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Environment Plan Summary

Gorgon DomGas Pipeline Operations

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1 Introduction

1.1 Overview

This public disclosure summary document of the Gorgon Domestic Gas (DomGas) Operations Environment Plan (EP) has been submitted to comply with State Petroleum Environment Regulations and aligns with the Department of Mines, Industry Regulation and Safety's' (DMIRS) Guideline for the Development of Petroleum and Geothermal Environment Plans in Western Australia.

This EP Summary document has been prepared in accordance with Regulation 11(8) of the Petroleum (Submerged Lands) (Environment) Regulations 2012, and the Petroleum Pipelines (Environment) Regulations 2012.

1.2 Background

Chevron Australia Pty Ltd (CAPL) is the operator and licensee of the Gorgon DomGas Pipeline via Pipeline Licences TPL/24 and PL 92. The DomGas Pipeline transports gas for domestic use between the Gorgon Gas Treatment Plant on Barrow Island and the domestic gas collection and distribution network on the Western Australian (WA) mainland.

This EP Summary document summarises the Gorgon DomGas Pipeline Operations Environment Plan (EP) (GOR-COP-0660). This document applies to the petroleum activities associated with operating the Gorgon DomGas Pipeline.

1.3 Location

The DomGas Pipeline is approximately 91.5 km long in total and is located between Barrow Island and the Western Australian mainland, approximately 90 km north-east of Onslow and 120 km south-east of Karratha (Figure 1-1).

The offshore section (TPL/24) extends from the Gorgon Liquefied Natural Gas Jetty on the east coast of Barrow Island to the mainland shore crossing low water mark. The onshore section (PL 92) extends from the low water mark through a 12 km intertidal zone, an 18 km onshore easement to a meter station, and then continues a further 1.5 km to where it ties in to the Dampier to Bunbury Natural Gas Pipeline (DBNGP).

Coordinates for the DomGas Pipeline are provided in Table 1-1.

Table 1-1: DomGas Pipeline Coordinates

Pipeline Section	Licence	Start Point (GDA 1994)	End Point (GDA 1994)
Offshore	TPL/24	Zone 50 7 698 728.89 m N Zone 50 342 362.08 m E	Zone 50 7 657 245.18 m N Zone 50 378 842.97 m E
Onshore	PL 92	Zone 50 7 657 245.18 m N Zone 50 378 842.97 m E	Zone 50 7 627 313.9 m E Zone 50 391 082.4 m E

