



Wheatstone Project

Summary Environment Plan – Flowline Structures Installation and Survey

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WHEATSTONE PROJECT

Summary Environment Plan – Flowline Structures Installation and Survey

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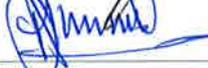
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ACRONYMS, ABBREVIATIONS AND TERMINOLOGY

ABU	Australasia Business Unit
ALARP	As Low As Reasonably Practicable
AMSA	Australian Maritime Safety Authority
AQIS	Australian Quarantine and Inspection Service
AS/NZS	Australian Standard/New Zealand Standard
BoM	Bureau of Meteorology
Chevron	Chevron Australia Pty Ltd
CSMF	Conservation Significant Marine Fauna
CSMFIMP	Conservation Significant Marine Fauna Interaction Management Plan
DEC	Department of Environment and Conservation (WA)
DEH	Department of Environment and Heritage (Cth)
DEWHA	Department for the Environment, Water, Heritage and the Arts (Cth) – formerly DEH
DP	Dynamic Positioning
EMBA	Environment that May Be Affected
EPBC Act	Commonwealth Environmental Protection and Biodiversity Conservation Act 1999
g	grams
HES	Health, Environment and Safety
hr	Hour(s)
IAG	Iago Well
IMO	International Maritime Organisation
IUCN	International Union for Conservation of Nature
km	kilometre(s)
L	Litre(s)
m	metre(s)
MDO	Marine Diesel Oil
mm	Millimetre
NEBA	Net Environmental Benefit Analysis
NES	National Environmental Significance
nm	Nautical Mile
NOPSEMA	National Offshore Petroleum Safety Environment Management Authority
NWS	North-West Shelf
ODS	Ozone Depleting Substance
(The) Plan	Installation Environment Plan – Flowline Structures Installation and Survey
ppm	Parts Per Million

Project	Nearshore and offshore marine facilities, trunkline, and Onshore Facility
Practicable	Means reasonably practicable having regard to, among other things, local conditions and circumstances (including costs) and to the current state of technical knowledge (<i>taken from the EP Act</i>)
Proponent	Chevron Australia Pty Ltd
ROV	Remotely Operated Vehicle
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities (Cth) - formerly DEWHA
SIMOPS	Simultaneous Operations
SIV	Structures Installation Vessel
SOPEP	Shipboard Oil Pollution Emergency Plan
WA	Western Australia
WP	Wheatstone Platform
WST	Wheatstone Well

1.0 INTRODUCTION

This Summary Environment Plan – Flowline Structures Installation and Survey summarises the Wheatstone Project Installation Environment Plan – Flowline Structures Installation and Survey (Document Number WS2-3002-HES-PLN-CVX-000-00001-000, referred to as the Plan in this Summary document). The Plan details the planned pre-engineering flowline survey, structures (counteracts) placement and pre-lay span correction activities in Commonwealth Waters and was accepted by the National Offshore Petroleum Safety Environment Management Authority (NOPSEMA) on 12 September 2013.

1.1 Operator

Chevron Australia Pty Ltd (Chevron) is the proponent for the Wheatstone Liquefied Natural Gas Project. The Joint Venture Participants in the Wheatstone Project are Australian subsidiaries of Chevron, Apache Corporation, Kuwait Foreign Petroleum Exploration Company, Shell, Kyushu Electric Power Company and PE Wheatstone Pty Ltd (part owned by TEPCO).

1.2 Location

The activities will be performed in petroleum titles WA-46-L, WA-47-L and WA-48-L approximately 145 km off the north-west coast of Western Australia (WA) in the West Carnarvon Basin, as represented in Figure 1.1 and Figure 1.2. Indicative primary installation locations for the counteracts are specified in Table 1.1 to Table 1.4. In addition to the planned primary locations, alternate secondary and tertiary locations 10 m upstream and downstream of the primary position, respectively, which may be utilised instead of the primary location, are also presented in Table 1.1 to Table 1.4.

1.3 Activities and Timing

The activities are scheduled to commence in Quarter 4 2013. Indicative durations are:

- ◆ Pre-engineering flowline survey activities: approximately 3 to 7 days
- ◆ Structures installation activities: approximately 21 days
- ◆ Pre-lay span correction activities: approximately 15 days.

