



Asset Development

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25 September 2015

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Level 8, 58 Mounts Bay Road  
Perth WA 6000  
Ref: A443759: ID3082

Dear Sir/Madam,

**Gorgon Ocean Bottom Node Seismic Survey Environment Plan – Summary**

Further to your Environment Plan acceptance letter from 23 September 2015 please find enclosed the Gorgon Ocean Bottom Node Seismic Survey Environment Plan summary.

Please do not hesitate to contact myself if you require any clarification about this summary.

Yours sincerely

A handwritten signature in blue ink, appearing to read "B. Cropp".

**Birgit Cropp**  
Geophysical Operations Coordinator  
Chevron Australia Pty Ltd



# Gorgon Ocean Bottom Node Seismic Survey

## Environment Plan Summary

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## TABLE OF CONTENTS

<b>1.0 INTRODUCTION</b> .....	<b>3</b>
1.1 Purpose.....	3
1.2 Scope.....	3
1.3 Location .....	3
1.4 Timeframes .....	3
1.5 Nominated Titleholder Details .....	3
<b>2.0 DESCRIPTION OF THE PETROLEUM ACTIVITY</b> .....	<b>5</b>
2.1 Deployment of OBN units and PIES.....	5
2.2 Seismic Acquisition .....	5
2.3 Supporting Activities.....	5
<b>3.0 DESCRIPTION OF THE ENVIRONMENT</b> .....	<b>6</b>
3.1 Physical Environment.....	6
3.2 Ecological Environment.....	6
3.3 Socioeconomic Environment.....	10
<b>4.0 ENVIRONMENTAL IMPACTS, RISKS AND CONTROLS</b> .....	<b>11</b>
4.1 Determination of ALARP .....	11
4.2 Determination of Acceptable .....	12
4.3 Summary Environmental Impacts, Risks and Control Measures .....	12
<b>5.0 MANAGEMENT APPROACH</b> .....	<b>17</b>
5.1 Roles and Responsibilities .....	17
5.2 Training and Competency .....	17
5.3 Monitoring and Reporting.....	17
5.4 Compliance Assurance .....	17
5.5 Documentation and Records.....	17
5.6 Environment Plan Review .....	18
<b>6.0 OIL POLLUTION EMERGENCY PLAN</b> .....	<b>19</b>
<b>7.0 CONSULTATION</b> .....	<b>20</b>
7.1 Relevant Stakeholders .....	20
7.2 Consultation Undertaken.....	21
7.3 Ongoing Consultation.....	23
<b>8.0 REFERENCES</b> .....	<b>24</b>
<b>9.0 ABBREVIATIONS &amp; ACRONYMS</b> .....	<b>25</b>

## TABLES

Table 1-1: Nominated Titleholder Contact Details .....	3
Table 3-1 Areas of conservation significance and key ecological features which occur within the EMBA.....	7
Table 4-1: Environmental Impacts, Risks and Control Measures.....	13
Table 7-1 Stakeholders engaged for the Gorgon OBN Survey .....	20
Table 7-2 Summary of key stakeholder concerns.....	22
Table 7-3 Ongoing consultation.....	23

## FIGURES

Figure 1-1: Location of OBN Survey operational area on the North West Shelf .....	4
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## 1.0 INTRODUCTION

### 1.1 Purpose

The Gorgon Ocean Bottom Node (OBN) Seismic Survey Environment Plan Summary (this Summary) provides a summary of the Gorgon Ocean Bottom Node Seismic Survey Environment Plan (the Plan) accepted by the National Offshore Petroleum Safety and Environment Management Authority (NOPSEMA) on 23 September 2015. This Summary has been prepared in accordance with Regulation 11(3) and 11(4) of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (OPGGGS(E)R).

### 1.2 Scope

The scope of the Plan and this Summary includes activities in Commonwealth Waters associated with the Gorgon OBN Seismic Survey (the petroleum activity). Activities occurring outside of the Survey operational area are not included in the Plan.

### 1.3 Location

The Gorgon OBN Seismic Survey (Survey) will be undertaken over the Gorgon gas field, located in the Commonwealth waters of the North West Shelf, Western Australia (WA). The Survey operational area is situated approximately 65 km west of Barrow Island and approximately 140 km north of Onslow on the WA mainland (Figure 1-1) in water depths ranging from approximately 80 to 1,100 m.

The Survey area includes the Chevron Australia Pty Ltd operated titles WA-37-L, WA-38-L and WA-14-R. Additionally Petroleum Access Authority WA-81-AA has been obtained through the National Offshore Petroleum Titles Administrator (NOPTA) to allow access to surrounding titles.

### 1.4 Timeframes

The activities described in the Plan are planned to commence from approximately mid-October with an expected acquisition start date of 01 November 2015. The Survey is expected to take up to approximately 210 days to complete, depending on weather conditions and is planned to be completed by the end of June 2016.

### 1.5 Nominated Titleholder Details

The Titleholder is Chevron Australia Pty Ltd (Chevron) and details are provided below:

**Table 1-1: Nominated Titleholder Contact Details**

<b>Company Name</b>	Chevron Australia Pty Ltd
<b>Contact Person</b>	Birgit Cropp
<b>Business address</b>	250 St Georges Terrace, Perth, WA 6000, AUSTRALIA
<b>Telephone number</b>	Tel: +61 8 9262 2433
<b>Email Address</b>	birgit.cropp@chevron.com