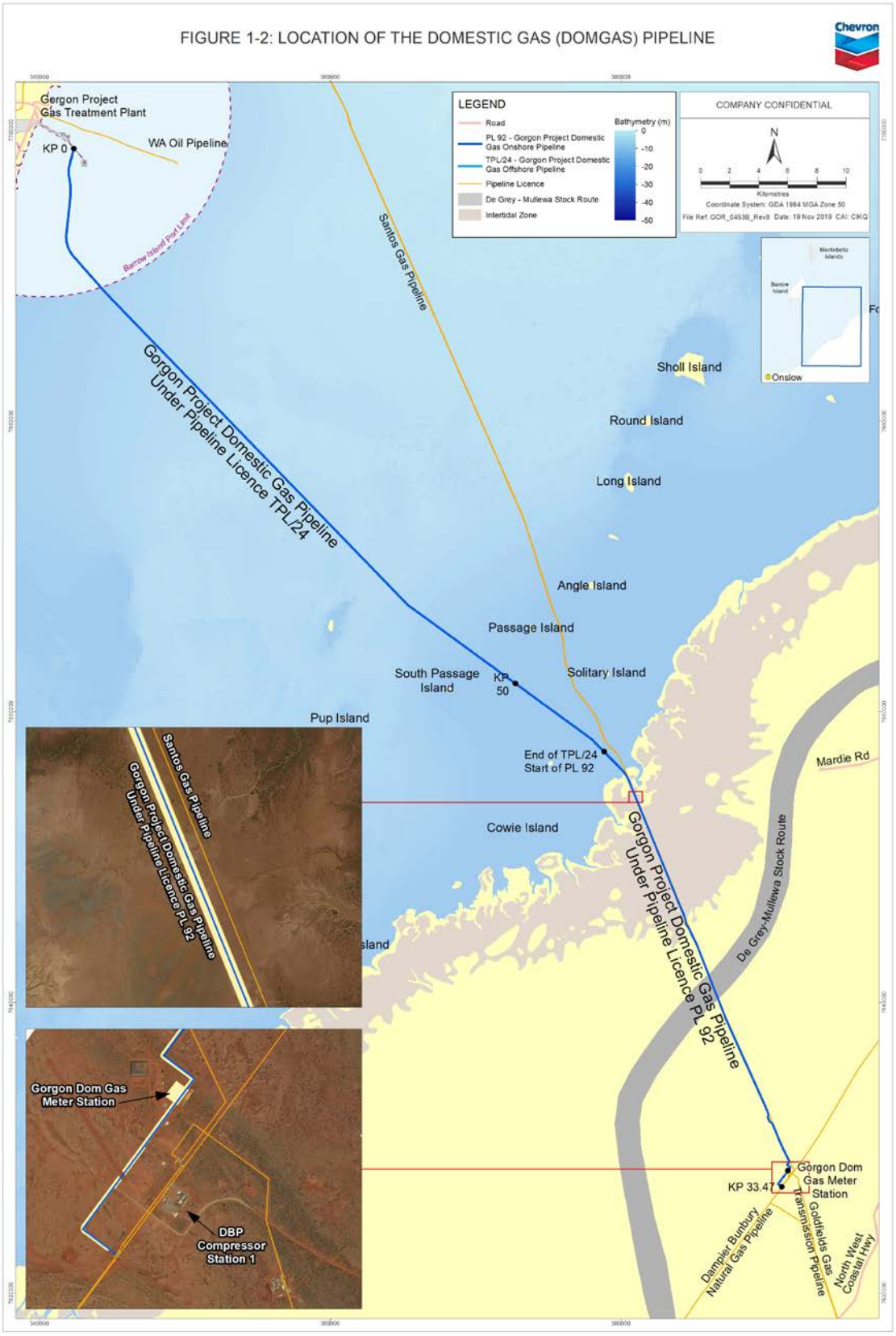

Figure 1-1: Location of the Gorgon DomGas Pipeline

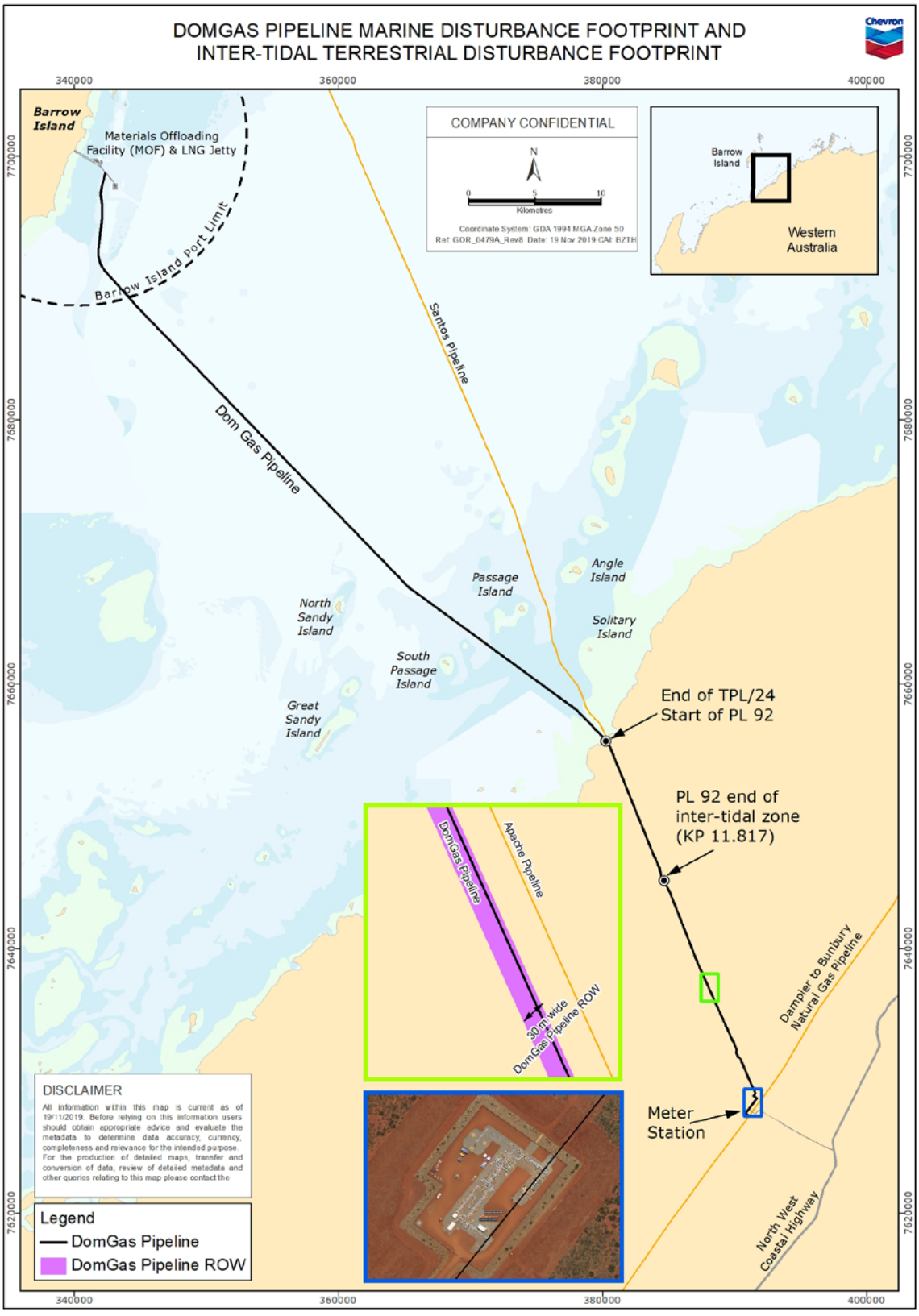

Figure 1-2: DomGas Pipeline Corridor

1.4 Instrument Holder/Operator Details

CAPL is nominated as the operator on behalf of the titleholders (Table 1-2) for the Gorgon DomGas Pipeline.

Table 1-2: Titleholder Details

Titles	Titleholders	Operator	Address
TPL/24 PL 92	• Chevron (TAPL) Pty Ltd • Shell Australia Pty Ltd • Mobil Australia Resources Company Pty Ltd • Tokyo Gas Gorgon Pty Ltd • Osaka Gas Gorgon Pty Ltd • JERA Gorgon Pty Ltd	Chevron Australia Pty Ltd	QV1, 250 St Georges Terrace, Perth, WA, 6000

In accordance with the Petroleum (Environment) Regulations 2012, contact details for the operator, CAPL, are listed in Table 1-3.

Table 1-3: Operator Contact Details

Company Name	Chevron Australia Pty Ltd
Nominated Liaison Person	Melissa Smith
Position	PGPA Operations Manager
Business Address	GPO Box S1580, Perth WA 6845
Telephone Number	08 9216 4000
Fax Number	08 9413 6067
Email Address	ABUEnvPlanInfo@chevron.com

1.5 Stakeholder Engagement

Regular consultation with stakeholders has been undertaken by CAPL throughout the development of environmental impact assessment and management documentation for the Gorgon Project. This stakeholder engagement has included engagement with the community, government departments, industry operators, and contractors to CAPL through planning workshops, risk assessments, meetings, teleconferences, and formal environmental approval processes.

As part of CAPL's ongoing stakeholder engagement activities and in compliance with the requirements of Regulation 17(1)(b) of the Petroleum (Environment) Regulations 2012, relevant stakeholders for the operations of the DomGas Pipeline were engaged during preparation of this EP.

CAPL continues to provide updates regarding Gorgon related activities at regular informal interface meetings with stakeholders (as required).

The Department of the Environment and Energy and Department of Water and Environment Regulation continue to receive annual updates on Gorgon status and environmental performance, including DomGas Pipeline related activities, via existing regulatory defined avenues such as annual performance reporting, annual compliance reporting and incident notifications. For other interested stakeholders, these annual reports are publicly available on the CAPL website (https://www.chevronaustralia.com/our-businesses/gorgon/environmental-approvals).

Table 1-4 details CAPL's ongoing consultation requirements.

Table 1-4 Ongoing Stakeholder Consultation Requirements

Stakeholder	Notification / Ongoing Consultation Requirement	Timing
DMIRS Petroleum.environment@dmirs.wa.gov.au https://www.dmp.wa.gov.au/Environment/Environment-reports-and-6133.aspx	Cessation notification	Within 1 week of cessation of pipeline operations
DBCA Karratha.admin@dbca.wa.gov.au	Consultation during development of rehabilitation objectives	As required during development of rehabilitation objectives

2 Activity Description

2.1 DomGas Pipeline Infrastructure Overview

The DomGas Pipeline that is the focus of this EP begins at the tie-in weld located at the top of the pipeline riser on the LNG Jetty at Barrow Island. The pipeline is a 20-inch diameter dry gas carbon steel pipeline approximately 91.5 km long and includes a DomGas meter station located adjacent to CS1. The DomGas Pipeline terminates at the connection to the weld point at the boundary of the DBNGP easement.

The DomGas Pipeline has been designed and constructed in accordance with AS 2885.1 and AS 2885.2 design and construction codes. It is designed to accommodate an operating flow rate of 300 Terajoules of DomGas per day (TJ/d). The DomGas Pipeline is designed to accommodate a pressure of up to 17.5 MPag and a gas temperature of between 0 and 45 °C.

For protection and stability, the offshore section of the DomGas Pipeline is concrete weight coated for most of its length and is further stabilised by a combination of rock bolting, rock installation, or trenching. The onshore section of the DomGas Pipeline (including across the intertidal area) is buried to a depth of between 1 and 1.2 m to the top of the pipe.

The DomGas Pipeline includes all facilities within the meter station fence line, including DomGas metering, flow control and filtration, instrument gas, pig launching and receiving facilities, emergency diesel generator, a field equipment room, and communications.

The DomGas Pipeline is controlled via the Central Control Room on Barrow Island; the meter station is normally unmanned. Access to the DomGas Pipeline meter station and onshore pipeline section is via public roads, existing private tracks, and the DomGas Pipeline Right of Way (ROW).