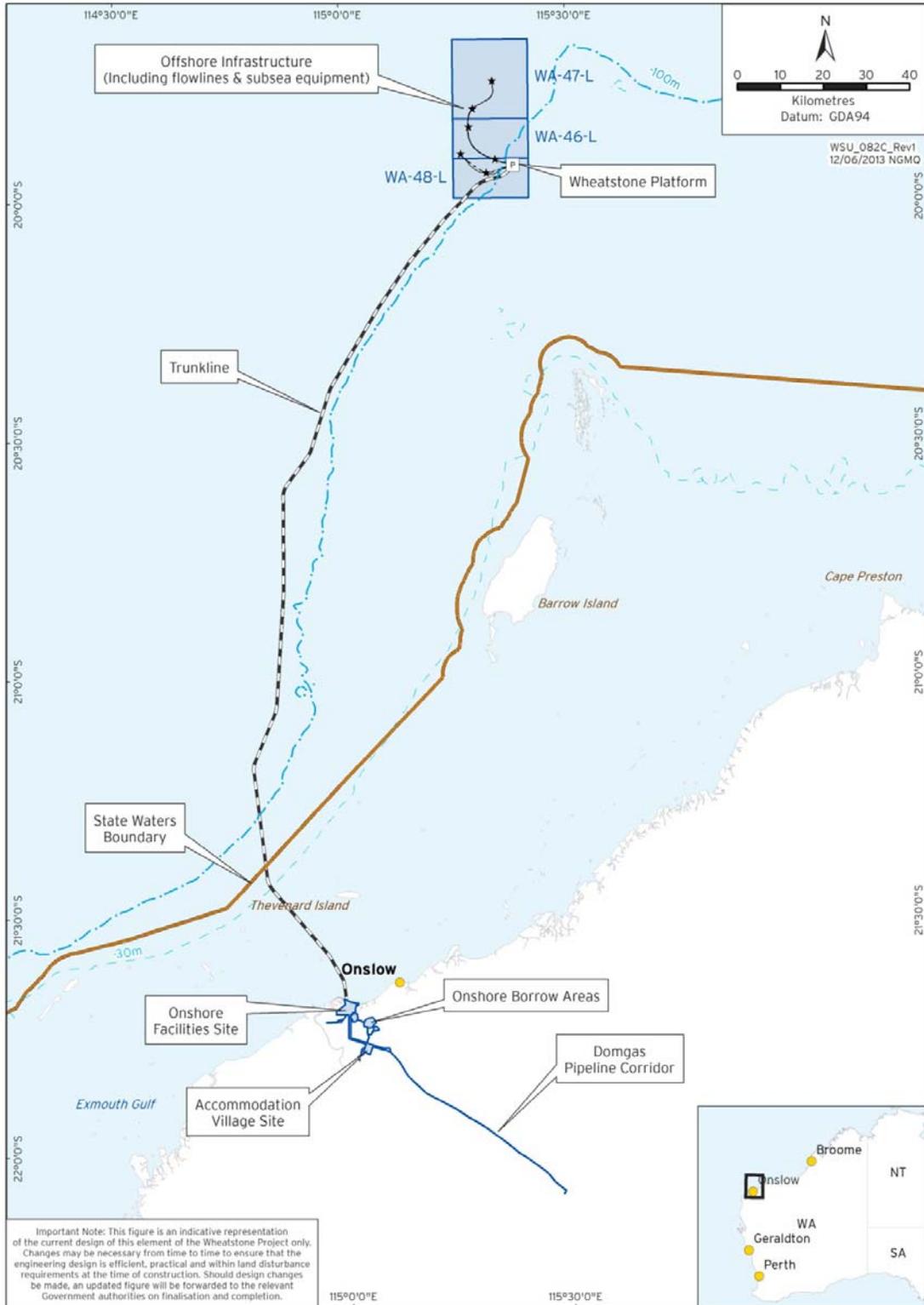


Figure 1.1: Location of Wheatstone Project Infrastructure

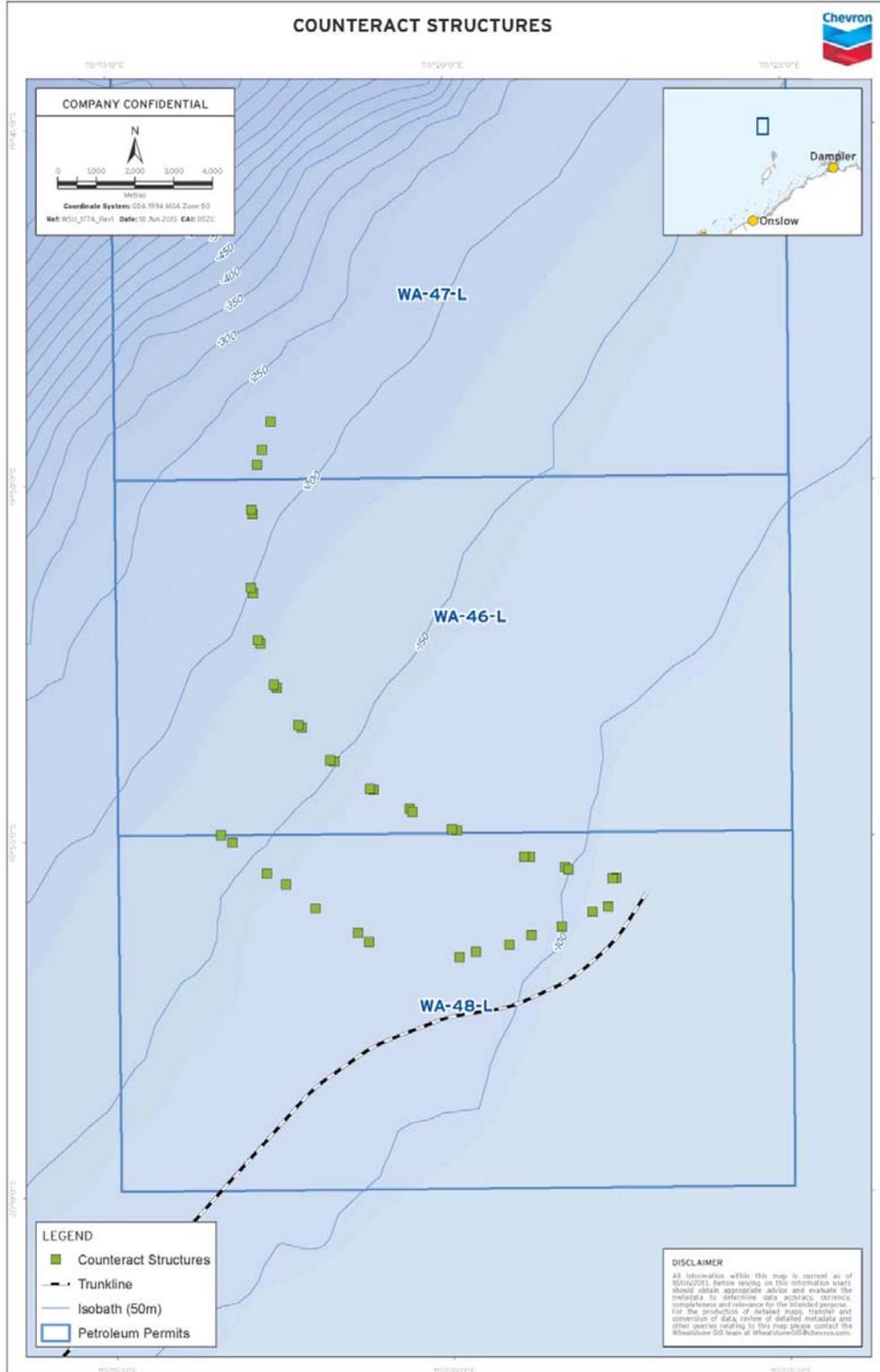


Figure 1.2: Indicative Counteract Locations

Table 1.1: Counteract Structures Nominal Locations – 24” Production Flowlines - WST-1 to Wheatstone Platform (WP)

