GOLDEN BEACH GEOTECHNICAL INVESTIGATIONS

ENVIRONMENT PLAN SUMMARY

Vic/RL1(V)

Revision 0

GB Energy Holdings Pty Ltd
ABN 60 615 552 693

Rev	Date	Description	Author	Checked	Approved	Document
0	28/10/2024	Issued to DEECA	BP	GP	SM	GBES-GBE-00-GG-EN-PLN-0002
A	25/10/2024	Issued for GBE review	BP	SA, GP	-	

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Acronyms

Acronym	Definition
3D	Three-dimensional
AFMA	Australian Fisheries Management Authority
AHO	Australian Hydrographic Office
AIS	Automatic Identification System
ALA	Atlas of Living Australia
ALARP	As Low As Reasonably Practicable
AMOSC	Australian Marine Oil Spill Centre
AMSA	Australian Maritime Safety Authority
AMP	Australian Marine Park
APPEA	Australian Petroleum Production and Exploration Association
AS/NZS	Australian Standard/New Zealand Standard
BIA	Biologically Important Area
BPEM	Best Practice Environmental Management
BWMC	Ballast Water Management Certificate
BWMP	Ballast Water Management Plan
BWR	Ballast Water Report
CBiCS	Combined Biotope Classification Scheme
CEFAS	Centres for Environment, Fisheries and Aquaculture Science
CFA	Commonwealth Fisheries Association
CHARM	Chemical Hazard and Risk Management
CHMP	Cultural Heritage Management Plan
CPT	Cone Penetrometer Tests
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAFF	Department of Agriculture, Fisheries and Forestry
DAWE	Department of Agriculture, Water and the Environment
DAWR	Department of Agriculture and Water Resources (Cth)
DEDJTR	Victorian Department of Economic Development, Jobs, Transport and Resources (Vic) (*former*)
DEECA	Department of Energy, Environment and Climate Action
DELWP	Department of Environment, Land, Water and Planning (Vic)
DoD	Department of Defence (Cth)
DoE	Department of the Environment (Cth) (*former*)
DoEE	Department of Environment and Energy (Cth)
DoF	Department of Fisheries (WA)
DP	Dynamic Positioning
DSEWPC	Department of Sustainability, Environment, Water, Population and Communities (Cth) (*former*)
DTP	Department of Transport and Planning
EAC	East Australian Current
EARPL	Esso Australia Resources Pty Ltd
EIA	Environmental Impact Assessment
EMBA	Environment that May Be Affected

Acronym	Definition
EMS	Environmental Management System
EP	Environment Plan
EPA	Environment Protection Authority (Vic)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPO	Environmental Performance Outcome
EPS	Environmental Performance Standard
ERA	Environmental Risk Assessment
ERC	Emergency Response Coordinator
ERP	Emergency Response Plan
ERR	Earth Resources Regulation (division of DEECA)
ESD	Environmentally Sustainable Development
FAQ	Frequently Asked Questions
FFG Act	*Flora and Fauna Guarantee Act 1988* (Vic)
GAB	Great Australian Bight
GIS	Geographic Information System
GLaWAC	Gunaikurnai Land & Waters Aboriginal Corporation
GMP	Garbage Management Plan
HDD	Horizontal Directional Drill / Horizontally Directionally Drilled
HSE	Health, Safety and Environment
IAP	Incident Action Plan
IAP2	International Association for Public Participation
ILUA	Indigenous Land Use Agreements
IMO	International Maritime Organisation
IMS	Invasive Marine Species
IMT	Incident Management Team
LAT	Lowest Astronomical Tide
LCC	Latrobe City Council
LEFCOL	Lakes Entrance Fisherman's Cooperative
LiDAR	Light Detection and Ranging
MARPOL	International Convention for the Prevention of Pollution from Ships 1973, as modified by the Protocol of 1978
MARS	Maritime Arrivals Reporting System
MDO	Marine Diesel Oil
MNES	Matter/s of National Environmental Significance
MNP	Marine National Park
MO	Marine Order
MoC	Management of Change
MODU	Mobile Offshore Drilling Unit
MSS	Marine Seismic Survey
MSV	Maritime Safety Victoria
NEBA	Net Environmental Benefit Analysis
NatPlan	National Plan for Maritime Environmental Emergencies
NNTT	National Native Title Tribunal
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority

Acronym	Definition
OCNS	Offshore Chemical Notification Scheme
ODS	Ozone-Depleting Substance
OIW	Oil-in-Water
OPEP	Oil Pollution Emergency Plan
OPGGS Act	*Offshore Petroleum and Greenhouse Gas Storage Act* (Cth & Vic)
OPGGS	Offshore Petroleum and Greenhouse Gas Storage
OSMP	Oil Spill Monitoring Program
OSPAR	Oslo-Paris Conventions
OSRA	Oil Spill Response Atlas
OSRT	Oil Spill Response Team
OWR	Oiled Wildlife Response
OWS	Oily Water Separator
PLEM	Pipeline End Manifold
PMS	Planned Maintenance System
PMST	Protected Matters Search Tool
POWBONS	Pollution of Waters by Oil and Noxious Substances
PPE	Personal Protective Equipment
RAMSAR	Convention on Wetlands of International Importance especially as Waterfowl Habitat
ROS	Regional Outfall Sewer
ROV	Remotely Operated (underwater) Vehicle
SA	South Australia/n
SCAT	Shoreline Clean-up and Assessment Technique
SEEMP	Ship Energy Efficiency Management Plan
SEP	Stakeholder Engagement Plan
SES	State Emergency Service (Vic)
SESSF	Southern and Eastern Scalefish and Shark Fishery
SETFIA	South-East Trawl Fishing Industry Association
SHS	Scalefish Hook Sector
SIMOPS	Simultaneous Operations
SIV	Seafood Industry Victoria
SMPEP	Shipboard Marine Pollution Emergency Plan
SRT	State Response Team
SSS	Side Scan Sonar
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
STP	Sewage Treatment Plant
TEC	Threatened Ecological Community
UXO	Unexploded Ordinance
VBA	Victorian Biodiversity Atlas
VFA	Victorian Fisheries Authority
VHF	Very High Frequency
WA	Western Australia/n
WBM	Water-Based Mud

1 Introduction

1.1 Background

GB Energy (Vic) Pty Ltd (hereafter referred to as GB Energy) (ABN 60 615 552 693), as Titleholder of Retention Lease Vic/RL1(V), proposes to appraise and develop the natural gas held in the Golden Beach gas field located within Victorian waters 20 m deep and approximately four kilometres off Ninety Mile Beach, in the Gippsland Basin (Figure 1.1). The project is referred to as the Golden Beach Gas Project (hereafter referred to as 'the Project'). Vic/RL1(V) was acquired by GB Energy in 2017.

The development will occur in two phases, with the first phase being the production of a portion of the gas currently within the reservoir. The second stage will be the conversion of the field into a gas storage facility with a potential lifespan of 40 years. Re-injection facilities will be provided to allow sales quality gas from the tie in point to be re-injected to the Golden Beach reservoir for later recovery.

1.2 Purpose

GB Energy is proposing to conduct geotechnical investigations (hereafter referred to as 'the activity') in Vic/RL1(V) (see Figure 1.1). The design of these investigations is informed by a geophysical survey that was undertaken by GB Energy from the 26th of March to the 2nd of April 2020 under the Golden Beach Geophysical and Geotechnical Investigations Environmental Plan (EP) (GB-OS-ENV-PLA-001), which was approved by the then Department of Jobs, Precincts and Regions on the 18th of April 2019.

The purpose of the geotechnical investigations is to assess and characterise the seabed to support a jack-up Mobile Offshore Drilling Unit (MODU) that will be used to drill future production and injection wells at the Golden Beach Gas Field and to determine the suitability of the seabed for the offshore pipeline route. The activity will be conducted entirely within Victorian State in accordance with the *Offshore Petroleum and Greenhouse Gas Storage Act* 2010 (Vic) (OPGGS Act).

1.3 Purpose of this Document

This EP Summary is prepared in accordance with the requirements of Regulation 13E of the Regulations. Table 1.1 outlines where the requirements of this regulation are met in this document.

Table 1-1 Addressing this EP Summary against the OPPGS Regulation 13E requirements

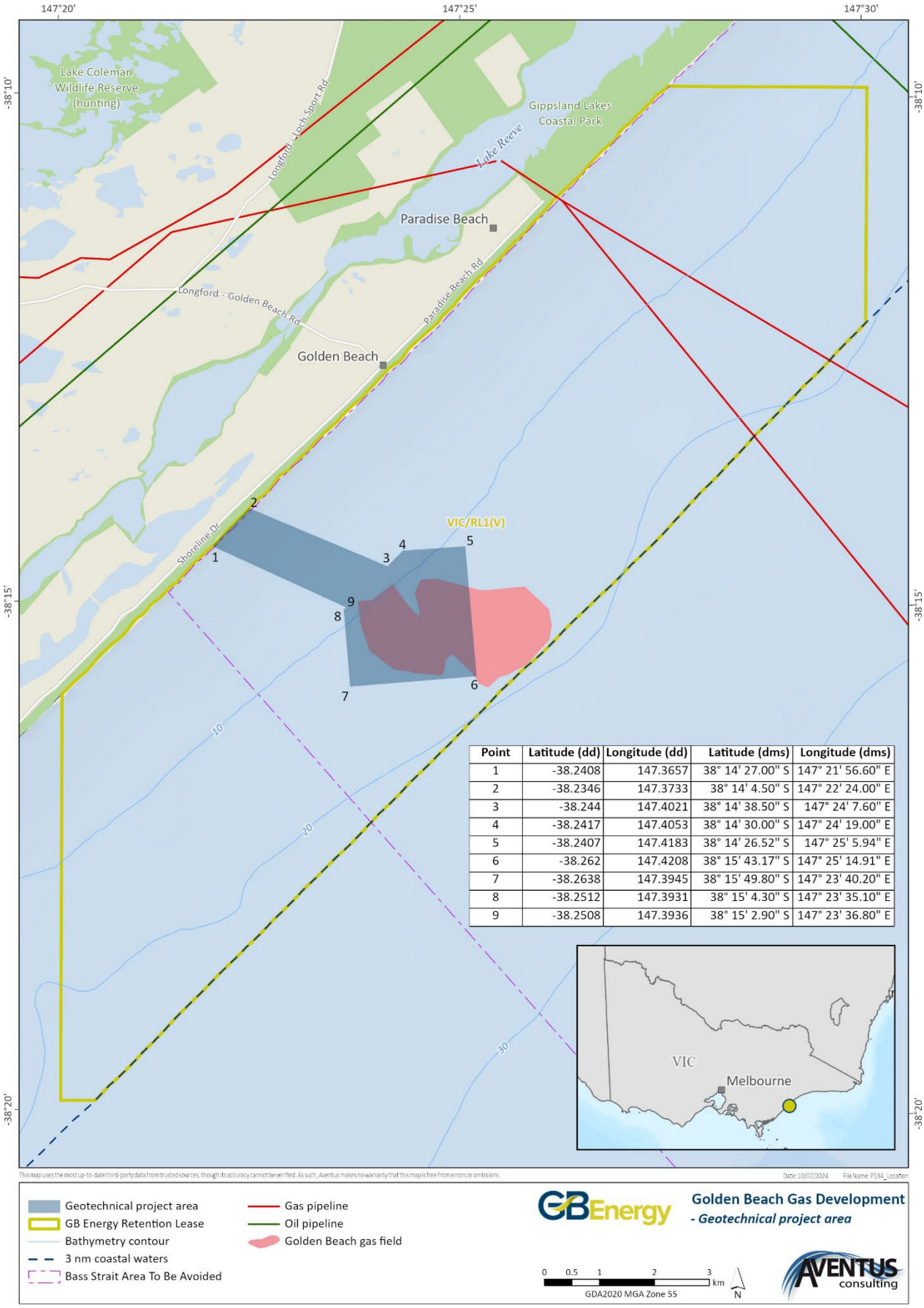
Regulation 13E requirement	Location in this EP summary
Location of the activity	Figure 1.1 and Table 2-1
Description of the receiving environment	Chapter 4
Description of the activity	Chapter 2
Details of environmental impacts and risks	Chapter 6
Summary of the control measures for the activity	Chapter 6
Summary of arrangements for ongoing monitoring of the authority holder's environmental performance	Section 7.9
Summary of environmental emergency response arrangements	Section 7.3 and 7.4
Consultations undertaken and plans for ongoing consultation	Chapter 3
Details of authority holder's nominated contact for the activity	Section 1.4

1.4 Proponent

In accordance with Regulation 18 of the Victorian *Offshore Petroleum and Greenhouse Gas Storage Regulations* 2021 (hereafter referred to as OPGGS Regulations), the titleholder and nominated liaison contact details for this activity are provided below:

Steven Marshall
Chief Operating Officer (COO)
Level 18, 90 Collins St, Melbourne, Victoria 3000
Phone: 0408 934 741
Email: sm@gbenergy.com.au

GB Energy will notify the regulator of a change in GB Energy's nominated liaison person or contact details in line with OPGGS Regulation 18(3).



Point	Latitude (dd)	Longitude (dd)	Latitude (dms)	Longitude (dms)
1	-38.2408	147.3657	38° 14' 27.00" S	147° 21' 56.60" E
2	-38.2346	147.3733	38° 14' 4.50" S	147° 22' 24.00" E
3	-38.244	147.4021	38° 14' 38.50" S	147° 24' 7.60" E
4	-38.2417	147.4053	38° 14' 30.00" S	147° 24' 19.00" E
5	-38.2407	147.4183	38° 14' 26.52" S	147° 25' 5.94" E
6	-38.262	147.4208	38° 15' 43.17" S	147° 25' 14.91" E
7	-38.2638	147.3945	38° 15' 49.80" S	147° 23' 40.20" E
8	-38.2512	147.3931	38° 15' 4.30" S	147° 23' 35.10" E
9	-38.2508	147.3936	38° 15' 2.90" S	147° 23' 36.80" E

Figure 1.1 Project location

2 Activity Description

2.1 Activity Location

The VIC/RL1(V) permit is located entirely in Victorian State waters, with the activity area being 7.5 km^2 in area. It is 5.2 km long and 3.3 km wide at its widest point in water depths ranging from 1 m to 19 m Lowest Astronomical Tide (LAT) (Figure 2.1).