2.2 Operation

Natural gas is conditioned and compressed at the Gorgon Gas Treatment Plant on Barrow Island to produce dry DomGas suitable for acceptance by DBP for transmission into the DBNGP. Operation of the DomGas Pipeline involves the transportation of DomGas between the Gas Treatment Plant on Barrow Island and the DBNGP via the meter station.

At the meter station, the DomGas flows through filters/coalescers to remove any solids and liquid droplets, and through a flow control/pressure protection skid to ensure that the required pressure and flow into the DBNGP tie-in point is maintained. It is then metered for the nominated flow, temperature, pressure, and gas quality.

Instrument gas for the meter station is supplied via an off-take from the DomGas Pipeline upstream of the metering skid, and is used to actuate valves, instruments and during flow control operations. Gas is discharged to atmosphere at a rate of approximately <0.54 m^3/h to actuate valves and instruments and approximately 0.14 m^3/h for continuous flow control operations (at operating pressure of 800 kPag and temperature of 20°C).

A buried pipeline carries the dry DomGas from the meter station compound to the DBNGP connection.

During normal operation, the DomGas Pipeline is monitored and controlled from the Central Control Room on Barrow Island; the meter station is normally unattended.

2.2.1 Inspections

Inspections of the DomGas Pipeline are carried out to ensure that the pipeline infrastructure is maintained and operated at or above acceptable standards. Inspection activities include visual inspections, non-destructive testing, and intelligent pigging.

Inspections occur along both the offshore and onshore sections of the DomGas Pipeline, including the meter station, and may cover the full length of either section, or focus on a specific point. Inspection activities are expected to be undertaken under simultaneous operations conditions while the DomGas Pipeline is operating.

2.2.2 Maintenance

Maintenance on the DomGas Pipeline, including its meter station, is required at regular or planned intervals to prevent deterioration or failure of equipment, and/or to maintain reliability or performance. However, the offshore section of the DomGas Pipeline is designed so that it does not need maintenance, and activities such as marine growth removal (if required) are considered a repair activity. Therefore, maintenance activities focus on the DomGas Pipeline Onshore ROW and meter station.

Maintenance activities along the DomGas Pipeline ROW include (but are not limited to) mechanical control of vegetation, maintenance of pipeline markers/signage, and management of vegetation encroachment.

Maintenance personnel are expected to visit the meter station approximately once a month for routine maintenance. Such visits may coincide with concurrent meter station and pipeline inspection and DomGas Pipeline ROW maintenance activities. Activities during these visits may include:

- maintenance of meter station facilities, premises, infrastructure, and equipment
- civil works (e.g. vegetation control, weed management, structural maintenance)
- removal and reinstallation of equipment.

2.2.3 Repairs

The DomGas Pipeline is designed and constructed such that it should not require any significant degree of repair. No internal corrosion of the pipeline is expected (this is a prerequisite for any gas delivered to the DBNGP), and the pipeline has cathodic protection to manage external corrosion potential.

Using heavy wall pipe and concrete weight coating, the offshore section is designed to withstand a 1-in-10-year return period cyclone without secondary stabilisation. However, as an added measure, this offshore section is also permanently stabilised by a combination of rock bolting, rock dumping, or trenching.

Despite being designed not to require repair, a range of minor repair activities are incorporated into the scope of this EP, including (but not limited to):

- along the offshore section:
  - correcting free-span/scour
  - reburying trenched sections of the Pipeline in the nearshore section approaching the mainland
  - removing marine growth and/or calcareous deposits around the riser
- along the onshore section (including the intertidal zone):
  - repairing the top cover of the Pipeline
- at the meter station
  - replacing equipment
  - modifying the design to facilitate expansion or efficiency improvements.

Although it is unlikely for the DomGas Pipeline to require a major repair, CAPL have prepared for the potential event by implementing the Emergency Pipeline Repair System (EPRS). The EPRS includes equipment and procedures to facilitate a major repair of CAPL pipelines.

2.2.4 Future Decommissioning and Rehabilitation

The DomGas Pipeline has a nominal operational design life of 50 years. The Gorgon gas processing facility on Barrow Island and the mainland section of the domgas pipeline are the subject of long term (out to 2069) land tenure granted pursuant to the Gorgon Gas Processing and Infrastructure Project Agreement (Schedule 1 to the *Barrow Island Act 2003*). Decommissioning activities intend to be planned and executed prior to the expiry of this tenure (2069) and will be managed according to regulatory requirements in force closer to that time.

To meet requirements of the Guideline for the Development of Petroleum and Geothermal Environment Plans in Western Australia, CAPL's decommissioning and rehabilitation philosophy is described in this section.

Decommissioning will follow cessation of operations, with rehabilitation of PL92 (the onshore and intertidal component) following. The below subsections provide preliminary rehabilitation objectives and outcomes for the ROW based on the current land uses of the surrounding environment. Given the DomGas pipeline is expected to be operating for a number of decades prior to any decommissioning or rehabilitation occurring, rehabilitation objectives and outcomes are subject to changed with any changes to the surrounding land uses.

Preliminary rehabilitation outcomes include:

- The **topography** of the rehabilitated area is integrated into the surrounding landscape (the original landform may not be reinstated)
- The rehabilitated **land surface and soil properties** are appropriate to support the target ecosystem and rates of erosion will be consistent with adjacent landforms.
- A **vegetation cover** comprised of an appropriate assemblage of species for the impacted land system.
- Rehabilitation which promotes self-sustaining **ecosystems** able to be managed as part of their surroundings, compatible with the surrounding pastoral or other land use

3 Existing Environment

In accordance with Regulation 14(2) of the Petroleum (Environment) Regulations 2012, this section describes the existing environment that may be affected (EMBA) during Gorgon DomGas pipeline operations and under emergency conditions (including spills).

Information in this section is derived from a variety of desktop sources, technical field surveys undertaken prior to and during the construction of the DomGas Pipeline, and through stakeholder engagement.

3.1 Physical Environment

The EMBA is characterised by an arid, subtropical climate. In summer (between September and March), average daily temperatures range from 21 °C to 36 °C. During winter (May to July), mean daily temperatures are in the range of 14 °C to 29 °C (Ref. 4; Ref. 5). April and August are considered transitional months during which either the summer or winter weather regime may dominate, or conditions vary between the two (Ref. 4).

Water depths along the DomGas Pipeline Corridor between Barrow Island and the mainland are less than 16 m (Ref. 8).

The waters between Barrow Island and the mainland are sheltered from deep ocean swells by Barrow Island, the shallow underwater ridges between Barrow Island and the mainland, and the island archipelago along the Mary Anne Passage (Ref. 6). There is a large tidal range at Barrow Island and at the mainland DomGas Pipeline shore crossing, with tides varying approximately 3 to 4 m between highs and lows (Ref. 7). Strong currents flow through the Barrow Island Channel, which separates Barrow Island and the Lowendal Islands, flowing east–west with each ebbing/flooding tide (Ref. 7).

The onshore section of the DomGas Pipeline Corridor lies between two major drainage lines of the Robe and Fortescue Rivers, located approximately 15 km to the west, and 25 km to the north-east respectively. These rivers are ephemeral and only flow following heavy rainfall (Ref. 1).

The DomGas Pipeline is within the Carnarvon Dunefield, featuring north–south longitudinal dunes (Ref. 9). Elevation gradually increases from approximately 2.5 m AHD at the high water mark, to approximately 50 m AHD at the tie-in point to the DBNGP.