Description	Approx. Water Depth (m)	KP	Structure Type	Primary Location Structural Datum Coordinates		Secondary Option - Relocate Upstream (10 m)		Tertiary Option – Relocate Downstream (10 m)	
				EASTING	NORTHING	EASTING	NORTHING	EASTING	NORTHING
WST-1 TO IAG-1									
PS-01	162	1.669	TYPE 1B	319 936	7 796 758	319 929	7 796 764	319 944	7 796 751
PS-02	145	3.425	TYPE 1B	321 320	7 795 678	321 312	7 795 685	321 328	7 795 673
PS-03	129.5	5.678	TYPE 1B	323 188	7 794 421	323 180	7 794 427	323 197	7 794 416
IAG-1 TO WP									
PS-04	112	1.551	TYPE 1B	326 230	7 793 928	326 220	7 793 926	326 240	7 793 931
PS-05	107	3.059	TYPE 1B	327 671	7 794 369	327 662	7 794 366	327 681	7 794 373
PS-06	95	4.748	TYPE 1B	329 247	7 794 975	329 238	7 794 972	329 256	7 794 980

Table 1.2: Counteract Structures Nominal Locations – 14” Utility Flowlines - WST-1 to WP

Description	Approx. Water Depth (m)	KP	Structure Type	Primary Location Structural Datum Coordinates		Secondary Option - Relocate Upstream (10 m)		Tertiary Option – Relocate Downstream (10 m)	
				EASTING	NORTHING	EASTING	NORTHING	EASTING	NORTHING
WST-1 TO IAG-1									
US-01	166	1.33	TYPE 2B	319 637	7 796 948	319 630	7 796 954	319 645	7 796 941
US-02	150	2.877	TYPE 2B	320 826	7 795 957	320 818	7 795 964	320 834	7 795 951
US-03	138	4.423	TYPE 2B	322 079	7 795 053	322 070	7 795 059	322 087	7 795 048
US-04	127	6.065	TYPE 2B	323 474	7 794 188	323 465	7 794 193	323 482	7 794 183
IAG-1 TO WP									
US-05	113.5	1.12	TYPE 2B	325 810	7 793 780	325 800	7 793 780	325 819	7 793 785
US-06	109.5	2.457	TYPE 2B	327 101	7 794 127	327 091	7 794 125	327 110	7 794 131
US-07	104	3.887	TYPE 2B	328 453	7 794 594	328 443	7 794 591	328 462	7 794 598
US-08	91	5.187	TYPE 2B	329 648	7 795 103	329 639	7 795 099	329 657	7 795 108

**Table 1.3: Counteract Structures Nominal Locations - 24” Production Flowlines –
 WST-3 to WP**

Description	Approx. Water Depth (m)	KP	Structure Type	Primary Location Structural Datum Coordinates		Secondary Option - Relocate Upstream (10 m)		Tertiary Option – Relocate Downstream (10 m)	
				EASTING	NORTHING	EASTING	NORTHING	EASTING	NORTHING
WST-3 TO WST-2									
PN-01	220	1.701	TYPE 1B-LS	320 695	7 806 943	320 698	7 806 953	320 693	7 806 933
PN-02	211	3.389	TYPE 1A	320 451	7 805 279	320 452	7 805 288	320 451	7 805 268
WST-2 TO IAG-2									
PN-03	201	5.439	TYPE 1A-LS	320 458	7 803 229	320 458	7 803 239	320 459	7 803 219
PN-04	191.5	6.761	TYPE 1B-LS	320 654	7 801 925	320 652	7 801 935	320 657	7 801 916
PN-05	181	7.984	TYPE 1B	321 080	7 800 782	321 077	7 800 790	321 084	7 800 775
PN-06	168	9.207	TYPE 1B	321 726	7 799 748	321 721	7 799 756	321 733	7 799 740
PN-07	155	10.43	TYPE 1B	322 566	7 798 863	322 559	7 798 870	322 574	7 798 857
PN-08	142	11.69	TYPE 1B	323 591	7 798 132	323 583	7 798 137	323 600	7 798 127
PN-09	134	12.74	TYPE 1B	324 513	7 797 640	324 504	7 797 645	324 522	7 797 636
PN-10	123.5	14.1	TYPE 1B	325 755	7 797 084	325 746	7 797 088	325 764	7 797 081
IAG-2 TO WP									
PN-11	111.5	16.1	TYPE 1A	327 632	7 796 397	327 623	7 796 401	327 642	7 796 394
PN-12	107	17.04	TYPE 1A	328 538	7 796 136	328 528	7 796 139	328 547	7 796 134
PN-13	89	18.4	TYPE 1B	329 869	7 795 851	329 859	7 795 853	329 879	7 795 849

Table 1.4: Counteract Structures Nominal Locations - NPS 14” Utility Flowlines - WST-3 to WP

Description	Approx. Water Depth (m)	KP	Structure Type	Primary Location Structural Datum Coordinates		Secondary Option - Relocate Upstream (10 m)		Tertiary Option – Relocate Downstream (10 m)	
				EASTING	NORTHING	EASTING	NORTHING	EASTING	NORTHING
WST-3 TO WST-2									
UN-01	224	0.95	TYPE 2A-LS	320 914	7 807 674	320 918	7 807 683	320 911	7 807 664
UN-02	218	2.113	TYPE 2A-LS	320 569	7 806 565	320 572	7 806 575	320 568	7 806 555
UN-03	212	3.306	TYPE 2A	320 425	7 805 384	320 426	7 805 394	320 425	7 805 374
WST-2 TO IAG-2									
UN-04	202	0.861	TYPE 2A-LS	320 412	7 803 371	320 412	7 803 381	320 413	7 803 361
UN-05	192.5	2.235	TYPE 2A-LS	320 593	7 802 012	320 591	7 802 022	320 596	7 802 003
UN-06	182	3.466	TYPE 2B	321 003	7 800 855	320 999	7 800 864	321 008	7 800 846
UN-07	169	4.697	TYPE 2B	321 636	7 799 804	321 631	7 799 812	321 642	7 799 796
UN-08	156	5.927	TYPE 2B	322 467	7 798 900	322 460	7 798 907	322 475	7 798 894
UN-09	143	7.197	TYPE 2B	323 490	7 798 154	323 481	7 798 159	323 498	7 798 149
UN-10	133.5	8.442	TYPE 2B	324 587	7 797 568	324 579	7 797 573	324 597	7 797 564
UN-11	124.5	9.563	TYPE 2A	325 611	7 797 110	325 602	7 797 114	325 620	7 797 107
IAG-2 TO WP									
UN-12	112	0.861	TYPE 2A	327 484	7 796 403	327 474	7 796 407	327 493	7 796 401
UN-13	106.5	2.046	TYPE 2B	328 622	7 796 075	328 612	7 796 078	328 631	7 796 073
UN-14	90	3.216	TYPE 2B	329 766	7 795 838	329 756	7 795 840	329 776	7 795 837

2.0 DESCRIPTION OF THE ACTIVITY

The primary vessels proposed for the activities include a Survey Vessel for pre-engineering flowline survey, Structures Installation Vessel (SIV) for counteracts placement and Span Correction Vessel for pre-lay span correction activities. The SIV may have up to two supporting vessels for crew transfer (if required) and supplies. The maximum number of vessels operating at any one time is four.