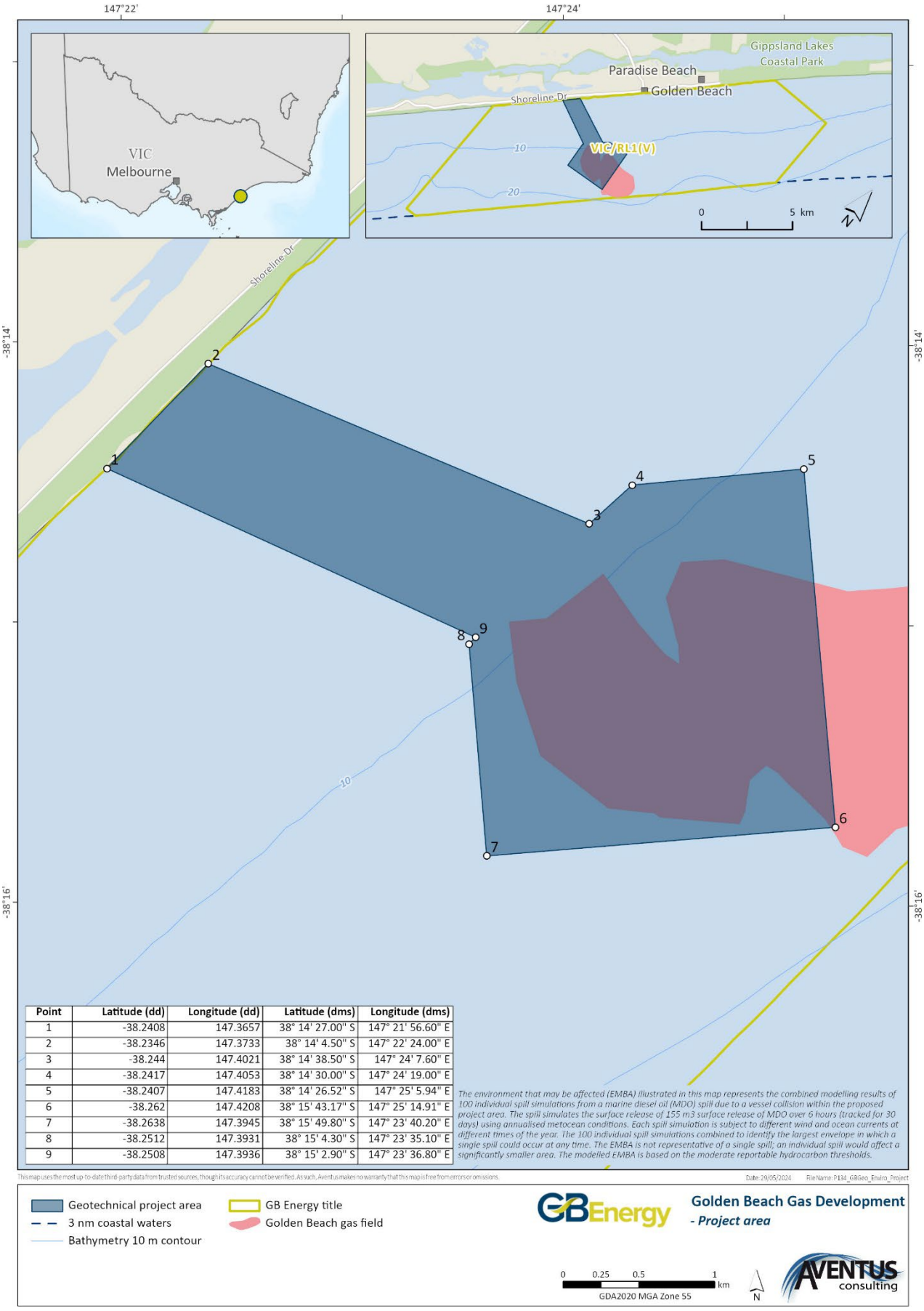
The activity area encompasses the area covered by the polygon bounded by the geographic coordinates provided in Table 2-1 (see Figure 2.1 for the corresponding location points). The activity area defines the spatial boundary of the geotechnical investigations as described in this summary EP.

Table 2-1 Activity area coordinates

Point	Longitude	Latitude
1	147° 21' 56.6"	38° 14' 27.0"
2	147° 22' 24.0"	38° 14' 4.5"
3	147° 24' 7.6"	38° 14' 38.5"
4	147° 24' 19.0"	38° 14' 30.0"
5	147° 25' 5.9"	38° 14' 26.5"
6	147° 25' 14.9"	38° 15' 43.1"
7	147° 23' 40.2"	38° 15' 49.8"
8	147° 23' 35.1"	38° 15' 4.3"
9	147° 23' 36.8"	38° 15' 2.9"

GDA 94, MGA Zone 55. See Figure 1.1 for the corresponding location points.

At its closest point, the activity area is located 3.5 km southwest of the centre of the township of Golden Beach, midway along the Ninety Mile Beach between Loch Sport and Seaspray in south Gippsland. Distances from the activity area to nearby features are provided in Table 2-2.



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The environment that may be affected (EMBA) illustrated in this map represents the combined modelling results of 100 individual spill simulations from a marine diesel oil (MDO) spill due to a vessel collision within the proposed project area. The spill simulates the surface release of 155 m3 surface release of MDO over 6 hours (tracked for 30 days) using annualised metocean conditions. Each spill simulation is subject to different wind and ocean currents at different times of the year. The 100 individual spill simulations combined to identify the largest envelope in which a single spill could occur at any time. The EMBA is not representative of a single spill; an individual spill would affect a significantly smaller area. The modelled EMBA is based on the moderate reportable hydrocarbon thresholds.

Date: 29/05/2024 File Name: P134_GBGeo_Enviro_Project

Figure 2.1. The activity area

Table 2-2 Distance to key features from the activity area

Feature	Distance and direction from the nearest point of the activity area to the nearest point of the feature
Towns	
Golden Beach (town centre)	3.5 km northeast
Paradise Beach	6 km northeast
Loch Sport	24 km northeast
Honeysuckles	18 km southwest
Seaspray	21 km southwest
Longford	26 km northwest
Sale	30 km northwest
Lakes Entrance	64 km northeast
Petroleum infrastructure	
Golden Beach-1/-1A	280 m east
Bream to shore pipeline: Vic/PL32 & Vic/PL32(V) (gas)	5.3 km east
Barracouta to shore pipeline: Vic/PL1 & Vic/PL1(V) (gas)	6.8 km east
Barracouta to shore pipeline: Vic/PL4 & Vic/PL4(V) (oil & condensate)	11.8 km east
Tarwhine to Barracouta A pipeline (oil)	17.8 km south
Seahorse to Barracouta A pipeline (oil)	21.8 km southeast
Tarwhine-1 subsea well (oil)	18 km south
Dolphin to shore pipeline (oil)	19.5 km west
Gippsland to Tasmania gas pipeline	20.5 km west
Non-petroleum infrastructure	
Regional Outfall Sewer (ROS) (Delray Beach)	1.5 km northwest
Saline Wastewater Outfall Pipeline (McGaurans Beach)	32 km southwest
Basslink electricity interconnector cable	32 km west
Australian Marine Parks (AMPs)	
Beagle AMP	96 km southwest
Victorian marine parks	
Ninety Mile Beach Marine National Park	23 km southwest

2.2 Timing and Duration

The activity is scheduled to commence late in Q4 2024, contingent on the availability of a suitable vessel. The activity is expected to take 20-25 days to complete, dependent on weather conditions and equipment performance. Operations will be conducted on a 24-hour basis, 7 days a week.

2.3 Objective of the Activity

The purpose of the activity is to:

- Identify constraints and hazards that may affect the drilling of future development and injection wells and installation of gas pipelines;
- Support the engineering of the pipeline end manifold (PLEM) foundation; and
- Confirm the absence of anomalous features throughout the activity area.

2.4 Project Management

GB Energy will manage this activity directly and is building up an in-house technical team comprised of highly experienced oil and gas professionals. GB Energy will contract a specialist geotechnical contractor to undertake this project.

2.5 Geotechnical Investigations

Geotechnical investigation methods collect detailed information on the properties of the seabed and the underlying shallow sediments to build up a picture of the local geology of the activity area.

The collected sediments are photographed, described and tested to determine the load bearing properties and determine the mechanical properties of the seabed at potential MODU spud can locations, and up to 10 locations in the activity area (one or more investigation techniques will be undertaken at each location), and validates the results of the geophysical data.

2.5.1 Investigation Techniques

The proposed geotechnical investigation techniques are described below:

- Cone Penetration Testing (CPT)
    - Determines soil strength and helps to delineate soil stratigraphy
- Coring
    - Piston and gravity coring - obtains a continuous soil sample in a wide range of water depths and are normally used on soft, unconsolidated sediments
    - Borehole sampling – a technique for collecting geotechnical soil data with use of rotary drilling

A simplified pictorial representation of geotechnical investigation techniques is provided in Figure 2.2.

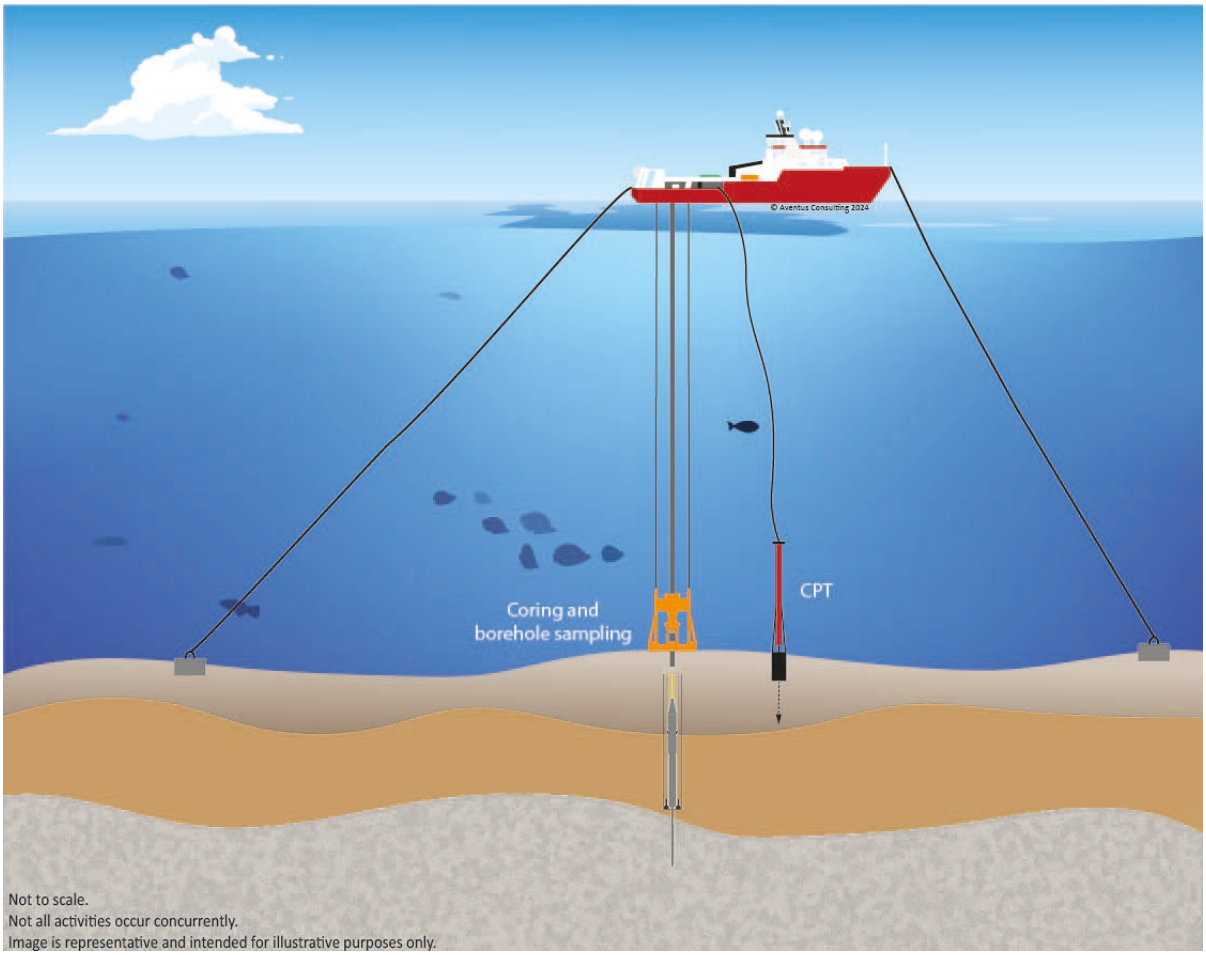


Figure 2.2. Simplified representation of geotechnical investigation techniques

2.5.2 Laboratory Testing

Laboratory analysis of the nature and composition of seabed sediments will be undertaken in onshore laboratories. No laboratory testing will be conducted offshore.

2.5.3 Drill Cuttings

Cuttings are discharged directly to the seabed during borehole sampling. Drill cuttings are inert pieces of rock, sand and other particles removed from the borehole during the sampling process. Cuttings range in size from very coarse to very fine particles.

2.5.4 Drilling Fluids

Drilling fluid will be used during the borehole sampling and CPT process to lubricate the drill bit, transport cuttings out of the borehole to keep the borehole clean and to prevent the borehole from collapsing during the coring process.

Seawater is the primary constituent of geotechnical drilling fluids. Inert drilling fluid additives may be added to the seawater to form a water-based mud (WBM) if challenging boring conditions are encountered. Common WBM additives that may be used during the coring process are:

- Guar (viscosifier)
- Bentonite (viscosifier)
- Barite (lost circulation and weighting agent)

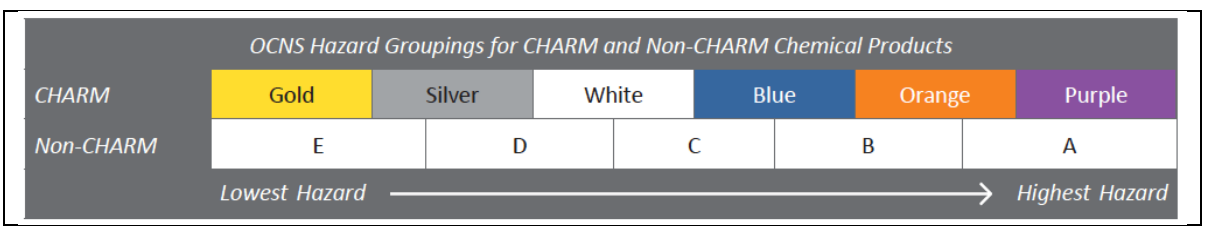
The WBM additives will be stored in sacks or drums within a bunded area of the vessel.

The exact types and composition of the WBM will not be known until after the geotechnical contractor has been engaged. GB Energy will specify that all drilling fluid additives are of low eco-toxicity, with only 'Gold'/'Silver' or 'D'/'E' Offshore Chemical Notification Scheme (OCNS) rated chemicals to be used in accordance with the OCNS.

In the absence of Australian standards, the OCNS is generally used as a basis for selecting environmentally-acceptable chemicals in the Australian offshore upstream petroleum industry. The OCNS manages chemical use and discharge by the UK and Netherlands offshore petroleum industries.

The OCNS uses the Harmonised Mandatory Control Scheme developed through the Oslo-Paris (OSPAR) Convention 1992. This ranks chemical products according to Hazard Quotient (HQ), calculated using the Chemical Hazard and Risk Management (CHARM) model. Gold has the lowest hazard, followed by silver, white, blue, orange and purple (having the highest hazard).

Products not applicable to the CHARM model (i.e., inorganic substances, synthetic-based muds (SBM), hydraulic fluids or chemicals used only in pipelines) are assigned an OCNS grouping A – E, with 'A' having the greatest potential environmental hazard and 'E' having the least. Products that only contain substances termed PLONORs (Pose Little or No Risk to the environment) are given the OCNS 'E' grouping (Figure 2.3).



Source: NOPSEMA (2015).

Figure 2.3. Illustration of hazard ranking bands for chemical products classified under the OCNS

2.6 Drop Camera

A drop camera may be deployed within the water column to provide visual information (i.e., seabed type and condition) within the activity area. This device is a non-invasive investigation technique that does not interact with the seabed and does not generate acoustic sound or other emissions.

2.7 Vessels

Two vessels have been contracted for the activity; one vessel will conduct the geotechnical investigation, and one will be used as a support vessel.

2.7.1 Geotechnical Vessel

GB Energy has engaged Bhagwan Marine to carry out the geotechnical surveys, utilising the vessels *Samson Explorer* and *Lobo*. The *Samson Explorer* is 35 metres in length and weighs 341 tonnes. The *Lobo* will be used as a support vessel, with primary marine surveys being conducted by the *Samson Explorer*.

Given the short duration of the activity, crew changes will not be required while on site. No helicopter transfers are planned (although they may be required in the event of medical emergencies). Nor will the vessel require refuelling on location in order to complete the investigations. In the event of bad weather during the investigations, the vessel will seek safe shelter or return to port. A weather look-ahead service will be used to ensure that the vessels are not mobilised immediately prior to forecast poor weather.

The geotechnical vessel will be positioned on location using a mooring system (likely to be a four-point mooring system). The mooring will allow the geotechnical vessel to to move over 500 m on anchors without having to adjust any of the anchors. This means dynamic positioning thrusters will not be required to position and vessel and keep it steady on location.

2.7.2 Support Vessel

A support vessel will be deployed to assist with anchor handling for the geotechnical vessel and to assist in emergencies. The *Lobo* measures at 18.3 metres in length and 40 tonnes.