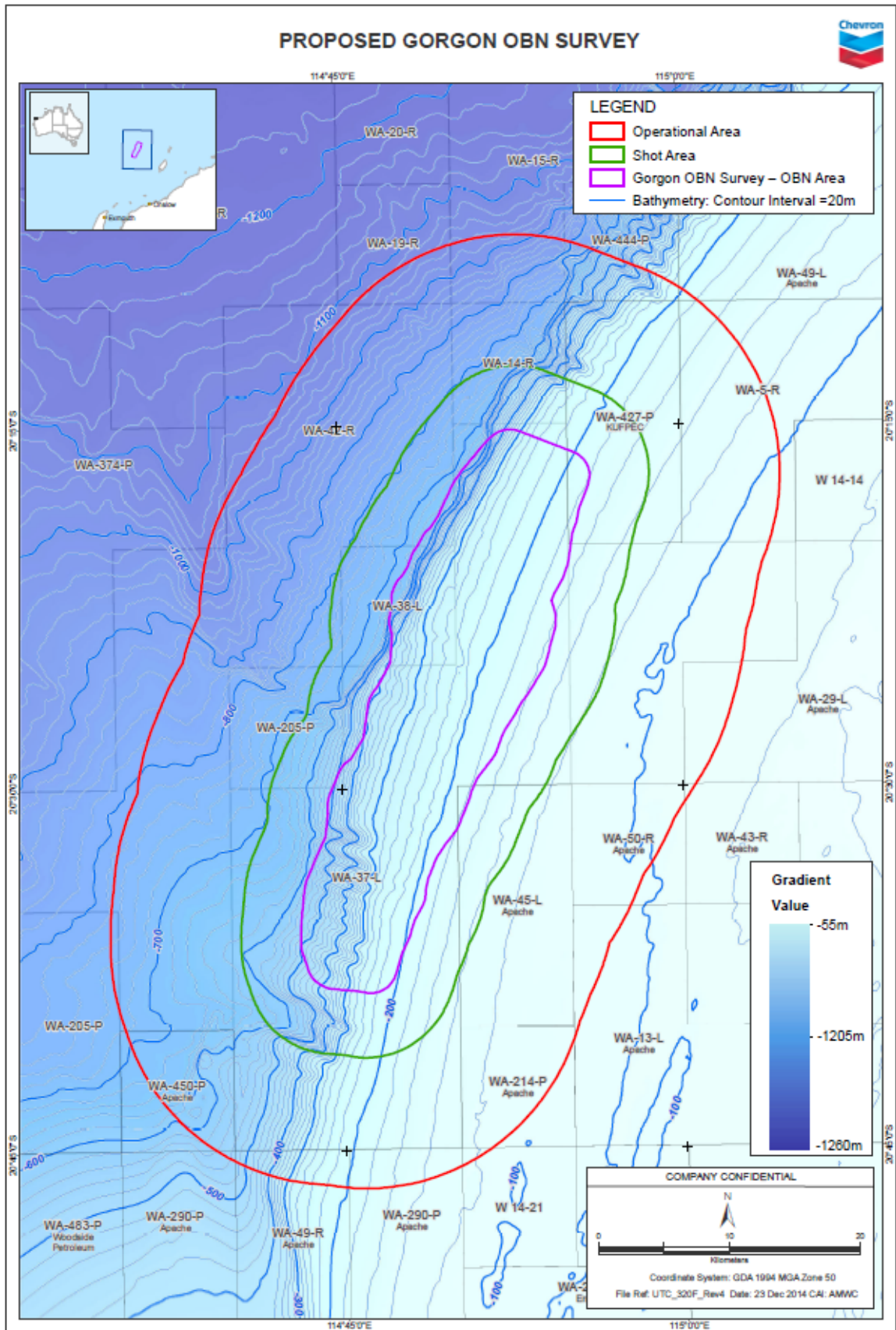


Figure 1-1: Location of OBN Survey operational area on the North West Shelf

## 2.0 DESCRIPTION OF THE PETROLEUM ACTIVITY

The Gorgon OBN Seismic Survey is a time-lapse baseline seismic survey that aims to provide an understanding of reservoir behaviour of the Gorgon gas field both pre and post hydrocarbon production. The activities associated with the Survey include:

- ◆ Deployment of OBN units and Pressure Inverted Echo Sounders (PIES)
- ◆ Seismic acquisition
- ◆ Supporting activities

### 2.1 Deployment of OBN units and PIES

An offshore installation vessel, hereafter referred to as the OBN vessel, will be used to deploy a network of nodes to the seabed with the use of a remotely operated vehicle (ROV). The nodes are discrete units, not connected by any cables and are typically 1 m<sup>2</sup> in size. Sufficient nodes are not available to cover the whole Survey area at once; therefore, nodes will be repositioned in the node area as the data has been acquired. During this process nodes will be retrieved back to the OBN vessel for data downloading and battery charging before being redeployed back to the seabed. Nodes are expected to remain at each location on the seabed for approximately 20 to 50 days as operationally required and will continuously record.

To measure variations in tidal depth and the speed of sound in water, PIES will be deployed at the start of the Survey at five locations within the Survey area. The PIES will be deployed from a support vessel with ballast material (sandbag) to act as a sinker weight. When seismic operations are complete, an acoustic signal is sent to the instruments via an acoustic release kit to release the ballast. Separation from the ballast will result in positive buoyancy so the instruments float to the sea surface to be retrieved. With the exception of the ballast material, nothing is left on the sea floor at the end of the survey.

### 2.2 Seismic Acquisition

After the initial nodes are in place on the seabed, the source vessel towing the seismic source array, but no streamers, will start acquisition. Seismic data acquisition will be conducted on a 24 hour basis operating a standard dual source array of  $\leq 4,200$  cubic inches (cu in) at approximately 2,000 psi. The nodes remain in place while all source points are acquired. Then the OBN vessel will retrieve all of the nodes with the ROVs and repositions them for further seismic acquisition as required. Upon completion of the seismic data acquisition all nodes are removed from the seabed and retrieved back to the OBN vessel. Acoustic sources will continue to be discharged during line turns with the exception of when the source vessel is operating in water depths of 100m or less.

### 2.3 Supporting Activities

The Survey requires the use of three types of vessel; an OBN vessel, source vessel and a support vessel. Bunkering of the OBN and source vessels will be undertaken in the operational area as required. Survey and crew changes will be carried out approximately every five weeks via helicopter (subject to helideck availability and certification). If the Survey vessels do not have a helideck, the vessel(s) will come into Dampier or similar port for crew change and resupply.

## 3.0 DESCRIPTION OF THE ENVIRONMENT

This section describes the environment that may be affected (EMBA) by the Survey including planned activities, associated unplanned events, and any emergency response activities.