3.2 Ecological Environment

The EMBA comprises a range of geomorphic features and habitats, which in turn support high species diversity, unique ecosystems, and associated trophic interactions and communities. The marine biota of the EMBA is predominantly tropical and typical of the Indo-west Pacific. The terrestrial biota of the EMBA reflects the arid environment of the Pilbara Region.

3.2.1 Marine and Shoreline Habitats

Marine and shoreline habitats present in the DomGas Pipeline Corridor and the wider EMBA are illustrated in Figure 3-1 and Figure 3-2 respectively.

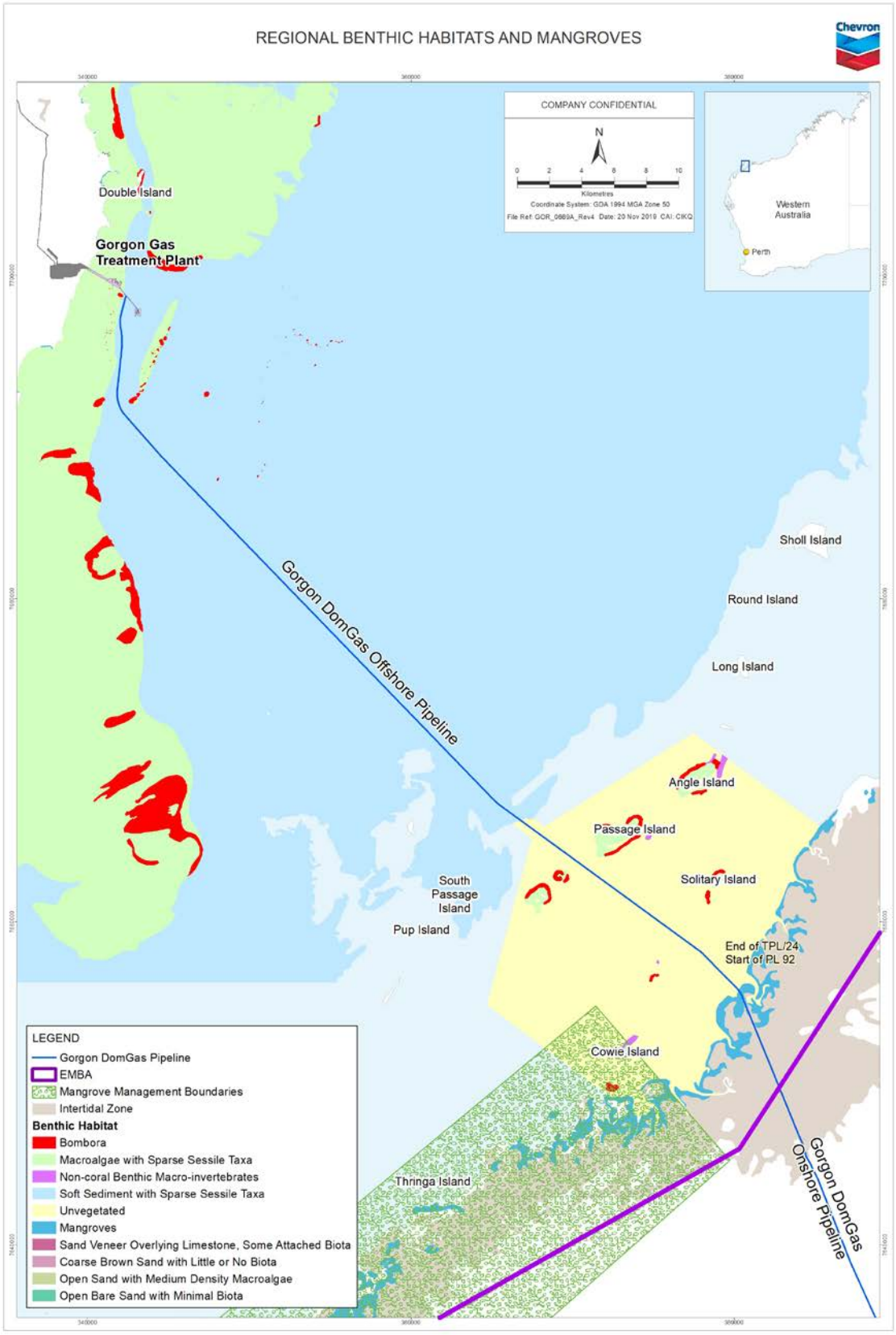

Figure 3-1: Marine and Shoreline Habitats around the DomGas Pipeline Corridor

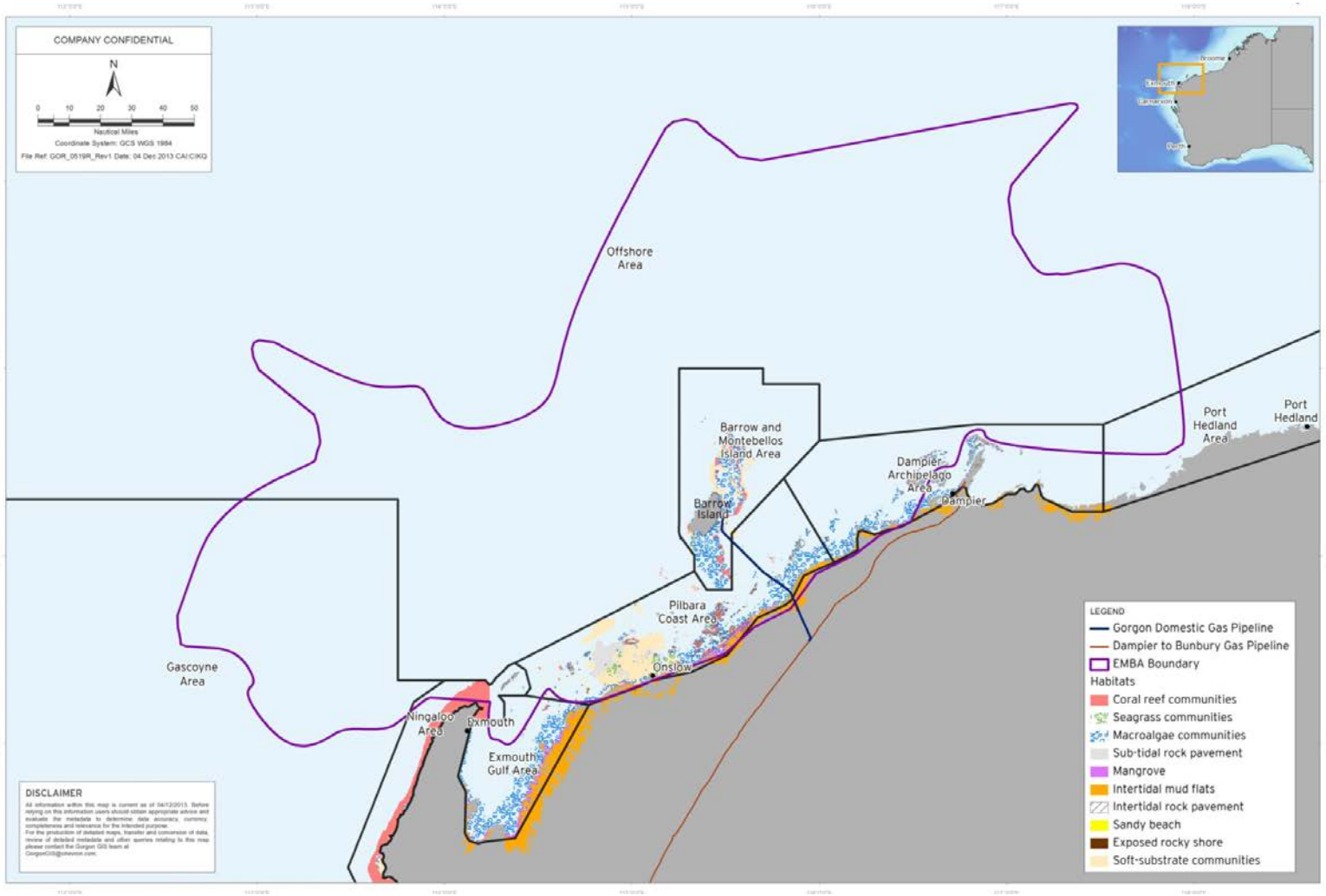

Figure 3-2: Marine and Shoreline Habitats in the wider EMBA

3.2.1.1 Protected Conservation Areas

The DomGas Pipeline Corridor intersects a portion of the Barrow Island Marine Management Area. This conservation area is managed by the Western Australian Department of Biodiversity, Conservation and Attractions on the basis of its balance of ecological and social values (Ref. 10).

3.2.2 Marine Fauna

Marine fauna recorded in the North-west Marine Region are typically tropical or subtropical species. The North-west Marine Region is considered species-rich as a result of the diversity of habitats available, however has low endemicity as many species are also found in other parts of the Indian Ocean and the western Pacific Ocean (Ref. 11).

Several marine fauna species that may occur in the Pilbara inshore region are protected under the *Biodiversity Conservation Act 2016* (WA). Some are also listed as Threatened and/or Migratory under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) Act and therefore are considered to be matters of national environmental significance.

Fifteen protected species of marine mammal may be present within the DomGas Pipeline Corridor (Ref. 13). Five species of marine turtle, all of which are listed under Commonwealth and State legislation, may be encountered in the DomGas Pipeline Corridor (Ref. 18). These are the Green, Hawksbill, Flatback, Loggerhead, and Leatherback Turtles. There are 14 species of sea snakes listed as 'Marine' under the EPBC Act that may occur in the DomGas Pipeline Corridor (Ref. 13). One of these, the Short-nosed Sea Snake (*Aipysurus apraefrontalis*), is listed as Critically Endangered under the EPBC Act and Priority IV (taxa in need of monitoring) under the DBCA priority listings (Ref. 18).

Numerous marine and migratory shorebirds are likely to be present in or near the DomGas Pipeline Corridor in the tidal flats and mangroves of the intertidal zone (Ref. 12). During pre-construction field surveys, migratory and wading birds were observed along the DomGas Pipeline Corridor, but with no major roosting concentrations (Ref. 12).

Table 3-1 summarises the key periods of biological activity for species groups in the EMBA.

Table 3-1: Key Periods of Biological Activity for Marine Fauna in the wider EMBA

Species Group	Seasonal Presence in EMBA											
	J	F	M	A	M	J	J	A	S	O	N	D
Marine mammals	Mi	Mi	Mi	Mi	Mi	Mi	Mi	Mi	Mi	Mi	Mi	Mi
Marine reptiles	M/N/H	M/N/H	M/N/H	N/H/R	H/R				M/H/N	M/H/N	M/H/N	M/H/N
Fish and sharks			Mi	Mi	Mi							
Avifauna	B/Mi	B/Mi	B/Mi	B/Mi	B	B	B/Mi	B/Mi	B/Mi	B/Mi	B/Mi	B/Mi
R: Resident; B: Breeding; M: Mating; Mi: Migrating: N: Nesting; H: Hatchling												

3.2.3 Terrestrial Flora and Ecological Communities

3.2.3.1 Vegetation Associations