2.7.3 Vessel Positioning

The geotechnical vessel will be positioned on location using a mooring system (likely to be a four-point mooring system). The mooring will allow the geotechnical vessel to to move over 500 m on anchors without having to adjust any of the anchors. This means dynamic positioning thrusters will not be required to position and vessel and keep it steady on location.

2.8 Activity Summary

Table 2-3 summarises the proposed activity parameters.

Table 2-3 Activity Summary

Parameter	Details	
Earliest commencement date	Q3 2024	
Duration of survey	20-25 days	
Water depths	5-20 m LAT*	
Activity area	7.5 km^2	
Geotechnical investigation	Depth of penetration (m)	Planned number of samples
Piston and gravity coring	Up to 6	12
CPT	Up to 25	17
Borehole sampling	Up to 30	5

*Note: Anchors may be placed in water depths as shallow as 3 m. These anchors will be placed and moved by the smaller support vessel.

3 Stakeholder Consultation

The overarching objective of the project's stakeholder consultation program is to enable the delivery of the project consistent with regulatory requirements and good practice engagement and secure government approvals of the various phases of the project.

GB Energy is committed to meeting these objectives by:

- Identifying stakeholders whose functions, interests or activities may be affected the activity;
- Confirming the relevant persons in accordance with the regulations and engaging those stakeholders at the earliest opportunity;
- Ensuring relevant persons are informed about the activity and the potential environmental and social impacts and risks;
- Proactively providing informative, accurate and timely information, and ensuring stakeholders have an adequate opportunity to consider the information and provide feedback;
- Ensuring affected stakeholders are informed about the consultation process and that their feedback, questions and concerns are considered in the EP; and
- Providing a mechanism for assessing the merit of any stakeholder objections, complaints or claims of adverse impacts received throughout the consultation period, and providing feedback to that stakeholder in a timely fashion.

3.1 Consultation Background

GB Energy has undertaken extensive consultation with the Gippsland community since October 2018, which includes consultation for the following project phases:

- Offshore geophysical and geotechnical (G&G) investigations EP (accepted on 8th March 2019);
- Whole-of-project EES application (accepted 6th April 2021);
- Land access negotiations since 2018 (for onshore geotechnical studies, environmental and heritage studies and pipeline route);
- GB-2 drilling EP (accepted on 3rd May 2023);
- Post GB-2 drilling updates with Golden Beach community; and
- Geotechnical investigations EP (accepted on 16th October 2024).

In April 2021, the Victorian Minister for Planning favourably assessed GB Energy's EES for the Golden Beach Gas Project. Within the assessed EES, GB Energy maintain two core documents and processes for stakeholder engagement, these being:

- EES Chapter 24 – Community and Stakeholder Engagement; and
- Golden Beach Pipeline – Consultation Plan (GB-PI-AP-PLA-001).

With the differing legislative requirements between onshore pipeline/facilities construction and offshore petroleum infrastructure development, a separate but complimentary Stakeholder Engagement Plan (SEP) was developed for the GB-2 drilling operations in 2023, with this utilised for the project's ongoing stakeholder engagement activities.

3.2 Consultation Methodology

The methods of consultation that GB Energy has adopted in the development of the EP include (but not limited to) the following:

- GB Energy website (www.gbenergy.com.au)
  - Frequently Asked Questions (FAQs)
- Project email (info@gbenergy.com.au)
  - Email updates
- LinkedIn
- Information flyers and fact sheets
- Letters
- Face-to-face meetings
- Outgoing phone calls
- Community information sessions
- Local media and advertising
- Virtual meetings.

3.2.1 EES Technical Reference Group

A Technical Reference Group (TRG) was convened by the Victorian Government to inform the development of the EES.

The TRG was chaired by the then DELWP (now DEECA) on behalf of the Minister for Planning. There were six TRG meetings throughout 2020 and the TRG provided advice to GB Energy throughout the EES processes.

The member organisations of the TRG for the Project were:

- DELWP – Assessment, Planning, Pipelines and Gippsland branches;
- Aboriginal Victoria (now First Peoples – State Relations);
- ERR;
- EPA;
- Gippsland Water;
- Southern Rural Water;
- Heritage Victoria;
- Parks Victoria;
- Wellington Shire Council; and
- West Gippsland CMA.

3.2.2 Recording Consultation Events

GB Energy uses Consultation Manager™ software as its stakeholder records management system. This holds copies of all correspondence issued and received in the development of the project, including issues raised and their resolution. This software has been variously managed by several project personnel, including dedicated consultation personnel and the COO.

3.2.3 Developing the EP

GB Energy has tailored consultation with relevant persons in the preparation of the EP to be proportional to the low level of impacts and risks predicted for the activity and for the low level of concern expressed by relevant persons through the EES process regarding offshore environmental

impacts and risks, while adhering to commitments in the EES regarding consultation post-EES phase.

Importantly, the stakeholder consultation process has leveraged the considerable experience and local knowledge of GB Energy's COO and the Principal Environmental Consultant of the environmental consultancy that has prepared the EP (and that has been with the project since mid-2018). These two individuals have carried out wide ranging consultation for petroleum and greenhouse gas projects in this nearshore (and onshore) part of Gippsland for between 10 and 20 years. This has provided them detailed knowledge of who the relevant persons are for this project, along with the key issues of concern to these relevant persons.

This knowledge has also allowed the project to incorporate previously raised issues, concerns and lessons learned into the design of the geotechnical investigations. This includes the following key engineering design decisions:

- Utilisation of high-performance water-based drilling fluids (rather than oil or synthetic-based fluids in order to reduce environmental impacts) for borehole sampling;
- Ensuring rocky reef in the project area is avoided by the vessel moorings; and
- Ensuring no discharge of treated sewage close to the shoreline in order to protect amenity values.

Additionally, the stakeholder consultation that was undertaken in the preparation of the offshore G&G EP (2018-19) and GB-2 drilling EP (2023), informed the methodologies adopted for the geotechnical investigations EP and the information contained within it (e.g., control measures).

3.3 Relevant Person Identification

The environmental values and sensitivities that occur within the EMBA were assessed to determine which categories of relevant persons may potentially be affected by the activities to be carried out (Table 3-1). These impacts and risks were assessed against the activity and relevant persons who may potentially be affected by the activities were identified (Table 3-2).

Table 3-1. Categories of Relevant Persons – Values and Sensitivities

Values and sensitivities	Activity area	EMBA	Relevant Person categories
Conservation Values & Sensitivities			
World Heritage Properties	No	No	Not applicable
AMPs	No	No	Not applicable
Victorian protected areas: • McLoughlins Beach – Seaspray Coastal Reserve • Gippsland Lakes Coastal Park	No	Yes	Reg 13F(1)(a) Government departments/agencies Reg 13F(1)(b) First Nations Peoples
National Heritage Places	No	No	Not applicable
Commonwealth Heritage Places	No	No	Not applicable
Wetlands of International Importance: • Gippsland Lakes Ramsar site	No	Yes	Reg 13F(1)(a) Government departments/agencies Reg 13F(1)(b) First Nations Peoples
Nationally Important Wetlands	No	No	Not applicable
Threatened and migratory species and biologically important areas (BIAs) (foraging aggregation, breeding) are identified in the EP.	Yes	Yes	Reg 13F(1)(a) Government departments/agencies Reg 13F(1)(b) First Nations Peoples
Key ecological features	No	No	Not applicable
Ecological and physical environment			
The ecological and physical environment described in Chapter 5 provides the basis for further assessment of values and sensitivities, along with impact and risk assessments (Chapter 7 and Chapter 8) from planned and unplanned activities. The ecological and physical environment includes: • Benthic habitats and species assemblages • Soft sediment (habitat for various species) • Seagrass (coastline presence) • Algae (coastline presence)	Yes	Yes	Reg 13F(1)(a) Government departments/agencies Reg 13F(1)(b) First Nations Peoples Reg 13F(1)(b) Commercial fishing associations

Values and sensitivities	Activity area	EMBA	Relevant Person categories
• Coral (not a dominant habitat) • Carbonate sands and exposed limestone (habitat for various species) • Basalt rises (habitat for various species) • Plankton • Invertebrates and fish • Birds • Marine reptiles • Cetaceans • Pinnipeds • Pest species			
Socio-economic			
Coastal settlements: • Golden Beach • Paradise Beach • Seaspray	No	Yes	Reg 13F(1)(a) Government departments/agencies Reg 13F(1)(b) First Nations Peoples Reg 13F(1)(b) Recreational fishing associations Reg 13F(1)(b) Volunteer emergency services
Offshore petroleum industry	Yes	Yes	Reg 13F(1)(b) Offshore oil and gas titleholders
Shipping	Yes	Yes	Reg 13F(1)(a) Government departments/agencies
Tourism industry	Yes	Yes	Reg 13F(1)(b) Local Government Authorities The presence of the activity area within the Area to be Avoided ([ATBA]) means that GB Energy has not consulted with marine tourism operators (e.g., game fishing charters) because large vessels are not permitted to operate within the ATBA.
Recreation (beach walking, fishing, snorkelling, diving, surfing)	Yes	Yes	Reg 13F(1)(b) Recreational fishers Reg 13F(1)(b) Local Government Authorities As per 'tourism industry' regarding the ATBA
Commercial fisheries: Extensive assessment undertaken of Commonwealth and Victorian managed fisheries and fishing effort in the activity area and EMBA. Very little in the activity area.	Yes	Yes	Reg 13F(1)(b) Commercial fishing associations
Cultural Environment			

Values and sensitivities	Activity area	EMBA	Relevant Person categories
First Nations People cultural values and sensitivities	Yes	Yes	Reg 13F(1)(b) First Nations Peoples
Maritime archaeological heritage	No	Yes	Reg 13F(1)(a) Government departments/agencies

Table 3-2. Categories of Relevant Persons – Impacts and Risks

Impacts and risks	Activity area	EMBA	Relevant Person categories
Impacts (planned events)			
Section 7.1 – Underwater noise emissions: temporary, during activities, up to several hundred metres	Yes	Unlikely	Reg 13F(1)(a) Government departments/agencies Reg 13F(1)(b) First Nations Peoples Reg 13F(1)(b) Commercial fishing associations
Section 7.2 – Displacement with third-party vessels and activities: temporary, during activities, limited to 500 m around the geotechnical vessel	Yes	No	Reg 13F(1)(a) Government departments/agencies Reg 13F(1)(b) Commercial fishing associations
Section 7.3 - Seabed disturbance: temporary, during activities and localised	Yes	No	Reg 13F(1)(a) Government departments/agencies Reg 13F(1)(b) First Nations Peoples Reg 13F(1)(b) Commercial fishing associations Reg 13F(1)(b) Offshore asset owners
Section 7.4 – Atmospheric emissions: decrease in air quality due to vessel emissions, localised and temporary	Yes	No	Reg 13F(1)(a) Government departments/agencies
Section 7.5 – Light emissions: may attract light-sensitive species, temporary, during activities and localised	Yes	No	Reg 13F(1)(a) Government departments/agencies Reg 13F(1)(b) First Nations Peoples Reg 13F(1)(b) Commercial fishing associations
Section 7.6 – Discharge of sewerage and grey water: reduction in water quality and increase in nutrients, temporary and localised, up to 50 m horizontally and 10 m vertically	Yes	No	Reg 13F(1)(a) Government departments/agencies
Section 7.7 – Discharge of cooling and brine water: potential toxicity impacts to marine fauna, increased sea surface temperature and salinity, temporary and localised, up to 100 m horizontally and 10 m vertically	Yes	No	Reg 13F(1)(a) Government departments/agencies
Section 7.8 – Discharge of bilge water and deck drainage: potential toxicity impacts to marine fauna, increased sea surface temperature and salinity around the discharge point, potential, temporary and localised, up to 100 m horizontally and 10 m vertically	Yes	No	Reg 13F(1)(a) Government departments/agencies

Impacts and risks	Activity area	EMBA	Relevant Person categories
Risks (unplanned events)			
Section 8.1 – Accidental overboard release of waste	Yes	Yes	Reg 13F(1)(a) Government departments/agencies Reg 13F(1)(b) First Nations Peoples Reg 13F(1)(b) Commercial fishing associations
Section 8.2 – Introduction and establishment of invasive marine species	Yes	Yes	As above.
Section 8.3 – Interference with third-party vessels and activities	Yes	No	Reg 13F(1)(a) Government departments/agencies Reg 13F(1)(b) Commercial fishing associations
Section 8.4 – Vessel strike with megafauna	Yes	No	Reg 13F(1)(a) Government departments/agencies Reg 13F(1)(b) First Nations Peoples
Section 8.5 – Diesel spill Residual risk assessment (i.e., with control measures in place) determined risks to environmental and socio-economic receptors are all 'low.'	Yes	Yes	Reg 13F(1)(a) Government departments/agencies Reg 13F(1)(b) First Nations Peoples Reg 13F(1)(b) Commercial fishing associations Reg 13F(1)(b) Recreational fishing associations Reg 13F(1)(b) Local Government Authorities
Section 8.6 – Oil spill response activities	Yes	Yes	As above.

3.3.1 Relevant Person Categories – Reg 13F(1)(a) – Authority or Entity of the State

Table 3-3 outlines the authorities or entities of the State (and Commonwealth, mostly related to overlap with the EMBA rather than the activity area) that have been identified as relevant persons under Regulation 13F(1)(a).

3.3.2 Relevant Person Identification – Reg 13F(1)(b) – Person or Organisation with Functions, Interests or Activities that may be Affected

3.3.2.1 Relevant Person Identification – General Methods

Authorities, entities, persons and organisations whose functions, interests or activities who may be affected by the proposed geotechnical investigations were researched by either:

- Database review;
- Functions, interests or activities;
- Local knowledge;
- Broad based keyword internet searches; and
- Marine Spatial Planning Framework.

Table 3-3 presents the relevant persons under Regulation 13F(1)(b) that have been identified using the methods outlined above, listing their functions, interests and activities and the values and sensitivities.

In light of the findings of the Case and the Appeal, the methods used to identify First Nations People and commercial fishers is described in more detail below.

3.3.2.2 Relevant Person Identification – First Nations People

The activity area intersects with areas of First Nations People cultural heritage sensitivity. The activity area and EMBA are located within the sea country of the Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC), representing five clans: Bratualung, Brayakaulung, Brabralung, Krauatungalung and Tatungalung family clans (and adjacent to their traditional lands).

GB Energy first engaged with GLaWAC about the project in November 2018 as part of the EES, and ongoing and regular contact has continued since that time. A total of 37 days was spent with Traditional Owners completing field work and cultural heritage surveys in the onshore project area for the CHMP, together with a number of meetings and exchanges of correspondence. This included a meeting with the GLaWAC Registered Aboriginal Party (RAP) Manager (June, 2020) to present the results of the field work, and nominated management measures for inclusion in the CHMP.

The method of identifying potential First Nations Peoples that may be relevant persons included:

- Using existing relationships with First Nations People in the Gippsland region;
- Assessing the total values and sensitivities of the physical environment that may be affected by the planned and unplanned activities in the EP; and
- Understanding and respecting that it is common for First Nations Peoples to be protective of their cultural sensitivities, and therefore such information may not be published, undertaking further research to identify First Nations Peoples organisations and persons, including:
    - Researched Prescribed Bodies Corporate, RAPs, Native Title holders and claimants (using the National Native Title Tribunal [NNTT] website).
    - Consulted with GLaWAC to seek their advice on identifying relevant persons.

GB Energy have ongoing engagement with GLaWAC, with recent meetings in June 2024 to discuss these Geotechnical Investigations and discussions over future (not related to the Geotechnical investigation), land access and use (along route of future pipeline).

