

# Black Watch 1 Gas Field Development Project

## Drilling Plan Environmental Summary

Review record (record the last 3 revisions here or the revisions required to achieve current approval version)

Revision	Date	Reason for issue	Reviewer/s	Consolidator	Approver
A	15/04/2019	Summary Document	RS		
B	24/04/2019	Internal Review	BW/RS		
0	1/5/2019	Issued for Submission	CK	TF	PF

### THE THREE WHATS

**What** can go wrong?

**What** could cause it to go wrong?

**What** can I do to prevent it?

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## Abbreviations

Terms/acronym	Definition/expansion
ALARP	As low as reasonably practicable
BICP	Bay of Islands Coastal Park
CO <sub>2</sub>	Carbon dioxide
CFA	Country Fire Authority
CHMP	Cultural heritage management plan
CMO	Beach Energy integrated and centralised Health, Safety and Environment information system used to track and monitor all related HSE regulatory compliance processes.
DELWP (formerly DEPI)	Victorian Department of Environment, Land, Water and Planning (formerly Victorian Department Environment and Primary Industries)
DoEE	Department of the Environment and Energy (Australian Government) (formerly the Department of Sustainability, Environment, Water, Population and Communities – DSEWPC)
DJPR (formerly DEDJTR)	Victorian Department of Jobs, Precincts and Regions (formerly Victorian Department of Economic Development, Jobs, Transport and Resources)
EP	Environment plan
EMP	Environment management plan
EPA Victoria	Environment Protection Authority (Victoria)
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ERD	Extended reach drilling
ERIP	Emergency Response Interface Plan
ERP	Emergency response plan
EES	Environment effects statement
EVC	Ecological vegetation class
FFG Act	Flora and Fauna Guarantee Act 1988
HAZID	Hazard identification
HSE	Health, Safety and Environment
HSER	Health, Safety Environment and Risk
HSEMS	Health, Safety and Environment Management System
LCM	Loss Circulation Material
Lh	Land holder
OPGGGS Act	Offshore Petroleum and Greenhouse Gas Storage Act 2010
OPGGGS Regulations	Offshore Petroleum and Greenhouse Gas Storage Regulations 2011
SBM	Synthetic based mud
SDS	Safety Data Sheets
SIMOPS	Simultaneous operations

<b>Terms/acronym</b>	<b>Definition/expansion</b>
SRW	Southern Rural Water
VDPCD	Victorian Department of Planning and Community Development
WBM	Water based mud
WECS	Well Engineering Construction System
WOMP	Well Operation Management Plan

## Glossary of key terms

<b>Key Terms</b>	<b>Explanation</b>
The drilling activities	The drilling activities associated with the Black Watch-1 Project as defined in Section 2 of this document.
The facility	The onshore gas extraction facility.
The project	The drilling and tie in of the Black Watch-1 Well to existing gas extraction facilities at the Halladale Black Watch and Speculant (HBWS) site
The project area	The HBWS facility and temporary accommodation camp area.
The rig	Rig 931 operated by Ensign International Energy Services and contracted to drill the Black Watch-1 well.

## 1 Introduction

This summary document has been prepared to satisfy the requirements for an Environment Plan (EP) Summary under the *Offshore Petroleum and Greenhouse Gas Storage Regulations 2011* (Vic) (OPGGs Regulations) as required by the *Offshore Petroleum Greenhouse Gas Storage Act 2010* (Vic) (OPGGs Act).

The purpose of this EP summary is to detail the potential environmental effects to the offshore environment that may arise from the drilling activities associated with the Black Watch-1 well, and to summarise the measures to mitigate or continually reduce potential impacts to the environment to as low as reasonably practicable (ALARP).

This EP Summary also documents Beach's commitment to managing environmental values associated with the drilling activities.

### 1.1 Scope of this Document

The scope of this EP Summary covers the extended reach drilling and completion of the Black Watch-1 development well from the existing onshore gas extraction facility, located approximately 3 km south-west of Nirranda South to the offshore Black Watch reservoir. The well drilling is a component of the Halladale and Speculant Gas Field Development Project which is designed to appraise and explore the natural gas resources from offshore commercial reserves in VIC/L1(V).

### 1.2 Nominated Titleholder and Liaison Person

Lattice Energy Limited (**Lattice**) is the owner and operator of VIC/L1(V) (Black Watch-1) and associated Access Authorities and existing consents and is wholly owned by Beach Energy (**Beach**). Beach acquired Lattice (previously named Origin Energy Resources Limited (**Origin**)) on 31 January 2018.

Notwithstanding that Lattice is the proponent for this project, as a member of the Beach group, it may be referred to in this application as 'Beach'. There may also be references to 'Origin' in material relevant to this document because that material was prepared before Lattice's change of name, or before Lattice was acquired by Beach.

In accordance with the OPGGS Regulations (offshore) Victoria Regulation 13E (4)(ix) the details of the titleholder's liaison person for the activity for the EP is provided below:

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The Titleholder's nominated liaison person is:

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## 2 Description of the Activities

### 2.1 Background

As part of the Halladale and Speculant Gas Field Development Project, four extended reach drilling (ERD) wells targeting the reservoirs in the offshore Halladale, Speculant and Black Watch fields were proposed for drilling from the onshore gas extraction facility located on Baileys Road, Nirranda South. Three of the four wells originally proposed (Speculant-1, Speculant-2 (ST1) and Halladale-2) were drilled from the onshore location.

The onshore gas extraction facility is owned by Beach and is regulated under the *Petroleum Act 1998* and associated *Petroleum Regulations 2011* and operated in accordance with the Operations and Environment Management Plan for the Halladale, Black Watch and Speculant Well Site (2017).

### 2.2 Proposed Activities

Beach are planning to drill the fourth of the planned four wells (Black Watch-1) as an extended reach well drilled from the onshore facility to appraise and develop the gas reserves in the Black Watch Field. The Black Watch field lies immediately south of the Halladale Field and has proven gas bearing sands.

#### 2.2.1 Location of Activities

The onshore gas extraction facility is located approximately 3 km south-west of the locality of Nirranda South, 30 km east of Warrnambool and 300 km south-west of Melbourne within the Shire of Moyne. The gas extraction facility and well site are contained within Beach’s onshore exploration permit PEP168.

The Black Watch Field is adjacent to the coastline in the Lattice operated VIC/L1(V) production licence and extends into the Cooper JV RL11 and RL12 retention leases in Commonwealth waters. The proximity of the gas field to the coastline enables the well to be drilled from the onshore drill site to the offshore location using Extended Reach Drilling (ERD).

The ‘Baileys Road’ location was selected based on the results of the assessment process carried out for the approved Halladale-Speculant Drilling Environment Plan (Origin, 2014). The location of the existing onshore gas extraction facility and associated accommodation camp areas were cleared and developed for previous project activities.

The locations of the onshore facility and accommodation site are shown in Table 1. The project location is shown in Figure 1. A description of the existing environment of the onshore facility is presented in Section 3.

Table 1: Location Coordinates

Location	Easting	Northing
Onshore gas extraction facility	E 653880	N 5722030
Accommodation site	E 654540	N5733050



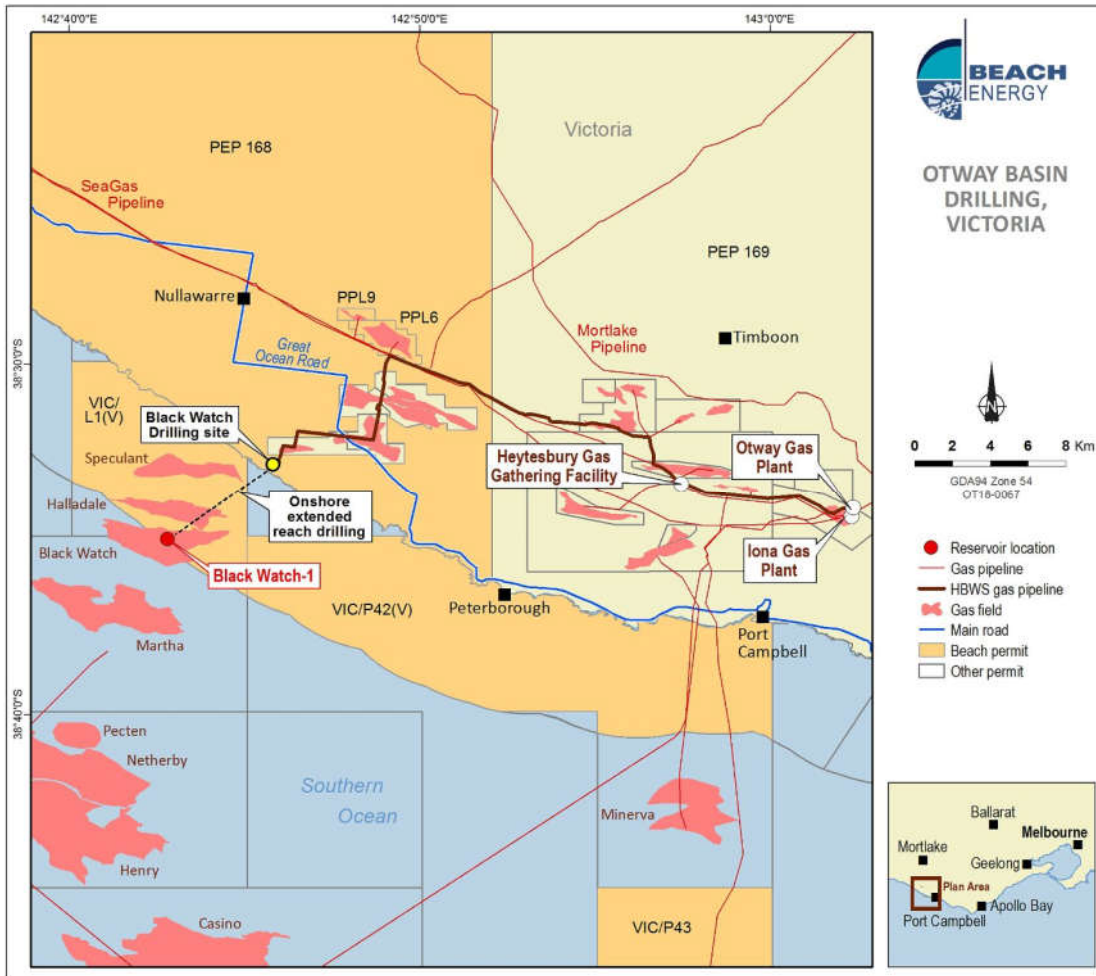


Figure 1: Black Watch-1 well location and key project components

**2.3 Description of Relevant Activities**

This section details those project activities that may be relevant to the offshore environment. As described below, the extended reach drilling methodology to be applied to this project removes interaction with the marine environment, however activities which may interact with the coastal / offshore environment are still included in the following section for completeness.

**2.3.1 Extended Reach Drilling**

Beach is planning to access the offshore Black Watch Field via extended reach drilling (ERD). The Black Watch-1 well will extend ~5 km offshore and approximately ~1.7 km below the sea floor. Drilling will commence onshore approximately 500 m from the high-tide mark and the well path will traverse beneath the onshore coastal section at a depth of >600 m below mean sea level (MSL) and extend for a measured depth of approximately 7,000 m getting progressively deeper until it reaches and intersects the offshore gas reservoir, reaching a total depth approximately 1.7 km below MSL.

Several technical reviews of the well design have been completed, as well as the successful drilling, completion and operation of Halladale-2, Speculant-1 and Speculant-2 (ST1). Recognised industry specialists have been engaged to manage technical aspects of the project, such as directional drilling practices and drilling fluid design.

Drilling the well from a shore-based location reduces the complexity of logistics and the susceptibility to weather delays. This also avoids marine interaction during the project. Well integrity specific risk associated with the ERD method are highlighted in the Black Watch-1 Well Operation Management Plan (WOMP).

The existing infrastructure and plant, and relationship to known offshore petroleum fields is illustrated in Figure 2 and the ERD technique which will be applied to avoid disturbance to the seabed or marine environment is shown in see Figure 3.

