western Tuna and Billfish	Interested party	Who: [redacted] When: October 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated Inactive License holder Agreed engagement is to keep them informed of Chevron activities in their license area, ongoing communication not required
Wayne McKenzie-Brown Marine Aquarium Fish, Specimen Shell	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Wayne is also a contact for Aquarium Specimen Collectors Association of WA Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Western Wild Fisheries (Miss Deb A Dell) Mackerel Fishery & Pilbara Line	Potentially affected party	Who: [redacted] When: October 2014 How: Email Outcome: Consulted	Define potential interaction with amenity user	No reply	N/A	Consulted Active commercial fisher Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
FISHERIES – RECREATIONAL	**Stakeholder Type**	**Engagement Logistics**	**Engagement Purpose**	**Stakeholder Response**	**Chevron Response**	**Status and Ongoing Communications**
Charter Boat Owners & Operators Association	Interested party	Who [redacted] When: September 2014 How: Email Outcome: Informed and updated	Define potential interaction with amenity user	No reply	As operations are estimated to continue for approximately thirty years, Chevron intention to provide updates on Wheatstone activities during operations to Marine Tourism WA, and also to seek two-way feedback (especially in relation to possible changes in charter boat activity in the area) on a 6 monthly basis and as required was confirmed	Consulted - Agreed engagement is to inform the Association who in turn on send to their member base. Ongoing 6 monthly engagement Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact Association members

Apache Charters	Potentially affected party	Who: [redacted] When: September 2014 How: Email Outcome: Informed and Updated	Define potential interaction with amenity user	No reply	N/A	Consulted Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Blue Juice Charters	Potentially affected party	Who: [redacted] When: September 2014 How: Email Outcome: Informed and Updated	Define potential interaction with amenity user	No reply	N/A	Consulted Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Coral Bay Discoveries	Potentially affected party	Who: [redacted] When: September 2014 How: Email Outcome: Informed and Updated	Define potential interaction with amenity user	No reply	N/A	Consulted Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Exmouth Deep Sea Fishing	Potentially affected party	Who: [redacted] When: September 2014 How: Letter Outcome: Informed and Updated	Define potential interaction with amenity user	No reply	N/A	Consulted Agreed engagement - does not require ongoing activity communications
Heron Charters	Potentially affected party	Who: [redacted] When: September 2014 How: Email Outcome: Informed and Updated	Define potential interaction with amenity user	No reply	N/A	Consulted Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Montebello Island Safaris	Potentially affected party	Who: [redacted] When: September 2014 How: Email Outcome: Informed and Updated	Define potential interaction with amenity user	No reply	N/A	Consulted Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Pelican Charters	Potentially affected party	Who: [redacted] When: September 2014 How: Email Outcome: Informed and Updated	Define potential interaction with amenity user	No reply	N/A	Consulted Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Point Samson Charters	Potentially affected party	Who: [redacted] When: September 2014 How: Email	Define potential interaction with amenity user	No reply	N/A	Consulted Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and

		Outcome: Informed and Updated				above operations which may potentially impact other ocean users
Top Gun Charters (Exmouth)	Potentially affected party	Who: [redacted] When: September 2014 How: Email Outcome: Informed and Updated	Define potential interaction with amenity user	No reply	N/A	Consulted Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
RecFishWest	Interested party	Who: [redacted] When: September 2014 How: Email Outcome: No issues	Define potential interaction with amenity user	No reply	Chevron confirmed intention to provide updates on the Wheatstone Project to RecFishWest, and also seek two-way feedback (especially in relation to possible changes in recreational fishing activity in the area) on a 6 monthly basis during operations and on a required basis	Consulted Ongoing 6 monthly engagement Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Exmouth Game Fishing Club	Potentially affected party	Who: [redacted] When: September 2014 How: Email Outcome: Informed and updated	Define potential interaction with amenity user	No reply	N/A	Consulted No reply expected, key follow-up as directed by RecFishWest Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Nickol Bay Sport Fishing Club	Potentially affected party	Who: [redacted] When: September 2014 How: Email Outcome: Informed and updated	Define potential interaction with amenity user	No reply	N/A	Consulted No reply expected, key follow-up as directed by RecFishWest Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Onslow Visitor Centre	Interested party	Who: [redacted] When: September 2014 How: Email Outcome: Informed and updated	Define potential interaction with amenity user	No reply	N/A	Consulted Onslow Visitors Centre provides an information service. Agreed engagement is to keep them informed of Chevron activities Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Port Hedland Game Fishing Club	Potentially affected party	Who: [redacted] When: September 2014 How: Email Outcome: Informed		No reply	N/A	Consulted No reply expected, key follow-up as directed by RecFishWest Chevron to advise (if) there are any