3.3.2.3 Relevant Person Identification – Commercial Fishers

The approach to identifying potentially impacted commercial fishing relevant persons is as follows:

- Identify and map Victorian and Commonwealth fisheries operating in the EMBA via the project Geographic Information System (GIS);
- Contact commercial and recreational fishing associations to ascertain whether they are relevant persons;
- Provide AFMA and VFA, as the Commonwealth and state-based commercial fisheries regulators, with information sheet and ask if they have any concerns;
- Provide an information sheet to relevant fishing associations, request direct meetings to provide opportunity for detailed discussion, respond to questions, concerns and further information requests, seek further information on actual fishing effort, and seek support for engagement with their members, either directly or via the association as applicable;
- Provide additional information to interested fishery groups where requested;
- Send follow up emails and phone key associations and fishers who may fish in the operating area; and
- Where fishers have identified that they may be potentially impacted by the project, GB Energy has liaised directly with them or the relevant fishing industry association to gather information (e.g., species targeted, fishing patterns and locations) and elicit concerns. For on-water project activities that have already occurred (i.e., geophysical investigations) and those that will occur in future, GB Energy has used South-East Trawl Fishing Industry Association's (SETFIA's) SMS service to keep commercial fishers informed of the location and timing of activities.

3.3.3 Relevant Persons – Reg 13F(1)(c) – Any other Person or Organisation

GB Energy identifies media organisations (print, television, radio, social) as 'other persons or organisations' per Regulation 13F(1)(c). This is because such organisations do not have a function, interest or activity in the project area per se, rather their 'function' is to report on stories that are likely to have a broader public 'interest.'

To keep the local and regional community informed of the project, GB Energy has consulted with the organisations listed in Table 3-3 through means such as feature interviews and advertising.

Table 3-3. Relevant Persons under Regulation 13f(1)

Category A – Authority or entity of the State	
Commonwealth government agencies	
AMSA – Nautical and Regulation Section	Department of Climate Change, Energy, the Environment and Water (DCCEEW)
AFMA	DoD – Defence Support Group & Royal Australia Air force (RAAF) Base East Sale
Australian Hydrographic Office (AHO)	Department of Agriculture, Fisheries and Forestry (DAFF)
Victorian government agencies	

DEECA	EPA
DEECA - ERR	Parks Victoria
Department of Transport and Planning (DTP)	Safe Transport Victoria
Department of Treasury and Finance	VFA
East Gippsland CMA	West Gippsland Catchment Management Authority (CMA)
Elected Victorian government officials	
Minister Danny O'Brien	
Local government	
East Gippsland Shire Council	Wellington Shire Council
Category B – Person or Organisation with functions, interests or activities that may be affected	
First Nations People	
GLaWAC	
Petroleum and greenhouse gas titleholders	
3D Oil	Esso Australia Resources Pty Ltd (EARPL)
CarbonNet Project	Petro Tech Pty Limited
Carmarvon Hibiscus Pty Ltd	
Fisheries associations – commercial	
Abalone Council Victoria	Seafood Industry Victoria (SIV)
Commonwealth Fisheries Association (CFA) (Comfish)	SETFIA
Eastern Zone Abalone Industry Association (EZAIA)	Victorian Scallop Fishermen's Association (VSFA)
Lakes Entrance Fisherman's Cooperative (LEFCOL)	
Commercial fishing license holders	
Mitchelson Fisheries	
Local groups and residents	
Committee for Gippsland	Landowners (onshore pipeline alignment)
Golden Paradise Beach Ratepayers and Residents Association	Local residents via the Golden Beach Community Centre
Fishing Associations - recreational	
Victorian Recreational Fishing (VRFish)	
Emergency preparedness and response agencies	
Gippsland coastguard	
Category C – any other person or organisation	
Australian Financial Review newspaper	Latrobe Valley Express newspaper
Gippsland Times and Maffra Spectator newspaper	

3.4 Provision of Information

3.4.1 Approach to Providing Information

The OPGGS Regulations requires titleholders to give each relevant person sufficient information to allow them to make an informed assessment of potential effects on their functions, interests or activities from the activities in the EP. Provision of information is responsive and adaptive to the individual needs and circumstances of the relevant person seeking the information. Key approaches to providing sufficient information are set out in Table 3-4.

Table 3-4. Information provided for Relevant Persons categories

Category	Description	Information type
13F(1)(a)	Relevant authorities or entities of the State	Information sheet emailed to relevant persons. Provision of further information where requested or required. Participation in TRG during the development of the EES. Meeting or phone call where requested or required. Commencement and cessation notices for relevant agencies.
13F(1)(b)	Persons or organisations whose functions, interests or activities may be affected by the activity	Information sheet emailed to relevant persons. Meetings with SETFIA. Phone calls (when there is no response to initial emails). Provision of further information where requested or required. Public notice advertisements. Feature stories (print, radio, television, social media). Community information sessions in Golden Beach.
13F(1)(c)	Any other person or organisation	Updates to project timings. Commencement and cessation notices. Public notice advertisements. Feature stories (print, radio, television, social media). Community information sessions in Golden Beach.

In the information flyers issued to date to relevant persons specifically for the full EP, GB Energy provided as much information as was available regarding investigation techniques and potential impacts and risks, which is considered a sufficient level of information for several reasons:

- Many of the government agencies were involved in the TRG and are well informed of the Project;
- GB Energy consulted with stakeholders and the local communities in 2019 for the G&G investigations EP with no significant concerns raised;
- The EES was hosted on the GB Energy website for over two years, with no related comments or enquiries submitted post-EES exhibition;
- The project is located within Australia's oldest petroleum exploration and production region, where the petroleum industry has established close working relationships with local communities. As such, local communities are very well informed and educated about offshore petroleum activities and don't have the same concerns that communities new to the industry have; and
- No complaints about the level of detail or requests for additional information resulting from the distribution of these or previous information sheets has been received by GB Energy.

3.4.2 Consultation in the Course of Preparing the EES

Significant consultation for the Golden Beach Gas Project was undertaken between October 2018 and December 2020 while preparing the EES. A summary of consultation undertaken while preparing the EES is provided in Table 3-5 because this consultation has also informed the preparation of the EP.

Evident in this table is the significant opportunity (about 3 years) for relevant persons to inform GB Energy of their functions, interests and activities that may be affected by the project. The EES was accepted by the Minister for Planning on the 9th of April 2021.

Table 3-5. Summary of consultation undertaken in the course of preparing the EES

Date	Description
2018	
24 October	Introductory meeting with GLaWAC
24 October	Introductory meeting with SETFIA
29 October	Briefing of SIV
31 October	Introductory meeting with Gippsland Water
6 November	Radio Interview with ABC Gippsland
13 November	Briefing of Wellington Shire Council, Chamber of Commerce and Gippsland Times
13 November	Briefing of local MPs
19 November	Introductory meeting with Local Ratepayers Association
28 November	Project information provided to key stakeholders including Victorian Fishing Association RecFish, NNTT, DoD, nearby permit holders, State and Federal departments
8 December	Community Session #1 at Golden Beach
2019	
January	Approval of Pipeline Consultation Plan and commencement of engagement with landowners and Wellington Shire on proposed pipeline route
2 March	Community Session #2 at Golden Beach
27 March	Meeting with local community organisations with respect to support for Easter community events
11 April	Meeting with SETFIA and GB Energy's subsea design engineer to discuss measures to minimise impacts to trawl fishing. Related to production wells rather than GB-2.
24 May	Meeting with Golden Paradise Beach Ratepayers' Association to discuss community development initiatives
25 May	Community Session #3 at Golden Beach
27 August	Meetings with GLaWAC, Wellington Shire Council and Gippsland Water
11 September	Information sheet distributed
14 September	Radio interview with Gippsland FM
21 September	Community Session #4 at Golden Beach
3 December	Briefing for Wellington Shire Council and Executive
2020	
February	Project Update distributed by email
5 February	TRG Meeting #1

Date	Description
29 February	Community Session #5 at Golden Beach
March	Project Update distributed by email
March	EES Draft Scoping guidelines released (by the then DELWP) inviting public comments
24 March	TRG Meeting #2
27 April	TRG Meeting #3
May	Project Update distributed by email
May	EES Technical Studies Fact Sheets distributed by email
May	EES Fact Sheets published in Letts Beach News
27 May	TRG Meeting #4 (marine ecology study presented)
June	EES Technical Studies Fact Sheets distributed by email
16 June	Briefing of Wellington Shire Councillors and Executive
20 June	Community Session #6 at Golden Beach
23 June	TRG Meeting #5
July	EES Facts Sheets published in Letts Beach News
15 July	TRG Meeting #6
August	Project Update distributed by email
21 & 24 August	Community Session #7 (two virtual meetings due to Covid-19 restrictions)
18 October	Terms of Reference for EES inquiry released (by the Minister for Planning)
26 October	EES released for public exhibition
27 October	Advertisement of publication of EES, Pipeline Licence and Works Approval in the *Herald Sun* newspaper (available state-wide)
17 December	EES Directions Hearing (submitters to the EES invited to attend)

Following the closure of the EES process, GB Energy consulted with multiple commercial parties to fund the project's development.

3.4.3 Consultation Undertaken in the Course of Preparing this EP

Consultation undertaken while preparing the EP has built on that undertaken in the course of preparing the EPs for the G&G investigations and GB-2 drilling, noting that the geotechnical investigations is but one part of the greater Golden Beach Gas Project development.

In May 2021, the Commonwealth Energy Minister at the time announced Budget funding to support the project and specifically the drilling of GB-2. The intention at that time was that the funding would be in place within a few months and then a commitment would be made to drill GB-2, at which time further consultation with relevant persons would take place. The expectation was that drilling would take place in about March 2022 and as such, engagement would re-commence six months ahead of that, in September 2021.

GB Energy made a deliberate decision not to undertake proactive engagement activities while the Commonwealth funding process was underway. This was due to:

- Uncertainty around the timeframe of potential activities;
- Potential change of the nature and scope of activities;

- Concerns with the previous consultation burden on relevant persons through the EES process; and
- Relevant persons fatigue post-EES and as a result of many other projects in the local region (e.g., CarbonNet Project, Star of the South and the Seadragon offshore windfarm proposals) undertaking consultation at this time.

The funding from the Commonwealth was ultimately delayed and did not conclude until May 2022. GB Energy recommenced engagement planning activities in June 2022 and formally kicked off engagement in July 2022, with an increase in engagement in September 2022. The timing of this was deliberate as it was seen to be six months in advance of the GB-2 drilling activities commencing, which represented a suitable time to re-engage with relevant persons.

The principals and practices of the IAP2 spectrum have also been applied in the consultation undertaken while preparing the EP, noting that interest levels in the project have been very low.

A summary of consultation undertaken in the course of preparing the EP is provided in Table 3-6. This summary indicates that GB Energy has provided sufficient time (over two months) to relevant persons to engage on the proposed geotechnical investigations. To date, no relevant persons have raised concerns that their functions, activities or interests may be negatively impacted by the geotechnical investigations.

Table 3-6. Summary of consultation undertaken in the course of preparing the EP

Date	Description
19 April 2024	GB Energy website updated with Geotechnical Investigations sections, including link to existing EP.
23 April 2024	Project newsletter April 2024 and geotechnical investigations flyer sent out via email.
28 April 2024	300 Printed copies of April 2024 project update and geotechnical investigation flyers distributed by Golden Beach Residents and Rate Payers Association to Golden Beach, Paradice Beach and Duston Downs. Additional 150 copies distributed to Golden Beach, Seaspray and Longford General Stores.
30 April 2024	Press release in the *Gippsland Times Newspaper* included April newsletter and geotechnical survey information.
1 May 2024	Press release in the *Latrobe Valley Express Newspaper* included April newsletter and geotechnical survey information.
8 May 2024	Community information session held at Sale community library.
8 May 2024	Community information session held at Golden Beach community hall.

3.5 Measures Implemented in Response to Consultation

As a result of consultation with relevant persons while preparing this EP, there have been no requests to modify or add control measures for the geotechnical investigations. Twelve (12) public submissions were received in response to the public exhibition of the EES, with none of these relating to the environmental management of the offshore exploration activities.

In general, and despite the significant consultation undertaken for the project, there has been very little concern expressed by stakeholders to GB Energy regarding offshore environmental issues.

3.6 Management of Objections and Claims

If any objections or claims (that are non-vexatious in nature) are raised during consultation with relevant persons, GB Energy will attempt to substantiate these using evidence such as publicly available and credible information (e.g., scientific article, government-supplied fishing data). No such objections or claims have been raised in relation to the geotechnical investigations.

Where the objection or claim is substantiated, where applicable, it will be assessed as per the risk assessment process and controls applied where appropriate to manage impacts and risks to ALARP and an acceptable level. Relevant persons will be provided with feedback as to whether their objection or claim was substantiated, and if not why, and if it was substantiated, how it was assessed and if any controls were put in place to manage the impact or risk to ALARP and an acceptable level. If the objection or claim triggers a revision of the EP, this will be managed in accordance with GB Energy's Management of Change process and the relevant person will be advised of the process.

3.7 Ongoing Consultation with Relevant Persons

Consultation with relevant persons in the preparation of the EP does not end once the EP is submitted for assessment to ERR or once it is accepted. Consultation is ongoing in the lead up to, during and after the geotechnical investigations.

GB Energy continues to consult with relevant persons regarding the geotechnical investigations and the project more broadly. For the geotechnical investigations this will be achieved via a number of methods, as outlined in Table 3-7. The planned events and notifications are subject to change, based upon the operational timings for geotechnical vessel and commencement of operations. Additional events and/or the timing and content of events may be modified based upon the feedback received from relevant persons.

Any new relevant persons identified through the ongoing consultation process will be contacted and provided information about the activity relevant to their functions, interests or activities.

Table 3-7. Summary of plan for ongoing consultation with relevant persons

Timing/ milestone	Relevant person	Consultation method/content
Ongoing		
As required	All relevant persons	• Communication of information and addressing queries and concerns via email, phone or meeting. • Project updates including acceptance of EP and start and completion of drilling.
Pre-activity		
2 to 4 weeks prior to activity commencing	AHO & MSV	GB Energy to issue notification of activity for publication of NTM, including: • Geographical coordinates of the activity; • Duration of vessel presence on location; • Vessel details including names, Maritime Mobile Service Identity, satellite communications details (including INMARSAT-C and satellite telephone), contact details and call signs; and • GB Energy contact details. GB Energy will provide updates on project timing and any changes to the intended operations.
10 days prior to activity commencing	DEECA – ERR	Email notification of start of activity.
	GB Energy LinkedIn members	Posting of a LinkedIn notification that the activity is imminent.

Timing/ milestone	Relevant person	Consultation method/content
7 days prior to vessel arrival	Local community and visitors	Signage will be posted at the Golden Beach lookout and campgrounds along the foreshore providing details of the geotechnical investigations given that the vessels will be close to the beach.
	Local community	Advertising of the vessels' arrivals in *The Gippsland Times* and *Latrobe Valley Express* newspapers and the *Letts Beach News*.
48 – 24 hrs prior to activity commencing	AMSA - JRCC	Per AHO & MSV information.
While undertaking investigations		
During activity	All relevant persons	• Communication of information and addressing queries and concerns via email, phone or meeting. • Emergency notifications via email, as and if required (e.g., diesel spill).
	GB Energy LinkedIn members	LinkedIn post to provide update on operations.
	General public	Progress updates released weekly via the GB Energy website.
	Commercial fishers active in the area	SMS via SETFIA advising of the geotechnical vessel's location and activity timing.
Activity completion		
Within 24 hours of activity completion	AMSA – JRCC	Email notification providing information on completion in order to cease AusCoast warnings.
Within 2 days of activity completion	All relevant persons	Email notification providing information on completion and vessel demobilisation.
	AHO & MSV	Email notification providing information on completion in order to cease NTM.
Within 10 days of activity completion	DEECA - ERR	Email notification of cessation of activity.
	Local community	Remove information signage at the Golden Beach lookout and campgrounds.
	GB Energy LinkedIn members	LinkedIn post to provide notification of cessation of activity.
	General public	Notification of cessation of activity via the GB Energy website.

4 Description of the Existing Environment

In accordance with OPGGS Regulation 13E, the EMBA by the activity is summarised in this section, together with its values and sensitivities. While each project hazard has its own unique EMBA, the most significant one has been chosen for this chapter, which is that relating to a diesel spill.