All vessels will contain marine diesel oil (MDO) with single tank capacities ranging from the smallest of 4 m³ on the crew transfer vessels, to a maximum of 325 m³ on the SIV. For the purposes of risk and oil spill response capability assessments, a conservative maximum volume of 355 m³ has been used. Vessel bunkering in the field is not expected for these activities; all bunkering is planned to occur in port waters.

2.1 Pre-Engineering Flowline Survey

A pre-engineering flowline survey will be undertaken along the flowline routes in preparation for the future flowline installation activities. The survey will verify results of earlier initial route investigations, identify debris / anomalies along the proposed flowline routes and may involve shifting minor debris using a remotely operated vehicle (ROV) where debris is an obstruction. The Survey Vessel uses a hull mounted multibeam echo sounder supplemented with ROV configured to include standard survey equipment (obstacle avoidance sonar video camera, bathymetric system, gyrocompass, Doppler log, depth sensor etc.).

2.2 Structures installation

Approximately 41 counteracts to aid and control pipe buckles will be placed along the proposed flowline route, with approximately 19 of these fitted with ballast blocks. Anti-scour grout mats/skirts are attached to the sides of the counteract structures. The preferred locations for the counteracts are primarily featureless, soft seabed surfaces that provide optimal stability and lateral resistance to the counteracts. Should the primary installation locations contain seabed features deleterious to the long term performance of the counteracts, are uneven or if the structure skirts do not adequately penetrate the seabed, the secondary or tertiary locations will be used instead.

2.3 Pre-Lay Span Correction

The pre-engineering flowline survey will identify whether and where mattresses (typically concrete) are required along the flowline route for support of the flowline when it is laid. Anti scour mats/skirts will be filled with grout, and mattresses, grout filled bags or rock bags will be installed around the counteracts for scour protection where required. The mattresses, grout bags and rock bags will be deployed by crane or A-frame and will be guided into position on the seabed using an ROV.

2.4 Unplanned Events

Single point failures overboard may result in minor hydrocarbon or chemical spills to the marine environment. Damage to a vessel could result in potential loss of containment of a fuel tank of MDO.

3.0 DESCRIPTION OF THE ENVIRONMENT

3.1 Physical Environment

The Wheatstone fields are located on the edge of the continental shelf. The operational area is represented as the petroleum licensed area (WA-46/47/48-L) plus a conservative 2 km buffer zone around the area. The operational area is predominantly within the North-west Province Bioregion, while the the Environment that May Be Affected (EMBA) (based on spill modeling for the worst case MDO spill) extends into the Northwest Integrated Marine and Coastal Regionalisation of Australia (IMCRA) Province and the Northwest Transition (DEH 2006).

The counteract placement locations are in depths of approximately 90-225 m, with the operational area sloping to depths of approximately 820 m. The EMBA is on the continental slope of the NWS, in water depths ranging from approximately 50-1300 m. The seafloor slopes down to the north-west throughout the EMBA, with no shallow or emergent features within the EMBA.

The dominant feature of circulation in the vicinity of the EMBA is the Holloway Current, driven by the Indonesian Throughflow which flows along the outer North-West Shelf (NWS). Tides in the area are semi-diurnal with a spring tide range of 1.9 m. Waters of the NWS 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.

Offshore open ocean waters have small variability in water quality parameters due to limited anthropogenic influence. The waters of the NWS region are oligotrophic, with limiting rates of primary production. The near-surface water range from 31 °C maximum in summer to 22 °C minimum in winter (Chevron 2005), whilst depths of >400 m are much less seasonally variable and average 5–6 °C (NWPJEMS 2004). Salinity varies (~ 34.4 g/L to ~ 36.3 g/L) around the NWS (Chevron 2010), influenced by evaporation and cyclone events.

Tropical cyclones occur in the region, with an average of five per year (BoM 2012). The Australian region tropical cyclone season runs from 1 November to 30 April (BoM 2012). Tropical cyclones are unpredictable in occurrence, intensity and behaviour, but are most common between December and March and can generate extreme seas and swell, as well as localised wind gusts of over 150 km/hr.

3.2 Biological Environment

The oligotrophic offshore waters of the EMBA generally support low productivity and low planktonic biomass (Chevron 2010). However, the annual weakening of the Leeuwin Current and Indonesian Throughflow during the Northwest Monsoon season (October to March) is known to facilitate the movement of cold nutrient-rich slope waters from the Indian Ocean into the EMBA, subsequently mixing as a result of strong tides (DEWHA 2008).

The benthic habitat in the EMBA is largely characterised by soft, unconsolidated sediments (DEWHA 2008; Chevron 2010). The soft sediments of the EMBA are likely to support sparse communities of benthic epifauna, such as crustaceans, molluscs and sponges, typical of the North-west Province (DEWHA 2008; Chevron 2010).

ROV surveys show bare sand is the dominant habitat within the operational area. The majority of these habitats were:

- ◆ Flat to micro rippled (< 0.5 m)

- ◆ Silt/sand substrate
- ◆ Sparse (1–10 m²) to abundant (50–100 m²) bioturbation (evidence of infauna such as burrows and mounds)
- ◆ Trace to very sparse (< 1%) benthic sessile and motile invertebrates including soft corals, sea pens, sponges, sea whips, ascidians, urchins and hydroids.

These soft substrate habitats are not considered ecologically sensitive, unique or significant to the region. Significant habitats in deeper waters (beyond the 20 m bathymetry line) have been defined as complex hard substrate areas. ROV footage shows the operational area supports occasional benthic sessile invertebrates, dominated by gorgonians (sea fans and sea whips), sponges and soft coral (Chevron 2010).

