



Gorgon Gas Development and Jansz Feed Gas Pipeline: Offshore Feed Gas Pipeline Prelay Activities - Summary Environment Plan

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Terms, Definitions and Abbreviations

AFMA	Australian Fisheries Management Authority
AMSA	Australian Maritime Safety Authority
AQIS	Australian Quarantine and Inspection Service
AS/NZS	Australian Standard/ New Zealand Standard
CO ₂	Carbon dioxide
DMP	Western Australian Department of Mines and Petroleum (formerly Western Australia Department of Industry and Resources [DoIR])
EPBC	Environment Protection and Biodiversity Conservation
FFPV	Flexible Fall-pipe Vessel
GDA	Geocentric Data of Australia
HFO	Heavy Fuel Oil
IMDG	International Maritime Dangerous Goods
km	Kilometres
LNG	Liquefied Natural Gas
m	Metres
MARPOL	The International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. Also known as MARPOL 73/78.
MFO	Marine Fauna Observer
MGA	Map Grid of Australia
mm	Millimetres
MSDS	Material Safety Data Sheet
MTPA	Million Tonnes Per Annum
nm	Nautical Miles
ODS	Ozone Depleting Substance
ppm	Parts Per Million
PTS	Pipeline Termination Structure
ROV	Remotely Operated Vehicle
SEWPaC	Commonwealth Department of Sustainability, Environment, Water, Population and Communities (formerly Commonwealth Department of the Environment, Water, Heritage and the Arts [DEWHA])

SOPEP Shipboard Oil Pollution Emergency Plan

UTM Universal Transverse Mercator. UTM coordinate system is a grid-based method of specifying locations on the surface of the Earth that divides the world into 60 zones, each being 6 degrees longitude wide, and extending from 80 degrees south latitude to 84 degrees north latitude

1.0 Background

Chevron Australia proposes to develop the gas reserves of the Greater Gorgon Area. Subsea gathering systems and subsea pipelines will be installed to deliver feed gas from the Gorgon and Jansz–lo gas fields to the west coast of Barrow Island. The feed gas pipeline system will be buried as it traverses from the west coast to the east coast of the Island where the system will tie in to the Gas Treatment Plant located at Town Point. The Gas Treatment Plant will comprise of three Liquefied Natural Gas (LNG) trains capable of producing a nominal capacity of five Million Tonnes Per Annum (MTPA) per train. The Gas Treatment Plant will also produce condensate and domestic gas. Carbon dioxide (CO₂), which occurs naturally in the feed gas, will be separated during the production process. As part of the Gorgon Gas Development, the separated CO₂ will be injected into deep formations below Barrow Island. The LNG and condensate will be loaded from a dedicated jetty offshore from Town Point and then transported by dedicated carriers to international markets. Gas for domestic use will be exported by a pipeline from Town Point to the domestic gas collection and distribution network on the mainland.

2.0 Activity and Location

Chevron Australia plans to install a gravel blanket (or rock foundation) for one of its buckle initiators between the Gorgon Drill Centre M1 and the midline Pipeline Termination Structure (midline PTS) flowline route (see Table 2–1 and Figure 2-2).

Table 2–1 Approximate Location of the Proposed Rock Foundation

Location	MGA Coordinates (GDA94) UTM 80 Zone 50	
	Latitude, Longitude	Easting, Northing
Rock Foundation Location	20° 25' 31" S, 114° 51' 31" E	276 563 mE, 7 739 986 mN

This buckle initiator is to be located in an area of irregular rocky seabed and the rock foundation is required to provide a level seabed so as to ensure the serviceability of the buckle initiator. The rock foundation will have a dimension of approximately 47 m × 12.5 m × 0.3 m (minimum) high (see Figure 2-1), comprising approximately 300 m³ of gravels.