This diesel spill EMBA has been established through hydrocarbon spill modelling and is based upon the area that could be affected by the largest credible spill from the project vessels. The EMBA (Figure 4.1) is therefore defined as:

The extent of low level hydrocarbon exposure to the sea surface (1 µm) and contact to shorelines (>10-100 g/m^2) as a result of the loss of 155 m^3 of marine diesel oil over 6 hours from a project vessel within the proposed activity area during annualised metocean conditions.

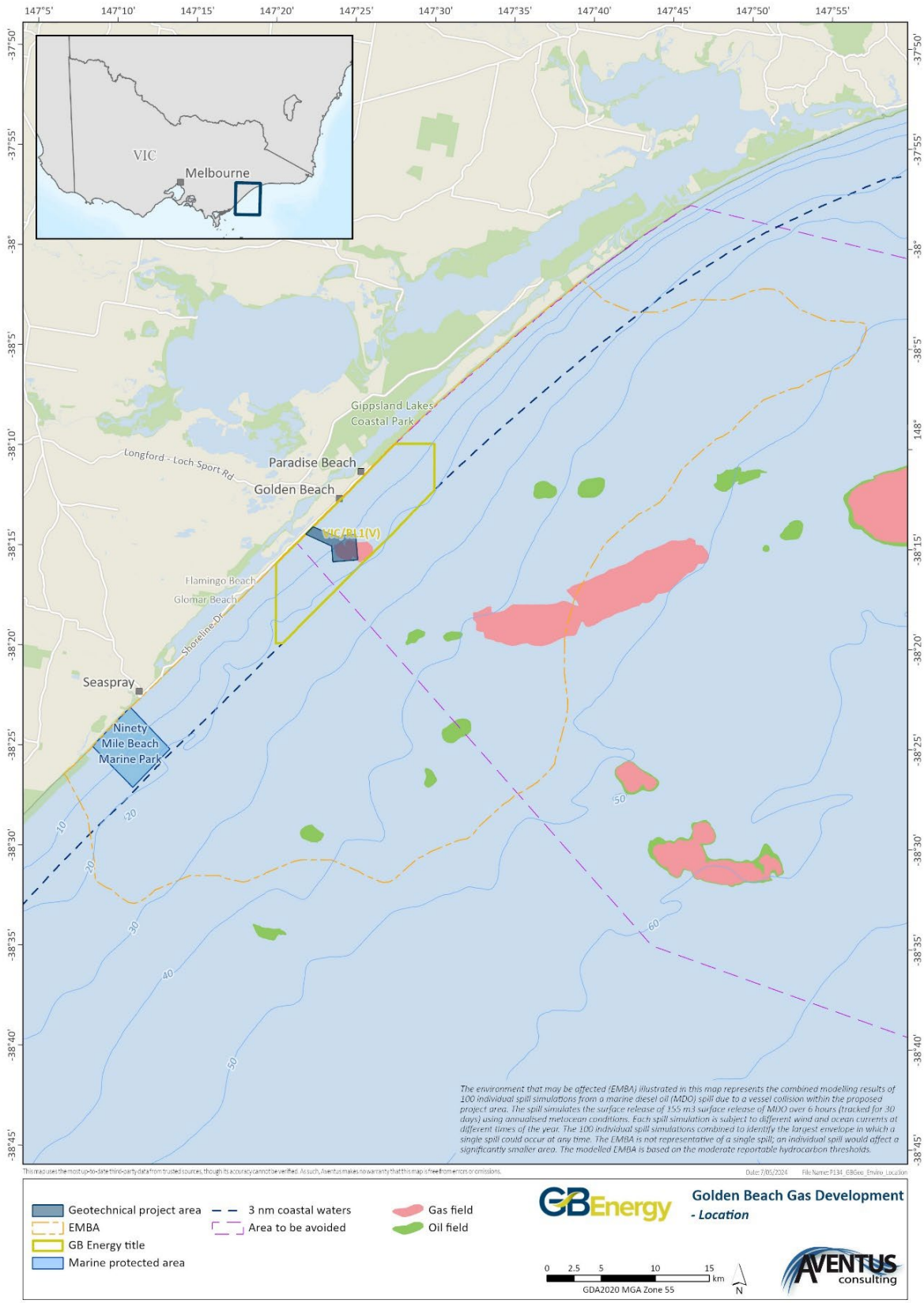


Figure 4.1 The EMBA

Table 4-1 summarises the presence or absence of receptors and sensitivities within the proposed operational area.

Table 4-1 Presence of receptors within the activity area and EMBA

Receptor	Activity area	EMBA
Physical		
Low profile rocky reef	Patchy	Patchy
Sponge garden	Patchy	Patchy
Conservation values		
AMPs		
World Heritage-listed properties		
National Heritage-listed properties		
Threatened Ecological Communities (TECs)		
Key Ecological Features (KEFs)		Upwelling East of Eden (located 1.8 km east of the EMBA)
Nationally Important Wetlands		
Victorian marine protected areas		Ninety Mile Beach
Onshore protected areas		
Biological environment		
Plankton		
Benthic species:		
- commercial scallops		Isolated individuals
- rock lobsters	Isolated individuals	
Seagrass beds	Isolated & sparse	
BIA for fish:		
- Great white shark		
BIA for cetaceans:		
- Pygmy blue whale	Foraging & distribution	Foraging & distribution
- Southern right whale	Migration & reproduction	Migration & reproduction
- Humpback whale		
Pinnipeds	Foraging only	Foraging only
Reptiles	Vagrants only	Vagrants only
Seabirds		
Shorebirds		
Marine pests	Possible	Possible
Cultural Heritage Values		
Shipwrecks		
Indigenous heritage		
Socio-economic Environment		

Receptor	Activity area	EMBA
Native Title		
Tourism	Possible game fishing	
Petroleum infrastructure		
Commercial fishing	**Victorian:** Ocean (general) Octopus Purse seine Rock Lobster Scallop **Commonwealth:** Southern Squid Jig Fishery SESSF – CTS – otter board SESSF – CTS – Danish seine	**Victorian:** Ocean (general) Octopus Purse seine Rock Lobster Scallop Trawl **Commonwealth:** Southern Squid Jig Fishery SESSF – CTS – otter board SESSF – CTS – Danish seine
Recreational fishing	Possible game fishing	
Commercial shipping		

Red shading denotes no presence, green shading denotes presence.

4.1 Regional Context

The activity area and EMBA are both wholly located within the South-east Shelf Transition provincial bioregion within the South-east marine region (CoA, 2015a). Victoria's marine environment has been classified into five mesoscale bioregions, with the activity area and EMBA located wholly within the Twofold Shelf bioregion.

4.1.1 Climate

The region's climate is moist cool temperate (Barton *et al*., 2012), with cool wet winters and cool summers. It is influenced by rain bearing cold fronts that move from south-west to north-east across the region, producing strong winds from the west, north-west and south-west. In winter, when the subtropical ridge moves northwards over the Australian continent, cold fronts generally create sustained west to south-westerly winds and frequent rainfall in the region (McInnes and Hubbert, 2003). In summer, frontal systems are often shallower and occur between two ridges of high pressure, bringing more variable winds and rainfall.

4.1.1.1 Temperature and Rainfall

Climate statistics between 2006-2024 at Lakes Entrance (62 km northeast of the activity area, but the closest coastal town with a Bureau of Meteorology [BoM] weather station) shows that the average maximum temperature ranges from 15.2ºC - 24.3ºC and the average minimum temperature ranges from 6ºC – 15.2ºC (BoM, 2024). Mean annual rainfall is 724 mm with June producing the most rainfall and May the least (BoM, 2024).

4.1.1.2 Winds

Bass Strait is located on the northern edge of the westerly wind belt known as the Roaring Forties. Occasionally, intense meso-scale low-pressure systems occur in the region, bringing very strong winds, heavy rain and high seas. These events are unpredictable in occurrence, intensity and behaviour, but are most common between September and February (McInnes and Hubbert, 2003).

4.1.2 Physical Environment

4.1.2.1 Seabed

This section details the seabed composition on regional and local level as well as specific to the activity area.

Regional

Bass Strait is concave-shaped, with a shallower rim on the eastern and western entrances to the strait and a deeper centre.

The substrate across Bass Strait comprises a variety of sediment types (Harris and Heap, 2009; Wilson and Poore, 1987). Inner shelf sediments, such as those of the activity area, generally consist of fine sands (Harris and Heap, 2009; Victorian Department of Economic Development, Jobs, Transport and Resources [DEDJTR], 2017a), with moderate and well-sorted sands confined to the nearshore zone (Harris and Heap, 2009).

Geoscience Australia's seafloor sediments database classifies the proposed activity area as having sediment grain sizes ranging in diameter from 0.2 to 0.5 mm, with isolated pockets within the EMBA having sediment diameters up to 5 mm (Harris and Heap, 2009).

Harris and Heap (2009) also state that that the calcium carbonate content of the sands in the activity area and the EMBA is about 10-20%. The carbonate component consists of recognisable skeletal fragments of molluscs, bryozoans and foraminifera (Harris and Heap, 2009).

Local

In 2021, the DELWP sponsored a new unified scheme for marine ecological classification, referred to as the Combined Biotope Classification Scheme (CBiCS). Edmunds et al. (2021) defines a biotope as a term describing a community of species in a defined abiotic habitat.

The activity area comprises predominantly of sublittoral sand and muddy sand, and littoral sand (where the activity area meets the shoreline). The activity area also contains sparse amounts of non-reef sediment epibenthos, high energy infralittoral rock, high energy littoral rock, and sublittoral seagrass beds. Similarly, the marine environment surrounding the activity area also contains the biotopes listed above with the addition of littoral sand, moderate energy infralittoral rock, sublittoral coarse sediment, and sublittoral seaweed on sediment (see Section 4.2.1).

Light Detection and Ranging (LiDAR) derived data on the sediments of the nearshore Victorian coastline was acquired in late 2008/early 2009 also indicates that the majority of the seabed shoreward of the activity area comprises sandy sediments. Intermittent and very narrow areas of low-profile reefs (about 0.5 m to 1.5 m in height above the surrounding seabed), running parallel to the coast, are scattered through the nearshore sandy sediments along the Ninety Mile Beach. These reefs comprise calcarenite and occur immediately behind the surf zone, in water depths ranging from 7 to 25 m (Burton *et al.*, 2012) and are likely to be often covered by mobile sand.

A seabed survey undertaken in 2007 for the nearby Sealion-1 drilling location (13.9 km to the east of the activity area) found fine to medium grained, yellow-brown unconsolidated sand with minor (<3 mm diameter sized) shell fragments (Fugro, 2007).

Activity area

Fugro undertook a geophysical survey in the activity area in March 2020 for GB Energy. Fugro found the gradient of the activity area is very flat, ranging from 0 m at the beach to 19.5 m at its deepest point. The key observations from the survey were:

- There are elongated seabed depressions oriented northwest-southeast in the activity area;
- The proposed pipeline route passes through seabed depressions;

- The seabed at the proposed well locations is flat; and
- The seabed depression depths measured less than one metre from the surrounding seabed.

The seabed around the activity area is largely homogenous, consisting primarily of unconsolidated sediments with some isolated patchy areas of reef/rock.

The seabed samples collected indicate that the seabed of the activity area is predominantly two types of carbonate sand:

- Class 1: Low, uniform, reflectivity response interpreted as flat lying sediments including fine to medium grained carbonate sands with silts.
- Class 2: Moderate to high reflectivity response interpreted as fine to coarse carbonate sands, gravels and shells.

Table 4-2 presents a summary of the grab sample material descriptions. The grab samples that were collected assist in determining the seabed types distributed at the GB-2 well site and along the pipeline corridor within the activity area.

Table 4-2 Grab sample results of the geophysical activity area

Sample ID	Location		Sample Description
	Easting (m)	Northing (m)	
Pipeline corridor			
G_001 9.6 m water depth	532,988	8,767,512	Siliceous CARBONATE SAND with silt. Sand is olive brown, fine grained and composed of mixed carbonates and siliclastics (mainly quartz), well sorted with few medium sand shell fragments and traces of coarse sand shell fragments. Some marine growth.
G_002 16.9 m water depth	533,808	5,767,126	Siliceous CARBONATE SAND with silt. Sand is olive brown, fine to medium grained and composed of mixed carbonates and siliclastics (mainly quartz), with few shell fragments and traces of coarse sand shell fragments
G_003 17.3 m water depth	533,942	5,767,277	Gravelly siliceous CARBONATE SAND. Sand is reddish to orange brown and coarse grained. Medium sand fraction composed of mainly quartz (clear and frosted) and some mixed carbonates. Coarse sand is partly shells and shell fragments With gravel composed of shells, shell fragments and traces of rock fragments
G_004 17.9 m water depth	534,565	5,766,820	Siliceous CARBONATE SAND with silt. Sand is olive brown, fine grained and composed of mixed carbonates and siliclastics (mainly quartz), well sorted with medium sand and few shell fragments and traces of coarse sand shell fragments
G_005 18.5 m water depth	534,714	5,766,879	Gravelly siliceous CARBONATE SAND. Sand is reddish to olive brown, coarse grained, and composed of mixed carbonates, particularly shells, shell fragments and probable coral fragments. Gravels of similar composition. Sample is composed for small part (10%) of fine sand
GB-2 Well site			
G_006	535,446	5,766,567	Siliceous CARBONATE SAND with silt. Sand is olive brown, fine grained and composed of mixed

Sample ID	Location		Sample Description
	Easting (m)	Northing (m)	
18.6 m water depth			carbonates and siliclastics (mainly quartz), well sorted with medium sand and few shell fragments and traces of coarse sand shell fragments
G_007 18.8 m water depth	535,458	5,766,593	Gravelly siliceous CARBONATE SAND. Sand is reddish to olive brown, fine to coarse grained. Fine to medium sand fraction composed of mainly quartz (clear and frosted) and some mixed carbonates. Coarse sand is mainly shells (intact bivalves) and shell fragments with gravel shells, shell fragments (e.g. oyster shell) and traces of rock fragments
G_008 18.8 m water depth	535,532	5,766,779	Gravelly siliceous CARBONATE SAND. Sand is reddish to olive brown, fine to coarse grained. Fine to medium sand fraction composed of mainly quartz (clear and frosted) and some mixed carbonates. Coarse sand is mainly shell fragments with gravel.

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) GipNet study (2018) includes a series of monitoring sites located in and around the activity area. These sites have been surveyed for physical properties (such as sediment grain size) and biological properties (including seabed habitat types and benthic fauna abundance). The CSIRO has shared this raw data (i.e., no consolidated study report has been made available) with GB Energy.

Table 4-3 summarises the substrate types identified at the CSIRO investigation sites within the activity area (site 9, 10, 11) by towed camera footage. CSIRO also conducted seabed surveying using SSS, which provides detailed bathymetry mapping of the seafloor in the activity area.

Table 4-3 Seabed conditions at CSIRO investigation sites within the activity area

CSIRO site	Water depth	Seabed condition
9	15 m	Sandy substrate sparsely interspersed with marine flora and macroalgae. No rocky reef was observed in the towed camera footage of these sites.
10	19 m	
11	19 m	

The bathymetry mapping (in full EP) demonstrates that the seabed of the activity area gradually increases in depth away from the coast. Areas of rocky reef that overlap with the activity area are also visible as a rise of 0.5-1 m from the surrounding seafloor. CSIRO assessment site 17 was located within this reef.

Table 4-4. summarises the seabed substrate types of these sites adjacent to the activity area, as identified through towed camera footage captured by CSIRO.

Table 4-4. Seabed conditions at CSIRO investigation sites adjacent the activity area

CSIRO site	Water depth	Distance from the activity area	Seabed condition
5	15 m	1.3 km southwest	Dominated by rippled sandy sediments, no hard substrate or reefs observed.