Twenty vegetation associations have been identified in the terrestrial EMBA. Most vegetation associations were assessed as being in excellent condition, with more than 80% native flora composition, less than 5% weed coverage, only minor signs of disturbance, and with most vegetation structure intact (Ref. 9). The exception is vegetation associations surrounding CS1 that have been degraded by cattle grazing, many tracks, and wind erosion as a result of removal of vegetation from these tracks. The previous disturbance of vegetation associations within the Santos sales gas pipeline route is evident, although regrowth of native grasses in this area of disturbance has generally been excellent (Ref. 9).

3.2.3.2 Communities of Conservation Significance

A Threatened Ecological Community (TEC) is an ecological community that has been identified as being subject to processes that threaten to destroy or significantly modify it across much of its range. There are no State- or Commonwealth-listed TECs listed in the terrestrial EMBA. However, the EMBA does intersect the Roebourne Plains Coastal Grasslands Priority 1 Priority Ecological Community (PEC; poorly known; known from very few occurrences with a very restricted distribution) at three locations between approximately Onshore KP21 and KP33.5. Areas of this PEC within the DomGas Pipeline Corridor were cleared during installation of the DomGas Pipeline.

3.2.3.3 Flora

A total of 154 plant taxa, representing 30 families and 80 genera, were recorded during vegetation surveys along the onshore DomGas Pipeline Corridor (Ref. 9). The most commonly represented families recorded in the DomGas Pipeline Corridor included Poaceae (32 taxa), Mimosaceae (21), and Papilionaceae (18).

No State-listed Declared Rare Flora or flora species listed under the EPBC Act have been recorded in the terrestrial EMBA.

3.2.3.3.1 Introduced Flora

Mesquite (*Prosopis* spp. and hybrids) is a Declared Plant and also a Weed of National Significance (Ref. 14), and occurs within the terrestrial EMBA (Ref. 9). Mardie Station is recognised to have the largest single core infestation of mesquite in Australia (approximately 150 000 ha) (Ref. 15).

Other weed species, which are not Declared Plants or Weeds of National Significance, identified during the DomGas Pipeline pre-construction baseline vegetation surveys (Ref. 9) include:

- Birdwood grass (*Cenchrus setiger*)
- Buffel grass (*Cenchrus ciliaris*)
- Mimosa bush (*Vachellia farnesiana*)
- Spiked Malvastrum (*Malvastrum americanum*)
- Ulcardo melon (*Cucumis melo*).

3.2.4 Terrestrial Fauna

Surveys and studies have identified 101 species of terrestrial or semi-aquatic fauna (excluding avifauna) that may occur in the terrestrial EMBA, including within onshore and intertidal areas (Ref. 12). Ten reptile and two mammal species were observed during pre-construction site inspections and field surveys. Two additional mammal species potentially present in the terrestrial EMBA, but not observed in the field, are listed as being of conservation significance, the Northern Quoll and Water-rat.

Surveys and studies have identified 114 bird species that may occur in the terrestrial EMBA. Three of these bird species are listed species of conservation significance, Striated Grasswren, Australian Bustard and Bush Stone-Curlew.

3.2.4.1 Introduced Fauna

Six species of introduced fauna (feral animals) may occur in the terrestrial EMBA including (Ref. 12):

- dogs (*Canis lupus*)
- cats (*Felis catus*)
- foxes (*Vulpes vulpes*)
- rock dove/feral pigeon (*Columba livia*)
- house mouse (*Mus musculus*)
- black rat (*Rattus rattus*).