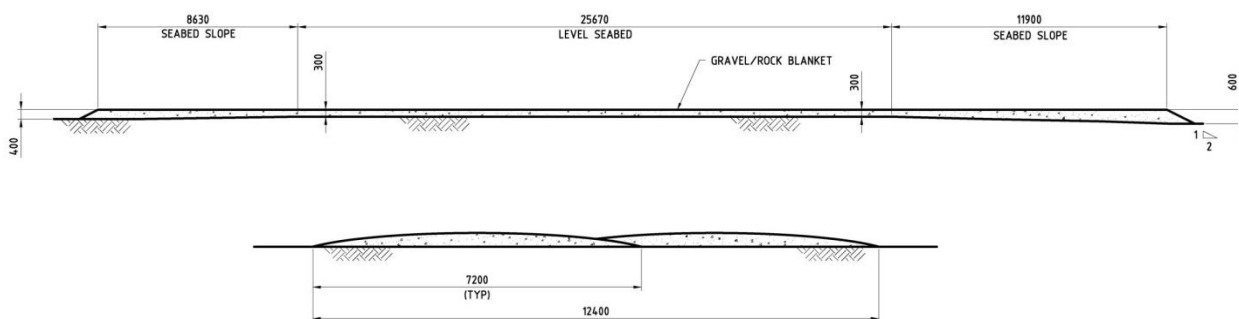


Figure 2-1 Rock Foundation Profile

The gravels will be installed by a Flexible Fall-pipe Vessel (FFPV) to ensure the accurate placement of the gravel materials. The quantity of gravels placed will be controlled by controlling the speed of the conveyor belt used to transport the gravels from the vessel into the fall-pipe.

Pre-survey, intermediate and post-installation surveys will also be carried out from the FFPV by the fall-pipe Remotely Operated Vehicle (ROV) to validate the existing bathymetry data, to monitor the installation progress, and to confirm the final profile of the rock foundation.

A supply vessel may be used for supply operation during the proposed activities. The base for the supply vessel will be either Dampier or Perth. No aircraft are intended to be used in association with the rock foundation works (other than in an emergency).

The work is expected to be completed within three days and will take place between January and June 2011.