CSIRO site	Water depth	Distance from the activity area	Seabed condition
6	19 m	1.7 km southwest	Dominated by rippled sandy sediments, no hard substrate or reefs observed.
7	20 m	670 m southwest	Dominated by rippled sandy sediments, no hard substrate or reefs observed.
12	20.5 m	270 m east	Dominated by rippled sandy substrate with some sporadic areas of seagrasses present. No hard substrate observed.
13	2.1 m	3.2 km north	Extensive areas of sandy sediments with only sporadic and interspersed areas of marine flora. Paucity of marine flora suggests lack of hard substrate present at the site.
14	17 m	1.8 km north	Rocky substrate and reef communities observed, dominated by marine flora beds, minimal areas of exposed sandy sediments.
15	20.5 m	1.8 km northeast	Dominated by rippled sandy sediments, no hard substrate or reefs observed.
17	18 m	237 m west	Some areas of sandy substrate. Rocky substrate, reef communities and marine flora observed.
18	18 m	307 m north	Extensive areas of sandy sediments with only sporadic and interspersed areas of marine flora. Paucity of marine flora suggests lack of hard substrate present at the site.
19	21 m	1.7 km northeast	Dominated by rippled sandy sediments, no hard substrate or reefs observed.

Independent of the CSIRO GipNet study, a marine habitat assessment (using a non-intrusive towed camera) was commissioned by CarbonNet and conducted in early April 2017 to provide information for the CarbonNet Pelican 3DMSS. The primary aim of the assessment, among others, was to determine broad seabed substrate types of the survey area, which included the GB Energy Project area. Of the 71 sites sampled in the Marine Seismic Survey (MSS) acquisition area, two sites are located within the activity area (site 32 and 33) and nine sites occur within proximity of the activity area (sites 23, 24, 31, 34, 41, 42, 43, 64 and 65) (CarbonNet, 2020). The results of this sampling indicate that sand is the dominant substrate around the activity area.

Table 4-5. CarbonNet seabed habitat investigation sites summary

CarbonNet Site	Water depth	Distance from activity area	Seabed substrate
23	20 m	220 m south	Rippled sandy substrate
24	21 m	355 m south	Rippled sandy substrate
31	19 m	663 m south	Rippled sandy substrate
32	19 m	Within the activity area	Rippled sandy substrate
33	20 m	Within the activity area	Rippled sandy substrate

CarbonNet Site	Water depth	Distance from activity area	Seabed substrate
34	20 m	1.1 km east	Rippled sandy substrate
41	17.5 m	535 m northeast	Rippled sandy substrate
42	20 m	467 m north	Rippled sandy substrate
43	20 m	1.3 km northeast	Rippled sandy substrate
64	20 m	405 m west	Hard substrate, marine flora and reef communities
65	20 m	605 m west	Hard substrate, marine flora and reef communities

4.1.3 Oceanography

4.1.3.1 Water depths

The activity area is located in shallow water depths ranging from 0 to 20 m in the Gippsland Basin. The bathymetry contours generally run parallel to the coast, though this pattern is less pronounced in waters deeper than 18 m.

4.1.3.2 Water Currents

Currents within Bass Strait are primarily driven by tides, winds and density-driven flows (RPS APASA, 2018). The region is oceanographically complex, with sub-tropical influences from the north and sub-polar influences from the south (CoA, 2015a). There is a slow easterly flow of waters in Bass Strait and a large anti-clockwise circulation (CoA, 2015a). Three key water currents influence Bass Strait:

1. The Leeuwin Current.
2. The East Australian Current (EAC).
3. The Bass Strait Cascade.

Table 4-6 provides the average and maximum combined surface current speeds (ocean plus tides) located within the activity area. The surface currents flow in the north-east to south-west axis parallel with the coastline. The average monthly surface current speed was 0.30 metres per second (m/s), with the maximum surface current speeds ranging between 1.0 and 1.5 m/s.

Table 4-6. Predicted average and maximum surface current speeds adjacent to the activity area from 2008-2012 (inclusive)

Month	Average current speed (m/s)	Maximum current speed (m/s)	General direction
January	0.28	0.95	Northeast/southwest
February	0.28	0.95	Northeast/southwest
March	0.28	0.92	Northeast/southwest
April	0.28	1.03	Northeast/southwest
May	0.28	1.04	Northeast/southwest
June	0.29	1.15	Northeast/southwest
July	0.28	1.01	Northeast/southwest
August	0.29	0.97	Northeast/southwest
September	0.30	1.0	Northeast/southwest
October	0.28	0.89	Northeast/southwest
November	0.27	0.93	Northeast/southwest
December	0.28	1.04	Northeast/southwest
Minimum	**0.27**	**0.89**	
Maximum	**0.30**	**1.15**	

Source: RPS APASA (2018).

4.1.3.3 Sea Temperature

The shallowness of Bass Strait means that its waters more rapidly warm in summer and cool in winter than waters of other nearby regions (CoA, 2015a). The sea surface temperatures in the area reflect the influence of warmer waters brought into Bass Strait by the EAC (IMCRA, 1998; Barton *et al.*, 2012).

RPS APASA (2018) reports that sea surface temperature in the region (based on the World Ocean Atlas database produced by the National Oceanographic Data Centre) varies annually from a minimum of 13°C (August/September) to a maximum of 19°C (March). The average annual sea surface temperature is 16°C.

4.1.3.4 Salinity

Salinity in the region consistently ranges from 35-36 practical salinity units (psu) throughout the year (based on the World Ocean Atlas database) (RPS APASA, 2018).

4.1.3.5 Tides

Bass Strait is a relatively shallow area of the continental shelf, connecting the southeast Indian Ocean with the Tasman Sea. Bass Strait has a reputation for high winds and strong tidal currents (RPS APASA, 2018).

Tidal currents run parallel to the coast and follow a semi-diurnal pattern (Barton et al., 2012).

The main tidal components in Bass Strait vary in phase by about three to four hours from east to west. Most of this phase change occurs between Lakes Entrance and Wilsons Promontory. Tidal flows in Bass Strait come in from the east and west during a rising (flood) tide and flow out to the east and west during a falling (ebb) tide.

4.1.3.6 Waves

Bass Strait is a high-energy environment exposed to frequent storms and significant wave heights (Jones, 1980), although Barton et al. (2012) report wave energy in the Twofold Shelf Bioregion as relatively low. Storms may occur several times a month resulting in wave heights of 3 to 4 m or more.

4.1.3.7 Water Quality

The ROS has a discharge point at Delray Beach that extends into nearshore waters in of the activity area. The mixing zone for the ROS extends within 100m of the ocean outfall diffuser (National Outfall Database, 2024), meaning that this mixing zone extends over much of the activity area. The last published full year of water quality data collection from this site was 2020. This indicates that the monthly average outfall volume was 851.93 megalitres (ML) and the average monthly results for assessable pollutants were:

- Colour (Pt. Co. units) – 218.33.
- E.coli (org/100 mL)- 3,709.4.
- pH – 7.9.
- Total dissolved solids (mg/L) – 3,100.
- Total suspended solids (TSS) (mg/L) – 11.83.
- Total nitrogen (mg/L) – 3.98.
- Total phosphorous (mg/L) – 1.31.

The data indicates that nutrient levels in the mixing zone are elevated compared to background levels.

4.1.3.8 Ambient Ocean Sound

Physical and biological processes contribute to natural background sound. Physical processes include that of wind, waves, rain and earthquakes, whilst biological noise sources include vocalisations of marine mammals and other marine species.

Table 4-7 presents a comparison of biological and anthropological sounds in the marine environment.

Table 4-7 Sound intensity and pressure (dB re 1uPa) @ 1 m from source for some common marine sources

Source	Sound intensity (dB re 1 uPa)	Frequency (Hz)	Reference
Natural sound			
Ambient sea sound	80-120	Varied	2
Undersea earthquake	272	50	2
Seafloor volcanic eruption	255+	Varied	2
Lightning strike on sea surface	250	Varied	2
Iceberg calving, shoaling and disintegration	220-245	Varied	5, 6
Bottlenose dolphin click	Up to 229	Up to 120,000	2
Breaching whale	200	20	2
Blue whale vocalisations	190	12 – 400 (16 – 25 dominant)	2

Source	Sound intensity (dB re 1 uPa)	Frequency (Hz)	Reference
Blue whale moans	188	12 – 390 (16 - 25 dominant)	1
Southern right whale	172 - 186	30 – 2,200 (50 – 500 dominant)	1
Humpback whale	144-174	30 – 8,000 (song) (120 – 4,000 dominant) 50 – 10,000 (social calls)	1, 3
Sperm whale clicks	Up to 235	100 – 30,000	2
Anthropogenic sound			
Seismic acoustic source (32 guns)	178-210	Most energy 5 to 200 Hz	1
Ship sound (close to hull)	200	10 - 100	2
Survey vessel	110-135 (without thrusters) 121-146 (with thrusters)	20 - 1,000	4
Fishing trawler	158	100	3
7 m outboard motorboat	156	630	3
Tanker (179 m)	180	60	3
Supertanker (340 m)	190	7	3
Containership (274 m)	181	8	3
Navigation transponders	180 – 200	7,000 – 60,000	3
SSS	220 – 230	50,000 – 500,000	3
Bottom profilers	200 – 230	400 – 30,000	3
References			
1 – Richardson et al. (1995).	3 – WDCS (2004).	5 – Chapp et al. (2005).	
2 – APPEA (2006).	4 – Total (2004).	6 – Matsumoto et al. (2014).	

4.2 Marine and Coastal Environment

A summary of marine and costal features within the activity area and EMBA is provided in Table 4-8.

Table 4-8 Summary of marine and costal features within the activity area and EMBA

Marine/coastal feature	Activity area	EMBA
Marine features		
Sublittoral sand and muddy sand		
Littoral sand		
High energy infralittoral rock		
Moderate energy infralittoral rock		
High energy littoral rock		
Non-reef sediment epibenthos		
Sublittoral seagrass beds		

Marine/coastal feature	Activity area	EMBA
Sublittoral coarse sediment		
Sublittoral seaweed on sediment		
Coastal features		
Sandy beach		
Hooded plover habitat		
Estuarine fish habitat		
Intermittently open estuaries		
Geological sites		

** Green shading indicates presence of the feature, red indicates an absence.*

4.2.1 Marine Environment

The biotopes within the activity area are discussed within Section 4.1.2.1. In addition to the biotopes found within the activity area, the EMBA also contains littoral sand, moderate energy infralittoral rock, sublittoral coarse sediment, and sublittoral seaweed on sediment. Habitat descriptions can be found at Marine and Coastal Knowledge – Supporting Information (https://www.marineandcoasts.vic.gov.au/marine-and-coastal-knowledge/feature-activity-sensitivity-tool/supporting-information).

4.2.2 Coastal Environment

The coastal environment described in this section is defined by the extent of the EMBA, which stretches for approximately 66 km from southwest of Seaspray to east of Loch Sport. The activity area is directly adjacent to the sandy shoreline between Delray Beach and Golden Beach.

The OSRA (2015) maps are the primary resource used when describing the coastal features of the EMBA. According to the OSRA (2015) maps the following features are overlapped by the coastal areas of EMBA:

- Sandy beach - majority of the coastal area overlapped by the EMBA comprises of sandy beaches, including Ninety Mile Beach;
- Hooded plover habitat - Hooded plover habitats are scattered along the sandy, coastal areas of the EMBA including near Lake Denison, Glomar Beach, Golden Beach and Loch Sport;
- Estuarine fish habitats - Estuarine fish habitats have been identified at the mouth of the Merriman creek estuary in Seaspray, which is intermittently open to the ocean;
- Intermittently open estuaries – the EMBA overlaps the Merriman creek estuary and Lake Dennison estuary; and
- One geological site - located at the mouth of the Merriman creek estuary.

4.3 Conservation Values and Sensitivities

The conservation values and sensitivities in and around the activity area particularly, but also within the EMBA, are described in this section, with Table 4-9 providing an outline of the conservation categories included.

Table 4-9 Conservation values in the EMBA

Category	Conservation classification	Section
MNES under the EPBC Act	AMPs	Section 4.3.1
	World Heritage-listed properties	Section 4.3.2
	National Heritage-listed places	Section 4.3.3
	Wetlands of international importance	Section 4.3.5
	Nationally threatened species and TECs	Throughout section 4.4 & 4.3.6
	Migratory species	Throughout Section 4.4
	Commonwealth marine areas	Throughout Section 4.4
	Great Barrier Reef Marine Park	Not applicable.
	Nuclear actions	Not applicable.
	A water resource, in relation to coal seam gas development and large coal mining development	Not applicable.
Other areas of national importance	Commonwealth heritage-listed places	Section 4.3.4
	Key Ecological Features (KEF)	Section 4.3.7
	Nationally important wetlands	Section 4.3.8
Victorian protected areas	Marine National Parks and Sanctuaries	Section 4.3.9
	Coastal (onshore) conservation reserves	Section 4.3.9

4.3.1 Australian Marine Parks

No AMPs are located within the activity area or EMBA.

The Beagle AMP is the closest, located 96 km southwest of the activity area, followed by the East Gippsland AMP, located 214 km southeast of the activity area.

4.3.2 World Heritage-Listed Properties

No properties on the World Heritage List occur within the EMBA or activity area. The nearest site is the Royal Exhibition Building and Carlton Gardens in Melbourne, an onshore property located 215 km to the northwest of the activity area.

4.3.3 National Heritage-Listed Places

There are no National Heritage-listed places in Bass Strait, with the nearest places all located onshore (Australian Alps National Parks and Reserves and the Point Nepean Defence Sites and Quarantine Station Area) over 70 km away.

4.3.4 Commonwealth Heritage-listed Places

No properties on the Commonwealth Heritage List occur within the EMBA. The nearest places are the Wilsons Promontory Lighthouse (128 km southwest of the activity area) and the Gabo Island Lighthouse (232 km northeast of the activity area).

4.3.5 Wetlands of International Importance

There are no Ramsar wetlands in within the activity area or EMBA. However, the 'Gippsland Lakes' Ramsar site is located in very close proximity to the shoreline contact points of the EMBA.

4.3.6 Threatened Ecological Communities

An ecological community is a naturally occurring group of native plants, animals and other organisms that are interacting in a unique habitat. TECs are a MNES under the EPBC Act. TECs provide wildlife corridors and/or habitat refuges for many plant and animal species, and listing a TEC provides a form of landscape or systems-level conservation (including threatened species) (DCCEEW, 2024h).

The following TEC's were detected by the PMST and overlap with the coastal areas of the EMBA:

- Natural Damp Grassland of the Victorian Coastal Plains; and
- Subtropical and Temperate Coastal Saltmarsh

Both of the above listed TECs are described within this section.

4.3.6.1 Natural Damp Grassland of the Victorian Coastal Plains

This TEC is a type of grassland that ranges of open grassy woodland with scattered trees and shrubs that occurs in the south east coastal Plain. This TEC is generally found on heavy grey silty–loamy soils, which are poorly drained and therefore often damp and sometimes waterlogged. The heavy soils may be derived from floodplain or swamp deposits, and they may be influenced by moisture from local rainfall, surface flows from local creeks or runoff from surrounding land, and occasionally groundwater. Despite this TEC being terrestrial in nature, a range of wetland and coastal birds utilise this TEC such as the curlew sandpiper, Australasian bittern, white-throated needletail, pacific golden plover, Australian painted snipe, Australian fairy tern, and the marsh sandpiper.

4.3.6.2 Subtropical and Temperate Coastal Saltmarsh

According to the Conservation Advice for Subtropical and Temperate Coastal Saltmarsh, this TEC occurs in a relatively narrow strip along the Australian coast, within the boundary along 23°37' latitude along the east coast and south from Shark Bay on the west coast of WA (TSSC, 2013). The community is found in coastal areas which have an intermittent or regular tidal influence. The saltmarsh community is inhabited by a wide range of infaunal and epifaunal invertebrates and low and high tide visitors such as fish, birds and prawns (Adam, 1990). It is often important nursery habitat for fish and prawn species. Insects are also abundant and an important food source for other fauna. The dominant marine residents are benthic invertebrates, including molluscs and crabs (Ross et al., 2009).