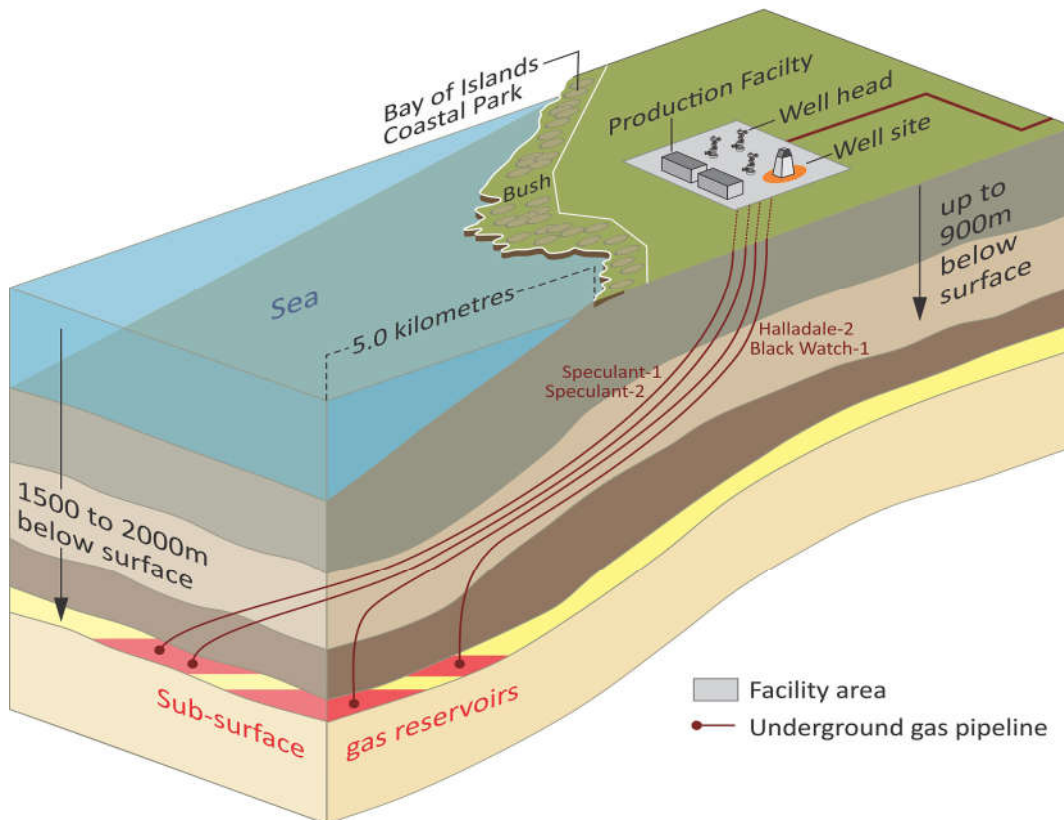


Figure 2: Conceptual Project diagram

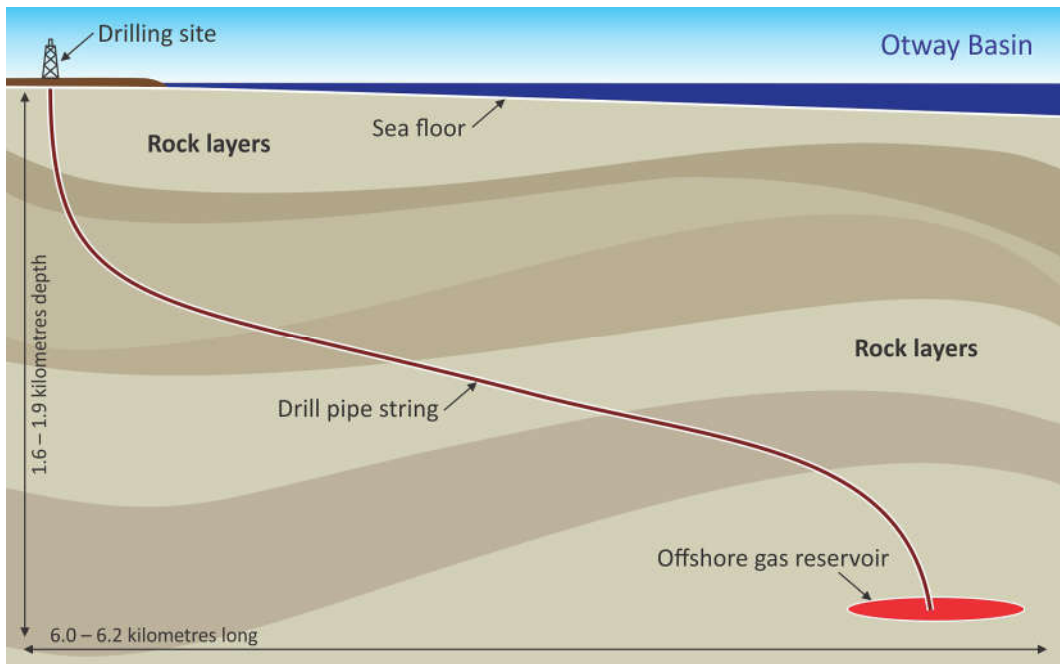


Figure 3: Illustration of Extended Reach Drilling

2.3.2 Drill rig equipment

Beach has contracted Rig 931 ('Rig'), operated by Ensign International Energy Services, to undertake the drilling activities for Black Watch-1. Ensign operates the Rig under Ensign's Global Risk Management System Health Safety Environment and Security Manual (Version 3) and Rig standard operating procedures. Ensign 931 was utilised to drill the Halladale and Speculant wells and is adequately specified to meet the drilling requirements of the well.

Drilling will continue on a 24 hour per day / 7 days per week basis for a period of approximately 90 days. All onshore drilling activities will be confined to the facility compound inside the fenced area.

2.3.3 Drilling fluids program

Drilling fluids are used to transport drilling cuttings to the surface, prevent well-control issues, preserve wellbore stability, and cool and lubricate the drill bit and drill string during drilling. Both water-based mud (WBM) and synthetic based mud (SBM) will be required on the Black Watch -1 well. Indicative information on the composition of WBM and SBM is listed below in Table 2.

Table 2: Indicative composition of WBM and SBM

Mud Type	Component	Function	Concentration Range (kg/m <sup>3</sup> )
WBM	Bentonite	Lubricity and hole stability (formation of filter cake)	60.0
	Caustic Soda	pH control	0.3
	Polymers	Viscosity and gel strength for suspension of solids	3.0
	Potassium Chloride	Shale stability (if required)	45.0
	Soda Ash	Improve yield, gel strength and fluid loss properties	0.3

Mud Type	Component	Function	Concentration Range (kg/m <sup>3</sup> )
SBM	Ester - Base oil component	Lubricity and hole stability	240
	Olefin - Base oil component	Lubricity and hole stability	550
	Barite	Mud weight additive	100
	Viscosifier	Barite and cuttings suspension	5
	Calcium Chloride	Mud weight additive	15.5
	Emulsifier	Stabilise fluid	1.4
	Fluid Loss Additive	Dehydration control	0.7
Completion Brine	Potassium Chloride	Mud weight additive and inhibitor	165
	Oxygen Scavengers	Corrosion control	20
	Biocides	Biodegradation control	20

Drilling fluid formulations are proposed by third party mud specialists to meet the project HSE and technical requirements. This is done by the following:

- Chemicals are proposed based on technical performance and then assessed based on their risk to environment and will be selected as outlined in the Beach Well Engineering Construction System (WECS) Standards
- Reviewing the Safety Data Sheet’s (SDS) for each product

WBM will be used to drill the 36”, 26” and 17.5” hole sections on Black Watch-1 and the 12.25” and 8.5” hole sections will be drilled at high angle through clay layers using SBM. The superior inhibition characteristics of SBM are critical to the success of the Black Watch-1 well due to the long open hole sections and the extended period the hole will be exposed to the drilling fluid. The use of SBM will also reduce drag, torque and friction as a result of the improved lubrication that this type of fluid offers when compared to WBM.

Offset well data (including the three wells drilled previously from the site) will be reviewed to ensure potential loss zones have been identified so that well designs, drilling parameters and lost circulation material (LCM) programs are implemented to limit any contamination of the environment.

Losses are most likely to be encountered in the top hole sections (WBM sections down to 17.5" hole). Fluid volumes are continually monitored and drilling parameters managed to minimise losses through these hole sections. To protect the shallow aquifers and maintain well integrity, loss control measures will be implemented in accordance with the procedures and strategies in the WECS.

At the completion of the drilling phase the SBM will be displaced out of the wellbore in preparation for completion and testing operations. The SBM will be removed from the site in mobile tankers and processed by the drilling fluids supplier for future re-use. The mud tanks will be cleaned in a planned manner with all SBM and waste captured and removed from site by Beach’s waste disposal company.

### 2.3.4 Cuttings management

WBM cuttings and residual WBM will be collected in a lined sump adjacent to the rig location. If the build-up of sediment in the sump reaches the 1 m freeboard mark the sediment will be transported via Vacuum truck to a Victorian EPA licensed waste facility as was done on the previous wells drilled from the site.

SBM cuttings circulated to surface will exit the fully enclosed mud system at the Rig's shakers and will then be further separated from the liquid SBM by means of additional mechanical separation (centrifuge/cuttings dryer). The SBM cuttings will be transferred to enclosed holding bins. Haulage of SBM cuttings will be managed and operated by an approved Waste Management Contractor to transport the bins containing dry SBM cuttings offsite to a licensed Victorian EPA waste facility. Any SBM liquid waste will be transported by fully enclosed vacuum trucks to a licensed Victorian EPA waste facility.

### 2.3.5 Casing designs

The casing design for Black Watch-1 was generated in accordance with the Beach WECS. The casing placement has been selected as below:

- The 30" conductor casing will be set at sufficient depth to isolate the shallow aquifer zones in the Port Campbell Limestone and the weakly cemented calcisiltite and calcarenite in readiness for drilling the subsequent 26" hole section. This is expected to be approximately 60m deep (+/-20m).
- The 18 5/8" casing will be set in Narrawaturk Marl formation to isolate any unstable zones and losses in the upper Gellibrand Formation.
- The 13 3/8" casing in the Massacre Shale with good Leak off Test (LOT) results, therefore providing adequate kick tolerance when drilling the 12.25" section into the reservoir.
- The 9 5/8" casing will be set at the top of the reservoir target.
- A 6 5/8" liner will be set across the reservoir.

The casing will be selected to mitigate well integrity issues due to casing corrosion as per the WECS Standards.

### 2.3.6 Cementing program

The cement will be placed as per the Beach WECS standard to ensure isolation of aquifers and reservoir sections to ensure well integrity. The 30" conductor casing will be cemented from the base of the 36" hole section to ground level for well integrity and aquifer protection purposes. To ensure these objectives are met an excess of up to 200% cement will be pumped down hole. In the event that this volume does not provide cement returns a top-up job will be conducted from surface down the annular space between the 30" conductor and open hole.

The 18 5/8" casing will be cemented from the base of the 26" hole section to the base of the cellar for well integrity and aquifer protection purposes. To ensure these objectives are met a 100% cement excess will be pumped down hole.

The 13 3/8" casing will be cemented from the base of the 17 1/2" hole section to the 18 5/8" casing shoe for well integrity and aquifer protection. To ensure these objectives are met a 30% cement excess will be pumped down hole.

The 9 5/8" casing will be cemented to isolate the top of the reservoir. To ensure these objectives are met a 30% excess will be pumped down hole.

The 6 5/8" liner will be cemented to the top of the liner.

### 2.3.7 Aquifer protection – conductor and surface hole section

Protection of the aquifer zones will be managed via:

- The use of a water based mud system for shallow aquifers;
- The monitoring of mud returns at surface to determine if losses are occurring and at what rate;
- The use of loss circulation material (LCM) to cure losses; and
- The isolation of aquifer systems via casing and cement to ensure they are not exposed whilst drilling subsequent hole sections.

### 2.3.8 Well control

Beach's Well Engineering Construction System (WECS) Standards are the mandatory requirements which dictate how wells are to be designed and constructed. The WECS Standards provide the standards that well designs and operations must conform to, to ensure fit-for-purpose wells delivery with integrity assurance at all lifecycle stages (construction, maintenance, production, suspension and abandonments).

### 2.3.9 Well completion

After the drilling phase has been completed a production liner will be cemented across the targets to well total depth (TD). The completion will consist of a cemented liner, which will be subsequently perforated to allow production. After the liner is installed, wellbore clean-up operations will be undertaken to remove debris from the well and to displace the drilling SBM to a kill weight completions brine.

The upper completion will then be installed in the well with the production packer set above the primary target. The completion will be pressure tested to ensure that well integrity standards are met. After the upper completions are run, the production tree will be installed and pressure tested and preparations will be made at site to undertake the subsequent well testing operations.

### 2.3.10 Well test and flaring

It is not planned to flare the well during the drilling phase which ends once total depth on the well has been reached and hole conditioning operations completed. In the event of success upper and lower completion strings may be run in hole and pressure tested to ensure wellbore integrity exists. Following completion operations, a well clean-up and testing phase may be undertaken to reduce formation impairment and to measure flow-rate of well effluent. During this phase of the well testing sequence the well fluids (liquid and gas) may be either flared/burnt at the flare pit or captured for later disposal.

### 2.3.11 Associated activities

The storage and use of fuels and chemicals will be managed to minimise the risk of a release, and measures adopted to promptly address these impacts should a release occur.

Oil fuel, chemicals and other hazardous substances will be stored in designated areas with secondary containment measures in accordance to Safety Data Sheets (SDS) and legislative requirements.

All hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids must be stored and handled in accordance with the relevant legislative requirements and Australian Standards.

### 2.3.12 Waste management

The project contractors will comply with the requirements of the HSEMS Standard 19 Waste Management, Environmental Effects and Management Directives.

The Waste Management Plan developed for project activities complies with the *Environment Protection Act (1970)* Victoria, and *Environment Protection (Industrial Waste Resource) Regulations 2009*, applying the waste management hierarchy including avoidance, reduction, reuse, recycling, recovery, treatment and disposal. The waste management plan addresses both general and hazardous wastes generated by project activities.

The total containment, transport, disposal and cleaning process of cuttings will be executed by a Waste Management Contractor that has met HSE pre-qualification requirements, has a proven and robust management system in place and is experienced with executing the work scope.