The search for matters of National Environmental Significance (NES) under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) identified ten threatened species and 18 migratory species that may potentially occur in the operational area and EMBA (SEWPAC 2013).

A number of sharks and pelagic finfish, including mackerels, tunas and billfishes, occur in the waters of the North-west Marine Region and would be expected to occur within the EMBA (DEWHA 2008). There are three species of migratory sharks that may occur within the EMBA, including the whale shark.

Seabirds that occur in the North-west Marine Region include terns, noddies, petrels, shearwaters, tropicbirds, frigatebirds and boobies. These species spend most of their lives at sea, ranging over large distances to forage over the open ocean. No regions or islands regarded as significant seabird habitats occur within the EMBA.

Six species of EPBC-listed marine reptiles were identified as having the potential to occur within the EMBA. Significant habitat for these species is within the Montebello / Lowendal / Barrow Island regions located outside the EMBA.

There are five species of marine turtles that may occur in the EMBA: green, leatherback, hawksbill, flatback and loggerhead turtles. The water depths of the EMBA and the lack of shallow or emergent features preclude the presence of important foraging habitat for marine turtles. All five species are known to undertake long migrations between foraging grounds and nesting beaches. Given the distance of the EMBA from the nearest turtle nesting beaches (approximately 20 km from Montebello Islands), the presence of turtles would mainly be limited to migrating turtles passing through the area and nesting flatback turtles during the inter-nesting period in relatively low numbers. It is also unlikely that turtle hatchlings will be encountered during the operation as hatching occurs at approximately eight weeks after nesting. Therefore it is unlikely that turtle hatchlings will emerge during the activities due to timing. Additionally, after leaving the nesting beaches, turtle hatchlings undertake oceanic migrations, travelling with the currents. The surface currents in this region are predominantly to the south-west from January through to June, away from the EMBA (APASA 2013).

Several species of whale are known to frequent the waters of the North-west Province bioregion, including the blue whale, listed as endangered, and the humpback whale, listed as vulnerable under the EPBC Act. Humpback whales migrate along the WA coastline from June to November between their winter feeding grounds and the breeding grounds of Camden Sound in north-west WA (SEWPaC 2012b; DEH 2005; Jenner et al. 2001). Humpback whales are thought to only feed opportunistically whilst migrating along the WA coastline (SEWPaC 2012a). Northbound migration in the vicinity of the EMBA (Montebello Islands region) peaks in mid to late July. Breeding and calving takes place between mid-

August and early September in Camden Sound, more than 900 km to the north-east of the EMBA (DEH 2005). Humpback whales then migrate south along the coastline from late August to November, with peak numbers during the southbound migration in the region from late August to mid-September. The humpback whale migration corridor tends to be within the 200 m isobath (Jenner et al. 2001). Satellite tagging studies in north-west WA have shown that cow and calf pairs tend to stay close to the coast during their southern migration, largely within tens of kilometres of the coastline, usually in water depths of 30 m or less (Double et al. 2010). The planned activities may coincide with the southern migration period, therefore, low to moderate numbers of humpback whales may occur in the EMBA.

Many species of pelagic dolphin are known to occur in the North-west Marine Region, however, pelagic dolphins are not known to concentrate in any significant numbers within the EMBA (Chevron 2010; RPS 2010).

Dugongs are widely distributed throughout tropical and subtropical waters around the world, and are most common in north-west Australian waters (RPS BBG 2005; SEWPaC 2012c). The species is typically found in warm, shallow waters that support the seagrasses upon which it feeds, typically at depths of 5-10 m. Given that dugongs generally are found in shallow water areas (5-10 m water depth), significant numbers are not expected to occur in the EMBA.

3.3 Marine Protected Areas

The EMBA coincides with the northern boundary of the Montebello Commonwealth Marine Reserve, classified as an International Union for Conservation of Nature (IUCN) Multiple Use Zone, IUCN Category VI. The reserve was established by the Commonwealth Government in 2013, covers an area of 3413 km², and provides for improved representation and protection of continental shelf environments and habitats, but allows for petroleum-related activities.

The nearest State-managed marine protected areas are the Montebello Islands Marine Park and Barrow Island Marine Management Area, approximately 10 km and 20 km from the EMBA, respectively.

3.4 Social Environment

The closest recreational fishing destination is the Montebello Islands (Chevron 2005), approximately 20 km to the south of the EMBA and 40 km from the operational area. Due to the isolation of the operational area and EMBA from tourist main centres, the lack of facilities and various landing restrictions on the nearby islands, current levels of recreational fishing and nature-based tourism in the area are low (DEC 2007).

A search of the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) Australian Heritage Database identified one heritage listed entity in the vicinity of the EMBA, the Trial Shipwreck about 8km from the EMBA. There are no known Indigenous heritage values within or in close proximity to the EMBA.

3.5 Industry and Fishing

The Pilbara economy is dominated by the mining and petroleum industries, with iron ore, oil and condensate, Liquefied Petroleum Gas, Liquefied Natural Gas, and natural gas among WA's largest export revenue earners. Onslow Salt Works lies along the eastern adjacent boundary of the Ashburton North site and the BHP Macedon on shore gas plant lies adjacent to the south west.

The operational area and EMBA overlaps with several authorised commercial fishing zones. Consultation with Australian Fisheries Management Authority, the WA Department of Fisheries, licence holders, representatives and operators has identified that only low levels of commercial fishing may occur in the vicinity of the operational area and EMBA.

The EMBA overlaps with fishing zones for the following Commonwealth-managed fisheries:

- ◆ North West Slope Trawl Fishery
- ◆ Western Tuna and Billfish Fishery
- ◆ Southern Bluefin Tuna Fishery
- ◆ Western Skipjack Fishery.

The following State managed fisheries are permitted to operate in waters within the EMBA:

- ◆ Onslow Prawn Managed Fishery
- ◆ Pilbara Trap Managed Fishery
- ◆ Pilbara Line Fishery
- ◆ Mackerel Managed Fishery
- ◆ Specimen Shell Managed Fishery
- ◆ Marine Aquarium Fish Managed Fishery.