		and updated				exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
GOVERNMENT - COMMONWEALTH	**Stakeholder Type**	**Engagement Logistics**	**Engagement Purpose**	**Stakeholder Response**	**Chevron Response**	**Status and Ongoing Communications**
Australian Hydrographic Service (AHS)	Government agency	Who: [redacted] When: October 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users
Australian Maritime Safety Authority (AMSA)	Government agency	Who: Response Planning Officer When: October 2014 How: Email Outcome: Informed and updated	Define potential interaction with amenity user	Queried restriction areas, Notice to Mariners and Marine Traffic	Confirmed information premature at this point, confirmed further information will be sent as we move closer to operations	Informed and updated Chevron to advise (if) there are any exclusion zones and to advise of any significant activity over and above operations which may potentially impact other ocean users and ocean safety
Department of Broadband, Communication and the Digital Economy (DBCDE)	Government agency	Who: [redacted] When: October 2014 How: Email Outcome: Informed and updated	Advise interested party	Change of contact	Contact details updated	Informed and updated
Department of Defence Royal Australian Navy and Royal Australian Air Force Defence Property Services Group	Government agency	Who: [redacted] When: October 2014 How: Email Outcome: No issues	Advise interested party	Email acknowledged, noted no concerns	N/A	Informed and updated
Department of Defence (Border Protection Command)	Government agency	Who: Border Patrol liaison When: October 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated
GOVERNMENT - STATE	**Stakeholder Type**	**Engagement Logistics**	**Engagement Purpose**	**Stakeholder Response**	**Chevron Response**	**Status and Ongoing Communications**
Department of Parks and Wildlife (DPAW)	Government agency	Who: [redacted] When: October 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated
Department of Transport (DoT) - Harbour Master	Government agency	Who: [redacted] When: September 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated
Department of Transport (DoT) -	Government agency	Who: Navigational Safety	Advise interested party	No reply	N/A	Informed and updated

Navigational Safety		When: September 2014 How: Email Outcome: Informed and updated				
Department of Transport (DoT) - Pilabara Office	Government agency	Who: [redacted] When: September 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated
Port Authorities Pilbara Ports	Government agency	Who: [redacted] When: September 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated
GOVERNMENT - LOCAL	**Stakeholder Type**	**Engagement Logistics**	**Engagement Purpose**	**Stakeholder Response**	**Chevron Response**	**Status and Ongoing Communications**
Shire of Ashburton	Government agency	Who: [redacted] When: December 2014 How: Letter Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated
Shire of Roebourne	Government agency	Who: CEO When: December 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated
OTHER	**Stakeholder Type**	**Engagement Logistics**	**Engagement Purpose**	**Stakeholder Response**	**Chevron Response**	**Status and Ongoing Communications**
Onslow Chamber of Commerce (OCCI)	Interested party	Who: [redacted] When: December 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated
Onslow Community Reference Group (CRG)	Interested party	Who: Onslow Group When: November / December 2014 How: Email and CRG meeting of 3 December 2014 Outcome: Informed and updated	Advise interested party	No issues raised at the CRG meeting	N/A	Informed and updated The fact sheet and supporting information was distributed to CRG members on 27 November 2014 as part of the CRG meeting pre-reads and presented at the meeting on 3 December 2014. [redacted] Environmental Operations and Performance Team Lead for the Wheatstone Project, was at the CRG meeting to provide additional context and to answer any

						questions if required. No questions were raised.
Onslow Salt Pty Ltd	Interested party	Who: [redacted] When: December 2014 How: Letter Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated
Stations in the region - Mindaroo	Interested party	When: December 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated
Stations in the region - Peedamulla	Interested party	When: December 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated
Stations in the region - Urala (BHPB)	Interested party	When: December 2014 How: Email Outcome: Informed and updated	Advise interested party	No reply	N/A	Informed and updated