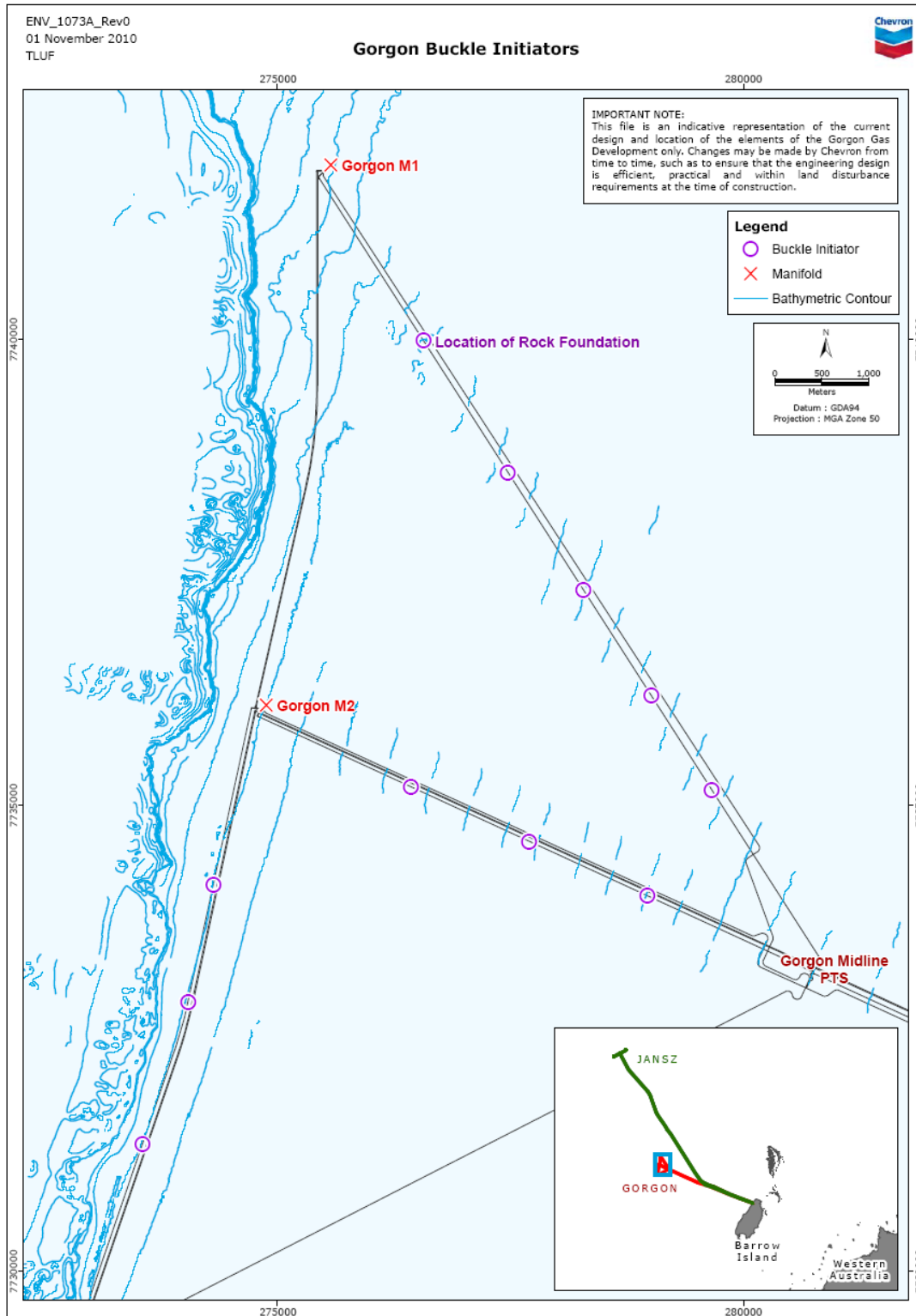


Figure 2-2 Rock Foundation Location

3.0 Receiving Environment

The proposed rock foundation location is not located within any marine reserve or conservation area. The nearest marine protected area, the Barrow Island Marine Management Area, is located approximately 60 km to the south-east.

The climate of the area is arid and subtropical, with warm, dry winters from June to August and hot, humid summers between October and March. The months of April, May and September are considered a transition season during which either the summer or winter weather regime may predominate or conditions may vary between the two. Rainfall is low and extremely variable, with the annual average for Barrow Island being 320 mm. Tropical cyclone activity occurs in the region, mostly between November and April.

The prevailing oceanic conditions in the Barrow Island region are governed by a combination of sea and swell waves. Sea waves are shorter period waves generated by local winds, whereas swell waves are generated by distant storms. Tides in the Barrow Island region are semidiurnal, comprising two high tides and two low tides per day. The tidal gradients are strong, and aligned in a north-south direction.

The proposed rock foundation installation is located in water approximately 190 m deep. The seabed in the area is a broad, relatively smooth, west-north-west dipping sea floor that forms part of the margin of the north-western continental shelf of Australia. Rock outcroppings were found where the rock foundation is proposed.

The seabed sediments in the area are dominated by surficial uncemented sediments, consisting of silty mud and soft to firm muddy silty sand. The soft sediments are heavily bioturbated indicating an active infauna assemblage, which is typically dominated by polychaete worms and crustaceans that burrow into the sediment. This assemblage is widely distributed in similar depths along the edge of the continental shelf, thus none of the invertebrate assemblages are considered to be of local or regional significance.

Several species of whale and dolphin are known to occur in the region. Humpback Whales are known to pass through the Barrow Island region between June and October on their annual migration between their summer feeding grounds and their subtropical winter calving grounds. However, the rock foundation is located outside their known migration route. Blue Whale migration patterns are thought to be similar to Humpback Whales, with most migrating annually to Antarctic waters in early summer and leaving in autumn to breed in deep tropical waters. However, the Blue Whale tends to be more widely dispersed in its migration and rarely presents in large numbers outside aggregation areas, the nearest of which is located approximately 1200 km to the south at the Perth Canyon.

Other cetaceans that may occur in the region include Antarctic Minke, Bryde's, Killer, and Sperm Whales as well as Striped, Risso's, Spotted and Rough-toothed Dolphins. However, the proposed rock foundation is not known as a recognised breeding, feeding or migratory area for any cetacean species.

Five of the six species of marine turtle found in Western Australia are known to occur in the region. Of these, Green and Flatback Turtles regularly nest on the sandy beaches of Barrow Island, approximately 60 km south-east of the proposed rock foundation location.

Over 508 fish species have been identified in the region, including a number of species important to commercial and recreational fisheries. However, the deep offshore environment of the proposed rock foundation location is typical of the region and is not expected to represent habitat of particular importance to these fish.

The North West Shelf region has been subjected to extensive petroleum exploration and production activities since the late 1960s. The nearest oil and gas production facility to the proposed rock foundation location is the John Brookes platform, approximately 20 km east. Other activities in the region include low levels of commercial fishing and shipping activities. Little marine-based tourism occurs in the proposed work locations due to the area's isolation from major mainland centres and lack of visitor facilities.