3.6 Shipping

Consultation with the Australian Maritime Safety Authority (AMSA) identified that the operational area does not overlap with any designated shipping routes, and that some local traffic may pass through the area. It is evident from the information provided by AMSA that the EMBA coincides with a nearby recognised fairway. However, AMSA shipping density data from 2010 to 2011 showed that areas of relatively high traffic are associated with existing oil and gas facilities around the EMBA, such as the east coast of Barrow Island, and other petroleum exploration and development activities. Relatively low shipping densities (less than two vessels per day) were evident within the EMBA and the recognised shipping fairway (AMSA 2013).

4.0 MAJOR ENVIRONMENTAL HAZARDS AND CONTROLS

The risk assessment was undertaken in alignment with the processes outlined in AS/NZS ISO 31000:2009 Risk Management and Handbook 203:2012 Managing Environment-Related Risk, using the Chevron Integrated Risk Prioritization Matrix. The risk assessment involved subject matter experts including environmental advisors, health and safety representatives, flowline engineers and senior operations line management representatives.

The risk assessment process comprised the following components:

1. Identification of physical, biological and socio-economic receptors, including any considered to be sensitive
2. Identification of activities and events and associated aspects with the potential to impact identified physical, biological and socio-economic receptors
3. Quantification of the level of risk associated with the impact
4. Identification of safeguards and mitigations in place for the specific risk
5. Determination of whether the potential environmental risks and impacts are As Low As Reasonably Practical (ALARP) after considering mitigation effectiveness
6. Determination as to whether the potential environmental risks and impacts are acceptable.

The key environmental hazards and the associated management/mitigation measures to ensure these hazards, arising from operational activities, unplanned events and event response activities, are reduced to ALARP and residual risks are acceptable, are detailed in Table 4.1.

Table 4.1: Key Environmental Risks and their Management and Mitigation Measures

Sources of Risk (Hazards)	Potential Environmental Impacts	Management and Mitigation Measures
Counteracts, mattresses, grout/rock bags placement	<ul style="list-style-type: none"> ◆ Direct disturbance to locally or regionally significant habitat through smothering and indirect disturbance through sediment dispersion 	<ul style="list-style-type: none"> ◆ Installation Vessels equipped with Global Positioning System and Dynamic Positioning (DP) systems to ensure vessel is always accurately located to prevent placement of structures outside designated areas ◆ ROV and DP fully functional ◆ Crane and ROV operators are trained and competent ◆ Habitats are sparse and well represented regionally
Discharges to sea – cooling water	<ul style="list-style-type: none"> ◆ Temporary and localised reduction in water quality 	<ul style="list-style-type: none"> ◆ Volumes are low, sources mobile, remote offshore location in open ocean currents ◆ Cooling water system and engines maintained as per Preventative Maintenance Schedules
Discharges to sea - sewage, greywater and putrecible waste	<ul style="list-style-type: none"> ◆ Localised increase in nutrient availability and biological oxygen demand 	<ul style="list-style-type: none"> ◆ Offshore discharge of food wastes occurs only if macerated (< 25 mm) at >3 nm and/or unmacerated at >12 nm from land from when vessel is moving, in accordance with International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78 ◆ Offshore discharge of grey water and treated sewage occurs only when > 3 nm from land and when vessel is moving, in accordance with MARPOL 73/78 ◆ Vessels discharging treated sewage have an International Maritime Organisation (IMO) approved Sewage Treatment Plant onboard, and where applicable, vessels will hold a current International Sewage Pollution Prevention Certificate ◆ Macerator maintained as per Preventative Maintenance Schedules
Discharges to sea – equipment/machinery space (oily bilge water and deck drainage)	<ul style="list-style-type: none"> ◆ Contamination of marine water ◆ Localised acute and chronic toxic effects to marine biota 	<ul style="list-style-type: none"> ◆ Vessels discharging treated oily water have oil-water separators onboard and hold a current International Oil Pollution Prevention Certificate in accordance with MARPOL 73/78 and maintain per the Vessel's Preventative Maintenance Schedule ◆ Oily bilge water contained onboard and disposed of at a licensed facility or discharged to marine environment only when concentration < 15 ppm and vessel is moving ◆ Vessels > 400 Tonnes maintain an Oil Record Book, detailing oily water discharges and wastes transferred for onshore disposal ◆ Vessels < 400 Tonnes (and do not have an oil-water separator onboard) contain oily water onboard and dispose of at a licensed onshore disposal facility ◆ Waste management and housekeeping requirements are communicated to all

Sources of Risk (Hazards)	Potential Environmental Impacts	Management and Mitigation Measures
		personnel during inductions
Wastes – generation and accidental loss to marine environment	<ul style="list-style-type: none"> ◆ Temporary and localised reduction in water quality ◆ Ingestion by or entanglement of marine fauna 	<ul style="list-style-type: none"> ◆ Offshore discharge of food wastes occurs only if macerated (< 25 mm) at >3 nm and/or unmacerated at >12 nm from land from when vessel is moving, in accordance with MARPOL 73/78 ◆ Vessels > 100 Tonnes (or certified for > 15 persons onboard) have a Waste Management Plan, in accordance with MARPOL 73/78 ◆ Vessels > 400 Tonnes (or certified for > 15 persons onboard) incinerate or transfer waste to shore for disposal ◆ Solid and hazardous wastes segregated and fitted with appropriate covers (preventing wind-blown waste) onboard the vessels and are incinerated or appropriately disposed of at a licensed onshore facility if disposed of in Australia ◆ Incineration of wastes will only occur by IMO approved incinerator
Invasive Marine Species (IMS) transported by ballast water or biofouling	<ul style="list-style-type: none"> ◆ Introduction of IMS to the operational area 	<ul style="list-style-type: none"> ◆ Vessels have Australian Quarantine and Inspection Service (AQIS) clearance to operate in Australian waters, and records of submission of Quarantine Pre-Arrival Report to AQIS prior to entry ◆ All vessels maintain a current anti-fouling coating that complies with the requirements of Annex 1 of the International Convention on the Control of Harmful Anti-Fouling Systems on Ships ◆ No discharge of 'high risk' ballast water in Australian ports or waters ◆ No exchange of ballast water < 12 nm from land or in water depths of < 200 m, as per Australian Ballast Water Requirements, 2001
Vessel presence	<ul style="list-style-type: none"> ◆ Injury or fatality to marine fauna 	<ul style="list-style-type: none"> ◆ Vessel numbers limited for this activity ◆ ROV monitoring while lowering structures and mattresses ◆ Implementation of the Conservation Significant Marine Fauna Interaction Management Plan (CSMFIMP) which meets the requirements of EPBC Act Division 8.1, including: <ul style="list-style-type: none"> ▪ Requirement for trained crew member onboard all installation vessels on active duty during daylight ▪ Requirements for Marine Fauna Observer training ▪ Establishment of a caution zone, inside which speed limits will be enforced, and