3.2 Communication and Engagement Plan

Table 3.2 summarises the objectives of specific consultation with respect to each relevant stakeholder; details of who is involved with the consultation, when the stakeholder is contacted, what is to be communicated and in what format for this EP and for activities over the life of the Wheatstone project. All issues raised during the environment consultation stage have been documented, assessed with respect to potential impacts, merit and possible resolution and the outcomes communicated back to the stakeholder (See Table 3.3).

Ongoing communications will be managed by the PGPA (Policy, Government and Public Affairs) department working with the environment team and Wheatstone Operations.

Any ongoing incoming stakeholder correspondence raising any concerns, objections or claims will be documented, assessed with respect to potential impacts, merit and possible resolution and the outcomes communicated back to the stakeholder in a timely manner.

Table 3.2 Communication and Engagement Plan

Communication
Communication and Engagement Plan

Project Name	Wheatstone Start-up and Operations
Creation Date	15-Oct-14
Last Updated	15-Dec-15

	Communication Trigger	When will we distribute the Comms	Method	Key Message / Objectives	Frequency	Who Owns Content	Who will deliver the message	Status and / or outcome
Interested Party Potentially affected party Government Agency	Initial project information	Prior to submission of EP	Email	Fact Sheet and map	Once	Environment Advisor / PGPA	PGPA	Delivered
Emergency Response	Initial project and potential response requirements information	Prior to submission of EP	Email	Fact Sheet and map, confirm response/monitoring capabilities	Once	Environment Advisor / PGPA	PGPA	Delivered
OSRL and AMOSC	Availability of OPEP	Will review their OPEP sections and will provide confirmation of capability	Email	Confirmation of OPEP	Once	Environment	PGPA	Delivered
OSRL, AMOSC and Department of Transport (OSRC unit)	Acceptance of OPEP by Regulator	When acceptance of OPEP by Regulator has been	Email	Final Regulator approved OPEP to be sent for their record	Once	Environment	PGPA	Ongoing
Department of Transport (OSRC Unit)	Any significant changes to activities impacting state waters	After identification of any significant changes	Email	To update DoT on any significant changes to activities which may impact state waters	As required	Environment	PGPA	As required
Western Australian Fisheries Industry Council (WAFIC)	To the end of EP stakeholder engagement	When stakeholder engagement is finished	Email	Summary of feedback from WA Fisheries and the commercial fisheries sector	Once	PGPA	PGPA	Delivered
Regulator / Government Agency	Confirmation of the commencement of Wheatstone Start-up and Operations activities (introduction of hydrocarbons)	Minimum of 10 days prior to commencement of Wheatstone Start-up and Operation activities	Email	Official notification of the commencement of Wheatstone Start-up and Operational Activities (introduction of hydrocarbons)	Once	Environment Advisor / Operations / PGPA	PGPA	Ongoing
Regulator / Government Agency	Confirmation of the completion of Wheatstone Start-up and Operations activities	Within 10 days of completing Wheatstone Start-up and Operation activities	Email	Official notification of ceasing of Wheatstone Start-up and Operational Activities	Once	Environment Advisor / Operations / PGPA	PGPA	Ongoing

	Communication Trigger	When will we distribute the Comms	Method	Key Message / Objectives		Who Owns Content	Who will deliver the message	Status and / or outcome
Onslow Community Reference Group (CRG)	Onslow CRG meetings	At Onslow CRG meetings held every two months	Meeting	Overall Onslow/Chevron/Wheatstone update information and community feedback	Ongoing	PGPA	PGPA	Ongoing
WA Department of Fisheries, AFMA, Marine Tourism WA and RecFishWest	To provide updates on the Wheatstone Project and seek two-way feedback on a 6 monthly basis during operations.	On a six monthly basis, the weeks of 1 March and 1 September	Email/ Phone	To provide a Wheatstone update and to seek feedback from stakeholders	Six monthly and on a needs basis	Operations / PGPA	PGPA	Ongoing
Interested party Potentially affected party Government Agency (based on agreed engagement for each stakeholder)	Over the course of Operations (30 years), Chevron to advise of any new activity over and beyond operational activities which may potentially impact ocean users and (if) there are any exclusion zones relating to this activity	Prior to activity occurring	Email	Location, start and finish dates	As required	Environment Advisor / Operations / PGPA	PGPA	As required
Interested Party Potentially affected party Government Agency	Significant changes not covered by the existing Plan which may potentially impact stakeholders	As required	Email	To update and seek stakeholder feedback	As required	Project owner / Environment Advisor / PGPA	PGPA	As required