3.3 Social Environment

3.3.1 Cultural Heritage

There are currently two registered Native Title claims that overlap the DomGas Pipeline Corridor in its onshore section:

- Yaburara and Mardudhunera People (Tribunal No. WC96/89)
- Kuruma Marthudunera People (Tribunal No. WC99/12).

CAPL established heritage agreements with both claimant groups to allow for the construction of the DomGas Pipeline. Heritage surveys have been undertaken by both claimant groups to identify archaeological and ethnographic sites of cultural significance.

3.3.2 Coastal and Marine Economy

Four State-managed fisheries with reported fishing effort and three Commonwealth-managed fisheries intersect the DomGas Pipeline Corridor:

- State-managed fisheries
  - Pilbara Line (North Coast Demersal) Fishery
  - Pilbara Trap (North Coast Demersal) Fishery
  - Onslow Prawn Managed Fisheries
  - Mackerel Managed Fishery
- Commonwealth-managed fisheries:

- Southern Bluefin Tuna Fishery
- Western Tuna and Billfish Fishery
- Western Skipjack Tuna Fishery.

The DomGas Pipeline is adjacent to the Santos sales gas pipeline, which extends from Varanus Island to the mainland where it ties in to the DBNGP. The DomGas Pipeline meter station infrastructure lies adjacent to the DBNGP and its CS1.

The DomGas Pipeline Corridor does not attract any significant recreational boating, diving, snorkelling, or wildlife observation activities (e.g. of whales, dolphins, dugongs, turtles, and birds), mainly due to the remoteness of the area. However, occasional recreational vessels pass through the corridor on their way to the Montebello–Barrow Islands Marine Conservation Reserves.

3.3.3 Terrestrial Land Use

The terrestrial section of the DomGas Pipeline is on the Mardie Station pastoral lease, of which CITIC Pacific Mining is the current lessee. Mardie Station covers more than 225 000 ha and is a working beef cattle station with 8000 head of cattle (Ref. 16).

In the intertidal and onshore zone, the DomGas Pipeline Corridor encompasses the existing Santos sales gas pipeline. The separation between the DomGas Pipeline ROW and this existing pipeline is approximately 50 m, reducing to approximately 11 m in certain locations to avoid heritage sites.

4 Environmental Impact and Risk Assessment and Management Strategy

In accordance with Regulation 13(3) of the Petroleum (Environment) Regulations 2012, an environmental risk assessment was undertaken to evaluate impacts and risks arising from the activities described in Section 2.

The risk assessment was undertaken in accordance with the Chevron Corporate OE Risk Management Process (Ref. 2) using the Chevron Integrated Risk Prioritization Matrix. The approach generally aligns with the processes outlined in Australian Standard/New Zealand Standard ISO 31000:2009 Risk Management and Handbook 203:2012 Managing Environment-related Risk (Ref. 3).

The environmental impact identification and risk assessment process comprised the following components:

- identification of activities and events, and associated environmental aspects with the potential to impact identified physical, biological, and socioeconomic receptors
- identification of physical, biological, and socioeconomic receptors within the environment that may be affected by the activities and aspects, as well as identification of particular environmental values and sensitivities
- evaluation of the potential consequences to the identified receptors without safeguards
- identification of safeguards 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 safeguards in place
- determination of whether the environmental impacts and risks are as low as reasonably practicable (ALARP) after considering the effectiveness of the identified safeguards
- determination of whether the environmental impacts and risks are acceptable
- development of environmental performance objectives, performance standards, and measurement criteria.

Table 4-1 summarises the environmental impacts, risks, and control measures in place to manage the activity.

Table 4-1: Summary of the Potential Impacts, Risks and Control Measures

Source of Environmental Impact or Risk (Hazard)	Potential Environmental Impact or Risk (Consequence)	Summary of Control Measures
Seabed Disturbance		
• Anchoring of marine vessels • Grounding of a marine vessel	• Loss, damage, and/or alteration of habitat/ecological community	• Records confirm bombora location data have been transmitted to marine contractors. • Completed anchor management plans. • Navigational charts and equipment are accessible and current. • No incident reports of vessel grounding in the vicinity of bombora.
Ground Disturbance		
• Movement(s) of vehicles and/or mobile equipment • Excavations (for repairs)	• Damage or loss of cultural heritage sites/artefacts	• Induction materials include cultural heritage considerations and the restriction of vehicle/machinery access to the DomGas Pipeline ROW, existing roads, established tracks and areas of disturbance, wherever feasible. • Training records confirm onshore personnel involved in inspection, maintenance, and repair activities have completed the induction. • No incident reports detailing damage or loss of cultural heritage sites or artefacts.
• Control of vegetation to maintain line of sight or firebreak	• Damage and/or alteration of habitat/ecological community	• Survey records confirm vegetation control and ground disturbance/ excavation activities are restricted to the DomGas Pipeline ROW.
• Ground disturbance/excavation	• Damage and/or alteration of habitat/ecological community • Fauna entrapment results in injury or mortality	• No incident reports detailing injury/mortality of trapped fauna. • Records confirm fauna exclusion or fauna egress measures have been considered and approved by CAPL for activities requiring excavation deeper than 500 mm that is planned to be open for greater than 12 hours.
• Repair/replacement of pipeline top-cover using a hard substrate	• Alteration of habitat/ ecological community	• Survey records confirm repairs in the intertidal zone are restricted to the DomGas Pipeline ROW, existing roads, established tracks and areas of disturbance, wherever feasible. • Records confirm imported fill material is sourced from quarries / borrow pits (appropriately licensed under the Environmental Protection Act Part V, local government Town Planning Scheme, and/or by DMIRS where required).
Physical Presence		
• Presence and movement of vessels and equipment	• Fauna strike resulting in injury or mortality	• Vessel records confirm activities scheduled to avoid key periods and zones of biological activity where practicable. • Records show that the risk of fauna interactions has been assessed where offshore activities are scheduled to occur within the key zones and periods of biological activity. • Communication records with DMIRS if risks to cetaceans and/or marine turtles are anticipated to be different or greater than those assessed in the EP. • Cetacean or marine turtle incident reports attributable to offshore DomGas Pipeline inspection or repair activities. • Induction materials include relevant cetacean caution zone requirements.

