Plan

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CDN/ID 18726200

HBWS Production Environment Plan Summary

(OEMP Part 5: Environmental Management Plan)

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
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Review due	Review frequency
11/05/2025	5 year/s

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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Glossary of Key Terms and Abbreviations

Terms/acronym	Definition/expansion
ALARP	As Low As Reasonably Practicable
ARI	Average Recurrence Interval
BICP	Bay of Islands Coastal Park
CCR	Central Control Room
CFA	Country Fire Authority
CMA	Catchment Management Authority
CMO	Beach Energy integrated and centralised Heath, Safety and Environment information system used to track and monitor all related HSE regulatory compliance processes
CO2	Carbon Dioxide
DELWP	Department of Environment, Land, Water & Planning
DJPR	Department of Jobs, Precincts and Regions
DoE	Department of Environment
DN	Nominal Diameter
DW	Directional Well
EMAC	Eastern Maar Aboriginal Corporation
EPA	Environment Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act
ERP	Emergency Response Plan
ERD	Extended reach drilling
EVC	Ecological Vegetation Class
HBWS	Halladale, Black Watch and Speculant
HPU	Hydraulic Power Unit
HSE	Health, Safety and Environment
HSEMS	Health, Safety and Environment Management System
JHA	Job Hazard Analysis
Beach Energy	Beach Energy Limited
LER	Local Equipment Room
MCC	Motor Control Centre
MEG	Mono Ethylene Glycol
mg	Milli gram
MNES	Matters of National Environmental Significance
MOC	Management of Change
MPa	Mega Pascal

MRNL	Maximum Recommended Noise Levels
NIRV	Noise from Industry in Regional Victoria
OEMP	Operations and Environment Management Plan (approved Operations Plan in accordance with *Petroleum Act* requirements)
OGP	Otway Gas Plant
PCS	Process Control System
PLC	Programmable Logic Controller
PMV	Production Master Valve
PSDA	Petroleum Special Drilling Authority
PTW	Permit to Work
PWV	Production Wing Valve
TR SCSSV	Tubing Retrievable Surface Controlled Subsurface Safety Valve
SDS	Safety Data Sheet
SEPP	State Environment Protection Policy
SIS	Safety Integrated System
SOP	Standard Operating Procedure
UPS	Uninterruptible Power Supply
VESDA	Very Early Smoke Detection
WHCP	Wellhead Control
WOMP	Well Operations Management Plan

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 production activities from the Halladale, Speculant and Black Watch wells, 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 production activities.

1.1 Scope of this document

The scope of this EP Summary covers all activities relating to production from the Halladale, Black Watch and Speculant (HBWS) gas fields in VIC/L1(V) and the onshore wellsite located approximately 3 km south-west of Nirranda South.

1.2 Nominated Titleholder and Liaison Person

Beach Energy Limited (Beach) is the licence holder and operator of VIC/L1(V) and associated Access Authorities and existing consents. Beach acquired Lattice (previously named Origin Energy Resources Limited (**Origin**)) on 31 January 2018.

Notwithstanding that Beach is the proponent for this project, there may be references to 'Lattice' and '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:

The Titleholder's nominated liaison person is:
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2 Scope of Activities

The HBWS gas fields are located approximately 5 km from shore in Victorian waters within the Otway Basin (Figure 1). These fields have been developed from an onshore wellsite using extended reach drilling.

The HBWS production activities consist of:

- The production from up to 5 production wells located in VIC/L1(v) offshore production permit.
- The operation of up to five production wells (Halladale-2, Black Watch-1, Speculant-1, Speculant-2 ST1 and Speculant-3 (future)), either remotely from the Otway Gas Plant (OGP) Central Control Room (CCR) or locally at the onshore wellsite.
- Routine local intervention activities at the wellsite, including general site surveillance, wellsite hydraulic power unit (HPU)/wellhead control panel (WHCP) servicing, instrumentation calibration and testing, functional testing of control and trip functions, vessel inspection, pressure relief testing (HPU only), gas pipeline pigging and wellhead servicing.

Other activities undertaken at the site associated with the operation of the production wells include:

- Construction of tie-in works for Black Watch-1 and possibly Speculant-3 (future).
- Site modification, including earthworks, within the boundaries of the facility.

Activities explicitly excluded are:

- The transport of raw production fluids from the wellsite to the OGP (also known as pipeline activities) which are covered by the HBWS Pipeline Environmental Management Plan [1].
- Well intervention activities such as wireline and workover operations which will be addressed by separate Operations Plan approvals processes as required.
- Activities associated with the drilling of additional wells at the site which will be addressed by separate approvals processes (e.g. the recently drilled Black Watch-1 well is addressed in the Black Watch-1 Drilling Environment Plan [2]).

The HBWS gas fields and wellsite are managed by the Otway Gas Plant .

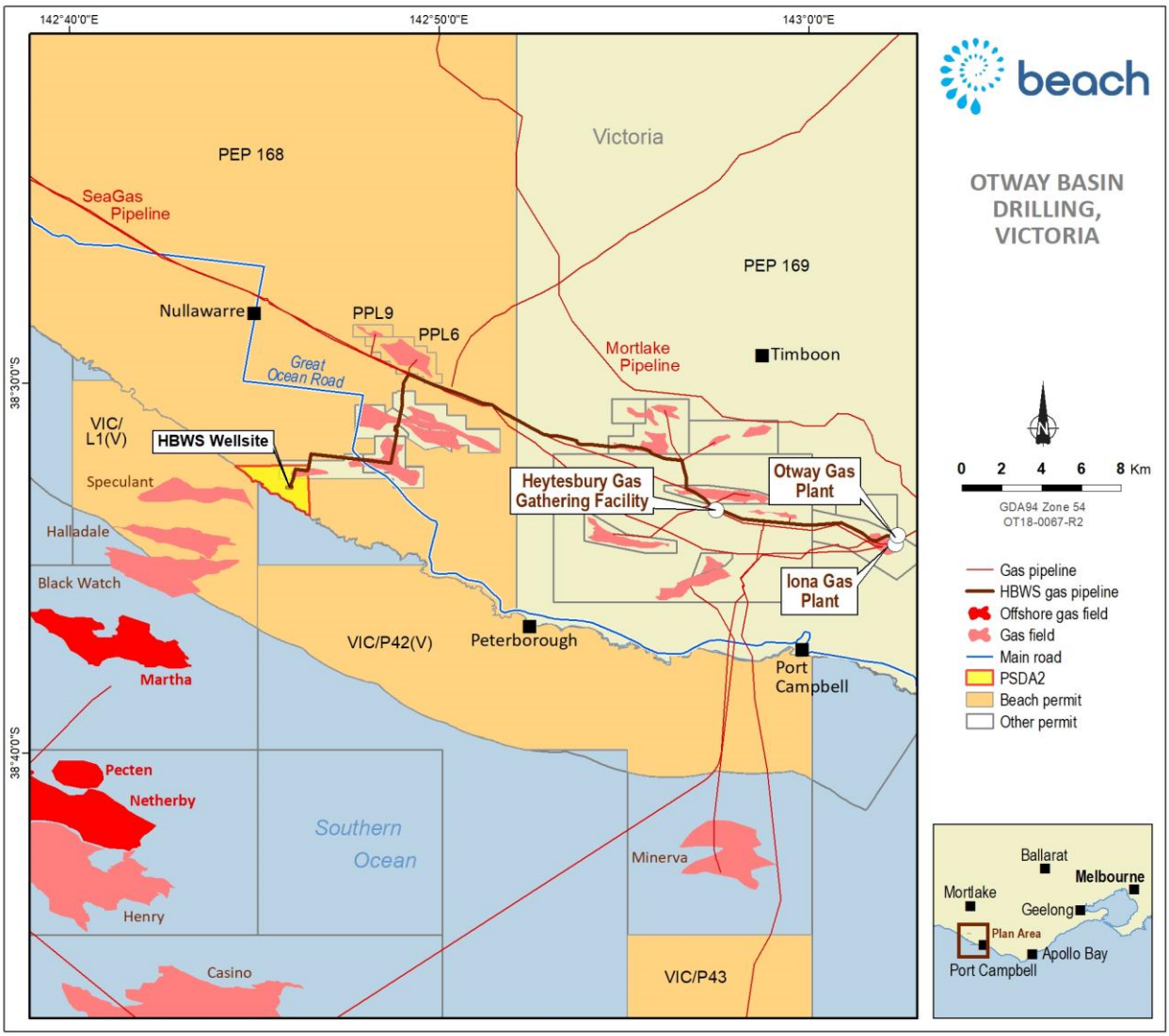

Figure 1: Locations of the Halladale, Black Watch and Speculant Fields and onshore wellsite

3 Description of Activities

3.1 Physical presence and operations

3.1.1 Physical presence

The wellsite operates on a 24 hour a day / 7 days a week basis. The facility is normally unmanned and is operated and maintained from the OGP Central Control Room which is located approximately 30 km to the northeast of the wellsite.

Routinely the site will be visited by two personnel to conduct inspections and perform required operations and maintenance activities. This number is expected to be greater for non-routine repairs, well site maintenance and facilities modification activities.

All routine operations and maintenance activities will be executed in daylight hours, however lighting is provided for safe access at night should this be necessary. Site lighting will normally be off to minimise impact on visual amenity. Activities at the well site that may require 24/7 operations are well site maintenance and facility modification activity such as well tie-in installation. These activities will require additional site lighting for safety and may result in additional noise emissions from the site but will be temporary in nature and for short durations.

The wellsite is equipped with 3 phase power which is provided to the site via a buried cable from the existing network. The site also provides a battery based uninterrupted power supply (UPS) as back up to essential services. There is also provision for a tie-in for a temporary diesel generator in the event of an extended power outage.

A local equipment room (LER) containing power, control and communications equipment is located at the wellsite. The LER is sized to allow for infrastructure to support a total of 5 wells and will include: a motor control centre (MCC) and programmable logic controller's (PLC)'s, air conditioning to ensure suitable operating conditions for equipment, fire detection and a Very Early Smoke Detection (VESDA) system.

The existing amenities building is a converted sea container that includes the following facilities:

- An air-conditioned crib area with basic kitchen facilities including sink, fridge, and microwave.
- A unisex ablutions facility with hand basin.
- A workshop including workbench, wash trough, first aid equipment as detailed in the Otway Emergency Response Plan (ERP) [3] and minor equipment storage.
- An additional amenities building will be installed with air conditioner, hot water service, additional ablution facilities including shower and a larger lunchroom space.

Site lighting is confined to the LER, amenities building and process modules. The LER is fitted with externally mounted LED light fittings for illumination of the amenities building and the concrete pad for the stand-by generator. Process modules are generally fitted with hazardous area rated fluorescent light fittings with

additional floodlights at the choke valve platform for illumination of the wells. The safety shower is fitted with its own dedicated fluorescent light (coloured green) which is continuously energized. This is the only light fitting that is normally on during the night and cannot be switched off remotely or by local operator.

The site perimeter and access gates are not equipped with lighting. Illumination of the access road and front gate is via vehicle head and taillights. External site lighting is controlled remotely from the OGP process control system and is normally switched off.

The wellsite does not have any major rotating machinery or power generation equipment. The only significant noise generating equipment at the wellsite are the four choke valves on Halladale-2, Black Watch-1, Speculant-1 and Speculant-2 ST1 flow lines. Other noise sources include the hydraulic pump and vehicle movements around the site.

Water at site is stored in a rainwater tank which is fed from the roof of the LER. Water is distributed to site users (safety shower, amenities building and general use) via a dedicated piping and rainwater pump. The safety showers utilise a self-contained header tank so that functionality is retained even in the event of power outage. Activation of the safety showers is alarmed in the OGP control room.

Drinking water is only from bottles which are brought in from offsite.

3.1.2 Waste generation and disposal

The wellsite will generate general wastes (solid inert materials including plastics, paper, glass, metal, food, sewage and greywater) and hazardous wastes including:

- waste oil and chemicals
- oily rags
- empty drums containing oil or chemical residues
- liquids remaining in the Closed Drain Vessel following blow down after maintenance.

Wastes are managed at the HBWS site in accordance with the Otway Waste Management Plan. General and prescribed wastes are temporarily stored at the wellsite prior to being transported to OGP for consolidation and appropriate disposal.

Liquids from the Closed Drain Vessel will be pumped out using a vacuum truck and transported directly offsite for licensed disposal.

A 2000 to 3000 L cesspit will be used to collect any waste from the amenities building. The cesspit will be emptied as required by a suitably licensed contractor for offsite disposal.

3.1.3 Storage and handling of chemicals

Oils and chemicals may be used as part of routine (e.g. topping up the HPU reservoirs, corrosion inhibition during pigging) and non-routine activities (e.g., maintenance activities). Chemicals for routine operations (including lubricants, hydraulic oil and diesel) will be brought to site, as required, in drums or as packaged

goods. Cleaning chemicals associated with the amenities building will also be stored on site in the chemical storage container. Hard copy chemicals SDS are stored onsite in the amenities building with the master files held on the Beach Hazardous Materials electronic database, ChemAlert.

Chemicals classified as Dangerous Goods for routine operations are stored in the dangerous goods (DG) cabinet which is located in the storage container.

3.1.4 Drainage Management

A drainage system for the site was designed, approved and installed with erosion and sedimentation controls prior to the drilling of the Halladale and Speculant wells. The site Drainage Management Plan describes controls for excessive rainfall periods, water storage, spill management, erosion and sedimentation control and how drainage on site is managed for operations and was prepared to meet the requirements of the applicable sections of the Victorian EPA State Environment Protection Policy (SEPP) (Waters).

3.2 Production

Production of gas from the reservoirs located offshore within VIC/L1(V) production permit area occurs through the production casing installed during the drilling and completion of each production well through the process of extended reach drilling (ERD) as described in the drilling Well Operations Management Plan (WOMP). A production WOMP describes the management of production, intervention and abandonment operations for producing wells at the HBWS well site. Each well bore is located between at least 600m to 2000m below the sea floor. There are no additional physical facilities in the marine environment required to facilitate gas production.