### 3.1 Physical Environment

The region is characterised by an arid, subtropical climate. Daily temperatures range from 20 °C to 34 °C between the months of October and March in summer, and 15 °C to 26 °C between May and August in winter. The transitional season occurs in the months of April and September. In these months, either the summer or winter conditions can dominate or vary between the two. The area receives relatively low rainfall, although heavy downpours can occur during tropical cyclones and depressions. Average annual rainfall is approximately 320 mm (Bureau of Meteorology 2012), with most rainfall occurring from January to June. The cyclone season runs from Mid-December to April, peaking in February and March (Bureau of Meteorology 2012).

Waters in the EMBA show temporal and spatial variation in water temperature, with mean sea surface temperature in open shelf waters being 29.3 °C in March dropping to 24 °C in August. Tides in the EMBA are semi-diurnal (i.e. two high tides and two low tides per day) with a spring tide range of 1.9 m. Offshore wave conditions are dominated by south-westerly swell waves generated from distant weather systems in the Southern Ocean. Significant wave height peaks in winter (median 2.4 m), and is lowest in summer (median 1.6 m). The large-scale currents predominantly flow southwest through the region influenced by the Indonesian Throughflow and the Leeuwin Current (Buchan, S. 1998). Below the surface currents, there are a number of subsurface currents, the most important of which are the Leeuwin Undercurrent and the West Australian Current.

The Gorgon gas field lies near the edge of the continental shelf which is gently sloping, with areas of moderate relief comprising rock and reef outcrops. The seabed sediments comprise soft sediments of varying grain size. The grading of sediments is related to water depth, with sediments becoming finer and having increasing clay-sized particle content at increasing water depth (IRC Environment 2005; GUFT 2009b). The thickness of sediment layers varies, ranging from more than 5m in the proximity of the gas field to a very thin patchy veneer, or absence, over large areas of seabed (Chevron Australia 2005).

### 3.2 Ecological Environment

The ecological environment of the EMBA is summarised below in Table 3-1 which details the values associated with the World, Commonwealth and National Heritage places located within the EMBA, including *Environmental Protection and Biodiversity Conservation Act 1999* listed 'threatened' and 'migratory' species that are known to occur within the EMBA.



**Table 3-1 Areas of conservation significance and key ecological features which occur within the EMBA**

Location	Recognised Conservation Areas	Key Ecological Features, Values and Sensitivities
Ningaloo Coast	<p>International:</p> <ul style="list-style-type: none"> <li>◆ Ningaloo Coast World Heritage Area</li> </ul> <p>Commonwealth:</p> <ul style="list-style-type: none"> <li>◆ Ningaloo Marine Park (Commonwealth Waters)</li> <li>◆ Marine National Park Zone (IUCN II)</li> <li>◆ Recreational Zone (IUCN IV)</li> </ul> <p>State:</p> <ul style="list-style-type: none"> <li>◆ Ningaloo Marine Park</li> <li>◆ Muiron Islands Marine Management Area</li> <li>◆ Cape Range National Park</li> </ul>	<ul style="list-style-type: none"> <li>◆ Commonwealth waters adjacent to Ningaloo Reef (Unique seafloor feature, high biodiversity, feeding and breeding aggregations of marine life)</li> <li>◆ Ningaloo Reef is the largest fringing barrier coral reef, and the second largest coral reef system in Australia. The Ningaloo Coast and Muiron Islands encompass a series of interconnected habitats, from the continental shelf and slope communities of the Commonwealth Waters to the reef and onshore ecosystems of Ningaloo Reef</li> <li>◆ Macroalgal and seagrass communities are patchily distributed but are important primary producers within the reserves along the Ningaloo Coast</li> <li>◆ Limited mangrove communities occur in the northern half of the Ningaloo Marine Park with three species of mangroves identified within the Park</li> <li>◆ Turtle nesting habitat with high utilization of beaches with high dune height with major turtle rookeries along the Ningaloo coast</li> <li>◆ Dugong foraging, breeding, calving and nursing habitat in the shallow protected lagoonal environments fringing the coast and the offshore islands, though not in large numbers or dense concentrations</li> <li>◆ Area provides important migratory habitat for both the northern and southern migratory routes of the humpback whale. Usage level is seasonally high (Listed species). Pygmy blue whale individuals transiting through the area during annual migration. Usage level is seasonally high (Listed species)</li> <li>◆ Loggerhead, Green, Hawksbill, Flatback, Leatherback and Olive Ridley turtles may all be present</li> <li>◆ Whale sharks aggregate in the waters of the Ningaloo Marine Park, frequently close to the Ningaloo Reef front, both in the lagoon and outside it (Listed species)</li> <li>◆ The Muiron Islands are significant feeding areas for many species of seabirds and shorebirds, and are important nesting sites for the Wedge-tailed Shearwater. Migratory species that are most abundant in summer and autumn include the Wedge-tailed Shearwater and nine other migratory bird species that are protected under the China–Australia Migratory Bird Agreement (CAMBA) and Japan–Australia Migratory Bird Agreement (JAMBA)</li> </ul>
Barrow and Montebello	Commonwealth:	<ul style="list-style-type: none"> <li>◆ Ancient Coastline at 125 m depth contour (Unique seafloor feature, enhanced</li> </ul>