### 2.3.13 Wellhead facility

Upon completion of the drilling and testing activities, the Black Watch-1 well will be tied-in to the existing facilities for Halladale and Speculant and gas will be transported by the existing HBWS pipeline to the Beach operated Otway Gas Plant.

Rehabilitation of the site upon completion of drilling activities will be undertaken, including removal of all drilling related infrastructure and rehabilitation of disturbed areas not required for ongoing operational activities. The existing permanently installed infrastructure for well head operation and maintenance will remain on the facility site.

### 2.3.14 Decommissioning

At the end of the economic life of the Halladale, Black Watch and Speculant Project, wells will be abandoned in accordance with *Petroleum Regulation 2011* (S.R. No.30/2011) and Beach (WECS) Standards.

### 2.3.15 Field development schedule

The drilling of Black Watch-1 is anticipated to commence in July 2019 once regulatory approval has been granted. The well testing and well completions activities are planned to take place in September 2019.

## 3 Existing Environment

Drilling the well from a shore-based location reduces the complexity of logistics and the susceptibility of the drilling program to weather delays, and avoids interaction with the offshore marine environment.

As noted above, drilling of Black Watch-1 will start onshore approximately 0.5km from the high-tide mark. The well bore pipeline will traverse beneath the coastal onshore section at a depth greater than 600 m underground and will continue for approximately 5.5 km getting progressively deeper until it reaches the offshore gas reservoirs up to 2000 m beneath the seabed.

Due to the application of the ERD methodology, description of the offshore environment is not covered in detail in the EP as no impacts on marine life are expected from drilling activities at these depths. The existing environment description below summarises the onshore location for reference, with the broader geology, landform and groundwater environment are also summarised for context.

### 3.1 Physical Environment

#### 3.1.1 Climate

The climate of the region is temperate and characterised by warm, dry summers and cool wet winters. Prevailing winds of the project area during summer are south-easterly to south-westerly in the afternoon after variable morning winds. During winter winds are generally south-westerly to northerly.

#### 3.1.2 Geology and landform

The project is located in the South East Coastal Plain Bioregion which consists of undulating Tertiary and Quaternary coastal plains and hinterlands that occur in several distinct segments (Warrnambool Plain, Otway Plain and Gippsland Plain subregions) rising up to 200 m in altitude. The Warrnambool Plain subregion (IBRA 6.14) is dominated by nutrient deficient soils and low calcareous dune formations over a limestone plain, and the distinctive coastline of high, vertical cliffs and offshore sea-stacks.

The project area is located in geomorphological unit 6.2.3 - Karst plains with depressions (Warrnambool), of the Glenelg-Hopkins Catchment Management Region (DPI, 2018). This geomorphological unit is characterised by a limestone plain that has developed many karst features, particularly 'sinkholes'. The facility itself occurs on an area of undulating limestone plain with coastal dune sand deposits, typical for the local area.

The edge of the limestone plain at the Southern Ocean is marked by spectacular coastal cliffs (now eroded to form gorges, rock stacks and islands), and exposed cave entrances, formed by rising sea level over the past 15,000 years. Associated soil types include deep sands over clay (sand depth may be variable) (DPI, 2018).

In accordance with the Beach Energy WECS, the Black Watch-1 well path will be drilled from the onshore top-hole location (within Port Campbell Limestone) to the offshore Waarre Formation reservoir target, which is a sequence of marginal marine to fluvial-deltaic sandstones, siltstones and mudstones.

#### 3.1.3 Surface water environment

No permanent surface water flows exist within the immediate area of the facility although some of the larger sinkholes in the surrounding farmland may hold water for most of the year.

#### 3.1.4 Groundwater environment

The project area is located within the South West Limestone Groundwater Management Area (SWL GMA) which applies to the management of groundwater in the southwest Victorian upper mid-Tertiary limestone aquifer. The limestone aquifer in this region falls entirely within the Otway-Torquay Basin and extends across parts of the Glenelg, Portland and Hopkins-Corangamite groundwater catchments. Groundwater flow is generally from the north to the south, discharging across the coast.

Groundwater resources in the SWL GMA are important for domestic and stock use, irrigation, commercial and industrial purposes, urban supply and the environment. These aquifers currently provide approximately 50% of the total water used for farming, industry and potable water supplies for cities and towns in the region. Groundwater extraction within the SWL GMA occurs predominantly from the Port Campbell Limestone which is used extensively for pasture irrigation and stock and domestic use in this area. The aquifer usage is covered by regulations within the South West Limestone Local Management Plan (SWL LMP) and groundwater extractions from the aquifer are capped.



The deep aquifers of south-west Victoria (principally the Dilwyn Formation, which includes the Pebble Point aquifer) are recognised as a significant water resource that have the potential to support future economic growth across the region. The nearest deep ground water well is located 21 km to the east of the site and is drilled to a depth of 658 m.

Recharge to the limestone occurs via direct infiltration of precipitation into the outcropping limestone with sinkholes often providing preferred flow pathways. Hydrographs for observation bores in the previously delineated Nullawarre Groundwater Management Unit (in which the project area sits) generally show a decline in water level commencing around November of each year, which is consistent with seasonal effects and increased extraction for irrigation during summer throughout the area. Water level recovery is slow throughout winter, with most recovery occurring after August (SRW, 2010). Bores installed in the vicinity of the onshore facility indicated that two water tables are present at around 10 m and 33 m below ground level, both of which demonstrate low levels of seasonal fluctuation.

The drilling activities will intersect the Port Campbell Limestone aquifer, and the Dilwyn and Pebble Point aquifers). The Port Campbell Limestone crops out at the surface and is assessed to extend to a depth of approximately 150 m in this area. Between the base of the Port Campbell Limestone and the top of the Dilwyn Formation there is estimated to be a thickness of about 500 m of Nirranda Group sediments, which are primarily low permeability sediments, creating good hydraulic separation between the lower Dilwyn aquifers, but may contain minor aquifer units. The Dilwyn Formation (which includes the Pebble Point aquifer) is assessed to be encountered at approximately 585 m depth and has a thickness of approximately 300 m.

### 3.2 Biological Environment

The onshore facility is located on agricultural (pastoral) land which has been cleared for grazing and dairy farming purposes. As the facility, accommodation camp and access road to be utilised for the project are established and in use, the ecological value of the onshore project area is generally low.

The Bay of Islands Coastal Park (BICP), located approximately 160 m from the facility, has significant ecological value.

#### 3.2.1 Flora

##### 3.2.1.1 Vegetation Communities

Modelling undertaken by the DSE (now DELWP) of pre-1750 vegetation indicates the project area previously supported a mixture of the following Ecological Vegetation Classes (EVCs):

- Herb-rich Foothill Forest
- Damp Heathland
- Damp Heathy Woodland; and
- Damp Sands Herb-rich Woodland.

Flora and fauna assessments undertaken by Biosis recorded a total of 61 native and 41 introduced plant species and concluded that the project area (outside of the sinkholes) no longer supports any EVCs (Biosis, 2009 and 2011).

##### 3.2.1.2 Rare or Threatened Flora

No flora species of state or national significance were recorded in the vicinity of the facility by Biosis (2009 and 2011), who concluded that the probability of such species occurring was negligible due to the lack of suitable habitat and the highly modified nature of the site. Biosis undertook an updated desktop review of flora and fauna within 5km of the project area in November 2013. This review confirmed that overall only Slender Pink-fingers (*Caladenia vulgaris*) has a

medium likelihood of occurrence within the roadside vegetation and no significant flora species would occur at the facility.

A desktop validation search for all available online resources was carried out in 2018 and confirmed the validity of the Biosis 2013 report.

### 3.2.2 Fauna

#### 3.2.2.1 Regional Fauna Habitats

The terrestrial habitat within the project area is dominated by introduced pasture/grassland. Due to the highly modified nature, introduced grassland provides few resources for native fauna and therefore contains relatively few species. Due to the lack of suitable cover, exotic grasslands generally provide poor habitat for native mammals, reptiles and frogs. The numerous sinkholes in the nearby area provide additional habitat for native fauna.

#### 3.2.2.2 Conservation Significant Fauna

Species of state and national significance reported as potentially occurring in the vicinity by Biosis (2009) are summarised in Table 3.

Table 3: Conservation significant fauna

Species	Listed	Comment
Orange-bellied parrot ( <i>Neophema chrysogaster</i> )	EPBC Act / FFG Act listed	Likely to make use of grassy areas within the BICP and pasture in adjacent private land and within roadsides on occasion. Shrubs within the BICP provide roosting habitat for this species.
Southern bent-wing bat ( <i>Miniopterus schreibersii bassanii</i> )	EPBC Act / FFG Act listed	Foraging likely to occur throughout the project area, but will be focused on patches of treed vegetation. Species detected during the November 2009 survey (Biosis, 2009), including at one location along Baileys Road. Crevices in coastal cliffs along the BICP provide roosting habitat.
Brown quail ( <i>Coturnix ypsilophora</i> )	DSE Advisory List near threatened – State significant	Species recorded during November 2009 assessment in rank grasses at the edge of BICP. Areas with rank vegetation throughout the project area, particularly adjacent to BICP, provide suitable habitat for this species.
Baillon's crane ( <i>Porzana pusilla</i> )	FFG Act listed, DSE Advisory List vulnerable – State significant	Species recorded foraging at the margins of the wetland located north-east of the facility and immediately adjacent to Baileys Road. Species likely to occur at wetlands within the project area that provide dense cover of emergent vegetation.
Hardhead ( <i>Aythya australis</i> )	DSE List vulnerable – State significant	Species previously been recorded in wetlands within the BICP in 2002 (Biosis, 2011). Likely this species utilises larger wetlands within the project area on occasion, particularly the large wetland located to the east of Baileys Road.
Growling Grass Frog ( <i>Litoria raniformis</i> )	EPBC Act/ FFG Act listed, DSE Advisory List endangered – Nationally significant	Suitable habitat for this species was identified and water bodies within the BICP and adjacent farmland provide suitable habitat for this species. However, targeted surveys undertaken by Biosis (2011) failed to detect this frog within the local area. There is some potential for the species to occur within water bodies within the BICP and in the wetland area located to the east of the existing facility.
Southern toadlet ( <i>Pseudophryne semimarmorata</i> )	DSE Advisory List vulnerable	Potential to be present in the vicinity of the project site, although this species was not found during field surveys of the area.

Biosis undertook an updated desktop review of flora and fauna within 5km of the project area in November 2013. There are 56 species of state and national significance that appear on database records within 5 km of the facility. Seventeen of these have at least medium likelihood of occurrence within the broader area (Biosis 2013).

The desktop validation search carried out in 2018 indicated that there were no new species records of significance in the vicinity of the sites. The Swift Parrot (*Lathamus discolor*) has had its EPBC status reclassified to 'Critically endangered', however, there are no records of the species in the search area and the Biosis 2013 report identified that there was no suitable habitat for the species to occur in. The PMST identified the critically endangered Curlew Sandpiper (*Calidris ferruginea*) as having potential to occur or having habitat occur in the area, however there are no records of this species in the search area.

### 3.2.2.3 Migratory species

Eight EPBC Act listed migratory species have been recorded within 5 km of the project area (Biosis, 2011) however it was concluded that the project area does not provide ecologically significant habitat supporting any of these species.

### 3.2.3 Bay of Islands Conservation Park (BICP) and Port Campbell National Park

The BICP is located approximately 160 m south of the facility. The area of the BICP adjacent to the project area is a linear strip approximately 500 m wide of heath vegetation on the cliff tops, cliff faces and high energy beaches at the base of the cliffs. Agricultural land uses border the park on the landward side.

The BICP is listed under Schedule 3 of the *National Parks Act* 1975 and together with the Port Campbell National Park, is managed under the 'Port Campbell National Park and Bay of Islands Coastal Park Management Plan' (Parks Victoria, 1998), which is administered by Parks Victoria.

The Port Campbell National Park and BICP contain some of the largest and most important areas of native vegetation remaining between Portland and the Otway Ranges. The BICP supports small populations of six fauna species of state significance.

The Port Campbell National Park and BICP are also situated within an area identified as of high geological and geomorphologic significance. The significance is due to both parks displaying sedimentary rocks in the coastal cliffs and the variety of coastal and karst landforms related to both past and present geomorphologic processes.

The proposed project activities will involve drilling and constructing a well beneath the BICP with the well bore no closer than 700 m TVDss below the beach section of the park.

## 3.3 Socio-economic Environment

The regional economy of the south-west Victoria is dominated by primary industry such as grazing (sheep, beef and dairy cattle), broad-acre cropping, forestry, and fishery. In total, these key industries account for 57% of the jobs in the region. Within the Moyne Shire, primary industry accounts for 37% of employment. Manufacturing, retail, health and community services also contribute significantly to the regional economy.

### 3.3.1 Oil and gas

The Otway Basin is one of the best known and most actively explored of the series of Mesozoic rift basins that span the southern coastline of Australia. The first commercial oil and gas discoveries in the basin occurred in Victoria in 1979 with North Paaratte 1.

The offshore Otway Basin is a gas producing hydrocarbon province that has enjoyed strong exploration and development activities since the commercial gas accumulations at Geographe and Thylacine were discovered in 2001. These successes were rapidly followed by the Casino discovery in 2002, and Blackwatch, Henry and Halladale in 2005. The discovery at Speculant in 2014 is the most recent to provide gas to the expanding energy market in south-eastern Australia.