3.3 Stakeholder Engagement Summary

Table 3.3 summarises specific concerns, objections, or claims raised by relevant stakeholders, including Chevron's assessment of the merit of these concerns, objections, or claims and Chevron's responses.

Table 3.3 Stakeholder Engagement Summary

Stakeholder	Concern, Objection or Claim	Assessment of Merit	Response
Australian Marine Oil Spill Response Centre (AMOSC)	Reviewed OPEP, requested Chevron cross-check the AMOSC on-line portal for current equipment/service; queried range of dispersants; queried range of agencies for termination end points.	Agreed engagement, AMOSC review of the OPEP. AMOSC is a key service provider in the event of an emergency response situation.	Suggested considerations raised internally at Chevron. Noted to AMOSC use of OSCA listed dispersants to align with the National Plan. Final regulator approved OPEP to be sent to AMOSC (Agreed engagement).
Australian Fisheries Management Authority (AFMA)	Requested continuing contact with the Fisheries involved.	Key Commonwealth agency for the sustainable management of Commonwealth fisheries, AFMA promote ongoing direct contact with the commercial fishers.	Ongoing contact to fisheries confirmed. As operations are estimated to continue for approximately fifty years, Chevron intention to provide updates on Wheatstone activities during operations and also to seek two-way feedback (especially in relation to Commonwealth fisheries in the area) on a 6-monthly basis and as required was confirmed.
Department of Fisheries Western Australia (WA) (DoF)	To allow us to provide up-to-date advice, we request that the WA Department of Fisheries (the Department) is notified a minimum of three months prior to the commencement of any new activities described in the Project Overview. Once notified, the	DoF is the key Western Australian state regulatory agency for the management of State fisheries and provides significant input for EP consideration.	The fact sheet and map were developed by Chevron Australia Pty Ltd (Chevron) to be inclusive of activities being undertaken during the operations phase, and covered by environment plans. Significant modifications to the activity or new stage of the activity not covered within the environment plan will be assessed in accordance with the Regulations to

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	Department will determine if there have been any significant changes to the information provided and would expect that any objections or claims resulting from these changes are resolved prior to commencement of any activity.		determine whether new or increased environmental impacts or risks exist and whether further consultation, revision and/or resubmission is required. Chevron notes the Department's request to be notified a minimum of three months prior to the commencement of new activities. Any objections or claims raised in relation to the activity will be dealt with appropriately and in accordance with the Regulations.
	The Wheatstone project has the potential to affect fish populations and the operations of fishers who harvest these resources. Because of this potential impact, the Department recommends that Chevron Australia Pty Ltd (Chevron) should consult with the Western Australian Fishing Industry Council (WAFIC), RecFishWest and individual licensed fishers regarding the overall proposal, including methods, and incorporate comments from this consultation in all existing and new EP submissions. Chevron will need to provide specific start and finish dates; the spatial extent of proposed activities (including any exclusion zones); and information on identified specific fishing interests, including previous consultation with		Chevron consults directly with WAFIC, RecFishWest and individual fishery licence holders. They have received the Fact Sheet outlining the overall project. WAFIC will also receive a summary of the feedback that Chevron has received from the commercial fishing sector and the Department. Comments from consultation with the above parties and relevant feedback from previous consultations with individual licensed fishers will be considered in the EP. The Department, WAFIC, RecFishWest and individual fishery licence holders will be advised of the commencement and completion of activities in the EP and any relevant exclusion zone information. This will be quite limited information considering it is a long term operations EP. Any objections or claims will be addressed to the satisfaction of the regulator prior to the