<p>Islands</p>	<ul style="list-style-type: none"> <li>◆ Montebello Commonwealth Marine Reserve</li> <li>◆ Multiple Use Zone (IUCN VI)</li> </ul> <p>State:</p> <ul style="list-style-type: none"> <li>◆ Montebello Islands Marine Park</li> <li>◆ Barrow Island Marine Park</li> <li>◆ Barrow Island Marine Management Area</li> <li>◆ Lowendal Islands Nature Reserve</li> </ul>	<p>biological productivity)</p> <ul style="list-style-type: none"> <li>◆ Undisturbed intertidal and subtidal coral reefs and bommies with a high diversity of hard corals. Coral reef communities occur throughout the reserves</li> <li>◆ Macroalgae meadows are a dominant feature of the sub-tidal habitats in this area and are most commonly found on shallow limestone pavement in depths of 5 to 10m. It is estimated that macroalgae meadows make up 40% of the benthic habitats of the Montebello/Barrow Islands Marine Conservation Reserve and make the major contribution to primary production</li> <li>◆ This location possesses regionally significant mangroves. Six species of mangrove are found in the reserves, with the Montebello Islands' mangrove communities considered globally unique as they occur in lagoons of offshore islands</li> <li>◆ Significant turtle nesting habitat particularly at sandy beaches on Varanus Island, Lowendal Island Group and Barrow Island</li> <li>◆ Dugongs are frequently recorded in the shallow, warm waters in the vicinity of the Montebello Islands, Lowendal Islands and Barrow Shoals, where they feed on seagrass meadows and algae, though not in large numbers or dense concentrations</li> <li>◆ This area provides important migratory habitat for both the northern and southern migratory routes of the humpback whale. Usage level is seasonally high. Female humpback whales and their calves use the sheltered water to the west of Trimouille Island in the Montebello group as a resting area during their southerly migration to feeding grounds in Antarctica (Listed species). Pygmy blue whale individuals transiting through the area during annual migration. Usage level is seasonally high (Listed species)</li> <li>◆ Several dolphin species have resident populations within the Barrow Island region area including bottlenose and Indo-pacific humpbacked dolphin (Listed species)</li> <li>◆ Loggerhead, Green, Hawksbill and Flatback turtles may all be present in this region</li> <li>◆ Whale sharks have been recorded foraging seasonally in the region, however not at significant densities. (Listed species)</li> <li>◆ The Montebello/Lowendal/Barrow Island region has significant rookeries for 15 seabird species, including the largest breeding colony of Roseate Terns in WA, located on the Montebello Islands</li> </ul>
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<p>Offshore Waters</p>	<p>Not applicable – No marine or coastal conservation areas occur within this location</p>	<ul style="list-style-type: none"> <li>◆ Glomar Shoals (Unique seafloor feature, high biodiversity)</li> <li>◆ Ancient coastline at 125 m depth contour (Unique seafloor feature, enhanced biological productivity)</li> <li>◆ Continental slope demersal fish communities (Communities with high species diversity and endemism)</li> <li>◆ Canyons on the slope between the Cuvier Abyssal Plain and the Cape Range Peninsula (Unique sea floor feature, enhanced biological productivity, aggregations of marine life)</li> <li>◆ Exmouth Plateau (Unique sea-floor feature)</li> <li>◆ Area provides important migratory habitat for both the northern and southern migratory routes of the humpback whale. Usage level is seasonally high (Listed species). Pygmy blue whale migration route (BIA) overlaps a portion of the Survey area with individuals transiting through the area during annual migration. Usage level is seasonally high (Listed species)</li> <li>◆ Loggerhead, Green, Hawksbill and Flatback turtles may all be present</li> <li>◆ This area overlaps a Biologically Important Area for Whale shark foraging in deeper waters</li> <li>◆ The offshore waters provide important foraging and breeding habitat that is highly utilised by various marine and migratory seabirds. Of particular note is the White-Tailed Tropic Bird which is only recorded in two locations in Western Australia</li> </ul>
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### 3.3 Socioeconomic Environment

There are numerous petroleum activities and associated infrastructure offshore on the North West Shelf and in the vicinity of the Survey including several oil and gas production facilities and subsea wells and pipelines. Vessel traffic in the area is predominantly associated with movements between Indonesia and Western Australia with the main shipping lanes situated to the East of the EMBA. There are a number of harbours and boats ramps throughout the EMBA, primarily used by marine tourism operators or for recreational activities.

A number of commercial fisheries operate in the North-west Marine Region and intersect the Survey operational area. They include the Commonwealth managed fisheries:

- ◆ North-west Slope Trawl fishery
- ◆ Southern Bluefin Tuna fishery
- ◆ Western Tuna and Billfish fishery
- ◆ Western Skipjack Tuna fishery.

The following state managed fisheries also intersect the Survey operational area:

- ◆ Beche-de-mer fishery
- ◆ Mackerel Managed fishery
- ◆ Marine Aquarium Fish Managed fishery
- ◆ Onslow Prawn Managed fisheries,
- ◆ Pilbara line
- ◆ Pilbara Trap Managed fishery
- ◆ Pearl Oyster Managed Fishery and Pearl Aquaculture
- ◆ Specimen Shell Managed fishery.

The pearling industry is present in the sheltered waters of the Montebello and Lowendal Islands however the pearling leases in the vicinity of the Montebello Islands are not currently active.

The northwest of Western Australia provides substantial marine-based tourism and recreational opportunities benefiting the Western Australian community. There is little marine-based tourism and recreational fishing within the operational area, due to its distance from the mainland and relative isolation. Most recreational fishing occurs in State Waters with very few recreational fishers visiting the offshore region where the Survey will be undertaken.

There are no identified areas of cultural heritage within the operational area. Numerous Indigenous cultural heritage sites occur within coastal areas of the Western Australian coastline and islands and include ceremonial and burial sites, engravings and paintings and middens/scatters. These types of sites are usually found above the high water mark and are common in dune blowouts, along water courses and on rock platforms. No shipwrecks were identified within the operational area however a number have been identified in the wider North West Shelf region including along the Ningaloo Coast, Barrow and Montebello Islands and the offshore waters of the EMBA.

## 4.0 ENVIRONMENTAL IMPACTS, RISKS AND CONTROLS

All aspects of the Survey have been subjected to an impact and risk assessment to understand the potential environmental risks associated with the activity and ensure risks are reduced to as low as reasonably practicable (ALARP) and are of an acceptable level.

An environmental risk assessment workshop was undertaken for the Gorgon OBN Seismic Survey at which environmental impacts and risks were considered for planned operational activities, unplanned activities and event response activities. The environmental impact identification and risk assessment process comprised the following components:

- ◆ Identification of activities and events (including planned activities, unplanned events and event response activities), and associated aspects with the potential to impact identified physical, biological, and socioeconomic receptors
- ◆ Identification of physical, biological, and socioeconomic receptors within the EMBA potentially affected by the activities and aspects, and 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 potential environmental impacts and risks are as low as reasonably practicable (ALARP) after considering the effectiveness of the identified safeguards
- ◆ Determination of whether the potential environmental impacts and risks are acceptable

Control measures were identified during the environmental risk workshop to ensure identified risks were reduced 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 Prioritization Matrix. 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

All potential risks identified during the risk assessment process are required to be reduced to ALARP.