3.3 Processing

3.3.1 Reservoir and wellheads, flowlines and manifold, raw gas pipeline and pig launcher

The Halladale, Black Watch and Speculant fields are three separate gas reservoirs which are not in pressure communication. The reservoir drive mechanism is predominantly aquifer, although geological faulting interpreted from seismic data could limit the effect of the aquifer influx from some directions. Flowing wellhead pressure is expected to decline moderately during field life. The Halladale, Black Watch and Speculant wells are expected to have very high deliverability based on data collected from the Halladale DW1, DW2 & SP1 exploration wells. Production from the Speculant field is expected to occur from both the Waarre A and Waarre C sands.

Flow of gas from each well head is controlled by the chokes which are opened remotely via the process control system (PCS) from the OGP. The duplex stainless-steel flowlines are rated to 22,000 kPag, with choke valve, V-cone flow meters, temperature and pressure sensors, and acoustics and monitoring facilities embedded on location. Mono-ethylene glycol (MEG) injection (refer Section 3.3.2 below) is introduced upstream of the choke valve during start-up.

The production manifold and the test manifold with the Wet Gas Flowmeter are rated to 22,000 kPag. The production manifold has been designed for a total of 5 wells over the life of the project with a “drop-out spool” for potential future addition of sand removal equipment if required.

The wet gas meter is installed on a separate test manifold to allow for individual testing of wells without impacting on production. The production manifold includes suitably located corrosion coupons at both top and bottom of pipe to allow for corrosion monitoring.

Gas flows from the production manifold through the two pipeline shutdown valves into the raw gas pipeline and is transported to the OGP.

The pig launcher has a design pressure of 22,000 kPag, and a design temperature range of-30ºC to 90ºC. The pig launcher is sized for both batch and intelligent pigging. This includes provision to allow neat corrosion inhibitor injection into the barrel of the launcher should this be considered necessary at a later date. The launcher is fitted with a band lock style door closure and the valving associated with the pig launching operation is interlocked.

3.3.2 MEG and methanol injection

MEG is used to control hydrate formation. The MEG is dosed with corrosion inhibitor for corrosion protection of piping and equipment and is transported to the wellsite via a DN 50mm pipeline from the OGP site.

MEG injection will be metered with flow control:

- For 'start-up' MEG is injected upstream of the choke (one well at a time), the production manifold, and the Closed Drain Vessel.
- For 'normal operation', MEG is injected downstream of the choke into the production manifold.

Methanol is used to dissolve hydrates once they have formed. It is not continuously injected, and no methanol is held onsite. Chemical injection points for the temporary connection and injection of methanol is provided at the wellheads.

3.3.3 Closed drain system and cold vent

The closed drain vessel and cold vent are used during site maintenance to vent all hydrocarbon process vents and drains. The design pressure of the closed drain vessel is 6900 Kpag, and design temperature is -100 to 70ºC. The vessel is constructed of stainless steel (SS316) and is located below grade to permit gravity draining from all other lines. The vessel will be emptied during scheduled visits using a "vacuum truck". The vessel is provided with a nitrogen purge connection to prevent air ingress during emptying of the vessel. The vessel is rated to Class 600 to prevent excessive damage in the unlikely event of vent ignition and flashback into the vessel itself.

3.3.4 Drainage and spill containment

The pig launcher and the area near the closed drain vessel is bunded, with a sump pit provided that is fitted with an isolation valve to allow for spills to be contained during pigging and maintenance activities. During maintenance the sump pit outlet valves will be closed. Once the pad has been cleaned post maintenance activities, the sump pit outlet valve will be left open to drain to the surrounding area via an interceptor pit. Hydrocarbon spills within the bund will be managed by draining the spill to the sump pit which shall be emptied using a vacuum truck.

Bunds are designed to accommodate rainfall from a 1 in 20-year average recurrence interval (ARI) storm.

3.3.5 Hydraulic control

The wellhead surface and subsurface valves, and shutdown valves are hydraulically operated, and the site is provided with a hydraulic power unit (HPU). The HPU is sized with sufficient capacity for 16 hours operation without power.

Hydraulic fluid is used for operation of the wellsite downhole and surface hydraulically actuated valves. The system capacity allows for operation of five wells and the site surface shutdown valves and utilises a suitable mineral based hydraulic fluid (Shell Tellus S2 32). The hydraulically activated valves are:

- 1 tubing retrievable surface controlled subsurface safety valve (TR SCSSV) per well.
- 1 Production Master Valve (Surface Safety Valve) per well.
- 1 Production Wing Valve per well.
- 1 MEG injection hand valve per well.
- 1 MEG pipeline shutdown valve.
- 2 raw gas pipeline shutdown valves.

All other non-safety critical surface actuated valves at the wellsite are electrically actuated i.e. wellhead chokes and MEG flow control valves.

The HPU supplies hydraulic fluid at two levels of pressure (design pressures of 69 Mpag and 35 Mpag). The high pressure is for operation of the TR SCSSV's, with the low-pressure level for all other hydraulic actuated valves. The HPU panel contains 3 separate tanks with volumes of 2 x 1000 L and 1 x 570 L, as well as a total of 16 accumulator bottles each with a volume of 32 L. There is a tray in the bottom of the HPU panel that will contain any leakage from all of the components within the HPU panel (capacity is 1080 L).

A wellhead control panel (WHCP) provides control of hydraulic fluid to the wellheads, interfacing to the safety integrated systems (SIS), and local manual controls for operation and resetting of the valves. All well control logic resides in the programmable logic controllers (PLC) located within the LER, allowing simplified WHCP design and enhancing reliability. The WHCP panel does not contain any stored volumes of hydraulic fluid aside from tubing and also has an integrated drain to contain any leakage from within the panel. The drains from both of these panels are piped off the skid to allow removal of the fluid.

3.4 Well site and facilities modification

As a producing well site, it may be necessary to undertake simultaneous operations (SimOps) on the site to undertake well site and facilities modifications. Specific activities will be subject to bespoke SimOps assessments in order to ensure there are no unforeseen conflicting activities and ensure that appropriate scheduling and implementation of management controls and mitigations is in place ie outcomes of SimOps assessments may identify requirements to modify the site within the boundaries of the facility, or may identify that two or more activities cannot be performed concurrently.

3.5 Decommissioning / Rehabilitation

At the end of the economic life of the Halladale, Black Watch and Speculant Project, wells will be plugged and abandoned in accordance with regulatory requirements, Beach Standards and accepted environmental practices of the day. The key steps in decommissioning and rehabilitation are outlined below.

3.5.1 Facilities, well sites and camp site

Decommissioning of surface facilities and wells involves the following:

- wells are securely decommissioned (see Section 3.5.2 below)
- surface structures are removed, and re-used / recycled where appropriate
- waste is removed, and recycled where appropriate
- foundations are removed where appropriate or levelled and covered (the standard to which they will be restored will be defined as a result of stakeholder consultations)
- sites are assessed for potential contamination and treatment / remediation is undertaken if necessary
- water wells or monitoring bores that are no longer required are decommissioned in accordance with relevant regulatory requirements, with appropriate permits in place
- disturbed areas are re-contoured to approximate pre-existing contours, natural drainage restored and compaction relieved (e.g. by scarification or ripping where appropriate) to promote rainwater infiltration and enhance seed capture and germination. Stockpiled topsoil is re-spread. Active re-seeding is undertaken where necessary.

3.5.2 Downhole decommissioning following production

Each well bore is evaluated individually to design the decommissioning program based on best industry practice to ensure two independent and verifiable barriers are in place. Decommissioning programs are submitted to DJPR prior to implementation. The decommissioning program usually involves the following:

- all perforated hydrocarbon zones are isolated with cement plugs and / or mechanical plugs
- bond logs, if conducted, are evaluated to ensure that the cement behind the production casing is adequate to avoid crossflow of aquifers with other aquifers or hydrocarbon producing zones
- if isolation is deemed insufficient, a decision may be made to access outer annuli to place appropriate plugs to achieve isolation of aquifers with other aquifers or hydrocarbon producing zones
- pressure testing and / or negative inflow testing is performed on barrier envelopes / components where feasible

- inhibited fluid is placed between barriers where applicable
- final well decommissioning at the surface will involve a surface cement plug and cutting or removing the wellhead to below natural ground level
- an abandonment plaque may be posted (generally on the nearest fence line)

A specific Operations Plan for decommissioning and rehabilitation will be prepared and submitted to the Regulator for approval prior to these operations being undertaken. The plan would be developed in consultation with relevant stakeholders and will include:

- Intended end land use and landowner position on it
- Timing of rehabilitation activities
- Scope of rehabilitation activities
- Objectives, standards and acceptance criteria that will be used to determine the success or failure of rehabilitation
- Monitoring program of rehabilitation activities.

4 Description of existing environment

The HBWS gas fields are located in Victorian waters within the Otway Basin, in production licence VIC/L1(V), approximately 5 km from shore and approximately 1.8 km below the sea floor (refer Figure 1). The onshore wellsite 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 petroleum special drilling authority PSDA 2.

The wellsite is located on agricultural (pastoral) land, which is used for grazing and dairy farming purposes, however it has since been cleared for project activities (e.g., site preparation and drilling). The wellsite is situated within the Warrnambool Plain sub-region of the South East Coastal Plain Bioregion (IBRA 6.14). Natural values of the South East Coastal Plain include a coastline, with extensive coastal wetlands and habitat for a range of threatened flora and fauna.

Agriculture is the predominant land use and previous vegetation clearance has resulted in a fragmented landscape, with only sparse vegetation remaining across much of the bioregion. Close to 90% of pre-1750 native vegetation cover within the Warrnambool Plain has been cleared for agriculture and modified by the introduction of pasture species. Processes that continue to impact on the condition of the bioregion include vegetation fragmentation, changed fire regimes, pollution of wetlands, urban expansion, weeds introduction, and grazing [4].

4.1 Physical environment

4.1.1 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.

4.1.2 Geology and landforms

The South East Coastal Plain Bioregion 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 sub region 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 wellsite itself occurs on an area of undulating limestone plain with coastal dune sand deposits, typical for the local area. The wellsite is located in geomorphological unit 6.2.3 – Karst plains with depressions (Warrnambool), of the Glenelg-Hopkins Catchment Management Region [5]. This geomorphological unit is characterised by a limestone plain that has developed many karst features, particularly 'sinkholes. These small limestone sinkholes vary between 20 m and 100 m wide, with gently concave slopes and rounded margins.

The edge of the limestone plain at the Southern Ocean is marked by spectacular coastal cliffs (now eroded to give gorges, rock stacks and islands), and exposing 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) [5].

An Acid Sulphate Soils study was carried out for the wellsite and surrounding area, which identified that the potential presence of Acid Sulphate Soils is 'low' at the site, as limestone is the natural geology in the area.

4.1.3 Surface water

No permanent surface water flows exist within the immediate area of the wellsite. Some of the larger sinkholes in the surrounding farmland may hold water for most of the year. However, some sinkholes are highly porous and do not retain water. A small wetland area surrounded by pasture is located approximately 50 m east of the wellsite. The wellsite is located within the boundaries of the Glenelg-Hopkins Catchment Management Authority.

4.1.4 Groundwater

The wellsite 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.

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 [6]. 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 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 Dillwyn Formation is a town water supply source for many of the towns in south-west Victoria. 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.

As the previous ground water monitoring bore ownership now resides with the adjacent landholder it was unable to be accessed for testing purposes during the Blackwatch Campaign. Four additional monitoring bores were drilled (marked in blue below) prior to the start of drilling for testing/quality control purposes for the drilling activity [7].

Figure 2: Locations of the HBWS water monitoring bores [7]

4.1.5 Noise and air quality

The existing noise environment for the wellsite is typical of a rural area, with low levels of background noise dominated by natural sources (e.g., wind, rain, ocean, animals and insects) and intermittent noise from vehicular traffic and agriculture activities.

A noise study was undertaken by Jacobs in 2015 [8] to determine the acoustic impact of differing vendor choke valves at the wellsite. As there is no major rotating equipment on site, the choke valves are considered to be the only significant noise generating equipment at the wellsite during normal operations. The valves are located approximately 290 m distant, and 4 m higher, than the closest sensitive receptor (residential building). The study calculated the Maximum Recommended Noise Levels (MRNL) noise criteria for the site using the EPA Guideline Publication 1411 dated October 2011 titled 'Noise From Industry in Regional Victoria' (NIRV) (see Table 1). The study found that the predicted noise levels due to the operation of the choke valves at the nearest residential property meet the MRNL noise criteria. This assessment was confirmed by a further assessment of the of the operational choke valves at the HBWs site by Jacobs in 2018 [9].

Table 1: Maximum Recommended Noise Levels derived from NIRV.

Time Period		
Day (0700-1800 Hrs)	**Evening (1800 – 2200 Hrs)**	**Night (2200-0700 Hrs)**
46 dBA	41 dBA	36 dBA

Eight residential locations have been identified within 2.6 km of the wellsite (refer Table 2 and Figure 3).

Existing air quality at the wellsite is good and is typical of a pastoral area in close proximity to the coast and remote from industrial or large urban development. Dust from agricultural activities and traffic movements may occasionally reduce local air quality over a short duration.