4.0 Major Environmental Hazards and Control

Chevron Australia has conducted an environmental risk assessment of all aspects of the proposed rock foundation works in accordance with Australian Standard/New Zealand Standard (AS/NZS) Handbook 203:2006 Environmental Risk Management – Principles and Process (Standards Australia/Standards New Zealand 2006). The analysis indicates that, with the proposed management/mitigation measures implemented, no aspects or impacts assessed as having significant residual risk are expected (see Table 7–1).

5.0 Summary of Management Approach

Chevron Australia's overall objective is to ensure that the rock foundation works are conducted in a manner that protects environmental values and reduces impacts to the environment as far as practicable.

To achieve this, the proposed activities will be conducted within Chevron Australia's Operational Excellence Management System, which provides a systematic approach to the management of safety, health, environment, reliability and efficiency.

The key management objectives and commitments to be applied during the proposed activities are summarised in Table 7–1.

6.0 Consultation

Chevron Australia is committed to open and accountable processes that encourage stakeholder engagement throughout all stages of Gorgon Gas Development and Jansz Feed Gas Pipeline. An extensive and ongoing stakeholder engagement program that builds on the proactive approach to consultation commenced in early 2002 and has continued until now.

Consultations and/or notifications have been undertaken, and will continue as required, with relevant stakeholders, including:

- Australian Fisheries Management Authority (AFMA)
- Western Australian Department of Fisheries
- Western Australia Fishing Industry Council
- Pearl Producers Association
- Charter Boats Users and Operators Association
- Nickol Bay Professional Fishermens Association Inc.
- Recfishwest (WA recreational fishers representation)
- Pilbara Fish Trap
- Austral Fisheries.

7.0 Further Information

Further information may be obtained by writing to:

Ashley Geneve
Offshore Construction Manager
PO Box 7869
Cloister Square WA 6850

Table 7–1 Environmental Risks and Management Measures

Aspects	Potential Environmental Impacts	Management and Mitigation Measures	Residual Risk
Interference with other marine users	<ul style="list-style-type: none"> FFPV creates obstacle to other vessel movements Restrict access to the proposed area 	<ul style="list-style-type: none"> Consultation with commercial fishing groups to advise them of the planned movements and schedule of the proposed works Activities are of short duration and limited spatial extent 	Low
	<ul style="list-style-type: none"> Adverse impacts to other oil and gas facilities 	<ul style="list-style-type: none"> No nearby oil and gas facilities in the vicinity of the proposed activities 	Low
Interference with marine fauna	<ul style="list-style-type: none"> Injury/mortality resulting from vessel strike 	<ul style="list-style-type: none"> Area is not known as having significant concentration of marine fauna Vessel will adhere to Part 8 of EPBC Regulation and 2005 Australian Guideline to Whale Watching (Department of Environment and Heritage 2006) Project personnel will not be permitted to feed, harass, capture, disturb, harm, or kill marine fauna on or near the worksite Vessel Master or delegate will be trained as the Marine Fauna Observer (MFO) and used during daylight hours when the vessel is moving at a speed greater than 5 knots within the project area to minimise risks of marine fauna injury/mortality due to vessel strike. The MFO will be trained in the actions to be taken in the event of marine fauna sightings, injury or mortality Marine megafauna (whales, dolphins, turtles) sighting reports will be completed and submitted to the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) via the Australian Antarctic Division 	Low
	<ul style="list-style-type: none"> Injury/mortality resulting from entanglement 	<ul style="list-style-type: none"> Vessel used in the proposed activities will be dynamically positioned (no mooring lines and anchors) Equipment will be deployed using taut/rigid lines 	Low
Artificial light	<ul style="list-style-type: none"> Disorientate marine fauna such as birds Increase incidents of marine fauna interactions with vessel and equipment Cause greater concentration of adaptable species leading to increased mortality of food source 	<ul style="list-style-type: none"> Lighting will be kept to that required for safety and navigation in accordance with Long-term Marine Turtle Management Plan (Chevron Australia 2009). Activities are of short duration (≤3 days) Activities are of significant distance to known sensitive area (>60 km from turtle nesting beaches, bird colonies) 	Low