Sources of Risk (Hazards)	Potential Environmental Impacts	Management and Mitigation Measures
	<ul style="list-style-type: none"> ◆ Vessels and infrastructure interfering or colliding with commercial fishing operations or commercial shipping 	<ul style="list-style-type: none"> restrictions on navigation paths <ul style="list-style-type: none"> ▪ Establishment of a no-approach zone, which will not be entered ▪ Establishment of procedures designed to avoid collisions ◆ Compliance with MARPOL Annex V ◆ Waste containers covered and segregation applied ◆ A 24-hour visual, radio and radar watch maintained for vessels, in accordance with relevant safety legislation ◆ Lighting required for safety and navigational purposes will be operational, in accordance with relevant safety legislation ◆ AMSA notified of vessel presence and flowline structures installation and survey activities as applicable to enable a Notice to Mariners (or similar) to be issued ◆ Australian Hydrographic Services informed of any structures / mattresses placed on the seabed and exact locations of these objects
Atmospheric Emissions	<ul style="list-style-type: none"> ◆ Temporary and localised reduction in air quality ◆ Increased greenhouse gas emissions to the atmosphere 	<ul style="list-style-type: none"> ◆ Vessel engines maintained according to manufacturer's specifications ◆ Vessels will be MARPOL 73/78 (Annex VI) compliant for Nitrogen Oxide and Sulphur Oxide emissions ◆ Vessels > 400 Tonnes will have an International Air Pollution Prevention Certificate and an International Energy Efficiency Certificate, certifying that a ship-specific Ship Energy Efficiency Management Plan is onboard, where applicable ◆ Incinerators are MARPOL 73/78 certified and maintained. Only appropriate volume and type of waste incinerated in the incinerators ◆ Vessels comply with requirements for Ozone Depleting Substance (ODS) specified in Regulation 12 of Annex VI of MARPOL, including prohibiting deliberate ODS release ◆ Personnel handling ODS are certified and hold the necessary permits and licenses required under the Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995
Light emission	<ul style="list-style-type: none"> ◆ Disruption to behaviour patterns of marine fauna 	<ul style="list-style-type: none"> ◆ The project induction includes all relevant requirements of the CSMFIMP, including the requirement for all vessels to not enter the Barrow Island or Montebello Islands state-managed marine parks, unless required in an emergency

Sources of Risk (Hazards)	Potential Environmental Impacts	Management and Mitigation Measures
		<ul style="list-style-type: none"> ◆ Light spill reduced, where reasonably practicable by directing artificial lighting away from water and directly onto work areas to prevent light spill on water ◆ The project induction includes all relevant requirements of the CSMFIMP, including the requirement to reduce light spill where reasonably practicable ◆ All vessel crew attend the project induction
Noise emissions from vessel thrusters / engine operation / transponders	<ul style="list-style-type: none"> ◆ Physiological damage (temporary or permanent threshold shift) ◆ Disruption to behaviour patterns 	<ul style="list-style-type: none"> ◆ Procedures for minimising impacts from vessel presence (noise) implemented as required by the CSMFIMP ◆ Vessels engines and thrusters and transponders maintained as per planned maintenance program
Unplanned events – spills from vessel collisions/grounding	<ul style="list-style-type: none"> ◆ Temporary and localised contamination of the marine environment ◆ Toxicity to Conservation Significant Marine Fauna (CSMF) 	<ul style="list-style-type: none"> ◆ 24-hour visual, radio and radar watch maintained for vessels in the vicinity of the operational area, advising other vessels of the exact position of any vessels operating under the activities ◆ Minimum lighting required for safety and navigational purposes is operational in accordance with the <i>Navigation Act 2012</i> (Marine Orders Part 30 [Prevention of Collisions]) ◆ Support vessel to keep ruptured vessel on location in the event of loss of power/propulsion or steerage to avoid collision with other vessels ◆ AMSA (Commonwealth Waters) notified of vessel presence, where applicable, to enable a Notice to Mariners (or similar instrument) to be issued ◆ A Simultaneous Operations plan if required is in place prior to commencement of the activities which identifies all known interactions between operations in the EMBA, and details measures to manage these interactions to avoid collision
Unplanned events – spills from single point failures: <ul style="list-style-type: none"> ◆ Storage of hazardous materials ◆ Hydraulic oil from mechanical failure 	<ul style="list-style-type: none"> ◆ Temporary and localised contamination of the marine environment 	<ul style="list-style-type: none"> ◆ Vessel equipment maintained as per planned maintenance program ◆ Vessels > 400 Tonnes have a Shipboard Oil Pollution Emergency Plan (SOPEP) Vessel Masters trained to implement the plan ◆ Vessels < 400 Tonnes have a Spill Contingency Plan. Vessel Masters trained to implement the plan ◆ Personnel trained in SOPEP requirements (or spill contingency plan), including the storage of hazardous materials within contained areas ◆ Hazardous materials appropriately contained and stored onboard to prevent discharge

Sources of Risk (Hazards)	Potential Environmental Impacts	Management and Mitigation Measures
<ul style="list-style-type: none"> ◆ Small oil spills 		<p>to sea</p> <ul style="list-style-type: none"> ◆ Spill kits provided and fully stocked on all vessels and spills cleaned up as soon as practicable ◆ High level of housekeeping and appropriate hazardous good storage maintained
<p>Unplanned events – spills:</p> <ul style="list-style-type: none"> ◆ Unprepared Response ◆ Response technique risks ◆ Post-spill aerial surveillance activities 	<ul style="list-style-type: none"> ◆ Temporary and localised contamination of the marine environment ◆ Post-spill aerial surveillance activities impacting on marine fauna 	<ul style="list-style-type: none"> ◆ Activity specific response exercises and appropriate personnel training in SOPEP and detailed Action Plan requirements ◆ SOPEP and Action Plan implemented in response to spills as detailed in the Plan ◆ Net Environmental Benefit Analysis (NEBA) conducted immediately after MDO spill reported to Australasia Business Unit Asset Emergency Management Team to determine appropriate response strategy ◆ Surveillance (aerial / marine) conducted to monitor and track the spill (based on the NEBA decision) ◆ Dispersion rate of MDO spill increased by conducting physical breakup within the first 24 hours (if NEBA decision required) ◆ Helicopters will not fly within 1000 m or hover over marine fauna