Table 2: Residential locations within 2.6 km of wellsite

Location	**Distance (km) / Direction**
1. 357 Blakes Road	2.23 (N)
2. 1580 Baileys Road	1.77 (NE)
3. 115 Radford Road	2.56 (ENE)
4. 189 Radford Rd	2.26 I
5. 235 Radford Rd	2.24 (E)
6. 285 Radford Rd	2.26 (E)
7. 359 Radford Rd	2.48 (E)
8. 1710 Baileys Road	0.27 (N)

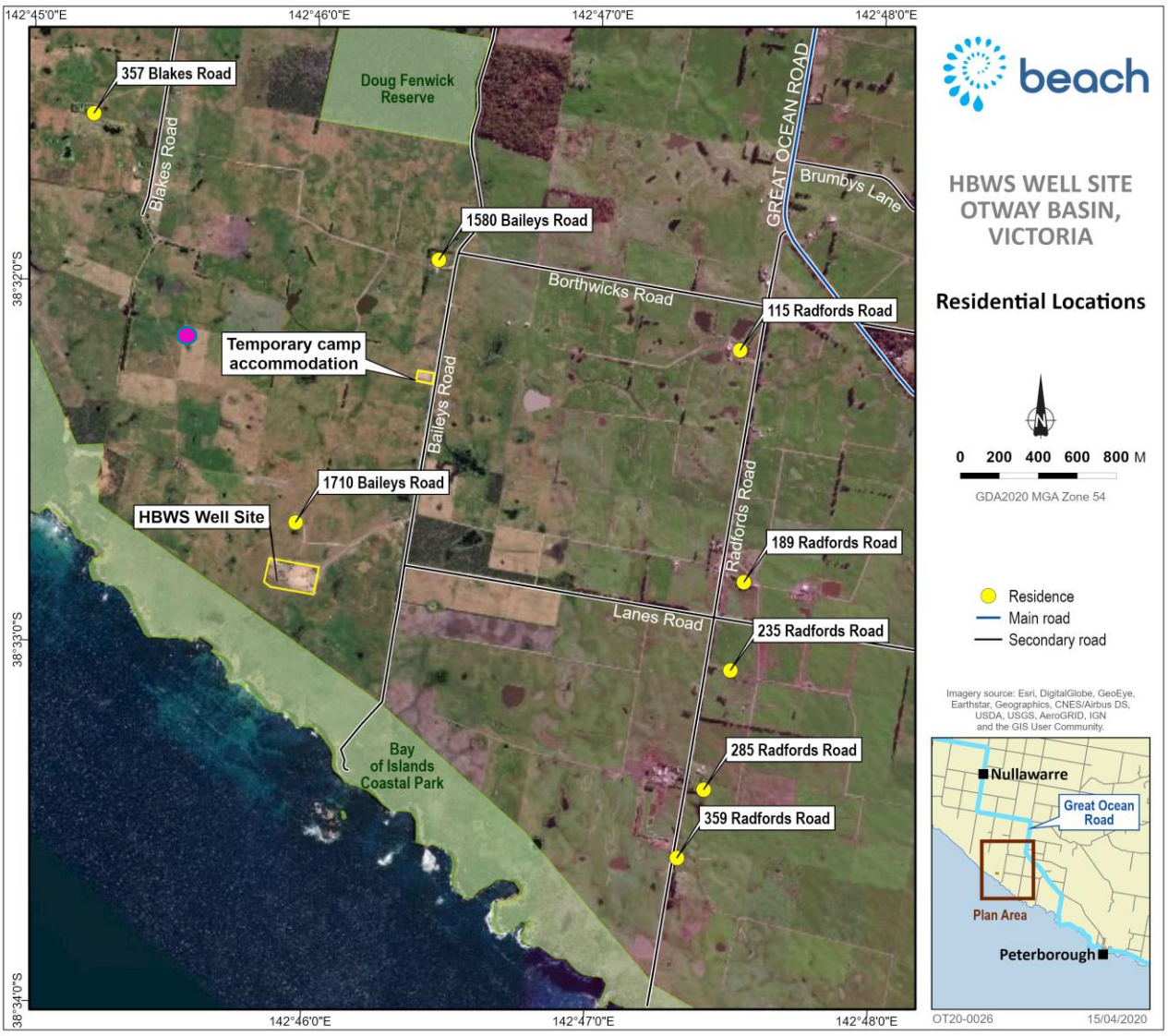

Figure 3: Existing Residential locations

4.1.6 Traffic

A traffic assessment for the wellsite was undertaken by Evans and Peck in 2011 [10]. The wellsite is currently accessed from the Great Ocean Road via Radfords Road, Borthwicks Road then Baileys Road. The traffic assessment found that Radfords Road, Borthwicks Road and Baileys Road provide access to approximately 10 residences', and pasture land for dairy cattle [**Error! Reference source not found.**].

4.1.6.1 Great Ocean Road / Radfords Road Intersection

The Great Ocean Road and Radfords Road intersection provides access to local residential and businesses areas and is a key tourist route. The Great Ocean Road is 6 m wide on the approaches to the Radfords Road intersection, with a single lane in each direction. There are multiple access points to local farms, houses and businesses and an indented school bus stop approximately 200 m north east of the Radfords Road intersection for southbound transit. At the approach to this intersection there is a speed advisory of 80 km/hr

and warning signs advising drivers to slow down in wet conditions. Otherwise the posted speed limit is 100 km/hr.

A school bus service stops on the Great Ocean Road approximately 180 m south east of the Great Ocean Road/Radfords Road intersection. The school bus route also utilises Radfords Road, Borthwicks Road and turns right at the Baileys Road intersection to then travel north back to the Great Ocean Road. The school bus route does not extend to the wellsite.

4.1.6.2 Radfords Road

Radfords Road extends from the Great Ocean Road south towards the coastline. The section of Radfords Road that is used to access the wellsite is between the Great Ocean Road and Borthwicks Road and is approximately 400 m long. The majority of this section of Radfords Road is sealed with a width of 6m; the sealed width is reduced to 4m for the first 80m from the Great Ocean Road intersection.

In the section of road that will be used to access the wellsite, there is a single property access to a farm building on the western side of Radfords Road between the Radfords Road/Borthwicks Road intersection and the Great Ocean Road/Radfords Road intersection.

4.1.6.3 Borthwicks Road

Borthwicks Road extends in an east-west direction, from Radfords Road at the eastern end to Baileys Road at the western end. This section of Borthwicks Road is a gravel road, approximately 8 m wide and approximately 1.6 km in length with several gate accesses to the south and north side of the road and approximately six drainage crossings. The gravel seal of Borthwicks Road is in good condition following road upgrades undertaken during the site preparation works for the drilling of the Halladale and Speculant wells.

4.1.6.4 Baileys Road

The section of Baileys Road that will be used to access the wellsite runs in a north-south direction from the intersection with Borthwicks Road for a distance of approximately 1 km to the location where access to the wellsite will connect to Baileys Road. Baileys Road has been upgraded and is, approximately 8 m in width.

Baileys Road from the Borthwicks Road intersection to the farmhouse access is in good condition, similar in standard to Borthwicks Road. The gravel seal of Baileys Road and the wellsite access road is in good condition following road construction upgrades undertaken during the site preparation works for the drilling of the Halladale and Speculant wells.

4.1.6.5 Additional access/egress road

During preparation for the drilling of the Black Watch 1 well, a LOPA workshop identified the need to construct an additional point of access/egress within the facility boundary to reduce the risk of damage to infrastructure within the facility.

The new access/exit road is approximately 100 m in length and less than 6 m in width to connect the inner facility road to the well access track, north of the sinkhole within the facility boundary, on previously modified land. The drainage management system installed at the well site is incorporated into the road design.

4.1.7 Visual Amenity

The wellsite is fully fenced. Remedial screening will be undertaken following the 2nd drilling campaign in accordance with the requirements of the landholder and Moyne Shire council under the planning permit.

4.2 Biological Environment

The wellsite is located within agricultural (pastoral) lands which were extensively cleared for grazing and dairy farming purposes and have since been cleared for project activities (e.g., site preparation and drilling). Native vegetation and fauna habitat is largely restricted to linear remnants along roadsides, small patches on private land, and is associated with water bodies. As such, the ecological value of the wellsite is very low. The BICP, located approximately 200 m from the wellsite, has significant ecological value.

The flora and fauna habitats and species that may be present at the wellsite are described below [4]. Biosis obtained information about flora and fauna within 5 km of the wellsite from the following databases:

- Victorian Biodiversity Atlas.
- Victorian Flora Information System.
- DSE (now DELWP) Victorian Aquatic Fauna database (2009 version).
- Birds Australia database.
- DoE EPBC Act database.

Other sources of biodiversity information included: DSE (now DELWP) Biosites register, DSE (now DELWP) Biodiversity Interactive map 3.0, Conservation Status of Australian Fishes, and A Census of the Vascular Plants of Victoria.

4.2.1 Flora

4.2.1.1 Vegetation communities

Modelling undertaken by the DSE (now DELWP) of pre-1750 vegetation indicates the wellsite and immediate surrounds 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. The DSE 2005 EVC vegetation mapping indicated that almost all of the wellsite and immediate surrounds no longer supports an EVC although two small patches of Damp Heathland and Damp Heathy Woodland are mapped to the east of Baileys Road [4].

The flora and fauna assessments undertaken by Biosis recorded a total of 61 indigenous and 41 introduced plant species and concluded that the wellsite and immediate surrounds, outside of the sinkholes, no longer supports any EVCs [11, 4].

The predominantly introduced vegetation at the wellsite and immediate surrounds consists of a suite of grasses including perennial rye-grass (*Lolium perenne*), meadow fox-tail (*Alopecurus pratensis*), sweet vernal-grass (*Anthoxanthum odoratum*), cocksfoot (*Dactyleviewmiata*), sea barley-grass (*Hordeum murinum)* and

herbs such as subterranean clover (*Trifolium subterraneum*), cape weed (*Arctotheca calendula*) and sheep sorrel (*Acetosella vulgaris*) [4, 11].

An aquatic assemblage of introduced and indigenous flora species is present in the basins of some of the larger sinkholes where water is retained for long periods, possibly permanently in some cases. A few stunted manna gum (*Eucalyptus viminalis*) and messmate stringybark (*Eucalyptus obliquea*) are also present in some of the dry sinkholes. However, there are no sinkholes in close proximity to the wellsite.

In most wet basins the vegetation has been heavily grazed by stock making it difficult to determine the full species composition and therefore the EVC it may represent. However, Biosis [1] concluded that it is likely that the wetland vegetation is Sedge Wetland/Calcareous Wet Herbland EVC as the most common feature of the more permanent basins were floating club-rush (*Isolepis fluitans)*, water ribbons (*Triglochin procera)* and swamp crassula (*Crassula helmsii)*. Introduced species are also very common in particular manna grass (*Glycer22eview22miata)* and water buttons (*Cotula coronopifolia)*. No sinkholes where water is retained for long periods have been or will be disturbed by the Project activities.

4.2.1.2 Rare or threatened flora

The Department of Environment (DoE) EPBC Act Protected Matters online database predicts the occurrence of, or suitable habitat for, species of national significance. A search of the DoE Protected Matters database identified eight flora species of national significance within 5 km of the wellsite. These include the maroon leek-orchid (*Prasophyllum frenchii*), clover glycine (*Glycine latrobeana*), Dense leek-orchid (*Prasophyllum spicatum*) and the short spider-orchid (*Caladenia brachyscapa*), now believed to be extinct. The metallic sun-orchid (*Thelymitra epipactoides*) has been recorded within 1 km of the wellsite and Tufted Grass-tree (*Xanthorrhoeviewmicosa*) is present within Baileys Road reserve.

The DSE's Flora Information System contains records of 281 flora species within 5 km of the wellsite, including those already identified species of national significance and an additional five species of state significance including the rare slender pink-fingers (*Caladenia vulgaris*), and coast twin-leaf (*Zygophyllum billardierei*). No flora species of state or national significance were recorded at the wellsite by Biosis [11, 4], 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 5 km of wellsite in November 2013 [12]. 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 wellsite.

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

4.2.2 Fauna

4.2.2.1 Regional fauna habitats

The terrestrial habitat within the wellsite and immediate surrounds is dominated by introduced pasture/grassland. Due to their highly modified nature, introduced grassland provides few resources for

native fauna and therefore contains relatively few species. Ground-foraging birds such as Australian magpie (*Gymnorhina tibicen*), magpie-lark (*Grallina cyanoleuca*) and corellas use the grassland areas for feeding. Other woodland birds such as eastern rosella (*Platycercus eximius*) are also likely to forage on seeding grasses and herbs within grassland. Due to the lack of suitable cover, exotic grasslands generally provide poor habitat for native mammals, reptiles and frogs.

A small ephemeral wetland located approximately 50 m east of wellsite, and the numerous sinkholes in the nearby area provide additional habitat for native fauna [4].

4.2.2.2 Conservation significant fauna

Five species of state and national significance were recorded during the November 2009 survey within or immediately adjacent to the wellsite. These species were:

1. Orange-bellied parrot, *Neophema chrysogaster* (EPBC Act/FFG Act listed). The orange-bellied Parrot is distributed in Tasmania (breeding) and southern mainland Australia (non-breeding overwintering population). On mainland Australia the species is usually found within 3 km of the coast and inhabits a variety of coastal habitats. Preferred foraging habitat is Coastal Saltmarsh, however they forage amongst seeding grasses and have been observed on open grassy areas near saltmarsh. This species can make significant use of altered habitats such as pasture. This species was recorded within the BICP in 2002. The species was recorded feeding on grasses and weeds within the BICP, adjacent farmland and roadsides near the wellsite during targeted surveys undertaken by Birds Australia in 2002. The orange-bellied Parrot is 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.

2. Southern bent-wing bat, *Miniopteris schreibersii bassanii* (EPBC Act/FFG Act listed). The Southern bent-wing bat is a cave dwelling insectivorous bat. Between March and April the species migrates to overwintering sites throughout south-western Victoria, including crevices in coastal cliffs. Foraging is likely to occur throughout the project area but will be focused on patches of treed vegetation during this time. This species was detected using an AnaBatTM bat detector during the November 2009 survey [11], including at one location along Baileys Road. The maternity cave near Warrnambool is located approximately 20 km northwest of the wellsite and crevices in coastal cliffs along the BICP provide roosting habitat for this species.