Despite its production status and long exploration history, large parts of the Otway Basin remain underexplored, especially those areas on the outboard part of the continental shelf and in the deep water areas represented by the Morum, Nelson and Hunter sub-basins (Department of Industry Innovation and Science, 2018).

### 3.3.2 Primary production and tourism

The predominant agricultural activities within the Moyne Shire are sheep (wool and prime lamb) production and cereal crop growing in the northern portion of the area, horticultural crop growing in the southern and coastal areas, and dairy production throughout the area.

The project area is located within the Great Ocean Road campaign region as defined by Tourism Victoria and the Shipwreck Coast area. The Great Ocean Road is a tourist attraction in itself and provides access to tourist attractions including the Twelve Apostles/Port Campbell National Park, the Port Fairy Folk Festival and Tower Hill Game Reserve. The Great Ocean Road is a National Heritage Place on the Australian Government Department of Environment National Heritage List. In 2012 it was estimated that approximately 2.5 million domestic and 1.5 million international tourists stayed overnight along the Great Ocean Road (Tourism Victoria, 2016).

The facility boundary fence is located on privately owned farm land approximately 160 m from the boundary of the BICP. Advice from Parks Victoria is that the access to the BICP from Baileys Road is not a commonly used access route and this remote section of the park is only visited by a small number of locals for fishing, surfing and four-wheel drive activities. The vast majority of tourist and visitor activity occurs in the coastal areas to the west (Warrnambool) and east (Peterborough/Port Campbell) of the proposed project area falling within the BICP.

### 3.3.3 Aboriginal cultural heritage

The traditional lands of the Girai Wurrung tribe, and its 21 associated clans, are located between Princetown and Warrnambool and extended inland to Lake Colac (Parks Victoria, 1998). The Eastern Maar People have a native title claim registered over the project area and broader region (Eastern Maar People VC2012/001).

A Cultural Heritage Management Plan was prepared in accordance with the requirements of the *Aboriginal Heritage Act 2006*, (including a 'Complex Assessment') which involved background research, a field survey, and subsurface testing. The assessment did not identify any Aboriginal places directly on the facility or accommodation area. No Aboriginal scarred trees were identified as no mature native trees were present in the project area, and no caves or rock shelters were present in the project area.

As Project activities will be restricted to the gas extraction facility and camp areas, the potential for impact to Aboriginal cultural heritage is considered low.

## 4 Stakeholder Consultation

Regulation 13E(4)(viii) of the OPGGS Regulations requires the EP summary to contain details of consultations undertaken and plans for ongoing consultation.

### 4.1 Stakeholder Engagement Plan

Beach has prepared a Stakeholder Engagement Plan (SEP) for near shore drilling projects commencing in 2019, including the Black Watch well construction program. The SEP sets out the strategy and procedure for identifying and engaging with stakeholders, enabling matters raised to be considered and addressed as appropriate to:

- Meet regulatory compliance requirements for stakeholder consultation.
- Achieve and maintain social licence for the program.

The SEP includes the method and procedures for engagement with community stakeholders to facilitate preparation of operations and environment plans (among others) required for Victorian State Government regulatory approvals.

A process for feedback, complaints, claims or grievances is managed in accordance with the Beach Energy Feedback and Complaints Procedure.

#### 4.1.1 Identification of Stakeholders

The Beach Energy - Otway stakeholder database is a comprehensive list of parties who have been identified in previous projects as impacted, involved, interested or to be informed. The stakeholder database was reviewed for the preparation of the SEP and additional desktop research was carried out to identify further stakeholders. The stakeholder groups relevant to the Black Watch project identified are listed in Table 4.

Table 4: Stakeholder Identification

Stakeholder	Functions and Activities
<b>Impacted stakeholders</b>	
Primary landholders	Farm production, farm planning and management.
Secondary landholders adjacent to primary landowners	Farming with residents on farm. Small lifestyle allotments.
Other near neighbours	Farming with residents on farm. Small lifestyle allotments. Tourism accommodation and business.
Tourism Businesses and Associations	Accommodation, retail, restaurants, boat charter, motor touring, tour guides, event organisers, helicopter flights, etc.
<b>Involved stakeholders</b>	
Beach staff and contractors	Work at Otway Gas Plant and live locally.
Otway Gas Plant (OGP) - Community Reference Group	Community engagement forum for Otway Gas Plant, surrounding assets and projects.
Moyné Shire Council	Administer local planning laws and approvals.
Eastern Maar Aboriginal Corporation	Traditional owner group who are party to an Indigenous Land Use Agreement with Beach relating to OGP and PL250 pipeline route.

<b>Stakeholder</b>	<b>Functions and Activities</b>
Country Fire Authority	Volunteer fire prevention and response. (Nirrandra South, Nullawarre, Peterborough, Port Campbell, Timboon)
Parks Victoria - Port Campbell	Manage Port Campbell National Park, boat ramps and public beach access.
Vic Roads	Maintenance of state sealed roads.
Wannon Water	Regional water and sewerage authority.
Southern Rural Water	Regional rural water authority.
<b>Other stakeholders</b>	
<b>Government / Agencies</b>	
Department of Jobs, Precincts and Regions (DJPR)	Victorian state economic development. Assessment agency for State waters Environment Plan. (formerly the Department of Economic Development, Jobs, Transport and Resources, DEDJTR)
Department of Environment, Land, Water and Planning (DELWP)	Protection and preservation of Victoria's native landscape.
Commonwealth Department of Environment and Energy	Protection of matters of National Environmental Significance.
Parks Victoria	Management of state parks, reserves and waterways.
National Parks Advisory Committee (NPAC)	Legislated advisory body to the Minister.
Regional Development Victoria	Warrnambool office servicing Moyne Shire, and Geelong office servicing Corangamite Shire. Oversees state funding for regional projects.
Aboriginal Victoria (AV)	Protection of native title and cultural heritage.
Port Campbell Police	Law enforcement.
Port Campbell SES	Emergency support.
Port Campbell Tourism Information Centre	Local government run tourism information centre.
<b>Community, Tourism and Recreation</b>	
Nirrandra and Districts Recreation Centre	Local sporting and community centre
Nirrandra Football and Netball Club	Local sporting clubs
Nullawarre Inc	Representative group focused on town amenity for residents and protecting local culture and way of life.
McDowall's Friendly Grocer	Grocery and fuel business in Nullawarre.
Nullawarre Veterinary	Local Vet.
Childers Restaurant	Local restaurant and takeaway store in Nullawarre.
Nullawarre Primary School	Local school.
Peterborough Residents Association	Community group - focus on amenity for residents.
Peterborough Golf Club	Golf club within region.
Peterborough General Store and Takeaway Food	Local restaurant and takeaway store.

<b>Stakeholder</b>	<b>Functions and Activities</b>
Peterborough Licensed Grocers	Local grocer.
Schomberg Inn	Hotel in Peterborough.
Port Campbell Progress Group	Representative group focused on town amenity for residents and protecting local culture and way of life.
Port Campbell Community Group	Small membership group focused on environment conservation.
Port Campbell Surf Lifesaving Club	Membership and volunteer based surf life-saving club, provides rescue services for 60 km of local coastline.
Great Ocean Road Touring	Tourism accommodation and tour services operator.
Port Campbell Boat Charters	Based in Port Campbell, operates dive and fishing charter boat services.
12 Apostles Helicopters Peterborough Airport	Local helicopter and tourism service.
Great Ocean Road Regional Tourism	Regional tourism association for Shipwreck Coast.
Twelve Apostles Tourism and Business Group	Membership group for local tourism operators.
Warrnambool Bus Lines	School bus service provider.
Popes Consolidated Buslines	School bus service provider.
Reids Stockfeeds	Agricultural feeds provider with truck fleet.
Warrnambool Cheese and Butter Factory	Dairy processor with truck fleet.
Bega Group	Dairy processor with truck fleet.
Fonterra	Dairy processor with truck fleet.
Bulla Dairy Foods	Dairy processor with truck fleet.
The Union Dairy Company / The Midfield Group	Dairy processor with truck fleet.
Matthews Petroleum	Bulk fuel delivery.
<b>Conservation interests</b>	
Heytesbury and Districts LandCare Network	Local biodiversity and conservation organisation.
Friends of The Bay of Islands Coastal Park	Local biodiversity and conservation organisation.
Sustainable Agriculture and Communities Alliance	Warrnambool and region conservation group.
Victorian National Parks Association	Conservation of national parks.
International Fund for Animal Welfare	IFAW works to rescue and protect animals with a focus on marine mammals and the protection of whales and dolphins in Australia.
<b>Infrastructure and other proponents</b>	
Lochard Energy	Gas plant adjacent Otway Gas Plant.
BHP Billiton	Nearby proponent with pipelines and current operator of Minerva gas processing plant.

Stakeholder	Functions and Activities
Cooper Energy	Proponent with nearby offshore permits and drilling projects. Recent investment in Minerva processing plant.
Santos	Pipeline assets in region.
CO2 CRC	Carbon capture and storage project in Otway region.
SEAGas	Gas pipeline asset owner.
APA	Gas pipeline asset owner.
APPEA	Oil and gas industry association.
Federal and State MPs	Elected parliamentarians

**4.2 Consultation during preparation of environmental plan**

A number of key stakeholders, including government agencies, conservation, industry peak bodies and landowners, were consulted during the preparation of the EP to discuss the technical aspects associated with the project and assist with the identification of key issues for consideration.

The consultation strategy involves informing stakeholders who are known to operate in the area of the intended scope of work and ongoing consultation to address any concerns they may have. Other stakeholders who are active in the area, including tourism, local bus operators, industry stakeholders, and groups that require access to the BICP, will also be consulted prior to the start of operations.

**4.3 Consultation summary**

All consultation is recorded in the Project consultation log. The log includes the identification of the stakeholder, a description of the nature of consultations, an outline of the level of information provided and any actions taken to resolve identified issues. A summary of the stakeholder consultation undertaken up to December 2018 is presented in Table 5.



Table 5: Stakeholder Consultation Log

(Historical consultation activities for the project have been included to demonstrate that consideration has been given to previous consultation outcomes)

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
DJPR/Victorian Gas Program Stakeholder Advisory Panel Members	Project briefing and Information sheet	No comments have been raised regarding the Black Watch-1 drilling activity at the time of submission.	27/11/2018	27/11/2018
VDPCD (Environment Assessment Branch) – now DEWLP	Assessment requirements under the Environment Effects Act 1978	Project briefing for phase one in 2009 was provided and the potential triggers for an Environment Effects Statement (EES) referral were discussed. A referral was submitted to the then VDPCD on 4 March 2011 and consequently the Minister for Planning advised that 'an EES was not required for the Halladale and Blackwatch Gas Development Project' (referral based on four ERDs). No further comments have been raised regarding the Black Watch-1 drilling activity at the time of submission.	Oct 2009	13/12/2018
DSEWPC (now DoEE)	Consent under the EPBC Act	Project description provided, and identification of key issues identified in the flora and fauna assessment. On 14 June 2011 the Federal Minister for the Environment determined that the project activities are not a controlled action. The proposal covered the drilling of up to four ERD gas wells from the coastal location and the transport of gas to existing offsite facilities and included the construction of ancillary infrastructure.	-	14/6/2011
DELWP, Parks Victoria	Existing National Parks Consent and Coastal Management Act Consent	A Section 40 application was submitted to the Victorian DSE (now DELWP) in April 2011 and consent was granted by the Minister for Environment and Climate Change for the drilling of 4 wells. Discussions have confirmed that Lattice (Beach) are the holder of the existing consent and it does cover Black Watch-1 drilling. Ministerial approval of the Black Watch EP will be required in accordance with the consent. Confirmation that Marine and Coastal Act consent would not be required for the Black Watch drilling. No further comments have been raised regarding the Black Watch-1 Drilling activity.	Dec 2009	02/11/2018
DJPR	Petroleum Act and OPGGS Act approvals process	Initial project briefing outlining the proposed Black Watch drilling project. Requested and received confirmation that a single document (EP/EMP) was acceptable as long as it met the requirements of	14/8/2018	14/12/18