Source of Environmental Impact or Risk (Hazard)	Potential Environmental Impact or Risk (Consequence)	Summary of Control Measures
		• Training records confirm offshore personnel involved in inspection and repair activities have completed the induction. • Records show egress or exclusion controls were implemented where potential risk to fauna is identified (e.g. for excavations greater than 0.5 m left unattended overnight)
• Presence and movement of vessels and subsea equipment	• Disruption to marine industries and/or recreational water activities	• Records confirm consultation undertaken in accordance with the Stakeholder Engagement Plan
• Movement of vehicles, equipment, and machinery	• Fauna strike resulting in injury or mortality	• Induction materials include fauna interaction requirements. • Training records confirm onshore personnel involved in inspection, maintenance, and repair activities have completed the induction.
Waste Management and Disposal		
• Inappropriate handling, storage, and disposal of waste not permitted for offshore discharge	• Marine water contamination • Contamination of seabed/benthic conditions • Fauna injury/mortality	• Induction materials include waste management requirements. • Training records confirm offshore personnel have completed the induction. • Vessel pre-mobilisation inspection records confirm waste storage appropriate. • Marine vessel wastes managed in accordance with MARPOL. • Records confirm wastes have been transferred to a CAPL-approved facility.
• Inappropriate handling, storage, treatment or disposal of operational waste	• Soil contamination • Groundwater contamination • Fauna injury/mortality	• Induction materials include waste management requirements. • Training records confirm onshore personnel have completed the induction. • Waste records confirm operational wastes generated during DomGas Pipeline onshore activities have been segregated, collected and recycled, treated, or disposed of at a CAPL-approved facility. • Records confirm evaporation pond designed to accommodate stormwater and lined with impervious polyethylene liner/membrane. • Records confirm wastewater discharged via Gorgon produced water disposal wells comply with EP Act Part V Licence (L9102/2017/1).
Discharges to Sea		
• Discharge of sewage, greywater, putrescibles, and bilge water from marine vessels to sea	• Marine water contamination • Contamination of seabed • Fauna injury/mortality	• Records confirm location of offshore discharge of comminuted, disinfected and untreated sewage. • Marine vessel wastes managed in accordance with MARPOL.
Introduction of Non-indigenous Terrestrial Species or Marine Pests		
• Introduction or spread of marine pests via biofouling on vessel hulls or via ballast water exchange • Introduction or spread of marine pests via biofouling on underwater equipment	• Loss, damage, and/or alteration of habitat/ ecological community • Disruption to marine industries (i.e. fisheries)	• Records confirm that relevant vessels conducting applicable activities (as defined in the performance standard) have: o Completed Quarantine Questionnaire, the Action Items and received the Authorisation to Mobilise from CAPL o CAPL-approved Vessel Quarantine Management Plan o Record of top-side and wet-side quarantine inspection.

Source of Environmental Impact or Risk (Hazard)	Potential Environmental Impact or Risk (Consequence)	Summary of Control Measures
		• For international marine vessels, records show compliance with the Australian Ballast Water Management Requirements (Ref. 112). • Records confirm marine vessels have current antifouling certification (and verification) that complies with the requirements of the Convention.
• Introduction of new weed species via vehicles, equipment, personnel, and materials	• Loss, damage, and/or alteration of habitat/ecological community • Disruption to other users of the land or coast	• Induction materials address declared weeds and the restriction of vehicle/machinery access to the DomGas Pipeline ROW, existing roads, established tracks, and areas of disturbance, wherever feasible. • Training records confirm onshore personnel involved in inspection, maintenance, and repair activities have completed the induction. • Records show that risks associated with weeds in imported fill material have been assessed and appropriate management measures documented. • Communication records with DMIRS if risks associated with weeds in imported fill material are anticipated to be different to, or greater than those assessed in Table 5-10 to Table 5-24.
Ignition Sources		
• Machinery, handheld equipment, or vehicle exhausts generating heat and sparks • Smoking by onsite workers	• Loss, damage, and/or alteration of habitat/ecological community • Fauna injury/mortality • Disruption to other land users	• Induction materials include smoking restrictions and the restriction of vehicle/machinery access to the DomGas Pipeline ROW, existing roads, established tracks and areas of disturbance, wherever feasible. • Training records confirm onshore personnel involved in inspection, maintenance, and repair activities have completed the induction. • No fire incident reports attributable to DomGas Pipeline inspection, maintenance, and repair activities. • Records confirm availability of a portable fire extinguisher.
Leaks and Spills		
• Single point failure during handling, use, and storage of hydrocarbons and chemicals resulting in a leak or spill of ≤1 m^3 (Level 1) to the marine or intertidal environment	• Soil and groundwater contamination • Marine water contamination	• Records confirm inspections/maintenance have been carried out on equipment and hydraulic hoses. • Records show hydrocarbons or chemicals are stored on the deck of marine vessels are within secondary containment. • Approved SOPEP is on board marine vessels >400 T. • Response records show the OPEP has been implemented. • Records show drills conducted in accordance with SOPEP.
• Single point failure during handling, use, and storage of hydrocarbons and chemicals resulting in a leak or spill of ≤1 m^3 to the terrestrial environment	• Soil and groundwater contamination	• Induction materials include no refuelling of plant and equipment used in onshore activities to occur within the intertidal zone. • Training records confirm onshore personnel involved in inspection, maintenance, and repair activities have completed the induction. • No leak or spill incident reports attributable to refuelling within the intertidal zone. • Spill containment and recovery equipment available.

Source of Environmental Impact or Risk (Hazard)	Potential Environmental Impact or Risk (Consequence)	Summary of Control Measures
• Failure of dry-break couplings during vessel refuelling resulting in a spill of ≤37.5 m^3 (Level 1/2) to the marine environment	• Marine water contamination • Fauna injury/mortality • Disruption to marine industries, recreational water activities, or other users of the coast	• Records demonstrate dry-break couplings or similar automated stop devices (e.g. bowser arrangement with automatic stop) are present on marine vessels that are refuelled at sea. • Records show hoses and connections used for refuelling are free of defects. • Records of notification to the WA Harbour Master lodged. • CAPL-approved refuelling / bunkering procedure.
• Rupture of a vessel's fuel tank following grounding or collision and resulting in a spill of ≤315 m^3 of marine diesel oil to the marine environment (Level 2)	• Marine water contamination • Contamination of seabed/ benthic conditions • Fauna injury/mortality • Loss, damage, and/or alteration of habitat/ ecological communities • Disruption to marine industries, recreational water activities, or other users of the coast	• Navigational charts and equipment are accessible and current. • Records confirm benthic habitat data have been transmitted to marine contractors. • Record of Notice to Mariners lodged with WA Department of Transport. • Records confirm navigational lighting is on board and operational. • Records confirm STCW95 certification held by crew. • Records demonstrate a watch is kept on the marine vessel. • Records demonstrate DP trials completed.

5 Implementation Strategy

This section details the implementation strategy relevant to addressing the requirements of Regulation 15 of the Petroleum Environment Regulations.

5.1 Environmental Management Documentation

As part of the Chevron ABU, implementation of the activities is governed by the requirements of the ABU Operational Excellence Management System (OEMS), within which a number of OE Processes exist. CAPL will implement internally those OE Processes (and supporting OE Procedures) that apply to DomGas Pipeline activities, where those Processes are appropriate and reasonably practicable.

The key ABU OE Processes taken into account during the development of this EP, with a description of the intent of the Process, are:

- **OE Risk Management Process**: Risk based and systematic approach to identify, assess, prioritise and manage health, environment, and safety (HES), operability, efficiency and reliability risks.
- **Environmental Stewardship Process**: Applies during the operations phase. Process for ensuring environmental aspects are identified, regulatory compliance is achieved, environmental management programs are maintained, continuous improvement in performance is achieved, and alignment with ISO 14001-2004 is achieved.
- **Hazardous Communication Process**: Includes hazardous communication requirements that define the scope for communicating hazards associated with the use of Hazardous Materials on Chevron controlled premises in Australia.
- **Management of Change Process**: Process for assessing and managing risks stemming from permanent or temporary changes to prevent incidents.
- **Contractor Health, Environment and Safety Management Process**: Process establishes clear accountabilities to ensure active engagement of contractors and provides a consistent program to help eliminate incidents and injuries involving contractors.
- **Competency Development and Assurance Process**: Process outlines the standardised approach to meet the competency expectations and the regulatory requirements governing its activities.
- **Incident Investigation and Reporting Process**: Process that defines the requirements to report, classify, record, and investigate incidents and near misses. The lessons learned from investigations are then used to prevent future events.
- **Emergency Management Process**: Process to ensure CAPL is prepared to respond immediately and effectively to all emergencies involving CAPL-owned or-operated assets. Provides for standardised framework, planning, preparedness, training and exercise requirements, and response resources and capabilities necessary to respond to emergencies and to prevent or mitigate emergency and/or crisis situations.
- **OE Assurance Process**: Process to enable conformance with applicable legal and company requirements, verify safeguards are in place and functioning, and non-compliances are reported and tracked to closure.