ALARP will be considered to be achieved when the following criteria are met:

- ◆ there are no reasonably practicable alternatives to the activity; or
- ◆ there are no additional reasonably practicable measures available to further reduce the risk; or
- ◆ the cost of implementing further measures is disproportionate to the reduction in risk.

Where it can be demonstrated that the 'cost' of further risk reduction is disproportionate to the benefit gained, the risk is considered ALARP. For this criterion, 'cost' is considered to include financial cost, time or duration, effort, occupational health and safety risks, or environmental impacts associated with alternatives.

## 4.2 Determination of Acceptable

The determination that impacts and risks associated with the activity are of an acceptable level are based on potential consequence and risk rankings. Impacts and risks are only deemed 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 activities described in the Plan were determined to be acceptable if:

- ◆ the level of environmental risk is assessed to be between 7 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) are compliant with relevant legislation, industry standards/guidelines, and corporate policies, standards, and procedures specific to the operational environment.

In all instances for the planned activities and potential unplanned events assessed during the environmental risk workshop, the risk levels with safeguards in place was determined to be low (between 7 and 10) and potential risks and impacts have been determined to be reduced to ALARP and an acceptable level.

## 4.3 Summary Environmental Impacts, Risks and Control Measures

A summary of the environmental impacts and risks and controls in place to manage the activity are detailed in Table 4-1.

**Table 4-1: Environmental Impacts, Risks and Control Measures**

Sources of Risk (Hazards)	Potential Environmental Impacts (Consequences)	Control Measures/Safeguards	Residual Risk
Physical presence of survey vessels in the operational area.	Vessel strike with marine fauna (including cetaceans, whale sharks, turtles) resulting in injury or death.	<ul style="list-style-type: none"> <li>◆ Dedicated MFO onboard on source vessel to observe marine fauna approaching vessel.</li> <li>◆ Survey vessels will comply with relevant requirements of EPBC Regulations 2000 – Part 8 Division 8.1, including:               <ul style="list-style-type: none"> <li>○ Taking action to avoid approaching or drifting closer than 50 m to a dolphin (or whale shark) or 100 m to a whale; and</li> <li>○ Not exceeding a speed of 6 knots within the 300 m caution zone of a cetacean (or whale shark).</li> </ul> </li> <li>◆ During source discharge and node deployment/retrieval operations, the Survey vessels will travel at slow speeds (&lt;6 knots).</li> <li>◆ The timing of the survey is between mid-October 2015 and end of June 2016 to avoid peak humpback whale migration periods through the region.</li> <li>◆ Crew induction will include <i>EPBC Act</i> requirements regarding vessel/fauna separation distance, vessel speed requirements and marine fauna reporting requirements.</li> </ul>	<b>Low (10)</b>
	Potential disruption/ interaction with commercial and recreational fishing operators, commercial shipping vessels or other users of the area.	<ul style="list-style-type: none"> <li>◆ Relevant stakeholders have been consulted throughout the development of this EP and will be kept informed of progress &amp; vessel locations during survey operations.</li> <li>◆ Notification to enable a Notice to Mariners to be issued.</li> <li>◆ During the Survey, a 24 hour visual, radio and radar watch will be maintained for vessels in the vicinity of the operational area in accordance with IMO International Regulations for Preventing Collisions at Sea 1972 (COLREGS).</li> <li>◆ Navigational equipment/ radar to aid detection of commercial shipping and commercial/ recreational fishing vessels.</li> <li>◆ AHS informed of location of activities no later than three weeks prior to activities commencing.</li> <li>◆ Minimum lighting installed for safety and navigational purposes.</li> </ul>	<b>Low (10)</b>

		<ul style="list-style-type: none"> <li>◆ SIMOPs plan in place if other oil and gas related activities occur in the vicinity of the Survey operational area.</li> </ul>	
Placement and retrieval of nodes on seabed.	Loss of significant benthic habitat	<ul style="list-style-type: none"> <li>◆ Use of ROV with a camera to confirm nodes positioned away from sensitive or unique benthic habitats.</li> </ul>	<b>Low (10)</b>
Dropped objects (ROV, nodes, loading basket or ballast) during deployment of nodes and PIES.	Loss of significant benthic habitat	<ul style="list-style-type: none"> <li>◆ Contractor lifting procedures in place.</li> <li>◆ Sandbags and tether ropes will be made of biodegradable materials such as hessian.</li> </ul>	<b>Low (10)</b>
Vessel engine operation / noise (continuous non-pulse sources).	Disruption to behaviour patterns of marine fauna	<ul style="list-style-type: none"> <li>◆ Vessel engines maintained in accordance with Planned Maintenance System (PMS).</li> </ul>	<b>Low (10)</b>
Operation of seismic acoustic sources (pulse sources).	Physiological damage to marine fauna	<ul style="list-style-type: none"> <li>◆ Dedicated MFO onboard the source vessel to observe marine fauna during daylight hours.</li> <li>◆ Part A, Standard Management Procedures of the EPBC Act Policy Statement 2.1 will be implemented and applied to whales and whale sharks, including but not limited to: <ul style="list-style-type: none"> <li>○ Precautionary zones:</li> <li>○ observation zone: 3 km+</li> <li>○ low power zone: 2 km</li> <li>○ shutdown zone: 500 m.</li> </ul> </li> <li>◆ Pre start-up-visual observation, soft start, start-up delay, operations and power-down, stop-work and night-time and low visibility procedures as outlined in Part A of the Policy Statement.</li> <li>◆ Crew induction will include whale observation, separation distance estimation, controls and reporting.</li> <li>◆ The timing of the Survey is between November 2015 and end of June 2016, to avoid peak humpback whale migration periods through the region.</li> <li>◆ Size of the seismic source (airgun array) reduced to the minimum operating requirements.</li> <li>◆ The 100m depth contour is displayed on source vessel navigation</li> </ul>	<b>Low (10)</b>