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
		both pieces of legislation. DJPR advised that would not require regular meetings, were happy to answer any questions that arose and would await our application.		
DELWP – Marine Pollution	Project briefing and Information sheet	No comments have been raised regarding the Black Watch-1 drilling activity at the time of submission.	15/11/2018	15/11/2018
DJPR (Earth Resources Regulation Branch) – formerly DEDJTR ERR	Project briefing and Petroleum approvals	Discussions surrounding required approvals, Special Access (Drilling) Authority, Safety Plan, and EMPs. The DSDBI was also represented on the National Parks Working Group. DJPR (previously known as DEDJTR) completed a site visit and undertook a compliance audit on the Site Preparation Operations Plan in 2015 A site tour was undertaken in September 2018. Positive feedback was given regarding the low levels of noise associated with the operation of the extraction facility. Advised that community consultation was of critical importance for projects.	Aug 2010	04/12/2018
Moyne Shire Council	Project briefing and discussion of statutory planning requirements	A planning permit to cover the drilling and completion of the Black Watch-1 well has been granted. Conditions set out in the planning permit will be incorporated into the EP following approval. Beach have been pragmatic in adapting the relevant conditions from the existing permit into the EP concurrently.	26/09/2018	15/04/2019
Corangamite Shire Council	Project briefing	No concerns have been raised regarding the Black Watch-1 drilling activity at time of submission.	June 2009	20/11/2018
EPA Victoria	Project briefing	No concerns have been raised regarding the Black Watch-1 drilling activity at time of submission.	15/11/2018	20/11/2018
Vic Roads	Great Ocean Road/Radford Road intersection	Consultation with Vic Roads was undertaken regarding an early phase one project plan (by Origin Energy) for inclusion of a slip lane from Great Ocean Road, turning right into Radfords Road. Beach advised that a traffic assessment would be undertaken to inform any requirements for changes to this intersection. Beach will continue to engage with Vic Roads.	30/11/2018	30/11/2018
CFA Nirranda South CFA Nullaware CFA	Fire management and planning	Consultation with the local CFA to ensure practices that minimise the risk of a bushfire and ensure that adequate emergency response procedures are in place for the project. CFA visited worksite following submission and approval of FRMP during phase one of project CFA Nullaware comment that they have high awareness of phase one and not no further comments. CFA Nirranda South have no further comments.	Apr 2011	15/10/2018

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
Southern Rural Water (SRW)	Project briefing	SRW provided approval to drill water bore; completed site assessment for water bore and confirmed entitlement for phase one of project.  No concerns have been raised regarding the Black Watch-1 drilling activity at time of submission.	Aug 2010	04/12/2018
Local Aboriginal Groups	Cultural Heritage values	Discussions surrounding the potential disturbance of lands containing Aboriginal heritage artefacts was undertaken during phase one of the project, with appropriate management of cultural heritage values applied, which included:  Indigenous groups representatives undertook Heritage digs in accordance to CHMP  Onsite consultation with Kuuyang Marr and Eastern Marr Corporations to undertake Heritage assessments for CHMP 12952.  Consultation was carried out in 2018 and no concerns have been raised regarding the Black Watch-1 drilling activity at the time of submission	Jan 2011	07/12/2018
CO2CRC	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 drilling activity at time of submission.	28/11/2018	03/12/2018
Friends of the BICP	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 drilling activity at time of submission.	May 2011	06/12/2018
Drill Site Land Holder (LH)	Lease agreement. Project updates and implications. Remediation planning.	Beach has maintained regular contact with the LH regarding the ongoing HBWS project, administering the lease agreement in place with the LH, and carrying out monitoring activities such as noise assessments and bore monitoring.  Beach undertook engagement on 22nd August 2018 to outline planning stages for returning to the site to construct the Black Watch well. No questions were raised regarding the drilling activities.  Well site remediation planning was discussed in September and October. Beach provided detailed project timelines so the LH could consider planning regarding their holiday home near the drill site.  Beach will consult with LH continuously throughout project in accordance with the SEP.	Jun 2009	30 October 2018
Accommodation Camp Land Holder (LH)	Lease agreement. Project updates and implications. Remediation planning.	Beach has maintained regular contact with the LH about the ongoing HBWS project and administering the lease agreement in place with the LH.  Beach undertook engagement on 23rd August 2018 to outline planning for returning to the site to construct the Black Watch well. No questions were raised regarding the drilling activities.	June 2009	11 December 2018

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
		Remediation options for the accommodation camp have been discussed as the LH has an interest in utilising the materials. Beach will consult with LH continuously throughout project in accordance with the SEP.		
Near neighbours	Project updates and implications.	Beach has maintained periodic contact with neighbours on the road to the drill site (Radfords Rd). Beach undertook engagement on 22nd and 23rd August 2018. A query was raised regarding an Origin Energy proposal to create a right-hand turn slip lane off Great Ocean Road to Radfords Road. Beach outlined the short term nature of the project relative to phase one of the project. The reduced levels of traffic generated in comparison and that a traffic management plan would be in place to manage the necessary haulage. Origin Energy were not contractually committed to building the slip lane and Moyne Shire informed Beach that Origin had met road upgrades and surveys as requested by the Shire. At this time Beach have committed to undertaking pre and post road condition surveys and will assess road upgrades at that time in conjunction with the relative authority. The party raising the query was satisfied and raised no further concern.	Jun 2009	1 November 2018
Nirranda and Districts Recreation Centre	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 drilling activity at time of submission.	15/10/2018	31/10/2018
Nullawarre Inc	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 drilling activity at time of submission.	15/10/2018	27/11/2018
Halladale Black Watch Community Engagement Committee	Project briefing and info sheet	Community Engagement Committee is established to promote clear communication between the project, council and the local community. The CEC meets every two months to discuss progress. Existing members with prior knowledge of phase one did not have any comments or concerns with the Black Watch-1 drilling activity.	May 2012	01/11/2018
Peterborough Residents Association	Project briefing and info sheet	Association raised concern regarding tourism traffic during the activity through Peterborough. Beach demonstrated that activity will adhere to Project Safety Plans and a Traffic Management Plan.	20/09/2018	06/10/2018

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
Popes Consolidated bus lines	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 drilling activity at time of submission.	27/11/2018	30/11/2018
Otway Gas Plant Community Reference Group	Project briefing and info sheet	No comments have been raised regarding the Black Watch-1 drilling activity. This group meets regularly to discuss updates and issues related to the Otway Gas Plant.	Sep 2012	31/10/2018
Sustainable Agriculture and Communities Alliance	Project briefing and info sheet	No comments have been raised regarding the Black Watch-1 drilling activity at time of submission, however further meetings are scheduled to take place.	03/11/2018	10/12/2018
Tourism Victoria	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 drilling activity at time of submission.	15/11/2018	15/11/2018
Transport Safety Victoria (Marine Safety)	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 drilling activity at time of submission.	15/11/2018	15/11/2018
12 Apostles Helicopters Peterborough Airport	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 drilling activity at time of submission.	28/11/2018	28/11/2018

#### 4.4 Ongoing Consultation

Beach is committed to consultation in accordance with the Stakeholder Engagement Plan throughout the planning and operational phases of the project. Stakeholder consultation will be continued through the following measures:

- Updates with the identified key stakeholders which may be potentially affected by the project;
- Updates to key regulatory bodies and relevant stakeholders in relation to changes in project scope and timing;
- Any reportable incidents or events will be communicated with the DJPR as outlined in Section 7.3; and
- Placing a Beach representative on-site during the drilling stage of the project to liaise with any stakeholders present in the project area.

Beach in collaboration with key stakeholders will ensure that delivery of current project information occurs in a timely manner.

##### 4.4.1 Land owner consultation

Contact will be maintained with land owner and occupiers in accordance to the Stakeholder Engagement Plan to ensure that there will be minimal inconvenience and impact on existing activities. Consultation will provide land owners and occupiers adequate time to review the information provided and seek advice from external parties or obtain further clarification from Beach.

##### 4.4.2 Contractor consultation

Beach will implement an effective communication process with the appointed contractors to ensure that information is exchanged in a timely and concise manner. This will be achieved by a number of methods, including:

- **Site inductions:** prior to work on site contractors are required to attend site inductions, which includes an environmental awareness component.
- **Contractor meetings:** The appointed contractors are required to attend site inductions and regular meetings to provide information and updates on the project environmental performance throughout the development phases.
- **Supervisor meetings:** Weekly supervisors' meeting will be held between Beach and the appointed contractors. This meeting forms the basis where HSE issues likely to be encountered in the coming week and mitigation methods are discussed.
- **Toolbox meetings:** The construction crews will hold daily pre-start and weekly toolbox talks to discuss issues associated with the scheduled work. This will include highlighting and discussing relevant environmental issues, and induction refresher information on EP requirements. The HSE Team Leader will plan to attend at least one toolbox meeting every week to discuss the upcoming environmental issues with the crew and to provide more detailed information as necessary.

## 5 Environmental Impact, Risk Assessment and Controls

### 5.1 Overview

Beach has identified, qualitatively risk assessed and reviewed the environmental hazards associated with the project.

The methodology utilised is consistent with the *Australian Standard for Risk Management: AS/NZS ISO 31000:2009*, and HSE Management System Standard 07 Hazard and Risk Management procedures and tool kits.

All hazards have been assessed to pose only a low or medium risk to the environment with risk controls in place. All hazards have been carefully reviewed and the controls in place to prevent and mitigate them have been examined for adequacy. All hazards are considered to be currently reduced to ALARP and risk to the environment from the activity is also considered to be acceptable. ALARP is an ongoing process and this assessment of and implementation of new controls is integral to Beach’s risk management process.

**5.2 Methodology**

Figure 4 presents an overview of the Beach Environmental Risk Assessment process for identifying, assessing and reviewing the hazards to ensure the risk is ALARP.

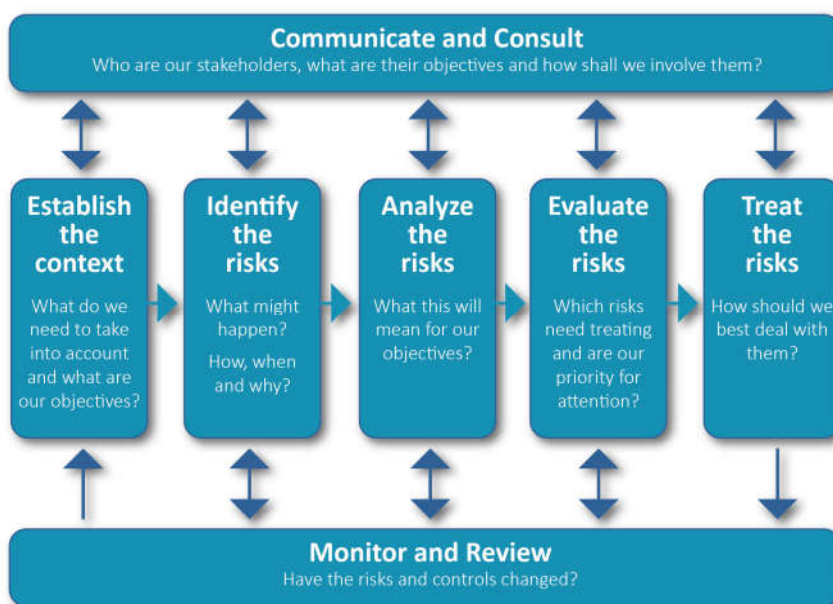


Figure 4: HAZID and Risk Assessment Process

**5.2.1 Environmental hazard identification**

The first step in the process is the identification of environmental hazards through reviews and workshops using the following information:

- Previous drilling projects by Beach and Lattice in Australia (including the three wells previously drilled from the existing facility), and lessons learned from those projects;
- The activities proposed for the Project;
- Consideration of the drilling technology to be used;
- Alternatives relating to the drilling methodology;
- Routine and non-routine activities expected to be undertaken in the course of the project;
- Knowledge of the receiving environment, with particular emphasis on sensitive environmental aspects of the project area; and
- Ongoing consultation and liaison with stakeholders.

The hazard identification process for drilling of Black Watch-1 built on previous work undertaken for the drilling of the initial three wells at the site. Hazard Identification (HAZID) workshops associated with the initial Halladale – Speculant EP were conducted in November 2012 and September 2013 which involved a multi-disciplinary team with representatives from Origin and Lattice management, HSE, operations, and project management. This was followed up by a controls adequacy and risk assessment/review in October 2013 and additional HAZID workshops were held in March 2014 and February 2015.

A simultaneous operations (SIMOPS) workshop for the specific purpose design and hazard identification of drilling the Black Watch-1 from the existing site was undertaken in September 2018 with a follow-on Environmental Risk Identification undertaken at the end of September 2018.

### 5.2.2 Qualitative risk assessment

Risk can be considered as the product of the likelihood that a particular risk event occurs and its resultant consequence. Likelihood is based on the probability that the resultant consequence will occur and the exposure to the event.

The process of assessment is as follows:

- Identify the hazard under consideration.
- Should the hazard occur, consider the possible consequences referencing the matrix consequence categories.
- Identify the existing controls and assess their effectiveness.
- Identify the consequence rating (1 to 6) corresponding to the maximum reasonable impact (see Figure 5) for Beach Consequence Categories featured in the Beach Risk Toolkit), given the existing controls and their effectiveness.
- Identify the likelihood rating (1 to 6) from the Likelihood Rating Table that the consequence could be realised, i.e. the probability of the consequence occurring (see the top of Figure 6 for Beach Likelihood Rating Table featured in the Beach Risk Toolkit) given the existing controls and their effectiveness.
- The likelihood rating of 1 to 6 should be used in conjunction with the consequence rating 1 to 6 in the Risk Matrix to identify the risk ranking (see Figure 6 for Beach Risk Matrix).
- In accordance with the Beach Risk Toolkit, reduce all risks are to a level that is considered to be As Low As Reasonably Practicable (ALARP), with actions taken in line with the Risk Management Action Table (see Table 6).

Further details of this process are provided in the following sections.