3. Brown quail, *Coturnix ypsilophora* (DELWP Advisory List near threatened – State significant). The brown quail inhabits a wide variety of grasslands and shrubland, preferably with tall, rank ground vegetation. When flushed this species explodes noisily from the ground with a distinctive metallic whirring and plunges rapidly into cover, headfirst. This species was recorded during the November 2009 assessment in rank grasses at the edge of BICP. Areas with rank vegetation, particularly adjacent to BICP, provide suitable habitat for this species.

4. Baillon's crake, *Porzana pusilla* (FFG Act listed, DELWP Advisory List vulnerable – State significant). Baillon's crake inhabits vegetated permanent and ephemeral wetlands with dense cover of emergent vegetation and often with abundant floating vegetation. They are often located foraging at the margins of wetlands, gleaning amongst aquatic vegetation for invertebrates and seeds. The species breeds in clumps of vegetation and tussocks at the edges of wetlands. This species was recorded foraging at the

margins of the wetland located northeast of the wellsite and immediately adjacent to Baileys Road. The species is likely to occur at wetlands that provide dense cover of emergent vegetation.

5. Hardhead, *Aythya australis* (DELWP List vulnerable – State significant) - the hardhead is almost entirely aquatic, inhabiting large deep freshwater wetlands with abundant aquatic vegetation frequenting open water where emergent vegetation is present. This species has previously been recorded in wetlands within the BICP in 2002 [4]. It is likely that this species utilises larger wetlands within the surrounding area on occasion, particularly the large wetland located to the east of Baileys Road.

The growling grass frog (*Litoria raniformis*) inhabits shallow water bodies with fringing vegetation and moderate amounts of floating vegetation. Males call from October to March each year. The greatest predictor of the occurrence of this species is the occurrence of a known population within 2 km, as the species rapidly colonises new wetlands. 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 during the current assessment 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 wellsite. There is potential that the southern toadlet (*Pseudophryne semimarmorata*) may also be present in the vicinity of the surrounding area, although this species was not found during field surveys of the area. The southern toadlet is listed as vulnerable on the Advisory List of Threatened Vertebrate Fauna in Victoria 2007.

In addition to the 2009 and 2011 report, Biosis undertook an updated desktop review of flora and fauna within 5 km of the wellsite in November 2013 [12]. There are 56 species of state and national significance that appear on database records within 5 km of the wellsite.

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 discolour*) 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 [11] identified that there was no suitable habitat for the species to occur in. The PMST also 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.

4.2.2.3 Migratory species

The list of migratory species under the EPBC Act is a compilation of species listed under four international conventions: China-Australia Migratory Bird Agreement (CAMBA), Japan-Australia Migratory Bird Agreement (JAMBA), Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA) and the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention). Eight EPBC Act listed migratory species have been recorded within 5 km of the wellsite [4].

Biosis [4] concluded that the wellsite or immediate surrounds does not provide ecologically significant habitat for supporting any of these species.

4.2.3 Weeds

Under the Victorian CALP Act, certain plants are declared as noxious weeds in Victoria. Weeds listed under this Act are classified as state prohibited weeds, regionally prohibited weeds, regionally controlled weeds or restricted weeds.

The Glenelg-Hopkins Catchment Management Region, which encompasses the wellsite, contains 13 regionally controlled weeds. Regionally controlled weeds are usually widespread and considered important in a particular region, with continuing control measures required to stop their spread.

The regionally controlled weeds recorded within the vicinity adjacent to the wellsite include the spear thistle (*Cirsium vulgare*), hemlock (*Conium maculatum*) and hawthorn (*Crataegus monogyna*). Additionally, Moyne Shire Council lists 38 common environmental weed species that occur in the local government area. Furthermore, 103 major environmental weeds are listed as occurring in the BICP or Port Campbell National Park [13].

Biosis was commissioned in 2016 to undertake a weed assessment along the HBWS pipeline route right of way prior to clearing works being undertaken to assess the presence of noxious and environmental weeds and determine the distribution of the weeds in the land adjoining or adjacent to the right of way. Twenty weed species were recorded within the study area, 10 of which are noxious (five regionally controlled and five regionally restricted) and nine are environmental weeds. Spear Thistle (*Cirsium vulgare*) and Slender Thistle (*Carduous pycnocephalus*) were the most common and widespread species and present in varying levels of infestation throughout the study area. Blackberry *Rubus fruiticosus* spp. was also common but within the private properties only occurred as single small and isolated clumps. The Blackberry species name can cover up to 15 species of Blackberry found in Australia. Weed infestations were generally higher within road reserves where a wider suite of species was also present. Overall the study area has a low level of weed infestation and none of the weed species recorded are likely pose a threat to either the private land or adjacent public lands. The facility and access roads are fully established, and vehicles will remain on designated roads.

4.2.4 Diseases

One consideration for the wellsite is the potential presence of diseases and viruses in agricultural livestock which may need temporary relocation. Two main dairy livestock diseases which may be present in the Otway area are ketosis (or acetonaemia) and Bovine Johne's disease. Neither of these diseases is known to occur in livestock within the immediate area surrounding the wellsite. As the wellsite is restricted to one property, the potential for transmission of these diseases between properties as a result of activities associated with the project is considered to be negligible.

4.2.5 Phytophthora Cinnamomi (Cinnamon Fungus)

Phytophthora (*Phytophthora cinnamomi*) is an introduced water mould that attacks the root systems of susceptible native plants thereby threatening plant species, the ecosystems in which it occurs, and subsequently the animals that depend on vegetation for food, shelter, and nesting [14]. The major mechanisms in which Phytophthora is dispersed by anthropogenic means include the transfer of infected plants or contaminated soils. Given that the construction phase of the project has been completed, the potential exposure pathway for the dispersal of Phytophthora is considered to be negligible.

4.3 Socio-Economic Environment

The regional economy of 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.

4.3.1 Primary Industry

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

The wellsite is fully fenced and no access to the site is required across farmland that requires the opening or closing of farm gates.

4.3.2 Tourism and recreation

The wellsite is located within the Great Ocean Road campaign region as defined by Tourism Victoria and the Shipwreck Coast area, and comprises the Corangamite, Moyne and Warrnambool municipalities. 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.

Domestic overnight visitation in Victoria peaks during summer. In 2012 it was estimated that approximately 2.5 million domestic and 1.5 million international tourists stayed overnight along the Great Ocean Road, with a further 5.5 million day-visitors to the Great Ocean Road in the year ending June 2012.

The wellsite boundary fence is located on privately owned farmland approximately 200 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. There may be irregular vehicle movements (e.g. cars or tractors) up and down Baileys Road by farmers accessing their properties. The vast majority of tourist and visitor activity occurs in the coastal areas to the west (Warrnambool) and east (Peterborough/Port Campbell) of the wellsite, falling within the BICP.

4.3.3 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).

4.3.4 Aboriginal Cultural Heritage

The Eastern Maar Aboriginal Corporation (EMAC) are the Recognised Aboriginal Party (RAP) across Beach operational permits in the Otway region. In accordance with the *Aboriginal Heritage Act, 2006* RAPs are the primary guardians, keepers and knowledge holders of Aboriginal cultural heritage. The Eastern Maar People also hold a native title claim registered over the project area and broader region (Eastern Maar People VC2012/001) (See FigureFigure 4).

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 cultural heritage sites directly on the facility or temporary camp area. All operational activities will be restricted to the facility and temporary camp area.

4.3.5 Areas of conservation, tourism and recreational value

The BICP is located approximately 160 m south of the wellsite. The area of the BICP adjacent to the wellsite 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 is assigned the World Conservation Union (International Union for Conservation of Nature (IUCN)) Category III (Natural Monuments), which are managed for the protection of the outstanding natural features and appropriate recreation, education and research [15]. Together with the Port Campbell National Park, the BICP is managed under the 'Port Campbell National Park and Bay of Islands Coastal Park Management Plan' [15], which is administered by Parks Victoria. The strategic goal of the Parks' Management Plan is to protect significant flora, fauna and other natural and cultural features.

The proposed operational activities are not expected to disturb the BICP.

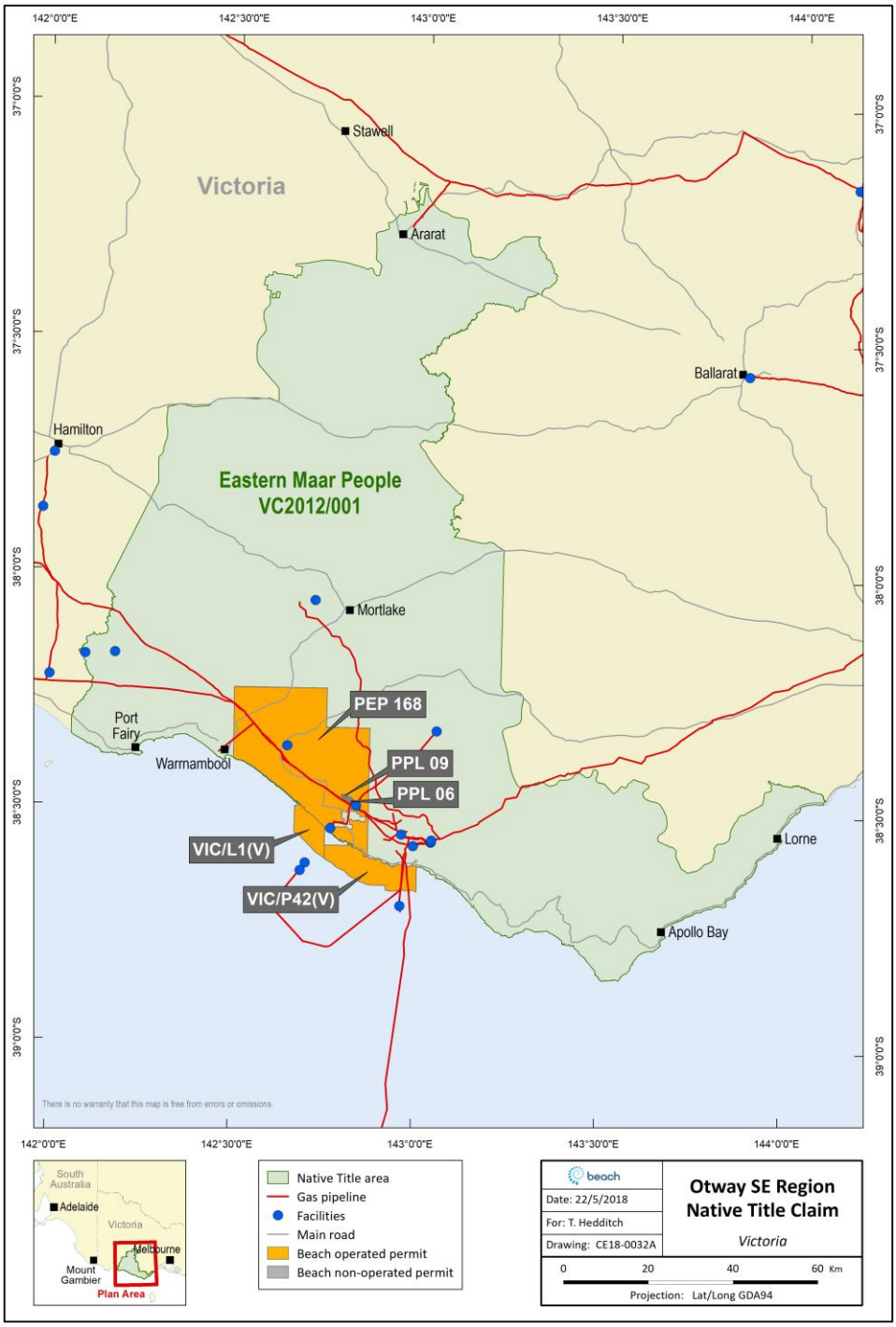

Figure 4: Otway SE Region Native Title Claim

5 Environmental impacts, risks and controls

An analysis of environmental hazards and risks has been conducted for the operation of the HBWS gas fields and wellsite. Its purpose was to:

- Identify and assess potential hazards to the environment during operations.
- Undertake a scenario-based risk assessment.
- Identify and rank hazards and determine appropriate risk reduction measures.

5.1 Risk assessment methodology

Regulation 15(3) of the OPGGS Regulations requires that the EP includes an evaluation of the environmental impacts and risks for the activity.

5.1.1 Environmental hazard identification

The Beach Energy Health Safety and Environment Management System requires that risk is managed in accordance with its Standard 7 Hazard and Risk Management and its Risk Management Directive. The Beach Risk Management Directive is based on the *Australian Standard AS/NZS ISO 31000:2009: Risk management – Principles and guidelines* and requires that risk is managed in accordance with the framework shown in Figure 5 below.

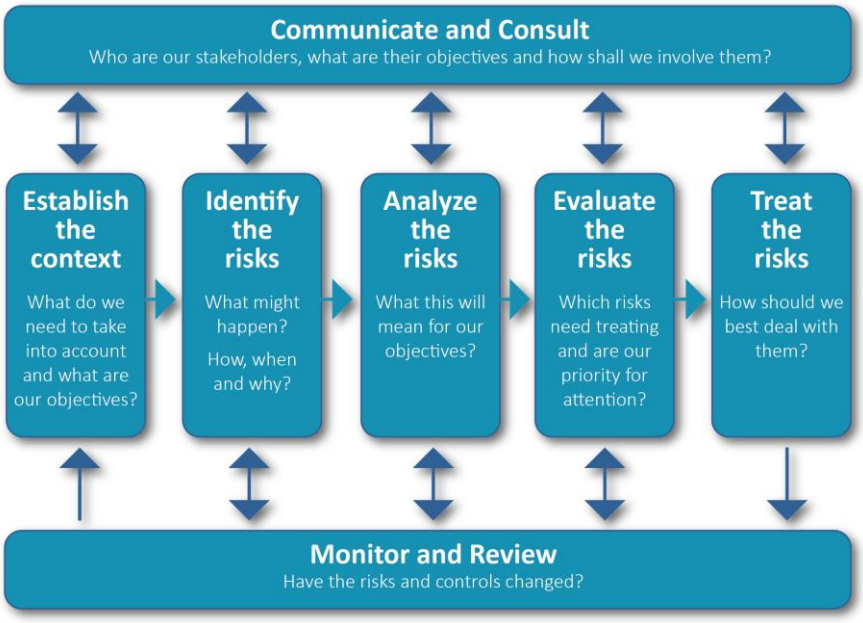

Figure 5: Hazard Identification and Risk Assessment Process

The Beach Corporate Risk Matrix and Likelihood Rating Table (refer Figure 7) is an important element of Beach's Risk toolkit and provides the framework for comprehensive assessment of any and all risk to the business. Coverage includes risks associated with operations that have the potential to pose injury or

damage to the environment, to any community, person, land user, land or property in the vicinity of the operation.