		system to ensure no seismic source discharge in water depths of 100m or less.	
Ballast water exchange in the operational area.	Introduction of IMP to the operational area.	<ul style="list-style-type: none"> <li>◆ There will be no exchange of ballast water within 12 nautical miles (nm) of land or in water depths less than 200 m deep, as per the Australian Ballast Water Requirements 2001.</li> <li>◆ All vessels will have Department of Agriculture clearance.</li> </ul>	<b>Low (7)</b>
Deployment and operation of vessels and in-sea equipment with potential biofouling.	Introduction of IMP to the operational area.	<ul style="list-style-type: none"> <li>◆ All vessels to have current anti-fouling to meet the requirements of Annex I MARPOL and the Protection of the Sea (Harmful Antifouling Systems) Act 2006.</li> <li>◆ Any in-sea equipment, such as ROVs, source arrays and nodes, will remain dry stored during transit periods, which will ensure the desiccation and mortality of any marine flora or fauna growing on the equipment.</li> <li>◆ In-sea equipment as defined above will be regularly inspected and cleaned as required to maintain performance and prevent biofouling.</li> </ul>	<b>Low (7)</b>
Routine discharge of putrescible wastes.	Temporary and localised reduction in water quality associated with increase in nutrients.	<ul style="list-style-type: none"> <li>◆ Food waste will be discharged in accordance with MARPOL 73/78 , Annex V i.e. in waters &gt;3 nm food waste will be macerated prior to discharge and in waters &gt;12 nm food waste may be unmacerated. No food waste will be discharged in &lt;3 nm from land.</li> </ul>	<b>Low (10)</b>
Accidental loss to the marine environment of generated solid hazardous and non - hazardous wastes.	Temporary and localised reduction in water quality. Ingestion or entanglement of marine fauna.	<ul style="list-style-type: none"> <li>◆ Appropriate segregation and containment of wastes.</li> <li>◆ Induction materials include waste management and house keeping requirements in accordance with waste management plan.</li> <li>◆ All non-putrescible solid wastes are incinerated or appropriately disposed of at a licensed onshore facility if disposed of in Australia.</li> </ul>	<b>Low (10)</b>
Routine discharge of sewage and grey water.	Temporary and localised reduction in water quality.	<ul style="list-style-type: none"> <li>◆ Untreated sewage discharged &gt;12 nm from land in accordance with MARPOL 73/78 Annex IV.</li> <li>◆ A MARPOL 73/78 compliant sewage treatment system.</li> </ul>	<b>Low (10)</b>
Routine discharge of bilge and oily water.	Temporary and localised reduction in water quality.	<ul style="list-style-type: none"> <li>◆ All vessels used in the Survey will comply with the requirements of MARPOL 73/78 Annex I, with bilge water routed to an oily water separator (OWS) for treatment prior to discharge to the marine environment at a maximum concentration of 15 ppm, or retained onboard for controlled disposal at a port reception facility.</li> </ul>	<b>Low (10)</b>

Single point failure Hydraulic oil spill – on-board or overboard (< 1 m <sup>3</sup> ).	Reduction in water quality resulting in toxicity effects on marine flora and fauna.	<ul style="list-style-type: none"> <li>◆ Preventative maintenance schedule for ROVs.</li> <li>◆ Spill kits present onboard vessels.</li> <li>◆ In the event of a spill, implement the Vessel Shipboard Oil Pollution Emergency Plan (SOPEP).</li> </ul>	<b>Low (10)</b>
Vessel refuelling – MGO spill (1.2-25m <sup>3</sup> ).	Reduction in water quality resulting in toxicity effects on marine flora and fauna.	<ul style="list-style-type: none"> <li>◆ Contractor bunkering procedure, use of dry break couplings and breakaway couplings on fuel transfer hoses.</li> <li>◆ Maintain communications and refuelling only undertaken in daylight hours.</li> <li>◆ In the event of a spill, implement the Vessel SOPEP.</li> </ul>	<b>Low (9)</b>
Vessel Collision – MGO spill (190 m <sup>3</sup> ).	Reduction in water quality resulting in toxicity effects on marine flora and fauna.	<ul style="list-style-type: none"> <li>◆ A valid Offshore Vessel Inspection Database (OVID) audit to confirm vessels have appropriate safety and navigational aids.</li> <li>◆ Notice to mariners.</li> <li>◆ 24-hour visual, radio and radar watch maintained for all vessels.</li> <li>◆ If applicable, SIMOPs plan if vessels are working within 500 m of each other in the operational area.</li> <li>◆ In the event of a spill, implement the Survey Oil Pollution Emergency Plan (OPEP).</li> </ul>	<b>Low (9)</b>
Implementation of monitoring, evaluation and surveillance (MES) activities in response to an oil spill resulting from a vessel collision.	No additional environmental impacts identified associated with MES activities above those described previously for planned activities and MES response activities will be implemented in accordance with the Survey OPEP.	N/A	<b>N/A</b>

## 5.0 MANAGEMENT APPROACH

The implementation strategy identifies the systems, practices and procedures used to ensure the environmental impacts and risks of the activity are continuously reduced to ALARP, and the environmental performance outcomes and standards that have been set are met.

The implementation strategy is split between planned operational activities and unplanned events, enabling roles and responsibilities to be clearly defined and to provide a clear chain of command for both.

The implementation strategy of the Plan has been developed in line with Chevron Australia's Operational Excellence Management System (OEMS). The Chevron OEMS is the over-arching corporate management system that ensures Chevron and its contractors have the processes, systems, equipment, people and procedures in place to continuously monitor, manage and reduce all potential environmental impacts and risks to ALARP.

### 5.1 Roles and Responsibilities

Accountabilities and responsibilities are defined for personnel involved in the Survey implementation for both planned activities and unplanned events.

### 5.2 Training and Competency

All personnel involved with the Survey will be competent to carry out their assigned position and shall be made aware of environmental risks through attendance at the crew induction. The induction will include an overview of the key risks, environmental sensitivities, impact mitigation strategies and initial response actions for unplanned events.