4.3.7 Key Ecological Features

Both the activity area and EMBA do not intersect any KEFs, the closest being the 'Upwelling East of Eden' KEF (located 52 km east of the activity area and 1.8 km east of the EMBA).

4.3.8 Nationally Important Wetlands

Several nationally important wetlands occur along the Victorian coast, although none of these occur within the EMBA. As such, they are not described here. The nearest nationally important wetland to the EMBA is the 'Lake Victoria Wetlands' located 1.1 km north of the EMBA.

4.3.9 Victorian Marine and Coastal Protected Areas

Victoria has 24 marine national parks and sanctuaries that were established, and are protected and managed, under the National Parks Act 1982 (Vic) by Parks Victoria. There is one marine protected area located in the EMBA, being the Ninety Mile Beach Marine National Park (MNP), 22 km southwest of the activity area.

Victoria has 45 national parks and 26 state parks that were established, and are protected and managed, under the National Parks Act 1982 (Vic), Crown Lands (Reserves) Act 1978 (Vic) and Parks Victoria Act 1998 (Vic) by Parks Victoria.

There is one onshore protected area in the EMBA, this being the 'Gippsland Lakes Coastal Park'.

4.3.9.1 Ninety Mile Marine National Park

The Ninety Mile Beach MNP covers an area of 2,750 ha and extends along approximately 5 km of coastline and offshore for 5 km from the high-water mark. The park protects an internationally significant sandy environment, recognised for its exceptionally high diversity of marine invertebrates.

The park's key natural values are listed as:

- Very high diversity of marine invertebrates, including the large endemic southern Australian seastar (*Coscinasterias muricata*) and the soft coral *Pseudogorgia godeffroyi*;
- Scattered low calcarenite reefs providing habitat for a distinctive marine invertebrate fauna, especially sponges, with sparse flora communities of small red algae; and
- Important habitat for threatened shorebird species, including species listed under international migratory bird agreements.

More than 800 different species were found within 10 m^2 of Ninety Mile Beach sand (compared to 300-400 per 10 m^2 in comparable habitats), making it one of the most biologically diverse marine environments in the world.Intertidal sand communities along the Ninety Mile Beach are species-poor, which is typical of coarse-grained, steep-faced, high-energy beaches.

The sub-tidal reefs support a community dominated by invertebrates, particularly sponges and sea squirts. Seaweeds are largely absent, possibly because of frequent scouring by shifting sand. The reefs themselves are likely to be periodically covered and uncovered by sand.

The waters of the park have aggregations of juvenile white shark (Carcharodon carcharias), snapper (Pagrus auratus), Australian salmon (Arripis spp.), long-finned pike (Dinolestes lewini) and short-finned pike (Sphyaena novaehollandiae). The southern right whale, Australian fur seals and New Zealand fur-seals are known to frequent the park.

4.3.9.2 Gippsland Lakes Coastal Park

Information provided here is sourced from Parks Victoria (1998).

This park is a narrow coastal reserve, covering 17,584 ha along the Ninety Mile Beach (including the beach itself, assumed to be to the low water mark) from Seaspray to Lakes Entrance.

The park's key natural values are listed as (use of the term 'parks' in this section references the adjacent Lakes National Park):

- Supports valuable remnants of vegetation communities that have been disturbed throughout much of their range, including Coast Banksia Woodland, Heath Tea-tree Heathland and Hairy Spinifex Grassland.
- Lake Reeve is of international significance and is a site of special scientific interest. This long, shallow lagoon is fringed by salt marsh with a number of plant species 'relatively uncommon in Victoria east of Seaspray.'
- Six significant flora and over 20 significant fauna species have been recorded within the Parks.
- Lake Reeve provides important breeding habitat for a number of waterfowl species and is one of Victoria's five most important areas for waders.
- The wetlands are important nursery areas for many fish species.

- The Parks contain sites of National, State and regional geological and geomorphological significance, mainly associated with the evolution of the barrier system that formed the Gippsland Lakes.
- The Gippsland Lakes area, which includes the Parks, is recorded as a significant regional landscape by the National Trust of Australia.

4.4 Biological Environment

The results of the PMST and VBA database searches provide the key means by which species are identified for the activity area and EMBA and are discussed in this section.

Additionally, BIAs are identified for those species that may occur within the activity area and EMBA. BIAs are spatially and temporally defined areas of the marine environment used by protected marine species for carrying out critical life functions. BIAs are designated by identifying areas and times known or likely to be regularly or repeatedly used by individuals or aggregations of a single species, stock, or population for either reproduction, feeding, migration or resting (DCCEEW, 2023b).

4.4.1 Benthic Assemblages

4.4.1.1 Regional knowledge

The seascape of the region is composed of a series of massive sediment flats, interspersed with small patches of reef, bedrock and consolidated sediment (Wilson and Poore, 1987).

The sediment flats are generally devoid of emergent fauna but benthic invertebrates such as polychaetes, bivalves, molluscs and echinoderms are present (Wilson and Poore, 1987). There are also a number of burrowing species that inhabit the soft seabed, including tubeworms, small crustaceans, nematodes, nemerteans and seapens (OMV, 2001).

4.4.1.2 Bass Strait

Surveys of benthic invertebrates in Bass Strait (Poore *et al*., 1985; Wilson and Poore, 1987) have shown:

- Crustaceans and polychaetes dominate the infaunal communities, many of which are unknown species.
- The high diversity of a wide range of invertebrate groups has been a recurrent observation of all surveys in Bass Strait and diversity is high compared with equivalent areas of the northern hemisphere.
- Many species are widely distributed across the Strait.
- Some invertebrate groups are allied with fauna from Antarctic seas. In winter, when the east coast of Tasmania is supplied with water from the sub-Antarctic, the overlap with the EAC contributes to the high diversity due to the transportation of nutrient-rich waters.

Parry et al. (1989) also found high diversity and patchiness of benthos sampled off Lakes Entrance, where a total of 353 species of infauna was recorded. Crustaceans (53%), polychaetes (32%) and molluscs (9%) dominated sample results.

Barton et al. (2012) report that in the Ninety Mile Beach Marine National Park (22 km southwest of the activity area), reefs are dominated by invertebrates (70% coverage), including sponges, ascidians (sea squirts) and smaller bryozoans (resembling coral) and hydroids (colonies of tiny jellies attached to a feather-like base).

A search of the VBA database for the EMBA reports no results for benthic fauna species. Elsewhere in eastern Bass Strait, the VBA indicates the presence of benthic species including sea snails, sea stars, sea urchins, sea slugs, rock lobsters and limpets (none of which are threatened species under Commonwealth or Victorian legislation).

This confirms the diverse nature of the benthic environment in the Bass Strait and Southern Ocean regions.

4.4.1.3 Activity area

The ALA database did not contain any records of benthic species within the activity area.

CSIRO has conducted biological surveying and investigation at the sites with a towed camera and Remotely Operated (underwater) Vehicle (ROV) footage, fish baiting and sampling of epibenthic fauna.

At sites within the activity area, sled tows of various lengths as well as opportunistic sampling of epibenthic fauna were conducted. The general assemblage of epibenthic fauna at sites in the activity area is consistent with the literature describing the region, with gastropods, polychaetes, echinoderms, cnidarians, crustaceans, bivalves and an assortment of sponges being collected and identified (CSIRO, 2018). Where hard substrate is identified at investigation sites, such as at site 14 (1.8 km north of the activity area), species richness is higher than the soft substrate samples.

A total of 1,253 individuals were found recorded from the benthic tows within the activity area, represented by 6 phyla, 8 classes and 28 taxa. The number of taxa recorded at Site 9 (8 taxa) and Site 10 (6 taxa at Site 10(A/B) and 3 taxa at Site 10(2A/2B)) was generally lower compared to other sites from the survey area. The abundance of benthic fauna at Site 9 and 10 was lower than most sites, with 0.5 individuals/m^2 at Site 9, 0.3 individuals/m^2 at Site 10(A/B) and 0.7 individuals/m^2 at Site 10(2A/2B)) recorded. Both abundance and richness of benthic fauna taxa at Site 11(A/B) was the second highest of all surveyed sites, with 19 taxa and 24.8 individuals/m^2 recorded.

Electroma georgiana (little wing pearl shell) was the most abundant species at all three sites (and accounted for 75% of the abundance and 76% of total biomass across all the CSIRO sample sites).

Ophiura kinburgi is also abundant at site 11 (in the activity area). This is a brittle star that grows up to 2 cm in diameter and lives in soft sediments in water depths ranging from 2 to 500 m (Port Phillip Marine Life, 2020) .

Site 9, close to the proposed Horizontal Direction Drilling (HDD) seabed exit point, has low species diversity and abundance.

A marine habitat assessment was commissioned by CarbonNet for their Pelican 3DMSS and conducted in early April 2017 to characterise the seabed. This habitat assessment included 11 sites two of which (site 32 and 33) were within the activity area and the others located within proximity to the activity area. Nine of the 11 sites consisted of sandy sediments and gravels/shells with contouring that is typical of mobile seabed affected by swell waves and strong tidal currents. Rocky reef was present at two sites located 800 m to 1 km to the southwest of the activity area. No beds of giant kelp, seagrass or sponges were observed at any of the 11 sites within proximity to the activity area. The results of this sampling relevant to the activity area indicate that, in general, the seabed is dominated by fine sand with very little epibiota. Low profile discontinuous rocky reef was observed at sites 64, 65 and 67 (directly adjacent to the activity area) during the assessment.

Scallops

Commercial scallops (*Pecten fumatus*) are present throughout Bass Strait, with a distribution along the southeast Australian coast from central NSW, Victoria, SA and Tasmania. Commercial scallops are mainly found at depths of 10-20 m, but may also occur at depths of up to 120 m. While mainly sedentary, scallops can swim by rapidly opening and closing their shells, usually when disturbed by predators (AFMA, 2017a). Scallops feed on prey and detritus, while they are prey for starfish, whelks, and octopus (AFMA, 2017a).

VFA data indicates that very little commercial fishing for scallops has been undertaken in the proposed activity area in the last five years (see Section 4.6.2.2).

While the dominance of sandy sediments throughout the activity area and surrounds provides abundant suitable scallop habitat and makes it possible that scallops occur, recent surveys indicate that the presence of commercial scallops is nil to low and commercially viable scallop beds are not present.

The VFA commissioned a 2023 pre-season abundance survey for the Victorian scallop fishery in eastern Victoria (Koopman *et al*., 2023). The survey focused on a the "Tarwhine bed" located near the Tarwhine oil and gas field (approximately 18 km south of the activity area). The Clonmel bed located off Port Albert (approximately 81 km southwest of the activity area) was also assessed during the 2023 survey. Twenty-five (25) exploratory tows at various locations surrounding the two beds were also evaluated in the 2023 survey. Results of the survey are as follows (Koopman *et al*., 2023):

- Clonmel (total area of 2.69 km^2): medium to high densities of commercial scallops were found throughout the bed.
- Tarwhine east (total area of 40.23 km^2): High, medium, and low densities were observed throughout the area surveyed.
- Tarwhine west (total area of 37.66 km^2): One tow had no commercial scallops, while medium and low densities were observed throughout the area surveyed.

The closest exploratory tow to the activity area, tow ID 50 located 4.2 km south of the activity area, was noted as containing no scallops (0 kg). The surrounding tows (ID 49 & 51) also noted no scallops (0 kg).

Rock Lobster

Two species of rock lobster occur within Victorian waters, the southern rock lobster (*Jasus edwardsii*) and eastern rock lobster (*Sagmariasus verreauxi*).

The southern rock lobster is found on coastal reefs from the south-west coast of WA to the south coast of NSW, including Tasmania and the New Zealand coastline. Southern rock lobsters are found to depths of 150 m (VFA, 2022). In Victoria, the abundance of rock lobsters decreases from west to east reflecting a decreasing area of suitable rock reef habitat.

The eastern rock lobster (*Sagmariasus verreauxi*) is found in coastal waters and depths of up to 200 m. The eastern rock lobster is found predominately in NSW and also occurs in Victoria, SA and Tasmania. The VFA states small quantities of the eastern rock lobster are taken off eastern Victoria, particularly near the border of NSW and Victoria (VFA, 2017).

The life cycle of the rock lobster is complex. After mating in autumn, fertilised eggs are carried under the tail of the female for approximately three months before being released, typically between September and November. Once released, rock lobster larvae, or phyllosoma, live in the plankton and undergo eleven developmental stages over a period of one to two years while being carried by ocean currents. During metamorphosis, juvenile rock lobster shift from a planktonic to a benthic existence (DPI, 2009).

Rock lobsters grow by moulting or shedding their exoskeleton. The frequency of the moulting cycle declines with age, from five moults a year for newly settled juveniles to once a year for mature adults. Males grow faster and larger than females, reaching 160 mm in carapace length after ten years. Females generally reach 120 mm in the same period. Growth rates also vary spatially, with growth faster in the east than in the west (DPI, 2009).

Adult rock lobsters are carnivorous and feed mostly at night on a variety of bottom dwelling invertebrates such as molluscs, crustaceans and echinoderms. Major predators include octopus and various large fish and sharks. Rocky reef is present as scattered patches shoreward off the activity area in waters less than 20 m depth.

It is assumed that the patchy low-profile rocky reef that is located within the activity area provides rock lobster habitat.

EMBA

A search of the VBA database reveals no recordings of benthic species in the EMBA. However, polychaete worms, tube worms, feather stars, sea snails and crabs are all likely to be present. the ALA records a variety of species of benthic fauna, including bristle worms (2), crabs, lobsters, shrimps and amphipods (31), barnacles (1), sea spiders (30), sea squirts (5),corals (2), starfish (1), sea urchins (15), brittle stars (23) sea cucumbers (3) as well as bivalves, such as mussels (28), scallops (22), oysters (84) and clams (11) , sea snails (43) and nudibranchs (2) and sponges (9).

Nearby petroleum infrastructure seabed assessments

- Longtom pipeline route selection process (82 km east of the activity area) – the relative homogeneity of sandy seabed sediments across all areas surveyed suggests that the low density and low diversity of benthic invertebrates found in the activity area extends over a large area across Bass Strait (Fugro, 2005).
- Patricia Baleen Project (94 km east of the activity area) – the inshore area has been characterised as containing scallops and other large bivalves, crabs, ascidians and small aggregations of sponges and bryozoans (CEE, 2001).
- Tasmanian Gas Pipeline (21 km southwest of the activity area) – benthic fauna studies (i.e., dredge samples) undertaken offshore Seaspray in water depths ranging from 17-20 m found that there were mobile sands with irregular ripples that contained a variety of small mobile animals, such as crustaceans, bivalves, sponges, worm tubes and polychaete worms.

4.4.2 Flora

Literature searches, combined with OSRA (2015) mapping, indicate that marine flora, such as seagrasses and kelp, are generally not abundant in the extensive areas of subtidal sand flats in the nearshore waters of the EMBA. This is likely to be due to the high-energy nature of the Gippsland coastline and the mobile nature of sands, which prevents many species being able to anchor themselves.

A search of the VBA database for the EMBA reports one species of seagrass (*Ruppia tuberosa*), this species of seagrass is known to estuarine and marine environments and has a wide distribution around all of Australia.

Barton et al. (2012) report that in the Ninety Mile Beach MNP (22 km southwest of the activity area), reefs have sparse floral communities of small red algae. Given the park's proximity, this may be expected to be representative of flora present on rocky reefs in the proposed activity area.

4.4.3 Plankton

Plankton is a key component in oceanic food chains and comprises two elements; phytoplankton and zooplankton, as described herein.

Phytoplankton (photosynthetic microalgae) comprise 13 divisions of mainly microscopic algae, including diatoms, dinoflagellates, gold-brown flagellates, green flagellates and cyanobacteria and prochlorophytes (McLeay *et al*., 2003). Phytoplankton drift with the currents, although some species have the ability to migrate short distances through the water column using ciliary hairs. Phytoplankton biomass is greatest at the extremities of Bass Strait (particularly in the northeast) where water is shallow and nutrient levels are high.