Hazards at the HBWS well site have been assessed to have a low or medium risk to the environment, community, people, land, land users and property with risk controls in place and have been reduced to ALARP with acceptable risk to the environment from the activity. The ALARP process is ongoing and assessment of and implementation of new controls is integral to Beach's risk management process.

Beach undertaken an annual review of the environmental risk assessment (ERA) for the project. This was undertaken was conducted in February 2019 and again in March 2020 to review the environmental risks associated with the operation of the HBWS gas fields and wellsite. Controls were identified to reduce risks to the environment to As Low As Reasonably Practicable (ALARP). Reviews are undertaken by representatives from Beach HSE and Operations.

Section 5.2 presents the outcomes of the ERA for the operation of the HBWS gas fields and wellsite. The consequence and probability/likelihood rankings are interpreted from the risk matrices provided in Figure 6.

5.1.2 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 8 for the Consequence Categories featured in the 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 event occurring (see the top of Figure 9 for Likelihood Rating Table featured in the 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 Risk Matrix).

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

CDN 14740489 Risk Rating Toolkit Matrix

Risk Matrix

CONSEQUENCE CATEGORY

CONSEQUENCE	PEOPLE	ENVIRONMENT	REPUTATION	FINANCIAL	LEGAL
	Impact to Beach or contracting personnel	Natural environment	Community safety, reputation/social licence. media, items of cultural significance.	Financial impact (e.g. due to loss of revenue, business interruption, asset loss etc.)	E.G. Breach of law, prosecution, civil action
6 Catastrophic	Multiple fatalities >4 or severe irreversible disability to large group of people (>10)	Catastrophic offsite or onsite release or spill; long-term destruction of highly significant ecosystems; significant effects on endangered species or habitats; irreversible or very long-term impact	Multiple community fatalities; complete loss of social licence; prolonged negative national media; complete loss of items of cultural significance	> AUD$500m	Prolonged and complex civil and/or regulatory litigation; potential jail terms and/or very high fines and/or damages claim
5 Critical	1-3 fatalities or serious irreversible disability (>30%) to multiple persons (<10)	Significant offsite or onsite release or spill; eradication or impairment of the ecosystem; significant impact on highly valued species or habitats; widespread long-term impact	Community fatality; significant loss of social licence; negative national media for 2 or more days; significant damage to items of cultural significance	>AUD$100m & ≤ $500m	Civil and/or regulatory litigation; potential significant fines and/or damages claim
4 Major	Serious permanent injury/ illness or moderate irreversible disability (<30%) to one or more persons	Major Offsite or onsite release or spill; very serious environmental effects, such as displacement of species and partial impairment of ecosystem; major impact on highly valued species or habitats; widespread medium and some long-term impact	Serious permanent injury to community member; major damage to social licence; negative national media; major damage to items of cultural significance	>AUD$10m & ≤ $100m	Civil and/or regulatory litigation; potential major fine and damages claim
3 Serious	Serious reversible/ temporary injury/illness; Lost Time Injury >5 days or Alternate/Restricted Duties > 1 month	Minor offsite or onsite release or spill; serious short-term effect to ecosystem functions; serious impact on valued species or habitats; moderate effects on biological or physical environment	Serious reversible injury to community member; serious damage to social licence; negative state media; serious damage to items of cultural significance	>AUD$1m & ≤$10m	Serious potential breach of law; report and investigation by regulator; possible prosecution or regulatory notice (e.g. improvement notice or equivalent), or possible civil litigation and serious damages claim
2 Moderate	Reversible temporary injury/ illness requiring Medical Treatment; Lost Time Injury ≤5 days or Alternate/Restricted Duties for ≤ 1 month	Event contained within site; short-term effects but not affecting ecosystem functions; some impact on valued species or habitats; minor short-term damage to biological and/or physical environment	Moderate injury to community member; moderate impact to social licence; negative local media; moderate damage to items of cultural significance	>AUD$100,000 & ≤ $1m	Potential Breach of law or non-compliance; inquiry by a regulator leading to Low-level legal issues; possible civil litigation and moderate damages claim
1 Minor	First Aid Injury/illness	Spill limited to release location; minor effects but not affecting ecosystem functions; no impact on valued species or habitats; low-level impacts on biological and physical environment	Minor injury to community member, public concern restricted to local complaints, minor damage to items of cultural significance	≤AUD$100,000	Minor potential breach of law; not reportable to a regulator; on the spot fine or technical non-compliance

CONSEQUENCE	1 Remote	2 Highly Unlikely	3 Unlikely	4 Possible	5 Likely	6 Almost Certain
	LIKELIHOOD					
	<1% chance of occurring within the next year. Requires exceptional circumstances, unlikely event in the long-term future. Only occur as a 100-year event	>1% chance of occurring within the next year. May occur but not anticipated. Could occur years to decades	>5% chance of occurring within the next year. May occur but not for a while. Could occur within a few years	>10% chance of occurring within the next year. May occur shortly but a distinct probability it won't. Could occur within months to years	>50% chance of occurring within the next year. Balance of probability will occur. Could occur within weeks to months	99% chance of occurring within the next year. Impact is occurring now. Could occur within days to weeks
6 Catastrophic	HIGH	HIGH	SEVERE	SEVERE	EXTREME	EXTREME
5 Critical	MEDIUM	MEDIUM	HIGH	SEVERE	SEVERE	EXTREME
4 Major	MEDIUM	MEDIUM	MEDIUM	HIGH	SEVERE	SEVERE
3 Serious	LOW	MEDIUM	MEDIUM	MEDIUM	HIGH	SEVERE
2 Moderate	LOW	LOW	MEDIUM	MEDIUM	MEDIUM	HIGH
1 Minor	LOW	LOW	LOW	MEDIUM	MEDIUM	MEDIUM

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Figure 6: Risk Matrix and Likelihood Categories

5.1.3 Demonstration of ALARP

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 discernible 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 Energy 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.

For medium and higher risks, and low risks with serious consequences, Beach requires a minimum of three controls before reviewing the hazard for acceptability and ALARP.

All hazards described in this EMP 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 the risk to the environment from the activity is also considered to be acceptable.

A risk is considered to be reduced to ALARP when the following criteria are met:

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

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.

5.2 Environmental risk register

This EP summary details the impacts and risks to the offshore environment from the production activity at the HBWS well site. As described previously, there is no interaction with the marine environment as the production well bores are located at least 600m below the sea floor; 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 are relevant to this EP Summary are listed in Table 3, detailed in Table 4 and discussed in Section 5.3.

Table 3: List of Environmental Risks

ID	Risk
R1	Wellsite operations cause disturbance to fauna (lighting)
R2	Wellsite operations cause disturbance to Bay of Islands Coastal Park
R3	Gaseous and liquid hydrocarbon discharge (loss of well control during normal operations) to soil or atmosphere
R4	Emergency event (fire)

Table 4: Environmental risk register

Risk ID	Risk	Causes	Consequences	Management Controls	Consequence	Likelihood	Level of Risk
R1	Wellsite operations cause disturbance to fauna (lighting).	Light emissions from fixed lighting sources.	Attraction of fauna to lighting resulting in potential for injury.	External lighting will be limited to that required for safe operations. Operator status switch on LER which turns off all the lights and advises OGP that Operator has left the site. If lighting is left on once Operations leave the site, an alarm sounds in the OGP CCR External lighting has been designed and selected in accordance with the following to ensure it is limited to that required for safe operations: • The OGP Onshore Electrical Design Philosophy (S4470RE146530.1.IFI); • The OGP Lighting System Calculation (S4470RE166083.0.IFI); and AS 4282 Obtrusive Effects of Outdoor Lighting.	1 - Minor	2 - Highly Unlikely	Low
R2	Wellsite operations cause disturbance to BICP.	Unauthorised vehicle/personnel access to the BICP from the wellsite. Disturbance/ trampling of vegetation adjacent to BICP or localized disturbance to flora and fauna.	Damage to BICP.	• All work to occur within clearly defined/fenced wellsite. • Employee movements will be restricted to the approved wellsite. • No parking of vehicles will be permitted off the site on surrounding road reserves. • No vehicle or personnel access within the BICP. • Site induction will specify areas of restricted access.	1 - Minor	2 - Highly Unlikely	Low

Risk ID	Risk	Causes	Consequences	Management Controls	Consequence	Likelihood	Level of Risk
R3	Gaseous and liquid hydrocarbon discharge (loss of well control during normal operations) to soil or atmosphere.	Well blowout during normal operations.	Localised soil contamination. Emission of greenhouse gases. Vegetation decline or death. Explosion and fire if ignited. Groundwater and/or surface water contamination. Ground disturbance for spill remediation. Potential escalation to bushfire.	• Beach Well Engineering & Construction Management System (WECS), Beach Well Operations Management Plan (WOMP). • Failed Closed Hydraulic actuated SSSV, PMV, PWV. • Beach Energy's Otway ERP. • ER exercises with employees will be undertaken to ensure employees are adequately trained in well control response. • Routine critical function & leak of testing of XMAS tree valves • The Drainage Management Plan (CDN/ID 18681501) demonstrates controls for spill containment on site.	3 - Serious	1 - Remote	Low
R4	Emergency event - fire	Equipment failure Loss of containment Cigarette ignition of flammable materials Lack of housekeeping- poor storage of flammable materials	Loss of property Loss of containment Serious injury Escalation to bushfire	• Maintenance of pre-existing firebreak zone around the flare pit. • Facility prepared to ensure that all sources of ignition, including vehicles and engines, chemicals and hot work are located within prepared hard stand areas with no flammable vegetation. • Fire Permit in place as required for site activities.	3 - Major	2 - Highly Unlikely	Medium

5.3 Environmental risk and impact assessment and demonstration of ALARP

This section describes the environmental risks, control measures and demonstration of ALARP for each of the potential hazards to the marine and coastal environment identified for the activities to be undertaken during the operation of the HBWS gas fields and wellsite.

This section outlines:

- A brief description of the hazards.
- The potential impact on the environment.
- A description of the controls in place to eliminate the risk where possible or reduce the risk of these events occurring to as low as reasonably practicable (ALARP).
- A demonstration of ALARP; this outlines any other measures that were considered, or actions taken to reduce the risks to ALARP.

The four risks (R1 to R4) identified have been assessed.

There are no risks to the marine environment identified as production from the gas reservoir is via the well bore which is located between approximately 600-2,000 below the seabed for each of the producing wells. There are no other facilities within the offshore marine environment associated with the production activity.

5.3.1 Wellsite operations cause disturbance to fauna (lighting) (R1)

5.3.1.1 Hazard

Wellsite lighting has the potential to disrupt or disorientate fauna. Fauna may also be attracted to lighting leading to a potential for injury.

5.3.1.2 Impact Assessment

Site lighting is confined to the LER, amenities building and process modules. The site perimeter and access gates are not equipped with lighting. Illumination of the access road and front gate is via vehicle head and taillights. As described, the only light fitting that is normally on during the night is that of the safety shower.

External site lighting is controlled remotely from the OGP process control system and is normally switched off. Lighting is switched on/off manually by onsite personnel as required via a pushbutton (or Operator status switch) on front of the light and power panel board (located inside the LER). The Operator status switch turns off all the lights and advises the OGP that the Operator has left the site.

The closest maternity roost for the Southern bent-wing bat is 20 km from the project area and the closest known overwintering cave is approximately 74 km from the site (Cape Otway); therefore, impacts on large numbers of roosting Southern bent-wing bats is not expected from operations.

The environmental risk of well site disturbance causing a disturbance to fauna (lighting) has been assessed as low based on a consequence of minor and a likelihood of highly unlikely.

5.3.1.3 Controls

- External lighting will be limited to that required for safe operations.
- Operator status switch on LER which turns off all the lights and advises OGP that Operator has left the site. If lighting is not turned off, an alarm sounds at the OGP CCR.

5.3.1.4 Risk Ranking

Consequence	Likelihood	Level of Risk
1	2	Low

5.3.1.5 Demonstration of ALARP

Elimination of lighting all together is not practical as standards apply for the minimum levels of lighting required to ensure a safe work environment.

Site preparation and drilling activities conducted at the wellsite, to date, did not appear to significantly disrupt or disorientate fauna due to lighting.

Given that there are no routine or planned activities occurring at night and lighting is limited to that required for safe operations, impacts to fauna as a result of lighting as expected to be low. There are no further controls identified to reduce light emissions. On this basis, Beach Energy considers the risk to be ALARP.

5.3.2 Wellsite operations cause disturbance to Bay of Islands Coastal Park (R2)

5.3.2.1 Hazard

No disturbance to the Bay of Islands Coastal Park (BICP) is intended as part of operational activities. This risk relates to unauthorised vehicle or personnel access to the BICP, which may result in:

- Disturbance/trampling to vegetation adjacent to the BICP; or
- Localized disturbance to flora and fauna.

5.3.2.2 Impact Assessment

The BICP is located approximately 150m-200 m south of the wellsite. Agricultural land users border the park on the landward side.