### 5.3 Monitoring and Reporting

The implementation strategy outlines the requirements for monitoring and reporting to ensure activities are accurately captured and reported in a timely manner including the following:

- ◆ Marine fauna observations
- ◆ Emissions and discharges
- ◆ Routine external reporting and non-routine reporting (including internal incident reporting and investigations and external incident reporting).

### 5.4 Compliance Assurance

Routine inspections will be undertaken for the duration of the Survey in accordance with Chevron's ABU Compliance Assurance Process. The aim of these inspections is to verify compliance with the Plan.

### 5.5 Documentation and Records

Chevron Australia's ABU OEMS has dedicated information management tools and processes to ensure critical information is developed, accessible and maintained by the workforce. Survey documentation shall be managed in accordance with this process and

all documentation and records demonstrating compliance against environmental performance outcomes and standards will be effectively maintained and retained for the life of the Survey and not less than five years.

## **5.6 Environment Plan Review**

Chevron's Management of Change process will be followed to document and assess the impact of any changes to 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 re-submitted to NOPSEMA for approval in accordance with Regulation 17 of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009.

## 6.0 OIL POLLUTION EMERGENCY PLAN

Chevron Australia's approach is to reduce the likelihood of a spill as far as practicable, through implementation of effective preventative measures, with the development and implementation of response techniques as a secondary mitigation measure.

To mitigate against oil spill scenarios, Chevron has developed an Oil Pollution Emergency Plan (OPEP) specific to the Survey based on the worst case credible spill scenario identified. Oil spill modelling of this scenario forms the basis of the EMBA as described in Section 3.0. The OPEP adopts a tiered response philosophy to oil spill responses, which is consistent with that adopted by the National Marine Oil Spill Contingency Plan (AMSA 2014) and the WA Marine Oil Pollution Emergency Management Plan (Department of Planning and Infrastructure 2007).

For all marine pollution incidents in Commonwealth waters, including those from ships and offshore petroleum activities that are not related to offshore petroleum facilities, AMSA has Control Agency responsibility as defined in the National Plan, and will respond in accordance with its Marine Pollution Response Plan. The Gorgon OBN Survey is using vessels in Commonwealth waters and therefore AMSA will be the Control Agency in the event of a spill occurring during the Survey.

First strike response in the event of a spill will be the implementation of the vessel Shipboard Oil Pollution Emergency Plan (SOPEP), which will direct the Vessel Master to notify AMSA of the incident. The Chevron Representative on the vessel and other Chevron Australia resources if requested will enact the Survey OPEP.

Although AMSA is the Control Agency, the Survey OPEP outlines how Chevron Australia's response to an incident would interface with the National Plan. Given the proximity to Barrow Island and associated spill response resources, Chevron Australia will liaise with AMSA, and if requested, could undertake spill response activities relevant to the Survey.

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

- ◆ Alert procedures and initial response actions
- ◆ Response team activation
- ◆ External notification and reporting.

Monitor, Evaluate and Surveillance (MES) has been assessed as an applicable spill response strategy for potential hydrocarbon spills associated with the Survey based on the open ocean environment and the expected behaviour of any spills to disperse and evaporate naturally.

Due to the relatively short duration of the survey (approximately 210 days) it is not anticipated to update the OPEP during the Survey. However, in accordance with Regulation 14(8) of the OPGGS(E)R, the OPEP will be updated as and when required to ensure all relevant information remains current and up to date.

## 7.0 CONSULTATION

Chevron Australia prepared a Stakeholder Consultation Plan specifically for the Survey. The Stakeholder Consultation Plan describes:

- ◆ Stakeholder identification and analysis
- ◆ Stakeholder engagement log, including information provided to stakeholders and Chevron Australia responses as well as ongoing consultation requirements
- ◆ Full text of consultation.

### 7.1 Relevant Stakeholders

Relevant stakeholders have been identified through a stakeholder analysis process to ensure persons or organisations that may be potentially affected by the Survey have been consulted. Relevant stakeholders are shown in Table 7-1.

**Table 7-1 Stakeholders engaged for the Gorgon OBN Survey**

Stakeholder	Stakeholder Type
<b>Emergency Response</b>	
Australian Marine Oil Spill Response Centre (AMOSOC)	Response organisations
Department of Transport (DoT) OSRC Unit	
Oil Spill Response Limited (OSRL)	
<b>Titleholders/Neighbouring Operators</b>	
Apache Energy Ltd	Interested parties
KUFPEC	
<b>Fisheries – Government &amp; Commercial</b>	
Australian Fisheries Management Authority (AFMA)	Government agencies
Department of Fisheries WA	
Pearl Producers Association (PPA)	Potentially affected party
Aquarium Specimen Collectors Association of WA	Interested parties
Australian Southern Bluefin Tuna Industry Association	
Commonwealth Fisheries Association	
Professional Specimen Shell Fisherman's Association	
Western Australian Fishing Industry Association (WAFIC)	
<b>Fisheries – Commonwealth &amp; State</b>	
North West Slope Trawl	Potentially affected parties
Onslow Prawn	
Marine Aquarium Fish	
Mackerel Managed	
Pilbara Line	
Pilbara Trap	
Specimen Shell	

Western Skipjack	Interested parties
Western Tuna and Billfish	
<b>Fisheries - Recreational</b>	
Apache Charters	Potentially affected parties
Blue Juice Charters	
Coral Bay Discoveries	
Exmouth Deep Sea Fishing	
Heron Charters	
Montebello Island Safaris	
Pelican Charters	
Point Samson Charters	
Top Gun Charters (Exmouth)	
Exmouth Game Fishing Club	
Nickol Bay Sport Fishing Club	
Port Headland Game Fishing Club	
Marine Tourism WA	Interested parties
RecFish West	
Onslow Visitor Centre	
<b>Government - Commonwealth</b>	
Australian Hydrographic Service (AHS)	Government agencies
Australian Maritime Safety Authority (AMSA)	
Department of Broadband, Communication and the Digital Economy (DBCDE)	
Department of Defence	
<b>Government - State</b>	
Department of Mines and Petroleum (DMP)	Government agencies
Department of Parks and Wildlife (DPAW)	
Department of Transport	
Pilbara Ports Authority	

## 7.2 Consultation Undertaken

A summary of the key stakeholder concerns and actions undertaken to address the concerns are contained in Table 7-2.