Risk Matrix		COLOUR RATING				
		LOW	MEDIUM	HIGH	SEVERE	EXTREME
		Impact to Beach or contracting personnel	Natural environment	Reputational and / or Community damage/impact/ social/cultural heritage	Financial impact (eg. due to loss of revenue, business interruption, commodity trading, asset loss)	Breach of law or criminal prosecution or civil action (eg. OHS, environment, industrial relations, trade practices, industry acts)
CONSEQUENCE	6 Catastrophic	Multiple fatalities >4 or severe irreversible disability to large group of people (>10).	Long term destruction of highly significant ecosystem or very significant effects on endangered species or habitats.	"Multiple community fatalities, complete breakdown of social order, irreparable damage of highly valued items or structures of great cultural significance. Negative international or prolonged national media (e.g. 2 weeks)."	"EBIT : Impact, loss or deterioration from expectation greater than \$300m. CASH FLOW: Severe cash flow crisis, unable to source funds."	"Potential jail terms for executives and or very high fines for the Company. Prolonged multiple litigations."
	5 Critical	1-3 fatalities or serious irreversible disability (>30%) to multiple persons (<10).	"Major offsite release or spill, significant impact on highly valued species or habitats to the point of eradication or impairment of the ecosystem. Widespread long-term impact."	"Community fatality. Significant breakdown of social order. Ongoing serious social issue. Major irreparable damage to highly valuable structures/ items of cultural significance. Negative national media for 2 days or more. Significant public outcry."	"EBIT : Impact, loss or deterioration from expectation greater than \$200m but less than \$300m. CASH FLOW: Severe cash flow crisis, difficulty to source funds."	Very significant fines and prosecutions. Multiple prosecution and fines.
	4 Major	Serious permanent injury/ illness or moderate irreversible disability (<30%) to one or more persons.	Offsite release contained or immediately reportable event with very serious environmental effects, such as displacement of species and partial impairment of ecosystem. Widespread medium and some longterm impact.	"Serious injury to member of the community, Widespread social impacts. Significant damage to items of cultural significance. Negative national media for 1 day. NGO adverse attention."	"EBIT : Impact, loss or deterioration from expectation greater than \$100m but less than \$200m. CASH FLOW: Loss of flexibility and/or increase in cost to source funds. Market explanation required."	Major breach of regulation and significant prosecution including class action.
	3 Serious	Serious reversible/ temporary injury/illness (e.g. lost time >5 days or hospitalisation or Alternate/ Restricted Duties > 1 month).	Moderate effects on biological or physical environment and serious short term effect to ecosystem functions.	"Media attention and heightened concerns by local community and criticism by NGOs. Ongoing social issues. Permanent damage to items of cultural significance. Negative state media. Heightened concern from local community. Criticism by NGOs."	"EBIT : Impact, loss or deterioration from expectation greater than \$50m but less than \$100m. CASH FLOW: Material impact to cash flow."	Serious breach of law/ regulation with investigation or report to authority with possible prosecution. Performance Infringement Notice (PIN)
	2 Moderate	Reversible temporary Injury/ illness requiring Medical Treatment (e.g. lost time <5 days or Alternate/ Restricted Duties for < 1 month).	Event contained within site. Minor short term damage to area of limited significance. Short term effects but not affecting ecosystem functions.	"Medical treatment injury to a member of the community, Minor adverse local public or media attention and complaints. Minor medium term social impact on local population, mostly repairable. Public concern restricted to local complaints Negative local media. Internal escalation to senior management. Adverse local public attention."	"EBIT : Impact or loss greater than \$25m but less than \$50m. CASH FLOW: Impact to project or business unit cash flow."	Breach of law/regulation or non-compliance. Minor legal issues, minor litigation possible.
	1 Minor	Injury/illness requiring Medical Treatment (no lost time, no Alternate/ Restricted Duties), First Aid, Report Only.	Minor consequence, local response. No lasting effects. Low level impacts on biological and physical environment to an area of low significance.	"Public concern restricted to local complaints, low level repairable damage to common place structures. Public concern restricted to local complaints."	"EBIT : Impact or loss less than \$25m. CASH FLOW: No significant impact."	Local investigation, minor breach of regulation, on the spot fine or technical noncompliance. Prosecution unlikely.

Figure 5: Consequence Categories

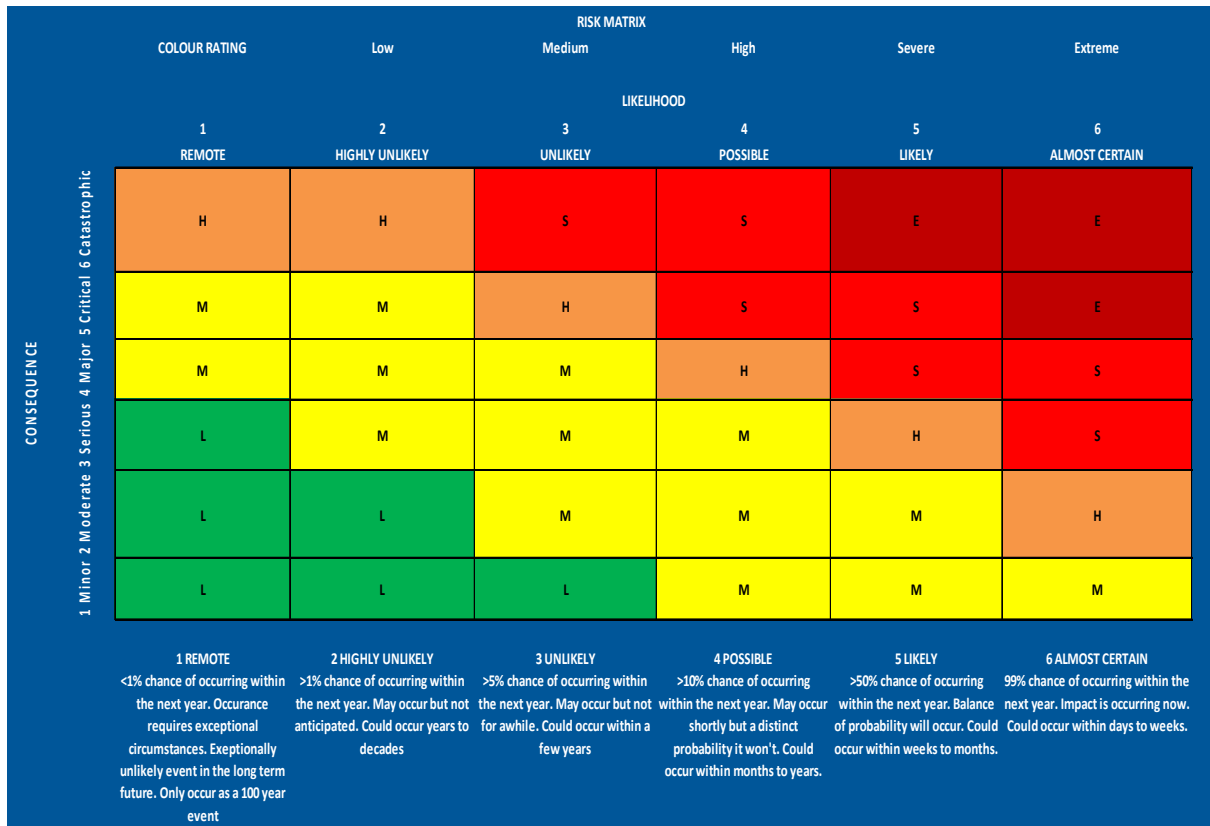


Figure 6: Corporate Risk Matrix and Likelihood Rating Table

Table 6: Risk Management Action Table

Level of Risk	Action required	Acceptance Authority
		Beach Energy
<b>EXTREME</b>	Risk treatment Plan must be in place immediately Risk reviewed monthly by Risk owner	CEO or Managing Director
<b>SEVERE</b>	Risk treatment must be considered Risk reviewed monthly by Risk owner	Divisional Executive
<b>HIGH</b>	Risk treatment must be considered Risk reviewed twice per year by Risk owner	General Manager or Department Head
<b>MEDIUM</b>	Risk treatment may be considered Risk reviewed annually by Risk owner	Group / Asset / Project / Site Manager
<b>LOW</b>	No risk treatment required Risk reviewed annually by Risk owner	Site / Activity Supervisor

**5.2.3 Acceptability and ALARP Assessment**

Following the initial hazard identification and qualitative risk assessment, Beach reviewed each of the hazards and gathered data to better define them and to confirm likelihood and consequences.

The extent of the review needed to determine the acceptability of risk should be commensurate with the level of risk, the inherent consequence and how society accepts similar hazards from other users and industries. For example, if an event has virtually no environmental impact and is standard accepted practice within other industries then the demonstration of acceptability and ALARP should be relatively simple. On the other hand, if there is significant risk, with potentially major consequences and it is not a standard industry or community accepted practice then Beach has spent considerably more effort assessing it, examining the controls to ensure they are effective and determining other risk reduction measures to be implemented.

For low risks with moderate consequences or less, Beach requires the hazard to comply, at a minimum, with standard industry practices and for there to be at least two controls in place to manage it. Once these criteria are satisfied the hazard is then subject to a final acceptability and ALARP review.

In line with the with the Risk Management Action (Table 6) all risks are subject to risk acceptance and the level of authority required to accept a risk is commensurate with the level of risk.

**5.2.4 ALARP and review of risk reduction measures**

The determination of ALARP has been an ongoing process from the original identification of the hazard. Additional controls have been sought at all stages, including:

- the initial workshops where additional risk reduction measures were examined and raised;
- the definition phase of the hazards;
- the examination of controls;
- peer reviews; and
- the final risk assessment and ALARP session.

Risk Reduction Measures (RRM) identified for consideration were chosen from the top of the control measure hierarchy:

- Elimination;
- Substitution;
- Prevention;
- Engineering controls;
- Procedural controls;
- PPE; and
- Emergency Response.



When deciding on whether to implement the proposed control/risk reduction measure, the following issues were considered:

- Does it provide a clear or measurable reduction in risk?

- Is it technically feasible and can it be implemented?
- Will it be supported and utilised by site personnel?
- Is it consistent with national or industry standards and practices?
- Does it introduce additional risk in other operational areas, e.g. will the implementation of an environmental risk reduction measure have an adverse impact on safety?
- Whether the change is effective taking into account the:
  - current level of risk i.e. with the existing controls;
  - amount of additional risk reduction that the control will deliver;
  - level of confidence that the risk reduction impact will be achieved; and
  - Resources, schedule and cost required implementing the control.

ALARP is an ongoing process and new risk reduction measures may be identified at any time, even during operations. Beach actively encourages recording and review of observations and good ideas through HSEMS and CMO. Incidents and lessons learned within Beach and Lattice and from the wider industry are reviewed and utilised to identify hazards and controls.

Finally, the effectiveness of ALARP measures will be demonstrated by setting objectives, standards and measurement criteria or Key Performance Indicators for critical controls, and to identify where action needs to be taken.

**5.3 Risk Assessment Register**

This EP summary details the impacts and risks to the offshore environment from the project. As described previously, the extended reach drilling methodology to be applied to this project removes interaction with the marine environment, however risks associated with well integrity and the coastal environment are still included in the following sections for transparency and completeness.

The list of environmental risks for the project which were identified through the Beach HAZID and Risk Assessment Process and which are relevant to this EP Summary are shown in Table 7.

There are no identified risks to the marine environment as the drilling is greater than 600 m beneath the seabed-surface.

Table 7:List of Environmental Risks

ID	Risk
R1	Disturbance to BICP
R2	Loss of containment – WBM
R3	Loss of containment – SBM
R4	Emergency event - loss of containment/well control

Table 8: Environmental Risk Assessment Summary

Risk ID	Risk	Causes	Consequences	Controls	Consequence	Likelihood	Level of Risk
R1	Disturbance to BICP	<p>Unauthorised vehicle access to BICP from the facility</p> <p>Disturbance/trampling of vegetation in adjacent BICP or localised disturbance to flora and fauna</p>	Damage to BICP	<ul style="list-style-type: none"> <li>All work to occur within clearly defined/fenced areas.</li> <li>All vehicles will remain within the designated access ways and park within designated parking areas.</li> <li>No parking of vehicles will be permitted offsite on surrounding road reserves.</li> <li>No work-related vehicles within BICP while under contract to Beach.</li> <li>Journey Management Procedure for all staff, contractors and sub-contractors specifies restriction of access to BICP.</li> <li>Site induction will specify areas of restricted access.</li> </ul>	1 - Minor	1 - Remote	Low
R2	Loss of containment – WBM	<p>WBM storage sump is overfilled.</p> <p>Damaged sump liner</p> <p>High rainfall and insufficient storage capacity cause overflow</p> <p>Inappropriate management or storage of muds</p> <p>Cement returns exceed expectations</p>	<p>Contamination of soil</p> <p>Contamination of surface water</p> <p>Contamination of groundwater</p> <p>Disturbance to fauna habitat</p>	<ul style="list-style-type: none"> <li>Drainage Management Plan demonstrates controls for excessive rainfall periods, water storage bunds and how drainage on site is managed for drilling operations.</li> <li>WBM cuttings and residual WBM collected in a lined sump adjacent to the rig location.</li> <li>Sump inspected following any clean out by excavator. Any tears or damage which present risk of leakage repaired prior to further use.</li> <li>Build-up of sediment in sump and excess fluid monitored and removed to ensure there is no overflow. Sump emptied to ensure 1m freeboard is maintained.</li> <li>Enclosed vacuum unit onsite to remove cuttings and liquids as they are discharged into sump to ensure 1m freeboard is maintained.</li> </ul>	2 - Moderate	2 - Highly Unlikely	Low