No work is required in the BICP as part of operational activities, including no access to BICP by vehicles relating to operations, and no clearance of vegetation within the BICP. Operations will not restrict public access to the BICP.

Vehicle and employee movements are restricted to the approved wellsite. Given that there is no unauthorised access outside the fenced wellsite area, impacts to the BICP are considered negligible.

The environmental risk of well site operations causing disturbance to Bay of Islands Coastal Park has been assessed as low based on a consequence of minor and a likelihood of highly unlikely.

5.3.2.3 Controls

- All work to occur within clearly defined/fenced wellsite. Employee movements are restricted to the approved wellsite.
- Parking of vehicles is allowed in designated parking areas within the well site, or in the designated parking area immediately outside wellsite fence line. No parking of vehicles is permitted on surrounding road reserves.
- No vehicle or personnel access within the BICP.
- Site induction specifies areas of restricted access.

5.3.2.4 Risk Ranking

Consequence	Likelihood	Level of Risk
1	2	Low

5.3.2.5 Demonstration of ALARP

While the BICP has significant ecological value, all operational activities will be contained within the fenced wellsite area, therefore the risk to BICP is very low. There are no further controls identified to reduce the risk of unauthorised vehicle or personnel access to the BICP. On this basis, Beach Energy considers the risk to be ALARP.

5.3.3 Gaseous and liquid hydrocarbon discharge (loss of well control during normal operations) to soil or atmosphere (R3)

5.3.3.1 Hazard

A release of gaseous or liquid hydrocarbon from a loss of well control event may develop during normal operations due to a well blowout. Loss of hydrocarbons to the environment can lead to soil contamination, surface water/groundwater contamination, impacts to landowners and impacts on flora and fauna.

5.3.3.2 Impact Assessment

A loss of containment event from a well/flowline blowout may result in a release of both hydrocarbon gas and liquids into the environment. Hydrocarbon gas released into the environment contributes to greenhouse gases and air pollution and may lead to an explosion/fire if ignited. Hydrocarbon liquids released into the environment can lead to contamination of the soil, surface water and groundwater and impacts to flora and fauna.

The environmental risk of a loss of containment from a well blowout has been assessed as low based on a consequence of serious and a likelihood of remote.

5.3.3.3 Controls

Engineered controls

The wellheads are each fitted with a tubing retrievable sub surface safety valve (TRSSSV), a production master valve (PMV) and production wing valve (PWV). All valves are fail-safe (fail closed). Well design is in accordance with the Beach Well Engineering & Construction Management System (WECS)

Procedural controls

Procedural controls are in place to prevent uncontrolled activities from occurring at the wellsite. This includes the implementation of Beach Energy's Well Operations Management Plan which also details maintenance and operational testing requirements.

Any well work activities will be undertaken in accordance with the accepted WOMP for the activity.

Emergency response

The OGP ERP will be activated when required, which includes bringing the wellsite into a safe state where possible. Emergency response exercises with employees will also be undertaken to ensure employees are adequately competent & trained in well control response.

5.3.3.4 Risk Ranking

Consequence	Likelihood	Level of Risk
3	1	Low

5.3.3.5 Demonstration of ALARP

In the unlikely event of a well blowout, the Otway ERP would be activated, and the impacts minimised.

No additional controls were identified in minimising the environmental impact from a loss of well control event due to a well blowout. On this basis, Beach Energy considers the risk to be ALARP.

5.3.4 Emergency Event (fire) (R4)

5.3.4.1 Hazard

There is an increased risk of bushfire at the site arising from activity at the site and the occasional temporary storage of flammable liquids.

5.3.4.2 Impact Assessment

The facility is located on a cleared hardstand lease area, the immediate surrounding landscape is a grassed paddock however, the facility is approximately 160m from the BICP, which is vegetated by shrub and heath.

The environmental risk of an emergency event (fire) has been assessed as medium based on a consequence of serious and a likelihood of highly unlikely.

5.3.4.3 Controls

The facility and associated temporary accommodation camp have been prepared to ensure that all sources of ignition, including vehicle, engines, chemicals and hot work are located within prepared hard stand areas with no remnant vegetation.

At the well site a section of vegetation has been cleared as appropriate for a firebreak zone around the flare pit and a soil embankment has been built up around the flare pit to provide additional protection to the surrounding environment. Maintenance of the firebreak will be undertaken during drilling activities.

The Fire Risk Management Plan developed for the site will be reviewed an updated as required for activities being undertaken at the site and approved by the CFA to minimise the risk of a bushfire and to ensure adequate emergency response is in place in such an event. Potential controls are:

- Hot work permits for all hot work activities and undertaking of PTW audits to confirm compliance;
- Fire extinguishers located as appropriate
- Designated fuel and chemical storage areas as required for operations
- Electrical equipment certification and hazardous area certification
- Fire prevention and firefighting response equipment is organised and checked prior to use for drilling
- Training of workforce in the use of firefighting equipment, and familiarity with the equipment
- All machinery shall be maintained and operated to comply with fire safety standards
- All personnel shall be inducted on the smoking policy and the dangers of inappropriate cigarette disposal - smoking will only be permitted in designated areas

5.3.4.4 Risk Ranking

Consequence	Likelihood	Level of Risk
3	2	Medium

5.3.4.5 Demonstration of ALARP

The residual risk of fire as a result of the project activities is medium. The controls and mitigations outlined above demonstrate that the residual risk of fire is ALARP and is considered acceptable.

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. Table 5 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 **Error! Reference source not found.**. For each objective a standard has been developed in conjunction with measurement criteria.

Table 5: Environmental performance objectives, standards and measurement criteria

Risk ID	Risk	Environmental Performance Objective	Environmental Performance Standard	Measurement Criteria
R1	Wellsite operations cause disturbance to fauna (lighting).	No impacts to fauna or fauna habitat due to lighting.	The requirement to report fauna congregations due to lighting are included in the induction	CMO reports of fauna congregations are investigated and the requirement for any additional mitigation controls is assessed.
		Operator status switch on LER is working effectively.	Wellsite personnel switch off the Operator status switch (located within LER) before leaving the site (Alarms if left on).	Event log records show that lights have been turned off (Can be done from OGP CCR)
R2	Wellsite operations cause disturbance to BICP.	No unauthorised vehicle access to the BICP from the wellsite.	Requirement is included in the site induction	CMO reports show that no environmental incidents have occurred involving unauthorised access to the BICP.
R3	Gaseous and liquid hydrocarbon discharge (loss of well control during normal operations) to soil or atmosphere.	Minimise gaseous/liquid hydrocarbon release into the environment from a loss of well control during normal operations.	Requirement to report all hydrocarbon releases is included in the induction	CMO reports show that there has been no release of gaseous/liquid hydrocarbons into the environment from a loss of well control during normal operations.
			Well design and operation is in accordance with Beach Energy Well Engineering & Construction Management Systems (WECS). Well control procedures, including Beach Energy's Well Control Standard and Well Integrity standard procedures, are in place to respond to a hydrocarbon release.	Accepted WOMP for the activity
		Mitigate impacts of a gaseous/liquid hydrocarbon release into the environment from a loss of well control during normal operations.	Otway ERP in place to respond to a gaseous/liquid hydrocarbon discharge from a loss of well control during normal operations. The ERP is resourced, accessible, current, and clearly communicated.	If an incident occurs, the emergency response log of events demonstrates that the ERP was followed. Emergency response exercises show the processes of the ERP have been practised, are adequate and have been undertaken according to schedule.

Risk ID	Risk	Environmental Performance Objective	Environmental Performance Standard	Measurement Criteria
			Exercises are conducted per schedule to determine the adequacy of the ERP and to ensure employees are adequately trained in well control response. Drainage management system is monitored and maintained	Inspection and maintenance records of the existing drainage management system
R4	Emergency event - fire	To prevent fires occurring as a result of activities	Maintenance of pre-existing firebreak zone around the flare pit. Regular environmental inspections are undertaken, and action is taken to address overgrowth of vegetation in areas within the facility. Any sources of ignition, including vehicles and engines, chemicals and hot work are located within prepared hard stand areas with no flammable vegetation. Fire extinguishers located at the well site Designated chemical storage areas Personnel provided with fire safety training awareness, including prevention and emergency response. Smoking will only be permitted in designated areas.	Records of maintenance of firebreak if required. Permits in place to undertake Hot Work. PMS records provide evidence of maintaining equipment efficiency Training records demonstrate competency of personnel Records of emergency response exercises undertaken and to schedule. Records of testing and review of ERP undertaken Electrical equipment certification and hazardous area certification are valid

7 Environmental Performance Monitoring

7.1 Beach Energy Health Safety and Environmental Management System and Environmental Commitment

Beach and its contractors operate under an established HSEMS to minimise and manage the impacts of activities, employees, contractors, on the environment and the communities in which the company operates. All operations at the wellsite will be undertaken in accordance with Beach Energy's values and HSEMS.

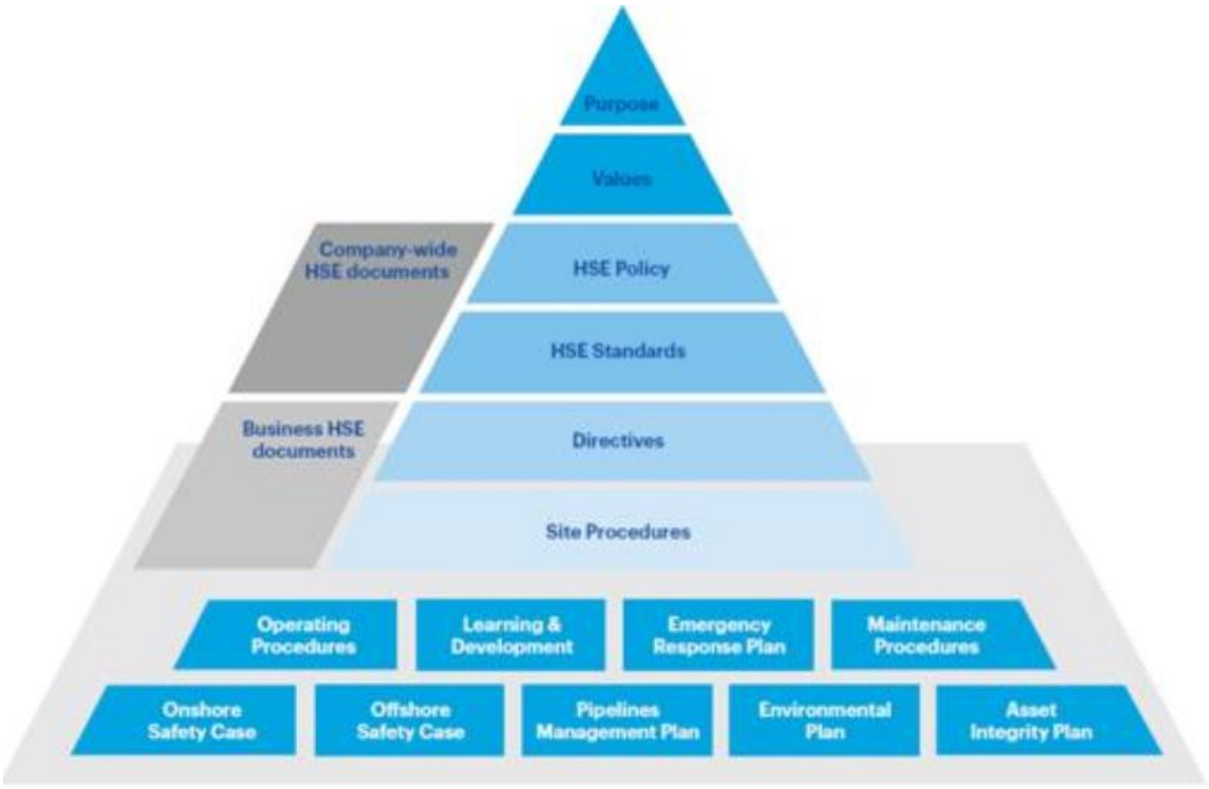

Figure 7: HSEMS Structure

The HSEMS is a key tool in the management of the Company and associated contractors' environmental responsibilities, issues and risks. This section outlines how Beach Energy's Health, Safety and Environment Management System (HSEMS) is used to avoid, reduce or mitigate the identified environmental risks and impacts.

Beach's systems ensure that:

- Roles and responsibilities for environment management are assigned and clear.
- Appropriate procedures, plans and practices are in place to minimise risk to the environment that relate to the performance standards set.
- Reviews and audits are in place to monitor that the environmental performance is adequate.
- A system is in place to monitor any discharges or emissions to the environment.

- A consultation process is in place for those impacted by the activities.
- A comprehensive Emergency Response Plan is in place that reflects the activities undertaken.

The HSEMS structure is illustrated in Figure 7, with the Beach Energy HSE Policy (refer Appendix A) near the top of the pyramid, demonstrating the company's commitment and intentions. At the second and third levels, the Beach Energy HSE standards and directives, detail corporate expectations on the implementation of the policy and HSE risk management across the Company. It provides a management framework for achieving the requirements in a systematic way but allows sufficient flexibility for the operating unit to achieve this in a manner which best suits the business, while maintaining high HSE standards.

7.2 Organisation, Accountability, Responsibility & Authority

7.2.1 Operations Procedures

The Otway Production Manager is responsible for ensuring that there are adequate plans and HSE procedures in place to address areas of HSE risk and ensure safe work practices. This requirement is to be fulfilled by the provision of comprehensive suites of:

- Standard operating procedures (SOPs) and permit to work (PTWs) covering process and equipment operations;
- Maintenance procedures covering specific maintenance related works; and
- Site HSE procedures (JHAs) that specify the method by which works will be safely and competently undertaken.

Procedures are reviewed periodically to ensure they remain suitable and to identify opportunities for improvement. Procedures are also reviewed where hazards are identified with equipment or materials proposed for purchase to ensure associated risks are controlled.