5.0 IMPLEMENTATION STRATEGY

5.1 Overview

The implementation strategy identifies the systems, practices and procedures to be used to ensure the environmental impacts and risks of the activities are reduced to ALARP and are acceptable, and the environmental performance objectives and standards are met. The implementation strategy is split between planned operational activities and unplanned event response, enabling roles and responsibilities to be clearly defined and to provide a clear chain of command for both.

The implementation strategy also describes the overview of systems and procedures, SIMOPs, training and competency, monitoring and reporting, compliance assurance, control of documents, and review of the Plan.

5.2 Unplanned Events

Potential spill scenarios, mitigation measures and response activities have been identified and described in unplanned events. The implementation strategy describes the following:

- ◆ Detailed chain of command for:
 - Shipboard response
 - Barrow Island Installation Emergency Management Team
 - Australasia Business Unit (ABU) Asset Emergency Management Team
- ◆ Roles and responsibilities
- ◆ Unplanned Event Response Action Plans and Checklists
- ◆ Interface of response activities including combat agency interaction and spill response resources
- ◆ Oil spill response termination arrangements
- ◆ Testing and maintenance of spill response
- ◆ Maintenance and review of spill response arrangements.

5.3 Training and Competency

All personnel are required to attend environmental inductions and training relevant to their role for the activities. Environmental training specific to the activities is described in the strategy and includes induction requirements, environmental roles and responsibilities and spill response / emergency management training.

Training records will be maintained and will include copies of certificates and attendance sheets. Further spill response related training requirements are listed with respect to desktop spill response exercise as well as a SOPEP spill drill.

5.4 SIMPOS and Marine Coordination

All parties involved in any part or phase of simultaneous operations (SIMOPS, i.e. all routine activities when two or more facilities / vessels are working in close proximity) share the responsibility for conducting their activities in a prudent, safe and environmentally acceptable manner. Risk Assessments will be performed utilising job safety analyses and other risk mitigation tools and shall be used to make safety-related decisions prior to the commencement of any activities. The Upstream Marine Coordination and Simultaneous Operations Framework describes how project activities will be managed to avoid SIMOPs

where practicable. If SIMOPs are unavoidable, the SIMOPs Guidelines describes the methodology to be applied to individual SIMOPs Plans.

5.5 Monitoring and Reporting

The Implementation Strategy outlines the requirements for the following: emissions and discharges, routine external reporting and non-routine reporting (including internal incident reporting and investigations and external incident reporting).

5.6 Compliance Assurance

A multi-tiered environmental compliance assurance program will be implemented for the duration of the activities described in the detailed Plan, including tools, processes and procedures to deliver and verify compliance with the detailed Plan. Assurance activities will include both Chevron-led and contractor-led audits and inspections. Chevron-led audits and inspections will be undertaken as required and in accordance with Chevron's ABU Compliance Assurance Process and the Health, Environment and Safety (HES) Audit Schedule for the Project.

5.7 Documentation and Records

Chevron Australia's ABU Operational Excellence Management System has dedicated information management tools and processes to ensure critical information is developed, accessible and maintained by the workforce. Wheatstone documentation shall be managed in accordance with this process, and specifically via the Project's Document Management System. Accordingly, all documentation and records demonstrating compliance against environmental performance objectives and standards will be effectively maintained and retained for the life of the Project and not less than five years and are available to the regulator.

5.8 Environment Plan Review

Chevron's Management of Change process will be followed to document and assess the impact of any changes to the activities described in the detailed 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 detailed Plan.

The detailed 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. If these changes do not trigger Regulation 17, the Plan shall be revised and changes recorded within the Plan.

6.0 CONSULTATION

Chevron has prepared a Stakeholder Consultation Plan specific for the flowline structures installation and survey activities. The Stakeholder Consultation Plan describes:

- ◆ Stakeholder identification and analysis
- ◆ Communication engagement plan, comprising the level and trigger of engagement, type of engagement, and frequency
- ◆ Stakeholder engagement log, including any issues raised and Chevron responses
- ◆ Full text of consultation.

6.1 Stakeholder Identification and Analysis

Relevant stakeholders have been identified through a stakeholder analysis process to ensure persons or organisations that may potentially be affected by the activities have been consulted. Stakeholders were identified by reviewing:

- ◆ social / commercial receptors within the EMBA
- ◆ historical consultation undertaken for Chevron
- ◆ applicable legislation to identify regulatory agencies.

6.2 Communication Engagement Plan

Upon completion of stakeholder analysis (included in the Stakeholder Engagement Log in the Stakeholder Consultation Plan), a Communication Engagement Plan was developed to determine the following for each stakeholder:

- ◆ The level of engagement
- ◆ The type of engagement
- ◆ When engagement would be undertaken
- ◆ Frequency of communication.

The Communication Engagement Plan covers both initial and ongoing stakeholder engagement and covers both planned activities and unplanned events. Chevron will maintain communications with identified stakeholders as required ensuring they are informed of any aspects of the activity that may potentially affect other users of the area.

6.3 Stakeholder Engagement Log

Consultation undertaken specifically for the Plan is in the Stakeholder Engagement Log. Stakeholder responses were assessed, and any relevant feedback made during the engagement process has been addressed within the Plan. Stakeholder responses deemed not relevant to the Flowline Structures Installation and Survey activities or unjustified have been addressed by return response to the stakeholder who raised the issue. Spill response service providers and organisations have also been contacted to advise potential requirements for this environment plan. Greater detail on the capabilities, agreements and timeframes with these service providers is provided in the Plan.

7.0 CONTACT DETAILS

The contact details for Chevron (the Operator for this activity) are:

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