R3	Loss of containment - SBM	<p>Spills during loading/unloading</p> <p>High rainfall and insufficient storage capacity cause overflow</p> <p>SBM cuttings bins or mixing hopper tanks overfilled</p> <p>Inappropriate management or storage of muds</p> <p>Human error leading to failure of management systems and/or equipment operation</p> <p>Conveyor/auger system spills</p>	<p>Contamination of soil</p> <p>Contamination of surface water</p> <p>Contamination of groundwater</p> <p>Degradation of fauna habitat</p>	<ul style="list-style-type: none"> <li>• Drainage Management Plan to address:                             <ul style="list-style-type: none"> <li>○ Management of rainfall/water storage and drainage/runoff on site.</li> <li>○ Spill capture management and sump design.</li> </ul> </li> <li>• Drainage management system designed to contain a SBM spill and will be designed around a 20 year storm event concurrent with a 30,000 litre spill during drilling operations.</li> <li>• Drainage system to include a HDPE lined sump and lined drainage channels.</li> <li>• Chemicals, hazardous materials and substances stored in accordance with Victorian WorkSafe Code of Practice for the Storage and Handling of Dangerous Goods, and in a manner that prevents and contains any spills.</li> <li>• Oil barrels stored in designated sealed and bunded area.</li> <li>• Waste labelled and segregated in accordance with SDS and stored in a bunded area.</li> <li>• Plastic matting installed below rig floor and rig tank area to prevent spills to ground of liquid SBM and cuttings.</li> <li>• Catchment system (mud bucket and Katch Kan) installed to catch any residual SBM drips from drill pipe as it is pulled from the wellbore. Captured SBM recycled into circulating system.</li> <li>• Mobile vacuum unit used to capture and clean up any resultant SBM spills.</li> <li>• SBM rock cuttings circulated to surface exit the fully enclosed mud system from shale shakers on drilling rig. Cuttings further separated from liquid SBM by means of additional mechanical separation (centrifuge/cuttings dryer). System to convey cuttings from shakers to secondary solids control equipment designed to efficiently convey material and avoid spills.</li> <li>• SBM contained in mud tanks and re-circulated during drilling.</li> <li>• Waste SBM and drill cuttings removed by EPA approved contaminated waste disposal facility in accordance with EPA Victoria requirements.</li> <li>• SBM used in a closed system and surplus SBM at end of project returned to the supplier.</li> <li>• Loading and unloading arrangements for SBM materials from vehicles carried out within specified areas of site at all times and only by competent persons in appropriate positions (Derrick Man/Assistant Driller).</li> </ul>	2 - Moderate	4 - Possible	Medium
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Risk ID	Risk	Causes	Consequences	Controls	Consequence	Likelihood	Level of Risk
				<ul style="list-style-type: none"> <li>• Standard operating procedure (SOP) for mud circulating system and mixing hopper includes:                             <ul style="list-style-type: none"> <li>◦ Safety pin and colour coded valves.</li> <li>◦ SOP training and competency assessment.</li> <li>◦ Identify competent positions responsible for SBM operations.</li> </ul> </li> </ul>			

Risk ID	Risk	Causes	Consequences	Controls	Consequence	Likelihood	Level of Risk
R4	Emergency event - loss of containment/ well control	Equipment failure / corrosion Human error Drill design error No emergency response Poor drilling practices Mud density increases Well bore instability	Loss of containment Serious injury Disturbance/mortality of flora and fauna through contamination Soil and groundwater contamination Loss of property Escalation to bushfire	<ul style="list-style-type: none"> <li>Beach Energy Well Engineering Construction System Standards red to at all times</li> <li>Emergency Response and Interface Plan describing Beach emergency response procedures and interface with drilling contractor for drilling.</li> <li>A Fire Risk Management Plan prepared for the campaign.</li> <li>Mud weight selected to maintain positive pressure (overbalance)</li> <li>Casing and wellhead designed to minimise risk of well blowout</li> <li>A Blowout Preventer (BOP) installed and tested every 2-3 weeks.</li> <li>Casing strings and cement bond pressure tested and kick tolerance determined for each hole section</li> <li>Floats provided in drill strings and casings to prevent backflow.</li> <li>Well equipment pressure function tested prior to commencement of operations and regularly after installation.</li> <li>Two independent flow detection alarm systems installed on mud circulating system.</li> <li>Pressure parameters continuously monitored during drilling.</li> <li>Fluid losses continuously monitored during drilling to maintain well control.</li> <li>Beach Energy Drilling Superintendent and Drilling Supervisor/ Ensign Rig Manager/Supervisor and Ensign Driller shall all hold well control certification</li> <li>For well integrity purposes, bridge plugs installed in wellbore as outlined in Black Watch-1 WOMP.</li> <li>Kill mud mixed in reserve pit and be available at all times when drilling top hole sections.</li> </ul>	3 - Serious	2 - Highly Unlikely	Medium



## 5.4 Environmental Impacts and Management to Reduce Impacts to ALARP

This section describes the environmental risks and impacts associated with the activities during the project to the offshore environment and their progression through the impact assessment process.

### 5.4.1 R1: Disturbance to Bay of Islands Coastal Park

#### **Risk**

This risk relates to unauthorised access to the BICP. No planned disturbance to BICP is intended as part of the project.

The project activities involve drilling and constructing a well beneath the BICP with the well bore no closer than 700 m TVDss below the beach section of the park. No work is required in the BICP as part of the project activities, including no access to BICP by vehicles relating to the project, and no clearance of vegetation within the BICP. The project will not restrict public access to the BICP.

Section 3.2.3 sets out information about the BICP which is located approximately 160 m south of the facility.

#### **Controls and ALARP discussion**

Controls to avoid unauthorised access to the BICP include:

- Ensuring all vehicles will remain within the designated access ways and park within designated parking areas. No parking of vehicles will be permitted off the site;
- Signage installed to prevent unauthorised access;
- Journey Management Procedure for all staff, contractors and sub-contractors specifies restriction of access to BICP;
- All employees will be appropriately inducted and provided with clear instructions on permitted access areas, and restricted access areas.

The residual risk for disturbance to BICP as a result of the project is low and is considered acceptable. The risk associated with potential disturbance to the BICP has been assessed to be ALARP.

### 5.4.2 R2: Loss of containment – WBM

#### **Risk**

Inappropriate management or storage of WBM and cuttings has the potential to result in a loss of containment, which may result in soil, surface water, or groundwater contamination. WBM and cuttings will be stored in a lined sump. However, there is a risk associated with the inappropriate storage and management of WBMs leading to an uncontrolled release from the site.

#### **Controls and ALARP discussion**

All potential sources of contamination of WBM and cuttings will be managed, in accordance with chemical storage and handling procedures and practices, containment systems, drainage controls, waste management procedures, and emergency response procedures. The primary control measure is storing WBM and cuttings in an isolated and elevated lined sump. The sump will be emptied by an enclosed vacuum unit to ensure a 1m freeboard is not exceeded.

The Drainage Management Plan details how rainfall/water storage and drainage on site is managed for drilling operations. The objective of the plan is to ensure that there is no contaminated spill from the facility area and the roads into surrounding countryside during drilling operations or from subsequent operations and access to the facility.

Daily visual checks of the WBM sump will be made during drilling. When a 1m freeboard is reached or the facility experiences excessive rainfall, the fluids will be removed by an enclosed vacuum unit.

The controls and management plans developed reduce the residual risk of loss of containment of WBM to low and it is considered acceptable and ALARP.

#### 5.4.3 R3: Loss of containment – SBM

##### **Risk**

Inappropriate management or storage or transport of SBM and cuttings has the potential to result in a loss of containment, which may result in soil, surface water, habitat degradation or groundwater contamination.

Cuttings produced from the sections of the wells drilled with SBM will be stored in sealed cuttings tubs and removed by road transport to a Victorian Environment Protection Authority (EPA Victoria) licensed waste facility.

##### **Controls and ALARP discussion**

The use of drilling muds is closely monitored, and personnel on site include a dedicated mud logger (Beach selected specialist contractor). A daily report including a mud-log is kept as detailed in the WOMP. Controls for SBM and cuttings include:

- SBM will be contained in holding bins.
- The installation of plastic matting under the rig and the use of an enclosed vacuum unit to capture any splashing wet SMB cuttings to ground.
- SBM will be collected for transport off-site by a licensed regulated waste contractor to a licensed regulated waste facility for reuse / recycling (where possible) or disposal.
- All chemicals, hazardous materials and substances will be stored in accordance to the Victorian WorkSafe Code of Practice for the Storage and Handling of Dangerous Goods.
- The loading and unloading arrangements for SBM will be carried out within the mud tank containment area.

The lessons learned from previous drilling at the site and development of management controls reduce the residual risk of loss of containment of SBM as a result of the project activity to medium and it is considered acceptable and ALARP.

#### 5.4.4 R4: Emergency event – Loss of containment/well control

##### **Risk**

A loss of well control event leading to a loss of containment of petroleum hydrocarbons to the environment from drilling activities is a highly unlikely event. An emergency event causing a loss of containment may be due to damage to drilling equipment, well bore pipeline (corrosion) or in an extreme case the loss of well control and blowouts caused by abnormally high sub-surface pressure in the reservoir.

Hydrocarbon gas releases present significant safety risks to personnel, flora and fauna, due to the potential for fire and explosion if an ignition source is present.

### **Controls and ALARP discussion**

The Black Watch 1 WOMP includes the risks associated with drilling a new well on an existing facility, and hence will include the well integrity control measures required to undertake the drilling safety.

The main controls to prevent a loss of containment/well control emergency event are the use of experienced drillers, casing and wellhead design to prevent well-blowout, drilling fluid to provide hydrostatic overbalance, and surface well control equipment (blow-out preventers).

Pressure parameters will be continuously monitored during drilling, and two independent flow detection alarm systems will be installed on the mud circulating system. Fluid losses will be continuously monitored during drilling to maintain well control.

The Ensign Emergency Response Plan (ERP) and the Beach Emergency Response and Interface Plan contain well control response, and key members of Beach's drilling management team, including the Principal Drilling Engineer, Drilling Superintendent and Well Site Representatives will all hold well control certification.

Corrosion mitigation will be managed through the selection of appropriate materials for the casing string in accordance with the WECS.

The management plans, drilling designs, safety systems and controls developed reduce the residual risk of an emergency event from a well control incident leading to a loss of containment as a result of the project activities to medium and it is considered acceptable and ALARP.

## **6 Environmental Performance Objectives, Standards and Measurement Criteria**

This section presents the Environmental Performance Objectives, Standards, and Measurement Criteria required that address sources of risks identified for the project.

The table below lists the key objectives, standards and measurement criteria that Beach use to ensure that the environmental risks are managed to ALARP. Objectives have been developed for each of the identified environmental risks and have been based around the identified controls from the control assessment described in Section 5. For each objective a standard has been developed in conjunction with measurement criteria.

A summary of the objectives, standards and criteria in place for the identified environmental risks is presented in Table 9.

Table 9: Objectives, Standards and Criteria

Risk ID/Impact	Objectives	Standards	Criteria
R1: Disturbance to BICP	No physical disturbance to the BICP. Prevent unauthorised access to BICP during the campaign.	<ul style="list-style-type: none"> <li>Schedule 3 of the National Parks Act 1975</li> <li>Section 40 of the National Parks Act 1975</li> </ul>	<ul style="list-style-type: none"> <li>Signage directing to wellsite.</li> <li>Fencing and/or 'No access for Beach employees or contractors' signposts are erected and maintained on the access road to BICP.</li> <li>Induction will include areas of restricted access including BICP.</li> <li>Any BICP restricted access non-compliances logged in Beach's CMO system.</li> <li>Fauna mortality from project vehicle strike recorded, reported and investigated as per incident management process.</li> </ul>
R2: Loss of containment - WBM	No unplanned discharge of separated water, cuttings, or WBM from sumps throughout the drilling campaign	<ul style="list-style-type: none"> <li>Environment Protection Act 1970 Section 38 and 39</li> <li>HSEMS Standard 16 Monitoring of the Working Environment &amp; 18 Environment Effects and Management</li> <li>Black Watch-1 WOMP</li> <li>WECS Standards – Section 13 Drilling and Completions Fluid</li> <li>Drainage Management Plan</li> </ul>	<ul style="list-style-type: none"> <li>Daily visual inspection and monitoring records of WBM collection sump level to 1 m freeboard limit.</li> <li>Records of sump maintenance.</li> <li>Report of unplanned discharge investigated and reported as per the incident management process.</li> </ul>
R3: Loss of containment - SBM	No unplanned discharge of SBM or cuttings from the holding tanks throughout the drilling campaign	<ul style="list-style-type: none"> <li>Environment Protection Act 1970 Sections 38 and 39</li> <li>EPBC referral application Part 4 (specifies 2 methods for cleaning)</li> <li>Black Watch-1 WOMP</li> <li>HSEMS Standard 16 Monitoring of the Working Environment &amp; 18 Environment Effects and Management</li> <li>WECS Standards – Section 13 Drilling and Completions Fluids</li> <li>SDS for Synthetic Based Drilling Mud</li> <li>Victorian Environment Protection (Industrial Waste Resource) Regulations 2009</li> <li>All chemicals will be stored in accordance to the Victorian WorkSafe Code of Practice for the Storage and Handling of Dangerous Goods.</li> <li>HSE Management System -Standard 20 Audits, Assessment and Review)</li> </ul>	<ul style="list-style-type: none"> <li>Daily drilling log report records SBM use and cuttings generated for licenced disposal.</li> <li>Mud Volume QA/QC reports.</li> <li>Audit records demonstrating compliance with the EP commitments.</li> <li>SBM waste transfer and disposal records recorded as per Waste Management Plan.</li> <li>Verification by reviewing incident/inspection records.</li> </ul>
R4: Emergency event - loss of containment/well control	To control and implement drilling and well operations in accordance with the WOMP during the campaign.	<ul style="list-style-type: none"> <li>Beach WECS</li> <li>Black Watch-1 WOMP</li> <li>Regulations 8 to 12 (Division 2) of the Petroleum Regulations 2011 under the Victorian Petroleum Act 1998</li> </ul>	<ul style="list-style-type: none"> <li>Bridging document between Beach's WECS and Drilling Contractors Well Control Standard.</li> <li>A Blowout Preventer will be installed and tested every 2-3 weeks – records</li> </ul>