5.1.1 Environment Plan Review

CAPL is committed to conducting activities in an environmentally responsible manner and aims to implement best practice environmental management as part of a program of continuous improvement. This commitment to continuous improvement means CAPL will review this EP every five years or more often as required (e.g. in response to new information) as required under Regulation 20 of the Petroleum (Environment) Regulations 2012. These regulations also require the Oil Pollution Emergency Plan to be revised in accordance with the timeframe outlined in Regulation 23(1).

Reviews will address matters such as the overall design and effectiveness of the EP, progress in environmental performance, changes in environmental risks, changes in business conditions, and any relevant emerging environmental issues.

If this EP no longer meets the aims, objectives or requirements of the EP, if works are not appropriately covered by the EP, or measures are identified to improve the EP, CAPL may submit an amendment or addendum to the EP to the Minister for approval under Regulation 18 of the Petroleum (Environment) Regulations 2012.

6 Acronyms and Abbreviations

Table 6-1 defines the acronyms and abbreviations used in this document.

Table 6-1: Terms, Acronyms, and Abbreviations

Term	Definition
ABU	Australian Business Unit
AHD	Australian Height Datum
AS	Australian Standard
CAPL	CAPL Pty Ltd
CS1	Compressor Station One on the Dampier to Bunbury Natural Gas Pipeline
DBNGP	Dampier to Bunbury Natural Gas Pipeline
DBP	Dampier Bunbury Pipeline
DMIRS	Western Australian Department of Mines and Petroleum
DomGas	Domestic Gas
EMBA	Environment that may be affected
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EPRS	Emergency Pipeline Repair System
IAPP	International Air Pollution Prevention
ISPP	International Sewage Pollution Prevention
KP	Kilometre Point
MARPOL	The International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978
NEBA	Net Environmental Benefit Analysis
OE	Operational Excellence
OEMS	Operational Excellence Management System
OPEP	Oil Pollution Emergency Plan
PEC	Priority Ecological Community
ROW	Right-of-Way
SOPEP	Shipboard Oil Pollution Emergency Plan
State	Western Australia
STCW95	Standards of Training, Certification and Watchkeeping
TEC	Threatened Ecological Community
WA	Western Australia

7 References

The following documentation is either directly referenced in this document or is a recommended source of background information.

Table 7-1: References

Ref	Title
1.	Chevron Australia. 2012. *Coastal and Marine Baseline State and Environmental Impact Report: Domestic Gas Pipeline*. Chevron Australia, Perth, Western Australia.
2.	Chevron Australia. 2017. *ABU OE Risk Management Process*. Chevron Australia, Perth, Western Australia.
3.	Standards Australia/Standards New Zealand. 2012. *Handbook 203:2012 Managing environment-related risk.* Standards Australia Limited/Standards New Zealand, Sydney, New South Wales/Wellington, New Zealand.
4.	Asia-Pacific Applied Science Associates. 2013. *Quantitative Oil Spill Modelling Study for the Gorgon Domestic Gas Pipeline Commissioning and Operation.* Unpublished report prepared for Chevron Australia Pty Ltd, August 2013. Asia-Pacific Applied Science Associates, Surfers Paradise, Queensland.
5.	Bureau of Meteorology. 2013. *Climate statistics for Australian locations. Summary Statistics Barrow Island*. Available from: http://www.bom.gov.au/climate/averages/tables/cw_005058.shtml [Accessed 08 July 2013].
6.	Asia-Pacific Applied Science Associates. 2011. *Gorgon Upstream Facilities – Oil Spill Risk Assessment for the DomGas Pipeline Installation.* Unpublished report prepared for Chevron Australia Pty Ltd, May 2011. Asia-Pacific Applied Science Associates, Perth, Western Australia.
7.	Asia-Pacific Applied Science Associates. 2009. *Hydrotest Discharge Water Simulation Study*. Prepared for Gorgon Upstream Joint Venture, Perth, Western Australia.
8.	DOF Subsea. 2009. *Domgas Pipeline Geophysical Survey – Results Report*. Unpublished report prepared for Chevron Australia, Perth, Western Australia.
9.	Astron Environmental Services. 2010. *Domgas Pipeline Flora and Vegetation Survey Phase 2*. Prepared for Chevron Australia Pty Ltd. Astron Environmental Services, Leederville, Western Australia.
10.	Department of Environment and Conservation. 2007. *Management Plan for the Montebello/Barrow Islands Marine Conservation Reserves 2007–2017. Adopted by the Marine Parks and Reserves Authority; Marine Management Plan No. 55*. Department of Environment and Conservation, Perth, Western Australia.
11.	Department of the Environment, Water, Heritage and the Arts. 2008. *North-west Marine Bioregional Plan Bioregional Profile: A Description of the Ecosystems, Conservation Values, and Uses of the North West Marine Region.* Department of the Environment, Water, Heritage and the Arts. Available from: http://www.environment.gov.au/coasts/mbp/publications/north-west/bioregional-profile.html [Accessed 16 July 2013].
12.	RPS Bowman Bishaw Gorham. 2006. *Terrestrial Fauna and Shorebird Surveys of the Gorgon Domestic Gas Pipeline Route*. Unpublished report prepared for Chevron Australia, Perth, Western Australia.
13.	Department of the Environment and Energy. 2019. *EPBC Act Protected Matters Database Report for the DomGas EMBA*. . Report created 6 June 2019.
14.	Thorp, J.R. and Lynch, R. 2009. *Weeds of National Significance – 2009. Update to the Determination of Weeds of National Significance, 2000*. The National Weeds Strategy Executive Committee, Launceston, Tasmania, Australia.
15.	Cooperative Research Centre for Australian Weed Management. 2003. *Weed Management Guide: Mesquite – Prosopis Species. Weeds of National Significance Series*. Commonwealth Department of Environment and Heritage, Canberra, Australian Capital Territory.
16.	Pastoral Management Pty Ltd. 2013. *Mardie Beef*. Available from: http://www.mardiebeef.com.au [Accessed 17 July 2013].

Ref	Title
17.	Australian Quarantine and Inspection Service. 2011. *Australian Ballast Water Management Requirements – Version 5*. Available from: http://www.daff.gov.au/biosecurity/avm/vessels/quarantine_concerns/ballast/australian-ballast-water-management-requirements [Accessed 21 November 2013]
18.	Department of Biodiversity, Conservation and Attractions. 2017. *Threatened and Priority Fauna List*, Government of Western Australia, Perth. Available from: *https://www.dpaw.wa.gov.au/.../threatened.../threatened_and_priority_fauna_list.xlsx* [Accessed 6 June 2019]