**Table 7-2 Summary of key stakeholder concerns**

Stakeholder	Key Concerns/Issues	Assessment of Merit/Action Taken
PPA	PPA noted until adequate science is completed or demonstrated to their industry to indicate the level of impact they will not support any seismic survey proposals within the P.maxima pearl oyster species range as currently known. On best information available from the Department of Fisheries they note the stock ranges out to the 100m depth contour between NW Cape and the Lacepede Is.	Chevron noted the actual shot area is outside the 100 metre contour. Acknowledged we do get close to the 100 metre mark on the east side during vessel line turns from the shot area into the operational / buffer zone, noted the likelihood of any seismic source discharge within this zone is low. Also note the area located in water depths <100 metres (as a percentage of the total operations area) is very small. Noted the open ocean environment of the survey operational area is generally unsuitable for pearl aquaculture or pearl shell drift diving and the distance to the nearest pearling activity is over 60 kilometres. Noted if between now and survey commencement, if any new pearling activity is established in this survey area, Chevron will reassess the situation and will be happy to discuss mitigation measures that may be appropriate to have in place. Chevron re-confirmed with the PPA that the turn circle will not broach the 100 metre contour line which rests approximately three kilometres from the edge of the shot area confirming there will not be any seismic activity in the 100 metre water depth range or less.
AMSA	Chevron requested clarification on Control Agency responsibilities in case of an unplanned oil spill during the Gorgon Ocean Bottom Node Seismic Survey.	AMSA via a telephone conversation on 30 <sup>th</sup> June 2015 (Jamie Storrie), confirmed that AMSA is the Control Agency for oil spills from vessels within Commonwealth waters, as stipulated in the National Plan. Following this, the interface with the National Plan and the Gorgon OBN Seismic Survey OPEP was clarified via email (confirmation received 7 <sup>th</sup> July 2015).
Department of Fisheries WA	In line with the Department's guidance statement on undertaking seismic surveys in Western Australian waters, we request that Chevron identifies a full range of mitigation strategies in the EP. It is expected that all feasible mitigation strategies will be implemented. In	The risks associated with seismic surveys and mitigation measures are identified in the EP. All risks are assessed and mitigation measures are determined using the ALARP (As Low as Reasonably Practicable) process. The ALARP justification is included in the EP. Chevron has



	particular, the Department requests that analysis is undertaken to ensure that Chevron use the minimum required acoustic capacity.	selected an acoustic source array that will have a minimal impact on the marine environment whilst still retaining the technical capability to obtain quality seismic data.
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### 7.3 Ongoing Consultation

Chevron will continue to engage with the relevant stakeholders prior to and during the Gorgon OBN Survey as appropriate. This includes ongoing engagement to inform stakeholders about key milestones and activities and any other relevant information. Table 7-3 summarises the ongoing key consultation to be undertaken.

**Table 7-3 Ongoing consultation**

Stakeholder	Ongoing Communications
Department of Transport (DoT) OSRC Unit	Copy of the regulator approved OPEP to be provided to DoT (OSRC unit).
OSRL	Copy of the regulator approved OPEP to be provided to DoT (OSRC unit).
Aquarium Specimen Collectors Association of WA	Chevron to advise start and finish dates and provide fortnightly updates on Survey progress.
Australian Southern Bluefin Tuna Industry Association	
Department of Fisheries WA	Chevron to re-engage with the Department three months prior to the commencement of the Survey. Start and finish dates, fortnightly updates of Survey and any exclusion zone information to be provided by Chevron to the Department of Fisheries, WAFIC, RecFish West and individual fishery license holders.
Western Australian Fishing Industry Association (WAFIC)	Chevron to provide WAFIC a summary of the feedback that Chevron has received from the commercial fishing sector.
Recreational and Charter Fishing Stakeholders	Chevron to advise of any relevant exclusion zone information, Survey start and finish dates and fortnightly updates on Survey progress throughout the duration of the Survey.
Marine Tourism WA	Agreed engagement to inform the Association who in turn send out updates to their members. To include Survey start and finish dates and fortnightly updates on Survey progress throughout the duration of the Survey.
Australian Hydrographic Service	Notification of intention to commence the Survey to be included in Notice to Mariners 3 weeks prior to start.
AMSA	Chevron to contact AMSA RCC for navigational warnings.
Department of Defence	Should helicopter transfers be required for crew changes, Chevron will send the proposed crew change schedule to the Department of Defence prior to commencement of the Survey.

## 8.0 REFERENCES

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## 9.0 ABBREVIATIONS & ACRONYMNS

Acronyms and Abbreviations	Description
ABU	Australasia Business Unit
AHS	Australian Hydrographic Service
ALARP	As Low As Reasonably Practicable
AMSA	Australian Maritime Safety Authority
Chevron	Chevron Australia Pty Ltd
COLREGs	International Regulations for Preventing Collisions at Sea, 1972
Daylight hours	The hours between sunrise and sunset
DoF	Department of Fisheries (WA)
DoT	Department of Transport (WA)
EMBA	Environment that May Be Affected
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
HES	Health, Environment and Safety
IMP	Introduced Marine Pests
KEFs	Key Ecological Features
km	Kilometre(s)
m	Metre(s)
MARPOL 73/78	International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978.
MES	Monitoring, Evaluation and Surveillance
MFO	Marine Fauna Observer
MGO	Marine Gas Oil
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
Nm	Nautical miles
OBN	Ocean Bottom Node
OEMS	Operational Excellence Management System
OPEP	Oil Pollution Emergency Plan
OPGGs(E)R	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
PIES	Pressure Inverted Echo Sounders
(the) Plan	Gorgon OBN Seismic Survey Environment Plan
ROV	Remotely Operated Vehicle
SIMOPS	Simultaneous Operations
SOPEP	Shipboard Oil Pollution Emergency Plan
WA	Western Australia