7.2.2 Training and Competency

The Otway Production Manager is responsible for ensuring that all personnel who work at the HBWS wellsite are trained and competent. Personnel who attend the HBWS wellsite ordinarily work at the OGP and are trained in accordance with Beach Energy HSEMS requirements. Personnel performing tasks that may involve environmental impacts will have the knowledge and skills necessary to perform their work in a manner consistent with company HSE policy and the requirements of HSEMS Performance Standard 5: Personnel, Competence, Training and Behaviours. All personnel, including third party service providers are required to undertake training based on the requirements identified in Position Descriptions. Accredited workplace trainers, assessors and coaches are used to develop and deliver the competence training modules, assess personnel and provide follow up coaching.

7.2.3 Site Induction

The Otway Production Manager is responsible for ensuring that all personnel who attend the wellsite have a current induction. A site induction is provided to all personnel that have not visited the wellsite before or have not been to the wellsite in more than two years. The induction includes site-specific information about environmental awareness, including how to identify the Orange-bellied Parrot / Southern Bent-Wing Bat, vehicle speed limits, no-go/restricted access zones, transport management,

cultural heritage management, reporting oil/chemical spills and locating emergency spill kits. A record is kept of all completed inductions for a minimum of 7 years.

7.3 Performance Measurement and Reporting

This section summarises the environmental reporting arrangements for production operations from the Halladale, Black Watch and Speculant gas fields. The Otway Production Manager is responsible for ensuring that all environment reporting requirements are met.

7.3.1 Incident Reporting and Recording

All environmental incidents will be reported to the Otway Production 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 operation a reportable incident is defined as any incident of consequence category 2 (moderate) or greater.

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.

7.3.2 Reporting of Reportable Incidents

Beach will notify the regulator, DJPR via their dedicated mobile number 0419 597 010, of any reportable incidents within two hours of the incident occurrence. This will either be an oral or written notification. The initial notification will include:

- All material facts and circumstances concerning the recordable incident;
- Details of actions taken to avoid or mitigate any adverse environmental impacts of the incident; and
- Details of the corrective actions taken or proposed to prevent similar recordable incidents.

The initial notification (oral or written) will be followed by a written report of the incident submitted within three business days, as required by Regulation 30 of the OPGGS Regulations.

7.3.3 Routine Reporting

Beach will submit a monthly report to DJPR by email (by the 15th day of the calendar month) detailing any recordable incidents as required by Regulation 31 of the OPGGS Regulations.

Should no recordable incidents have occurred during the calendar month, Beach will still lodge a report stating 'nil' incidents.

Beach will submit to DJPR an annual report summarising the performance against the requirements of this EP.

7.4 Monitoring and auditing

It is the responsibility of the Otway Production manager to implement ad monitoring and auditing program for the HBWS site in accordance with the commitments in this EP and the EHMS requirements.

7.4.1 Monitoring

Records of all monitoring will be generated and held for the duration of the operation. Responsibility for monitoring activities will be determined by the Otway Production Manager.

Monitoring and records that will be undertaken for the operational activities include:

- Incidents (injuries, minor spills, etc.) reportable and recordable environmental incidents
- A consultation log

As a minimum the following records and documentation will be maintained:

- OEMP and supporting documentation
- Operator wellsite checklists
- Equipment maintenance records
- Audit reports and non-conformance records
- Induction records
- Waste transfer records
- Training records
- Chemical inventory records
- SOP's, JHA's and PTW's

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

7.4.2 Site inspections

Site inspections will be undertaken during operational activities (monthly) and during well site maintenance and facilities modification activities (frequency as deemed appropriate for the nature and scale of the activity) and in accordance with HSEMS requirements.

7.4.3 Environmental performance review

Beach Energy continually reviews its environmental performance through scheduled risk reviews and regular HSE notices (used to keep all personnel involved up to date with HSE activities).

7.5 Emergency Response

The Otway Emergency Response Plan (ERP) describes the actions to be undertaken in the event of any emergency that threatens the environment in the vicinity of the wellsite operations.

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

Reporting relationships for command, control and communications are specified in the Otway ERP 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 Otway ERP 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.

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

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

8 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.

Consultation for the Halladale Black Watch and Speculant Project (HBWS) commenced in 2009, preceding the first drilling campaign undertaken by Origin Energy. Subsequent to the establishment of production wells at the site, consultation continued (from time to time) with key stakeholders including the landholder, near neighbours, LGAs, the HBWS Consultative Committee, the Otway Gas Plant consultative committee, key personnel from DJPR/ERR and the Victorian Gas Program Stakeholder Environment Panel. This included provision of information about the facilities and production from the site through to safety inductions and guided site tours.

In preparation for the recent drilling the Black Watch well, further consultation was undertaken pursuant to regulation 19 of the OPGGS Regulations, and Regulation 12 of the *Petroleum Regulations 2011,* which requires the EP to contain a report on any consultations with relevant agencies, interested people and organisations in the course of developing the EP.

Following completion of the Black Watch well, stakeholder consultation will continue in accordance with Beach's Community Strategy and routine engagement practices which will include:

- site tours for key stakeholders;
- information sheets to be sent to stakeholders and made available on Beach's website; and
- ongoing consultation through the Otway Gas Plant Community Reference Group.

8.1.1 Stakeholder Engagement Plan

Beach prepared a Stakeholder Engagement Plan (SEP) for near shore drilling projects commencing in 2019, including the Black Watch and Enterprise well construction program. The SEP set 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 included 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.

8.1.2 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 HBWS production operations identified are listed in Table 6**.**

Table 6: Stakeholder Identification

Stakeholder	Functions and Activities
Impacted stakeholders	
Landholder	Leaseholder of Beach's drill sites. Farming with residents on farm. Farming includes lease of land as out paddocks and primary farm production, farm planning and management.
Near neighbours	Farming with residents on farm. Small lifestyle allotments.
Other 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.

Stakeholder	Functions and Activities
Involved stakeholders	
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.
Moyne Shire Council	Administer local planning laws and approvals for Black Watch project.
Corangamite Shire Council	General interest in updates given close proximity to Black Watch project,
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.
Country Fire Authority	District coordinators in Warrnambool. Volunteer fire prevention and response. (Nirranda 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.
Other stakeholders	
Government / Agencies	
Department of Economic Development, Jobs, Transport and Resources (DJPR)	Victorian state economic development. Assessment agency for State waters Environment Plan. Governance of Victorian Gas Program.
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 Council (NPAC)	Legislated advisory body to the Minister for Energy, Environment and Climate Change.
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.
Community, Tourism and Recreation	
Nirranda and Districts Recreation Centre	Local sporting and community centre

Stakeholder	Functions and Activities
Nirranda 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.
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.
General community	Local residents, business owners and the like

Stakeholder	Functions and Activities
Conservation interests	
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.
Infrastructure and other proponents	
Lochard Energy	Gas plant adjacent Otway Gas Plant.
BHP Billiton	Nearby proponent with pipelines and current operator of Minerva gas processing plant. (Plant ownership since changed to Cooper Energy who will operate from early 2020)
Cooper Energy	Proponent with nearby offshore permits and drilling projects. New operator of 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

8.2 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 any issues raised. A detailed summary of the stakeholder consultation is presented in Table 7.

Table 7: Stakeholder Consultation Log

Consultation on the Halladale, Black Watch and Speculant project commenced in 2009 when Origin Energy and historical consultation with key stakeholders has also 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 (Earth Resources Regulation Branch)	Petroleum Act and OPGGS Act approvals process Project briefing and Petroleum approvals	Discussions surrounding required approvals, Special Access (Drilling) Authority, Safety Plan, and EMPs. The Department was also represented on the National Parks Working Group. DJPR (then 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. 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 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. Site visit conducted on 7/9/2020 for the HBWS and Enterprise sites. Ongoing consultation in late 2019 and early 2020 seeking clarification of approvals requirements relating commencement of production from the Black Watch-1 well.	Aug 2010	19/3/2020
DJPR/Victorian Gas Program Stakeholder Advisory Panel Members	Project briefing, Information sheet, updates	No comments have been raised regarding the Black Watch-1 development at the time of EP submission. Updates have been provided at each quarterly meeting of the Stakeholder Advisory Panel attended by Beach's Community Manger who is also a panel member.	15/11/2018	27/2/2020

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
		General updates throughout. Site tour offered at future appropriate time to be determined.		
VDPCD (Environment Assessment Branch) – now DEWLP	Assessment requirements under the Environment Effects Act 1978 Project briefing, Information sheet, updates	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 DELWP (formerly known as 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 development activity at the time of EP submission. General updates throughout.	Oct 2009	27/02/2020
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. No further comments have been raised regarding the Black Watch-1 development activity at the time of EP submission.	14/06/2011	08/01/2019
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 2011 and consent was granted by the Minister for Environment and Climate Change for the drilling of 4 wells. Discussions have confirmed that Beach is the holder of the existing consent and it does cover Black Watch-1 drilling. Ministerial endorsement of the Black Watch Environmental Management Plan was given in accordance with the consent. Confirmation that Marine and Coastal Act consent would not be required for the Black Watch drilling.	Dec 2009	08/05/2019

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
		Engagement was undertaken with the National Parks Advisory Council in relation to the Enterprise project, which included a site visit, along with a visit to the Black Watch site on 19 March 2019. No further comments have been raised regarding the Black Watch-1 development activity.		
DELWP – Marine Pollution	Project briefing and Information sheet	No comments have been raised regarding the Black Watch-1 drilling activity at the time of EP submission. General updates throughout.	15/11/2018	27/02/2020
DELWP – Parks Victoria	Notification Request	Comments where returned during the addition information request for the Black Watch 1 EP assessment from DJPR. 'Parks Victoria requests that you notify the Area Chief Ranger when flaring is to occur, when an emergency arises and when there is any non-compliance with the restricted access to BICP.'	17/05/2019	17/05/2019
Parks Victoria – Port Campbell	Project briefing, Information sheet, updates	No comments have been raised regarding the Black Watch-1 development activity at the time of EP submission. General updates throughout.	26/09/2018	27/02/2020
Moyne Shire Council	Project briefing, Information sheets, discussions on statutory planning requirements, updates on timings, coordination of mail outs	Communication is ongoing with Moyne shire regarding the provision of a planning permit to cover the drilling and completion of the Black Watch-1 well. Beach have been pragmatic in adapting the relevant conditions from the existing permit into the EP concurrently. A new permit application for '*development of a Gas Well (extension to existing earth energy and resource industry) including development of temporary drill rig and temporary accommodation camp*' was granted by Moyne Shire on 15th April 2019, this permit has 28 conditions and will be incorporated into the EP where relevant. The permit conditions were amended on 14 October 2019 to include car parking adjacent the accommodation camp on the existing area leased from the landholder.	26/09/2018	11/3/2020

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
		Beach has been consulting with the Moyne Shire Council and providing specific updates and direct engagement throughout the project including: community information sessions (which Moyne Shire Councillors have attended); mobilisation of drill rig; road signage and maintenance; commencement of drilling; flaring timings; site tours; updates on community engagement including Beach's attendance at the Peterborough Residents Group meetings. A site tour will be offered at future appropriate time to be determined. General updates throughout.		
Corangamite Shire Council	Project briefing	Corangamite Shire Councillors and Officers have previously toured the HBWS well site. No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	June 2009	20/11/2018
EPA Victoria	Project briefing	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	15/11/2018	27/02/2020
Regional Roads Victoria	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 carried out a traffic assessment and prepared a traffic management plan in accordance with its local government planning permit and a slip lane was not determined as necessary. Beach continued to engage with Vic Roads with project updates, including planning for mobilisation of the drill rig to the site. General updates throughout.	30/11/2018	27/02/2020

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
CFA Nirranda South CFA Nullaware CFA Peterborough CFA Timboon and Districts CFA South West Region CFA Command	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 Timboon and Districts CFA group meeting and site visit to Otway Gas Plant. No concerns raised. Beach met with CFA in Geelong July 2019 to discuss project updates, knowledge sharing of our ERPs and fire safety management plans and facilitating reviews and feedback by CFA, understanding CFAs expectations for fire safety management along with engagement and ongoing communications, planning for drill exercises, site familiarisation and ongoing communications. No concerns were raised. Consultation with CFA to apply for and obtain a section 40 Permit to enable works at critical times, where drilling activities require Beach to conduct hot work, including but not limited to, welding, cutting, grinding and flaring. It was noted that no planned flaring will occur during total fire ban days. General updates throughout.	Apr 2011	27/02/2020
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 development activity at time of EP submission. General updates throughout.	Aug 2010	27/02/2020
Local Aboriginal Groups	Cultural Heritage values	Discussions surrounding the potential disturbance of lands containing Aboriginal heritage artefacts was undertaken during phase one of the	Jan 2011	27/02/2020

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
		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 development activity at the time of EP submission. General updates throughout.		
CO2CRC	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. Engagement in February 2020 regarding CO2CRC's planned seismic surveys, resulting in ongoing sharing information among project teams. General updates throughout.	28/11/2018	27/02/2020
Friends of the Bay of Island Coastal Park	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	May 2011	27/02/2020
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. Well site remediation planning was discussed in September and October 2018. Beach provided detailed project timelines so the LH could consider planning regarding their holiday home near the drill site.	Jun 2009	13/3/2020

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
		Beach met with LH in June 2019 to discuss exit track; rig details pipeline crossing; drainage system; further civil works required; noise, light and dust; traffic; well site and vegetation; ongoing engagement. Beach met with LH in October 2019 to discuss lease area activities; high noise levels and lighting during drilling and future partial remediation plans. Beach consulted with LH in January 2020 regarding placement of temporary noise logger to validate noise modelling. Beach hosted a site tour with LHs in February 2020 which commenced with a safety induction and explanation of the drilling process and facilities locations. Updates in March 2020 have included progress on drilling, likely timing for flaring, followed by demobilisation. Beach will consult with LH continuously throughout project in accordance with the SEP and agreements with the LH. General updates throughout.		
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. Remediation options for the accommodation camp have been discussed as the LH has an interest in utilising the materials. Beach has kept the LH informed of rig mobilisation, road maintenance, flaring timings and offered a site tour. Beach consulted with LH in January 2020 regarding placement of temporary noise logger to validate noise modelling. Beach will consult with LH continuously throughout project in accordance with the SEP.	June 2009	12/3/2020