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	individual licensed fishers. Should there be any objections or claims during the consultation process, the Department requests that these matters are addressed to the satisfaction of the regulator prior to the commencement of the activity.		commencement of start-up and operations activity.
	The Department advises that the following commercial fishing interests exist in the proposed area: • Pearl Oyster Managed Fishery • Beche de Mer Fishery • Onslow Prawn Managed Fishery • Mackerel Managed Fishery • Pilbara Trawl Managed Fishery • Pilbara Trap Managed Fishery • Pilbara Line Fishery • Pilbara Development Crab Fishery • Marine Aquarium Managed Fishery • Specimen Shell Managed Fishery		The following commercial fisheries (State and Commonwealth) and fisheries stakeholders have been contacted, contact being licence holder direct (agreed engagement): • Pearl Oyster Managed Fishery (agreed engagement via the Pearl Producers Association) • Onslow Prawn Managed Fishery • Mackerel Managed Fishery • Pilbara Trawl Managed Fishery (included in consultation, note no active trawl fishing in any areas of the Wheatstone region) • Pilbara Trap Managed Fishery • Pilbara Line Fishery • Marine Aquarium Managed Fishery • Specimen Shell Managed Fishery • Western Tuna and Billfish • Western Skipjack Tuna • North West Slope Trawl The above stakeholders have received the Fact Sheet outlining the overall project and will be

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			advised of the commencement and completion of activities, rig move notices and any relevant exclusion zone information. Beche de Mer licence holders were not consulted. None of 6 licensed vessels fished for beche-de-mer in 2013. Industry has advised they are adopting a rotational fishing strategy for both the traditional sandfish *Holothuria scabra* fishery and recently discovered deepwater redfish *A. echinites* fishery. Fishing activity within the Western Australian fisheries is in a resting phase. In addition, the water depths for the Wheatstone operational area are beyond diving and wading depths required for this fishery. The fishing fleet is also based in the Northern Territory, therefore engagement or interaction with Chevron activities is considered to be highly unlikely. Fletcher, W.J. and Santoro, K. (eds). (2014). Status Reports of the Fisheries and Aquatic Resources of Western Australia 2013/14: The State of the Fisheries Department of Fisheries, Western Australia, pp 218 - 220 http://www.fish.wa.gov.au/Documents/sofar/status_reports_of_the_fisheries_and_aquatic_resources_2013-14.pdf Pilbara Development Crab licence holders were not consulted. Crabbing activity along the Pilbara coast is centred largely on the inshore

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			waters from Onslow through to Port Hedland, with most commercial and recreational activity occurring in and around Nickol Bay. Nickol Bay is not in the vicinity of this activity. Onslow Prawn fishers also retain crab as a by-product, Onslow Prawn licence holders have been consulted. Fletcher, W.J. and Santoro, K. (eds). (2014). Status Reports of the Fisheries and Aquatic Resources of Western Australia 2013/14: The State of the Fisheries Department of Fisheries, Western Australia, pp 222 – 224 http://www.fish.wa.gov.au/Documents/sofar/status_reports_of_the_fisheries_and_aquatic_resources_2013-14.pdf
	Customary, recreational and charter fishing may also occur within the proposed area of activities.		**Customary fishing** – Chevron has consulted with aboriginal stakeholder groups, and understands that there is no customary fishing in the proposed area of activities. Customary fishing in the wider region is usually limited to recreational fishing from the beaches or in near shore areas up to a couple of kilometres from the mainland. **Recreational fishing** – Chevron has consulted with RecFishWest and fishing clubs in the area (agreed engagement) - Exmouth Game Fishing Club, Nickol Bay Sport Fishing Club, Onslow Visitor Centre and Port Hedland Game Fishing Club. **Charter fishing** - Chevron has consulted