Aspects	Potential Environmental Impacts	Management and Mitigation Measures	Residual Risk
Underwater noise	<ul style="list-style-type: none"> Mask biologically important sounds Disturb marine fauna normal behaviour resulting in possible displacement from areas Cause temporary or permanent reductions in hearing sensitivity 	<ul style="list-style-type: none"> Activities will comply with Part 8 of the EPBC Regulations 2000 Vessel will operate in accordance with appropriate industry and equipment noise and vibration standards Regular maintenance will be conducted to the manufacturers' specifications Engines, thrusters and auxiliary plants will not be left in stand-by or running mode unnecessarily 	Low
Seabed disturbance	<ul style="list-style-type: none"> Direct loss of sensitive or ecologically important benthic communities from within the trenches area 	<ul style="list-style-type: none"> Vessel will be dynamically positioned with no anchor All equipment on board the vessel will be stowed securely to prevent solid objects that may present potential snagging or navigation hazards from falling overboard 	Low
	<ul style="list-style-type: none"> Increased turbidity of the water column leading to adverse impacts to marine life 	<ul style="list-style-type: none"> The location of any lost material will be recorded and, where objects are not recoverable, notification to the appropriate authorities will be given (Department of Mines and Petroleum [DMP], Australian Maritime Safety Authority [AMSA], SEWPaC). 	Low
	<ul style="list-style-type: none"> Burial of ecologically important benthic communities from sediment settlements 	<ul style="list-style-type: none"> Habitat types are widespread in the region Benthic fauna in the region is depauperate Turbidity levels will return to normal soon after the completion of the proposed works 	Low
Cultural Heritage disturbance	<ul style="list-style-type: none"> Damage to shipwrecks or relics 	<ul style="list-style-type: none"> No shipwrecks are recorded within a radius of 15 nm (28 km) of the proposed location Should any shipwreck or relics be discovered, Chevron Australia will provide the SEWPaC Maritime Heritage Section with written notification 	Low
Discharge of sewage, greywater and putrescible wastes	<ul style="list-style-type: none"> Increased nutrient availability and Biological Oxygen Demand Adversely impacting the visual amenity of the surrounding environment Localised pollution of the water column leading to adverse impacts to marine life 	<ul style="list-style-type: none"> Compliance to MARPOL Annex IV – Prevention of Pollution by Sewage from Ships and Annex V – Prevention of Pollution by Garbage from Ships, including: <ul style="list-style-type: none"> Inspection of treatment system will be conducted on a regular basis 	Low

Aspects	Potential Environmental Impacts	Management and Mitigation Measures	Residual Risk
Discharge of deck drainage	<ul style="list-style-type: none"> Localised pollution of the water column leading to adverse impacts to marine life 	<ul style="list-style-type: none"> High standards of housekeeping will be maintained in all areas, including keeping the area litter free Only limited and fit-for-purpose hazardous and dangerous materials will be kept on the vessel and they will be stored and handled in accordance with legal requirements, industry standards and Material Safety Data Sheet (MSDS) requirements A complete inventory of all hazardous materials stored on the vessel will be maintained on board, together with a complete up-to-date set of MSDSs for each hazardous or dangerous goods substance All maintenance activities on vessel that have the potential to result in leaks or spills will be contained (e.g. activities undertaken in bunded areas, use drip trays or sheets) Spill containment and recovery equipment will be provided where spills are possible and will be maintained to ensure that it is readily available and in working condition In the event of a spill or leak on deck and if it is safe to do so, vessel scuppers will be closed to ensure any contaminants on deck are not discharged into the ocean In the event of a spill or leak on deck, spilled materials will be cleaned and removed prior to any deck wash-down activities Fully biodegradable and phosphate-free detergent selected for wash-down, where practicable Low level of contamination and high dilution in offshore environment 	Low
Discharge from equipment/machinery space	<ul style="list-style-type: none"> Localised pollution of the water column leading to adverse impacts to marine life 	<ul style="list-style-type: none"> Oily water from equipment/machinery space will be treated to an oil-in-water concentration of 15 ppm An oily water monitor, which is routinely calibrated and maintained, will continuously monitor the discharge stream Collected oil will be transported onshore as waste to a government-approved waste disposal facility Each shipment of wastes to the onshore facility will be accompanied by a waste manifest and recorded in a waste transfer book 	Low
Discharge of cooling water	<ul style="list-style-type: none"> Behavioural changes, minor stress and potential mortality of marine fauna from prolonged exposure to elevated water temperature 	<ul style="list-style-type: none"> Relatively small quantity of cooling water discharged to highly dispersive marine environment 	Low
	<ul style="list-style-type: none"> Localised pollution of the water column leading to adverse impacts to marine life 	<ul style="list-style-type: none"> The seawater cooling is segregated from all oil services, preventing oil contamination of the cooling water discharge stream Only small quantity of biocide used 	Low