Risk ID/Impact	Objectives	Standards	Criteria
		<ul style="list-style-type: none"> <li>Ensign 931 Drilling Risk Register</li> <li>Beach Crisis and Emergency Management Directive</li> <li>Defined rig specifications</li> </ul>	<p>maintained by Rig Contractor- as per the Black Watch-1 WOMP)</p> <ul style="list-style-type: none"> <li>Casing strings and cement bond will be pressure tested and kick tolerance will be determined for each hole section recorded in daily reports.</li> <li>Well parameters will be continuously monitored during drilling – recorded in daily reports</li> <li>Fluid losses will be continuously monitored during drilling to maintain well control – recorded in daily reports.</li> <li>Records of testing and review of ERIP undertaken accordance with the ERIP requirements.</li> </ul>

## 7 Environmental Performance Monitoring

### 7.1 Beach Energy Environmental Commitment

Beach and its contractors operate under an established HSE Management Systems (HSEMS) to minimise and manage the impacts of activities, employees, contractors, on the environment and the communities in which the company operates.

The HSEMS is a key tool in the management of the Company and associated contractors’ environmental responsibilities, issues and risks. The HSEMS also provides a framework for the coordinated and consistent management of environmental issues by ensuring the:

- establishment of an environmental policy (see <http://www.beachenergy.com.au>);
- identification of environmental risks and legal and other requirements relevant to the operations;
- setting of appropriate environmental objectives and targets;
- delineation of responsibilities;
- establishment of a structure and program to implement environmental policy and achieve objectives and targets, including the development of procedures or guidelines for specific activities and education and induction programs; and
- facilitation of planning, control monitoring, corrective action, auditing and review of activities to ensure that the requirements and aspirations of the environmental policy are achieved.

### 7.2 Health Safety and Environment Management System

Beach’s environmental commitments for Black Watch-1 project are communicated and implemented under the Lattice Energy HSE Management System. The Lattice Energy HSE Management System and standards apply to HSE related matters for activities and operations controlled by Lattice including the impact of those activities and operations on employees, contractors, the environment and the communities in which the company operates. Black Watch-1 project will provide information and take action as required by the HSE Management System to ensure compliance with the performance objectives and standards established in the EP.

The HSE Management System is designed to provide Lattice with a consistent approach to HSE management and to allow for the integration of HSE management processes and responsibilities with other business unit requirements such as where individual businesses units and sites establish HSE management plans that describe how HSE risks are managed e.g., the Black Watch-1 Drilling EP and the Black Watch Emergency Response and Interface Plan (ERIP).

At the core of the HSEMS are 20 standards (Table 10) that detail specific requirements to manage potential risks leading to the implementation of the Beach Energy Environmental Policy commitment to conduct operations in an environmentally responsible and sustainable manner.

Table 10: HSEMS Standards

No	Standard	No	Standard
1.	Leadership and Commitment	11.	Management of Change
2.	Organisation, Accountability, Responsibility and Authority	12.	Facilities Design, Construction and Commissioning
3.	Planning, Objectives and Targets	13.	Contractors, Suppliers, Partners and Visitors
4.	Legal Requirements, Document Control and Information Management	14.	Crisis and Emergency Management
5.	Personnel, Competence, Training and Behaviours	15.	Plant and Equipment
6.	Communication, Consultation and Community Involvement	16.	Monitoring the Working Environment
7.	Hazard and Risk Management	17.	Health and Fitness for Work
8.	Incident Management	18.	Environmental Effects and Management
9.	Performance Measurement and Reporting	19.	Product Stewardship, Conservation and Waste Management
10.	Operations	20.	Audits, Assessments and Review

Integral to each standard is a series of HSE management processes including directives, procedures and other support documents that provide detailed information on requirements for implementation of performance objectives and standards. The Black Watch-1 Drilling Project HSE Management Plan has been developed to outline the health, safety and environmental responsible roles for HSEMS standards implementation.

### 7.3 Ongoing Monitoring of Environmental Performance

#### 7.3.1 Personnel, Competence, Training and Behaviours

Employees are carefully selected, trained and supported, and fitness for work, competence and behaviours are assessed at a minimum two yearly interval and monitored. This is tracked by the site training and competency matrix. Contractors are to provide competent workers and regularly assess and monitor their fitness for work.

All personnel (Beach and contractors) will be required to undergo a project specific HSE induction. An environmental awareness presentation will be conducted during the project specific induction prior to the start of operations. This will highlight the main environmental risks, relevant control measures, incident response and required reporting measures. Contractors and suppliers are required to ensure that all personnel have attended the induction training before the commencement of work. The personnel should also be familiar with the environmental controls required by the EP relevant to their scope of work

Regular refresher training will be delivered in toolbox talk sessions on EP related information. Environmental awareness topics will be included in toolbox and various other project meetings.

Visitors will also be required to attend an induction prior to entry into the project area. Records of inductions and other environmental awareness training provided will be held by the Beach Project Manager.

### 7.3.2 Performance Measurement and Reporting

Health, safety, and environmental performance data is collected, analysed and reported to monitor and evaluate ongoing HSE performance and drive continual improvement.

The Beach Project Team will prepare a monthly environmental report to update the Beach Project Manager on the activities of the previous month, typically a summary of the weekly reports and submit a report will be submitted monthly to DJPR.

Beach will also submit an annual report summarising the performance against the requirements set out in the EP to DJPR.

A Performance Report will be due to be submitted to the Regulator by the end of drilling.

### 7.3.3 Audits, Assessment and Review

Auditing of the Black Watch-1 EP and the underpinning procedures and practices will be undertaken in accordance to the project HSE Audit Plan and the requirements of the EP to identify any deficiencies recommend corrective action. Audit activities will include:

- Internal audits, assessments and reviews conducted by Ensign Field HSE advisers.
- Audits, assessments and reviews of the drilling contractor activities by Beach.

Outstanding actions will be managed through Beach Energy's CMO system to enable the Beach Site Representative to address and close out any items as necessary.

In addition, compliance audits against the commitments made in the EP, and development approval conditions, will be conducted as a minimum:

- On commencement of the development activities; and
- Following a major environmental incident.

All such audits ensure that the EP continues to be suitable and effective, and complies with all operations HSE and regulatory requirements.

### 7.3.4 Incident reporting and recording

All environmental incidents will be reported to the Project Manager and will be investigated.

Beach will notify the regulator of any reportable incidents within two hours of the incident occurrence. The initial notification (oral or written) will be followed by a written report of the incident submitted within three business days. In the context of this Project a reportable incident is defined as any incident of consequence category 2 (moderate) or greater.

Monthly reports will be submitted to DJPR during the drilling campaign detailing any recordable incidents including 'nil' incident reporting.

Written reports of recordable incidents will be stored and maintained for a period of 5 years from the making of the document and in a way that makes retrieval of the document or other record reasonably practicable.

#### **7.3.5 Contractors, Suppliers, Partners and Visitors**

The project team will monitor all contractors, suppliers and partners in accordance to the HSEMP and Beach's Contractor Management Directive. The approval for a contractor to commence the works under contract is subject to the contractor demonstrating appropriate safety management planning and preparation.

A contractor shall both assess and pre-qualify its third-party contractors (and equipment) to ensure it meets the HSEMS standards as outlined in the Black Watch-1 Project HSEMP.

#### **7.3.6 Product Stewardship, Conservation and Waste Management**

All resources used, or consumed as a result of Black Watch-1 Project operations are identified and documented. These include natural resources, materials and energy.

Systems are in place to ensure that the consumption of these resources is carried out both efficiently and in a manner that conserves such resources. Waste streams from Black Watch-1 project operations will be regularly evaluated with a view to maximising the use of recycling.

Waste management procedures will be used to control the disposal of hazardous waste. Only EPA licensed disposal contractors will be used for such disposal. Monitoring is undertaken to ensure that material usage and discharges comply with legislation and are minimised to ALARP.

#### **7.3.7 Management of Change**

Changes to equipment, systems, personnel, and documentation will be controlled by the Management of Change Directive to ensure that any factors that may have an impact on HSE issues are fully considered. A significant deviation from the outline drilling program would trigger a drilling management of change procedure actioned by the drilling completion manager and approved by the project manager. A change review team will be appointed for each change.

The process requires that a summary of each change is recorded so that a check may be periodically made on the cumulative effect of a number of small changes.

#### **7.3.8 Monitoring and Record Keeping**

A monitoring program will be implemented during the project. Records of all monitoring will be generated and held for the duration of the project. Responsibility for these inspections will be determined by the Project Manager and will include the Beach Site Representative and contractors.

Records will be established and maintained in accordance with the requirements of the Beach Energy HSEMS.

### **7.4 Emergency Response Management**

The Beach Emergency Response and Interface Plan (ERIP) describes the actions to be taken in the event of all identified environmental incidents and emergencies occurring at the facility and describes the interface with the Ensign Emergency Response Plan. The Beach ERIP and the Ensign ERP will operate in parallel during the project.



The project specific ERIP includes procedures for multiple emergency scenarios and response including:

- Well control incident;
- Bulk fuel / hazardous materials incident;
- Fire and/or explosion (rig/warehouse/camp/facility);
- Environmental pollution incident;
- Natural disaster incident (i.e. flooding);
- Hazardous materials and handling;
- Fuel/oil spills; and
- Bushfire.

The Beach ERIP includes input from a broad range of sources including Ensign drilling personnel, and health and safety representatives, and contains communication channels for emergency services. All drilling personnel will receive awareness training of the Beach ERIP and details of the ERIP will be made available to emergency services and relevant municipal authorities.

Reporting relationships for command, control and communications are specified in the Beach ERIP together with interfaces to emergency services specialist response groups, statutory authorities and other external bodies. The roles and responsibilities are communicated to all personnel involved in an emergency, including the response teams, support teams, visitors, contractors and employees.

The Beach ERIP defines the communication requirements to notify both the company and external bodies of the incident so as to obtain assistance where needed and to fulfil reporting obligations. Systems will be established to provide effective management in the event of a discharge or ignition of hydrocarbons to the environment. Such processes will include initial response, reporting requirements, and the involvement of third parties with skills and equipment necessary to respond effectively to emergency incidents.

The Beach ERIP will be reviewed and updated, as necessary, to incorporate lessons learned from training, exercises and incidents, both internally and externally. The ERIP will be updated as required following a major accident, near miss or an exercise. Review and testing of the ERIP will involve:

- Conducting an emergency response drill at all locations;
- Testing of associated procedures and system when they are first devised or significantly changed, and on a regular basis not exceeding 6 months;
- Conducting weekly site drills; and
- Undertaking a review of all tests to identify opportunities for improvement and amendment of the ERIP.

#### 7.4.1 Incident Management

The requirements of incident analysis and investigations are detailed in the Incident Management Directive which describes the steps to be taken after an incident has occurred or a hazard has been identified. The purpose of an analysis is to determine the causes of incidents (including near misses) or to correctly determine hazards that have not been adequately identified, assessed or controlled. Having verified the underlying causes, an analysis must then recommend how to prevent a recurrence. Incidents will be reported in accordance with the requirements in Section 7.3.4.

## 8 References

1. Biosis Research, 2009. Origin Energy, Halladale and Black Watch Project, Nirranda South, Victoria. Flora and desktop terrestrial fauna assessment. Prepared by Biosis Research Pty. Ltd., Melbourne.
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## 9 Document information and history

Document custodian group

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No.	Name and Position	Distribution
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2	DJPR	Sandra Vin, Senior Assessments Officer, Earth Resources Regulation, DJPR (via email)
	DELWP	Gary Niewand, Manager Planning Unit (via email)
	Parks Victoria	Mark Riley, Manager Parks and Water Policy (via email)

Document history

Rev	Date	Changes made in first document	Reviewer/s	Consolidator	Approver
0	1/5/2019	First Issue (for submission)	Catriona King	Tim Flowers	Patrick Flynn

### 9.1 Controlled copy distribution

Controlled Copies of this document shall be distributed to the persons/areas listed above. The Environmental Advisor, Development shall issue revised copies to all, as they are authorised.