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			Marine Tourism WA (Marine Tourism WA on-sends to its member base) as well as Apache Charters, Blue Juice Charters, Coral Bay Discoveries, Heron Charters, Montebello Island Safaris, Pelican Charters, Point Samson Charters and Top Gun Charters. The above customary, recreational and charter fishing stakeholders have received the Fact Sheet outlining the overall project. Recreational and Charter fishing stakeholders will be advised of the commencement and cessation of major operations activities, rig movements and any relevant exclusion zone information.
	Research indicates that Seismic surveys may alter fish behaviour during spawning and pre-spawning periods. The Department requests that Chevron specifically includes strategies in the EP to minimise impacts of its activities on fish spawning. It is preferable to avoid the times of the year that the following key fish species may be spawning within your proposed area of activities: • Blacktip shark – Nov – Dec • Goldband snapper – Jan – April • Rankin Cod – Aug – Oct • Red Emperor – Jan, Mar • Pink Snapper – May – Jul		There are no seismic activities associated with the Wheatstone start-up and operations EP. The EP includes an impact assessment on values (including the potential impacts to fisheries, fish and fish habitat) and considers measures to ensure impacts associated with start-up and operations activities are reduced to as low as reasonable practicable (ALARP) in accordance with relevant legislation and regulations.

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	• Sandbar shark – Oct – Jan • Spanish mackerel – Aug - Nov		
	In the event of an spill or discharge of any pollutant into the environment. The Department requests that its spill response officer is contacted by phone (0430 070 159) and by email (environment@fish.wa.gov.au) within 24 hours of Chevron reporting the incident to the appropriate authority.		The request from the Department has been noted and Chevron can confirm that the Department of Fisheries is listed in the Chevron Emergency Management Team contact list and reflects the contact details provided by the Department.
	When developing the Pollution Emergency Plans (PEPs), the Department requests that Chevron collects baseline marine data to compare against any post-spill monitoring to determine the nature and extent of any impacts. This data should be made available to the Department on request.		Chevron has an activity and scenario-specific Oil Pollution Emergency Plan (OPEP) and an Oil Spill Monitoring Program (OSMP) as part of each EP. These documents are subject to DMP and NOPSEMA assessment. The OSMP includes a range of spill impact monitoring techniques, including, where practicable, the use of pre-impact baseline data and spatial reference/control site comparisons. It also outlines the baseline data which Chevron may use for comparison in the event of a spill from this activity.
	In accordance with the Fish Resources Management Regulations 1995 (reg. 176(1) - the Department requires that all vessel managers and operators of immersible equipment minimise the risk of translocating pests and diseases into or within WA waters. Vessel hulls, sea chests and niche areas must be "clean" before each voyage. The Department's policy requires that the suspected or confirmed presence of		The EP specifies controls to minimize the risk of translocating pests and diseases into or within WA waters for vessels associated with the petroleum activity. This includes requirements for all relevant vessels to have a QPAR or Certificate of Pratique. Chevron can confirm that recordable and reportable incidents outlined within the EP will be reported in line with the petroleum regulations to DMP and NOPSEMA.

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	any marine pest or disease be reported within 24 hours by email (biosecurity@fish.wa.gov.au) or telephone (FishWatch tel. 1800 815 507) – including any organism listed in the Western Australian Prevention List for Introduced Marine Pests. The above information to be forwarded directly to all vessel operators associated with the project.		
	Chevron to consult / re-consult with the Department, WAFIC, RecFishWest and individual fishers in potentially affected fisheries there months prior to the commencement of any activity.		Significant modification to the activity or a new stage of the activity not covered within the environment plans will be assessed in accordance with the Regulations to determine whether new or increased environmental impacts or risks exist and whether further consultation, revision and/or resubmission is required. Chevron will consult with the Department as required through this process.
Pearl Producers Association (PPA)	Queried the pipeline route and possible interaction with pearl oyster fishery areas as it comes into the coast.	The PPA is the key representative body and communication authority for pearl fishery aquaculture and license holders and raises queries on behalf of its members.	Reconfirmed previous communication noting "no issues" for both the Wheatstone Platform and Trunkline installation activities. Noted the Trunkline was complete and provided a summary of construction, noted it did not go through Mangrove Passage.
Australian Maritime Safety Authority (AMSA)	Queried restriction areas, Notice to Mariners/AusCoast warnings and Marine Traffic.	AMSA is the key Commonwealth body for marine safety.	Confirmed information premature at this point, confirmed further information will be sent as we move closer to operations.