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
		General updates throughout.		
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. Beach committed to undertaking pre and post road condition surveys and will assess road upgrades at that time in conjunction with the relative authority. The assessment and traffic management plan determined that a slip lane wasn't required and this was communicated to the neighbour. One near neighbour attended the community information session at Peterborough in October 2019. No issues were raised. Beach has undertaken road and drainage maintenance during the drilling project. Beach consulted with a neighbour in January 2020 regarding placement of temporary noise logger to validate noise modelling. General updates throughout.	Jun 2009	27/02/2020
Nirranda and Districts Recreation Centre	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	15/10/2018	27/02/2020
Nullawarre Inc	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission.	15/10/2018	27/02/2020

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
		Beach attended meeting in October 2019 and no issues were raised. General updates throughout.		
Halladale Black Watch Community Engagement Committee	Project briefing and info sheet	Community Engagement Committee was established to promote clear communication between the project, council and the local community. The CEC met every two months to discuss progress. Moyne Shire liaison officer was consulted to determine if they required the CEC to be reformed. Given the site was established and Beach was communicating directly with past members, the Moyne Shire determined this was not necessary. Existing members with prior knowledge of phase one did not have any comments or concerns with the Black Watch-1 development 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. Group advised interest in touring the site and have been advised that a site tour will be offered at future appropriate time to be determined. General updates throughout.	20/09/2018	11/3/2020
Popes Consolidated bus lines	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	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 development activity. This group meets every 4 months to discuss updates and issues related to the Otway Gas Plant and updates are provided on the Black Watch project. The last meeting was on 19 February 2020. A site tour will be offered at future appropriate time to be determined. General updates throughout.	Sep 2012	27/2/2020

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
Sustainable Agriculture and Communities Alliance	Project briefing and info sheet	No comments have been raised regarding the Black Watch-1 development activity at time of EP submission. The group toured the Otway Gas Plant in 2019 and Beach held a project briefing for the group in April 2019. The group are generally opposed to fossil fuel development. General updates throughout.	03/11/2018	27/2/2020
Tourism Victoria	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	15/11/2018	27/2/2020
Transport Safety Victoria (Marine Safety)	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	15/11/2018	27/2/2020
12 Apostles Helicopters Peterborough Airport	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	28/11/2018	27/2/2020
Environment Victoria	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	4/02/2019	27/2/2020
Warrnambool Shire Council	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	20/11/2018	27/2/2020
Victorian Fisheries Authority	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	15/11/2018	27/2/2020
Member for Polwarth	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	16/08/2018	27/2/2020

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
Member for Wannon - Minister for Education	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	07/09/2018	27/2/2020
Office of the Victorian Minister for Energy, Environment and Climate Change, Solar Homes	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	08/01/2019	27/2/2020
Office of the Minister for Energy and Environment	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	08/01/2019	27/2/2020
Minister with responsibility for the Resources and Northern Australia portfolio	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	07/01/2019	27/2/2020
Resources at Minister responsible for Agriculture and Regional Development portfolios	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	07/01/2019	27/2/2020
Office of The Premier	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	08/01/2019	27/2/2020
Energy and Water Ombudsman Victoria	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	15/11/2018	27/2/2020
Energy Safe Victoria	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	15/11/2018	27/2/2020

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
Regional Development Victoria, Barwon South West Region	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	15/11/2018	27/2/2020
Victorian National Parks Association	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	28/11/2018	27/2/2020
Victorian Farmers Federation	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. Consultation has also been undertaken directly with VFF representative on the Victorian Gas Program Stakeholder Advisory Panel. General updates throughout.	02/05/2019	27/2/2020
Nirranda Footbal Club	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	1/11/2018	27/2/2020
Heytesbury and Districts LandCare Network	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	27/11/2018	27/2/2020
Nullawarre and District Primary School	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	27/11/2018	27/2/2020
Port Campbell Board Riders Association	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	27/11/2018	27/2/2020
Port Campbell Community Group	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	27/11/2018	27/2/2020

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
Port Campbell Progress Group	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	27/11/2018	27/2/2020
Port Campbell Surf Life Saving Club	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	27/11/2018	27/2/2020
Port Campbell Boat Charters	Project briefing and info sheet Community information session	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	13/02/2019	27/2/2020
Timboon Action Group	Community group worksheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. Met with group in October 2019 for general update and discussion General updates throughout.	4/03/2019	27/2/2020
Matthews Petroleum	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	27/11/2018	27/2/2020
Reids Stockfeeds	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	27/11/2018	27/2/2020
Twelve Apostles Tourism and Business Group	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	27/11/2018	27/2/2020
Warrnambool Bus Lines	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	27/11/2018	27/2/2020

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
Warrnambool Cheese and Butter Factory	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	27/11/2018	27/2/2020
Childers Restaurant - Nullawarre	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	28/11/2018	27/2/2020
McDowalls Friendly Grocer - Nullawarre	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	28/11/2018	27/2/2020
Nullawarre Vetrinary	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	28/11/2018	27/2/2020
Peterborough General Store and Takeaway Food	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	28/11/2018	27/2/2020
Peterborough Licensed Grocers	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	28/11/2018	27/2/2020
Port Campbell Touring	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	28/11/2018	27/2/2020
Schomberg Inn	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	28/11/2018	27/2/2020
Wannon Water	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission.	4/12/2018	27/2/2020

Organisation/Department	Subject	Comment	Date of first contact	Most recent contact
		General updates throughout.		
Bega	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	6/12/2018	27/2/2020
Bulla Dairy	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	6/12/2018	27/2/2020
Fonterra	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	6/12/2018	27/2/2020
The Midfield Group	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	6/12/2018	27/2/2020
Landmark	Community Information Session	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	13/02/2019	27/2/2020
Cooper Energy	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	27/11/2018	27/2/2020
Exxon Mobil	Project briefing and info sheet	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission. General updates throughout.	27/11/2018	27/2/2020
General Community	Community Information Session	No concerns have been raised regarding the Black Watch-1 development activity at time of EP submission.	13/02/2019	3/10/2019

8.3 Ongoing Consultation

Beach is committed to consultation in accordance with the project SEP and Beach's Community Strategy, 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 for the operation phase would be primarily the drill site landholder and a small number of near neighbours on the immediate approaching roads;
- Updates to key regulatory bodies and relevant stakeholders in relation to any changes in project scope and timing;
- Ongoing consultation regarding the HBWS well site will be undertaken with the Otway Gas Plant Community Reference Group, in accordance with the Terms of Reference under which the group operates;
- Site tours offered to relevant stakeholders identified in the SEP.
- Contact will be maintained with land owners in accordance with the SEP and relevant lease agreements.

9 References/Associated documents

References used in this document:

1. Origin Energy Resources, 2016. Halladale, Black Watch and Speculant Pipeline PL006009 Environment Management Plan (CDN/ID 8198931)
2. Beach Energy, 2019. Black Watch Drilling Environment Plan (S4600AH717795)
3. Beach Energy, 2019. Otway Emergency Response Plan (CDN/ID 3977022)
4. Biosis, 2011. Origin Halladale and Black Watch Project, Terrestrial and Aquatic Ecology Assessment Report. Prepared by Biosis Research Pty. Ltd., Melbourne.
5. DPI, 2018. Victorian Resources Online. Accessed by JBS&G. Department of Primary Industries, Victoria.
6. SRW, 2010. Nullawarre Groundwater Management Plan Annual Report 2009 -2010. Southern Rural Water, Victoria.
7. Golder, 2019. Baseline Groundwater Monitoring Report: Black Watch
8. Jacobs, 2015. Noise Report (Choke Valve Assessment)
9. Jacobs, 2018. HBWS Choke Valve Noise Impact Assessment
10. Evans and Peck, 2011. Halladale Black Watch Traffic Report. Prepared by Evans and Peck Pty Ltd, a division of Worley Parsons, Queensland
11. 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.
12. Biosis, 2013. Desktop Flora and Fauna Review for Halladale and Blackwatch Project. Prepared by Biosis Research Pty. Ltd., Melbourne.
13. https://trove.nla.gov.au/version/45644135 – 1998 Port Campbell National Park and Bay of Islands Coastal Park management plan / Parks Victoria
14. Victoria's Public Land *Phytophthora cinnamomi* Management Strategy
15. Parks Victoria, 1998. Port Campbell National Park and Bay of Islands Coastal Park Management Plan

10 Document information and history

Document custodian group

Title	Name/s
LE-Operations-Conv-Otway	Frank Groen, Rob Duncanson

Electronic Controlled copy distribution – via email

No.	Name and Position	Distribution
1	DJPR	workplan.approvals@ecodev.vic.gov.au
2	DJPR	Sandra Vin, Senior Assessments Officer, Earth Resources Regulation, DJPR sandra.vin@ecodev.vic.gov.au

Document history

Rev	Date	Changes made in document	Reviewer/s	Consolidator	Approver
A	01/04/2020	Preparation of EP Summary required under OPGGS Act	Catriona King	Catriona King	-
B		Internal Review	Ronan Scullion	Catriona King	-
C		Internal Review	Adrian Cukovski Matthew Ambrose Frank Groen Tom Hedditch	Catriona King	-
0	11/05/2020	Approved for submission to DJPR	Catriona King	Catriona King	Frank Groen

10.1 Controlled copy distribution

Controlled Copies of this document shall be distributed by the Otway Production Manager, via email to the persons/areas listed above as they are authorised.

Appendix A Beach Energy HSE Policies

Health and Safety Policy

Objective

Beach is committed to taking all reasonable steps to protect the health and safety of our employees, contractors, the community and stakeholders in all areas in which we operate.

Strategy

To achieve this, Beach will:

- Comply with relevant health and safety legislation and the Beach Health, Safety and Environment Management System which is the method by which Beach identifies and manages health and safety risk.
- Proactively identify health and safety hazards, assess risks and implement appropriate controls;
- Integrate health and safety into business strategy and planning;
- Provide adequate resources, systems and training to effectively manage health and safety risks;
- Consult with employees, contractors, and relevant stakeholders on health and safety matters;
- Audit health and safety systems regularly to verify risk management control and effectiveness;
- Strive to return injured personnel to gainful employment as soon as practicable;
- Continually aim to improve health and safety performance by establishing, reviewing and monitoring objectives and targets.
- Investigate incidents and share lessons learned to improve health and safety performance. All

personnel:

- Are required to comply with this policy and all Beach health and safety requirements;
- Have a responsibility and authority to stop work or intervene when an unsafe act or condition is observed.

Application

This policy applies to all personnel associated with Beach activities.

Matt Kay,
Managing Director and CEO
January 2020

Environment Policy

Objective

Beach is committed to conducting operations in an environmentally responsible and sustainable manner.

Strategy

To achieve this, Beach will:

- Comply with relevant environmental laws, regulations, and the Beach Health, Safety and Environment Management System which is the method by which Beach identifies and manages environmental risk.
- Establish environmental objectives and targets, and implement programs to achieve them that will support continuous improvement;
- Identify, assess and control environmental impacts of our operations by proactive management of activities and mitigation of impacts;
- Ensure that incidents, near misses, concerns and complaints are reported, investigated and lessons learnt are implemented;
- Inform all employees and contractors of their environmental responsibilities including consultation and distribution of appropriate environmental management guidelines, regulations and publications for all relevant activities;
- Efficiently use natural resources and energy, and engage with stakeholders on environmental issues; and
- Publicly report on our environmental performance.

Application

This policy applies to all personnel associated with Beach activities.

Matt Kay
Managing Director and CEO
December 2019

Risk Management Policy

Objective

Beach is committed to managing risk in a consistent, effective, and proactive manner across its business.

Strategy

Risk is an inherent component of Beach's business and represents an exposure and tolerance to the potential for both positive and negative outcomes.

Risk manifests itself in many ways in the exploration and production (E&P) industry. In addition to industry systemic risks, there are other material business risks specific to the characteristics of Beach's asset portfolio and business structure. Beach's systemic and specific risks are consistent with those of a mid-sized international E&P company.

The Board has overall responsibility for the integrity of Beach's risk management system that applies a consistent approach to measuring, managing, monitoring and reviewing risk. Beach executives and managers are responsible to implement this policy and integrate risk management throughout Beach. All Beach employees are responsible to apply this policy.

The scope of Beach's material business risks includes:

- operational (including safety, environmental, reserves) risks;
- commercial risks;
- legal, regulatory and contractual risks; Reputational/social license to operate risks; and
- economic and financial risks.

Beach is committed to:

- a Board appointed Risk, Corporate Governance and Sustainability Committee which and operates pursuant to a charter approved by the Board and oversees the effectiveness of Beach's risk management system.
- an executive Risk Management Committee that operates pursuant to a charter approved by the Managing Director and provides quarterly reports to the Risk, Corporate Governance and Sustainability Committee on material risks facing the organisation.
- managing risks in a pro-active and effective manner, based upon ISO 31000:2018
- adopting a consistent approach to assessing and managing risk
- adopting a consistent approach to recording and reporting, monitoring and reviewing risk, including maintaining an enterprise-wide integrated material risk register
- reporting to relevant stakeholders on a regular basis on material risks facing the company.

While appropriate methods will be utilised to identify, analyse and rank risks to minimise loss and maximise opportunity, no process can guarantee assurance against a risk of material loss.

Application

This policy applies to all personnel associated with Beach activities.

Matt Kay
Managing Director and CEO December 2019