Aspects	Potential Environmental Impacts	Management and Mitigation Measures	Residual Risk
Emissions of combustion products	<ul style="list-style-type: none"> Decline in local air quality Contribute to global atmospheric concentrations of greenhouse gases 	<ul style="list-style-type: none"> Emissions from marine utilities will be in accordance with the guidelines of MARPOL Annex VI Equipment will be maintained in accordance with the manufacturers' specifications Highly dispersive offshore environment with no sensitive receptors nearby 	Low
Emissions of ozone depleting substances	<ul style="list-style-type: none"> Contribute to the destruction of ozone layers 	<ul style="list-style-type: none"> Vessel will comply with the requirements for Ozone Depleting Substances (ODS) specified in Regulation 12 of Annex VI of MARPOL 73/78, including the prohibition of deliberate release of ODS Any systems containing ODS that need recharging or replacement will be exchanged to an 'ozone friendly' system, wherever options are available Any personnel handling ODS will be certified and hold the necessary permits and licences Requirements for recording and reporting the use and disposal of ODS under the Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995 will be adhered to 	Low
Discharge of ballast water	<ul style="list-style-type: none"> Competition with native fauna and flora for resources such as food and shelter 	<ul style="list-style-type: none"> Vessel will be required to conform to the requirements of Australian Quarantine and Inspection Service (AQIS) Australian Ballast Water Management Activities are conducted in remote location (>12 m) and deep water location (>50 m) 	Low
Biofouling	<ul style="list-style-type: none"> Introduction of disease and pathogens Detrimental impacts to aquaculture and fisheries 	<ul style="list-style-type: none"> Vessel hull will be cleaned prior to mobilisation to Australian waters Activities are conducted in remote location (>12 nm) and deep water location (>50 m) 	Low

Aspects	Potential Environmental Impacts	Management and Mitigation Measures	Residual Risk
Disposal of wastes and hazardous materials	<ul style="list-style-type: none"> Reduce water quality Injury/mortality (e.g. through ingestion or entanglement). Create minor incremental increase in the rate at which onshore disposal facilities reach their storage capacity resulting in the incremental increase in land disturbance 	<ul style="list-style-type: none"> Reduce wastes being generated in the first place, whenever practicable No disposal of wastes (except for those approved by MARPOL) into the marine environment Appropriate waste handling equipment, waste storage containers and spill response equipment will be provided at the waste storage area Wastes will be segregated at the source and stored in clearly marked, covered bins secured to the deck to prevent contamination of the various waste streams and to prevent litter Wastes (except for those approved by MARPOL to be discharged) returned to the mainland will be re-used, recycled or disposed in government-approved recycling or waste disposal facility Wastes designated as hazardous or dangerous goods will be identified, packaged, segregated, handled, stored, transported and tracked in accordance with legal requirements and industry standards, such as applicable International Maritime Dangerous Goods (IMDG) requirements Any unidentified wastes will be regarded as hazardous waste and handled and stored accordingly Controlled wastes (such as clinical wastes and oil/water mixture) returned to the Western Australian mainland will be managed in accordance with the Western Australian Environmental Protection (Controlled Waste) Regulations 2004 	Low
Diesel spills – vessel collision/grounding	<ul style="list-style-type: none"> Acute and chronic toxicity to marine life 	<ul style="list-style-type: none"> No refuelling will be undertaken at the proposed location; refuelling will be undertaken in port when necessary Vessel will adhere to maritime standards and procedures, including maintaining specific lights configuration and radar/watch Only personnel who are fully trained and competent in navigation and communication procedures will be used 	Low
Heavy Fuel Oil (HFO) spills – vessel collision/grounding	<ul style="list-style-type: none"> Oiling of birds Shoreline pollution Disrupt fishing activities 	<ul style="list-style-type: none"> Notice to mariners will be posted to alert fishermen and other vessels in the area Marine operations will cease operating and seek safe harbour (or deep water) where extreme conditions make it unsafe to continue the proposed activities Marine Oil Pollution Plan to ensure a rapid and appropriate response Sufficient Shipboard Oil Pollution Emergency Plan (SOPEP) equipment will be carried on board to deal with an on-deck spill 	Low

8.0 References

Chevron Australia. 2009. *Gorgon Gas Development and Jansz Feed Gas Pipeline Long-term Marine Turtle Management Plan*. Chevron Australia, Perth, Western Australia. (G1-NT-PLNX0000296)

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