It is expected that the suite of plankton species present in and around the activity area will be typical of those expected for temperate coastal waters.

4.4.4 Fish

The PMST detected 34 fish species (26 of which are seahorses and pipefish) as potentially occurring in the activity area, an additional two species of shark were detected in the EMBA only. Of the fish species detected, seven were listed as threatened under the EPBC Act and five were listed as threatened under the FFG Act. The great white shark (*Carcharodon carcharias*) has a reproduction BIA that overlaps with the activity area (0.13%) and EMBA (31.18%).

A search of the VBA database reveals no recordings of threatened fish species or sygnathids in the EMBA.

It is estimated that there are over 500 species of fish found in the waters of Bass Strait, including a number of species of importance to commercial and recreational fisheries (Latrobe City Council [LCC], 1993). Fish species commercially fished in and around the activity area are listed in Section 4.6.2.

The marine habitat assessment undertaken by CarbonNet found various site-attached species at some of the patch reef and sponge gardens in the area, including butterfly perch (*C. lepidoptera*), wrasse (*Labridae sp.*), goatfish (*Upeneichthys vlamingii*), bearded rock cod (*Pseudophycis sp.*), morwong (*Cheilodactylus sp.*), cowfish (*Arcana sp.*) and boarfish (*Pentaceropsis recurvirostri).*

4.4.5 Cetaceans

The PMST indicates that six whale species and seven dolphin species may reside within or migrate through the activity area, an additional species of whale was detected in the EMBA only.

A search of the VBA database indicates that the southern right whale has been recorded 17 times within the EMBA, with the most recent sighting recorded in 2021. One sighting of the strap-toothed whale (*Mesoplodon layardi*) and pygmy sperm whale (*Kogia breviceps*) were also recorded by the VBA within the EMBA, neither of these species were detected by the PMST, and have preferences for deeper water, it is likely the sightings were a result of strandings, vagrants or possibly misidentification.

The VBA also detected three sightings of the common dolphin (*Delphinus delphis*) and two sightings of the Risso's dolphin (*Grampus griseus*). One record of the burrunan dolphin (*Tursiops australis*) was also detected by the VBA within the EMBA in 2003, this species is listed as critically endangered under the FFG Act. This species of dolphin inhabits semi-enclosed embayments and estuarine systems, the species has also been recorded high up in freshwater rivers, and potentially inhabits inshore coastal waters. There are approximately 63 individuals located in Gippsland Lakes (onshore) directly adjacent to the EMBA.

4.4.5.1 Blue Whales

The blue whale (*Balaenoptera musculus*) has four subspecies, two of which occur within Australian waters, including the Antarctic blue whale (*B. m. intermedia*) and the pygmy blue whale (*B. m. brevicauda*) (Rice 1998, in (Department of the Environment, 2023)).

The pygmy blue whale (PBW) has five population groups, two of which are found in the Southern Hemisphere.

Distribution

McCauley et al. (2018) found Antarctic blue whale calls along the entire southern Australian coast, while calls from the NZ PBW population occur predominantly eastward of Bass Strait, and calls from the Indo-Australian PBW population were heard west of Bass Strait. The Indo-Australian PBW population wasn't recorded on the east Australian coast or east of Bass Strait and the New Zealand PBW population was always heard in the Bass Strait recordings, and only ever heard as far west as Portland in Victoria. The Antarctic blue whale was recorded at all sites south of 19°S (McCauley *et al.*, 2018).

Balcazar et al. (2015) suggests that the Australian continent acts as a geographic boundary, separating Indo-Australian and NZ PBW acoustic populations at the junction of the Indian and Pacific Ocean basins (Balcazar, *et al.*, 2015). There are few contemporary records of blue whales in the Gippsland region, which can be seen in the few sighting records within the ALA database (all of which are pre-2000). However, recent scientific literature suggests that PBW populations are capable of travelling great distances far beyond their expected range (Barlow, 2023). This concept that blue

whales can extend beyond their current range is corroborated by Branch et al. (2023), who modelled the predicted detection range for the Antarctic blue whale and PBW populations.

Diet

Blue whales have the highest known prey requirements, consuming up to two tonnes of krill per day (DoE, 2015a). Krill is the key to understanding the ecology and behaviour of blue whales. Krill is sensitive to temperature and migrates vertically and horizontally to maintain optimal positioning with respect to nutrients, often being found along thermal fronts and thermoclines. The krill species, *Nyctiphanes australis*, frequently swarm at or near the surface, making it easily available to foraging blue whales. Foraging is energetically expensive for blue whales, which must regularly find sufficient food to balance their enormous energy requirements (Gill., 2020). There are two important seasonal feeding aggregations areas known in Australia where large numbers of PBW have been recorded: the Bonney Coast Upwelling KEF and adjacent waters off South Australia (SA) and Victoria (located 440 km west of the EMBA); and the Perth Canyon KEF and adjacent waters off WA (located over 3,000 km west of the EMBA).

Antarctic Blue Whale

The Antarctic blue whale subspecies consists of one or more populations that feed off Antarctica during summer, and limited evidence suggests that some proportion migrate to subtropical latitudes of the Pacific and Indian Ocean to breed. They have been acoustically detected off the West and North coasts of Tasmania predominately from May to December. Based on the seasonality of recordings, these areas possibly form part of their migratory route, breeding habitat or a combination of the two (CoA, 2015).

Barlow (2023) noted that the South Taranaki Bight could be a migratory corridor for the Antarctic blue whale. The Antarctic blue whale is predicted to remain consistently within the Southern Hemisphere, with especially high probabilities in winter months (May-August), and low probabilities in summer (December-March) (Branch, 2023).

In light of the findings of Barlow (2023) and Branch (2023), it is possible the Antarctic blue whale will be present within the activity area and EMBA.

Indo-Australian Pygmy Blue Whale

The distribution and migration patterns of Indo-Australian PBW are relatively well understood in areas further west of the EMBA. Satellite tagging of Indo-Australian PBW by Double et al. (2014) and Möller, et al. (2020) has revealed that the Indo-Australian population migrates from southern Australian foraging grounds through a WA migratory corridor to (presumed) breeding grounds in waters around Indonesia. The EMBA overlaps with 0.98% of the BIA for foraging.

Barlow et al. (2023) detected the Indo-Australian PBW song during a 10-day period in January 2017, implying a rare vagrant occurrence. The modelling predicts that the distribution of the Australian PBW is further westward of WA, further south along the GAB and Indian Ocean, south eastward towards the Bass Strait and Tasmania and even as far as NZ (Branch *et al*., 2023).

In light of the findings of Barlow et al. (2023) and Branch et al. (2023), it is possible the Indo-Australian PBW will be present within the activity area and EMBA.

New Zealand Pygmy Blue Whale

Relatively little is known about NZ PBW. Antarctic blue whales are known to co-occur with PBW around New Zealand. Barlow et al. (2023) states that despite extensive acoustic recordings in eastern Australia, Bass Strait and Tonga, the NZ PBW has rarely been being detected in these locations. The NZ PBW is anticipated to be distributed northwards and eastwards of Tasmania (including Bass Strait and the eastern coast of Australia), and around NZ (Branch *et al*., 2023).

Due to a lack of records within the Gippsland region and known distribution surrounding NZ, it is unlikely the NZ PBW is present within the activity are and EMBA.

4.4.5.2 Southern Right Whale

The southern right whale (SRW) (*Eubalaena australis*) is listed as endangered under both the EPBC Act and FFG Act. SRWs were depleted to less than 300 individuals globally due to commercial whaling in the 19th and 20th centuries (Tormosov, Mikhaliev, Best, Zemsky, & Sekiguichi, 1998). They were protected from whaling in 1935 however, due to illegal whaling in the 1970s and because southern right whales have a slow rate of increase (7% per annum (p.a.)) compared to other marine mammals, their numbers remain low (IWC, 2013). Global abundance estimates are 13,000 for the species, across key wintering grounds in South Africa, Argentina, Australia, and New Zealand.

Population

The Australian population of SRW is divided into two sub-populations due to genetic diversity (Carroll, 2011; Baker *et al*., 1999) and different rates of increase (DSEWPAC, 2012b). The western sub-population occurs predominantly between Cape Leeuwin, WA and Ceduna, SA. This sub-population comprises most of the Australian population and is estimated at 3,200 individuals increasing at an annual rate of approximately 6% p.a. (Smith *et al*., 2019).

The eastern sub-population can be found along the south-eastern coast, including the region from Tasmania to Sydney, with key aggregation areas in Portland and Warrnambool in Victoria. The eastern sub-population is estimated at less than 300 individuals and is showing no signs of increase (Bannister, 2017). Connectivity between the two populations is unknown however, some limited movement between the two areas has been recorded (Burnell, 2001; Charlton, 2017; Pirzl *et al*., 2009).

Distribution

SRWs generally occur along the southern coast of Australia; they migrate annually along the eastern coastline from high latitude feeding grounds to lower latitudes for calving between mid-May and October (DCCEEW, 2023b). Known calving and aggregation grounds in the south-east region are Warrnambool, Port Fairy, Port Campbell and Portland in Victoria, and Encounter Bay in SA (DSEWPC, 2012). Nursery grounds are occupied from May to October, with female-calf pairs generally staying in the area for two to three months (Charlton, 2017). Calving itself usually occurs in very shallow (<10 m depth) waters. Sightings within the ALA database indicate that the SRW has been spotted within the Gippsland region pre and post 2000.

Biologically Important Areas

The activity area overlaps 0.007% of the reproduction BIA and the EMBA overlaps 0.47% of the reproduction BIA. The activity area overlaps 0.0002% of the migration BIA and the EMBA overlaps 0.07% of the migration BIA.

Southern right whales are likely to migrate through the activity area and EMBA.

4.4.5.3 Sei whale

The Sei whale (*Balaenoptera borealis*) is listed as vulnerable and migratory under the EPBC Act. Sei whales are considered a cosmopolitan species, ranging from polar to tropical waters, but tend to be found in deeper waters (not often near the coast) than other species of large whales. This species is not often recorded in Australian waters (TSSC, 2015b).

There are no known mating or calving areas in Australian waters (TSSC, 2015b). Sei whales move between Australian waters and Antarctic feeding areas, sub-Antarctic feeding areas and tropical and sub-tropical breeding areas.

Based upon the species preference for offshore waters, the absence of a BIA for the species in Australia, and the nearshore location of the activity area, it is considered unlikely that this species occurs within the activity area or the EMBA.

4.4.5.4 Fin whale

The fin whale (*Balaenoptera physalus*) is listed as vulnerable and migratory under the EPBC Act. The fin whale is the second-largest whale species after the blue whale, growing up to 27 m long and weighing up to 70 tonnes (TSSC, 2015c). It is a cosmopolitan species and is found from polar to tropical waters (more commonly in temperate waters) (TSSC, 2015c).

There are stranding records of this species from most Australian states, but they are considered rare in Australian waters (Bannister *et al*., 1996), with available information suggesting they are more common in deeper water (TSSC, 2015c).

Based upon the species preference for offshore waters, the absence of a BIA in Australian waters and the nearshore location of the activity area, it is considered unlikely that this species occurs within the activity area or the EMBA.

4.4.5.5 Humpback whale

The humpback whale (Megaptera novaeangliae) is a moderately large (15-18 m long) baleen whale that has a worldwide distribution but geographic segregation. In the 19th and 20th centuries, humpback whales were hunted extensively throughout the world's oceans and as a result it is estimated that 95% of the population was eliminated. In Australia, commercial whaling of humpback whales ceased in 1963 and until this time, it is estimated that humpback whales were reduced to between 3.5 and 5% of pre-whaling abundance (TSSC, 2015e).

In 2022, the humpback whale was removed from the vulnerable category and now holds no threatened status under the EPBC Act. However, they remain a of MNES under the EPBC Act as a listed migratory species, and the species remains listed as a cetacean, where it is an offence to kill, injure, take, trade, keep, move, or interfere with a cetacean (DAWE, 2022d).

Humpback whales are found in Australian offshore and Antarctic waters. Bass Strait represents part of the core range of the E1 Group, but feeding, resting or calving is not known to occur in Bass Strait (TSSC, 2015e), though migration through Bass Strait may occur. The nearest area that humpback whales are known to congregate (foraging BIA) is at the southern-most part of NSW (near the eastern border of Victoria), approximately 190 km northeast of the EMBA.

Humpback whales undertake annual migrations between their summer feeding grounds in Antarctic waters to their breeding and calving grounds in sub-tropical and tropical inshore waters, migrating up the Australian east coast (TSSC, 2015e). The northern migration off the southeast coast starts in April and May, with the southern migration occurring from November to December. This migration tends to occur close to the coast, along the continental shelf boundary in waters about 200 m deep (TSSC, 2015e).

The listing advice for the humpback whale (DAWE, 2022) identifies vessel strike and anthropogenic noise as current threats to the species. As the activity area and the EMBA represent a core range for humpback whales, they may be encountered, particularly during April, May, November and December, though the likelihood is considered low for the activity area due to their preference for migrating along the edge of the continental shelf in waters much deeper than those of the activity area.

4.4.5.6 Dolphins

None of the seven dolphin species listed in the PMST are listed as threatened under the EPBC Act or FFG Act. The detected dolphin species are listed below:

- The common dolphin (*Delphinus delphis*);

- Risso's dolphin (*Grampus griseus*);
- The dusky dolphin (*Lagenorhynchus obscures*);
- The killer whale (*Orcinus orca*);
- The Indian Ocean bottlenose dolphin (*Tursiops aduncus*); and
- The bottlenose dolphin (*Tursiops truncatus*).

4.4.6 Pinnipeds

There are two pinniped species recorded under the EPBC Act PMST as potentially occurring within the activity area and EMBA. The New Zealand fur-seal is listed as vulnerable under Victorian legislation but not under commonwealth. The VBA search for the EMBA recorded both species of the fur-seal. According to the VBA, the Australian fur-seal has been detected five times within the EMBA, with the most recent recording being in 2017. The New Zealand fur-seal was recorded once in 2015.

Three additional species of seal were also recorded by the VBA. The occurrences of these species within Australian coastal waters are considered vagrant and are typically pups or juveniles who have go astray. It is highly unlikely any of the additional seal species detected by the VBA will be encountered in the EMBA.

One un-specified eared seal (*Otariidae spp*.) was also recorded by the VBA in the EMBA in 2014.

4.4.6.1 New Zealand fur-seal

New Zealand fur-seals (*Arctocephalus forsteri*) are listed as marine under the EPBC Act, and vulnerable under the FFG Act. NZ fur seals are mostly found in central South Australian waters (Kangaroo Island to South Eyre Peninsula); 77% of their population is found here (Shaughnessy, 1999).

There are 51 known breeding sites for New Zealand fur-seals in Australia, with most of these outsides of Victoria (47 in SA and WA) (DEHWA, 2007). Breeding locations in Victoria occur at Kanowna Island, off Wilson's Promontory (located 138 km southwest of the activity area) and the Skerries (located approximately 193 km northeast of the activity area) (Kirkwood *et al*., 2009) (the latter being within the EMBA).

During the non-breeding season (November to January) the breeding sites are occupied by pups/young juveniles, whilst adult females alternate between the breeding sites and foraging at sea (Shaughnessy, 1999).

Haul-out sites in Bass Strait occur outside the EMBA (Barton et al., 2012).

There is no BIA for the New Zealand fur-seal in Bass Strait. Given the close proximity of the activity area to breeding colonies and haul-out sites, it is likely that the species feeds within the activity area and EMBA. However, there are no islands or rock outcrops within the activity area or EMBA, so a resident population is unlikely to occur. These waters are unlikely to represent important critical feeding or breeding habitat.

4.4.6.2 Australian fur-seal

The Australian fur-seal (Arctocephalus pusillus) is listed as marine under the EPBC Act. The Australian fur-seal has a relatively restricted distribution around the islands of Bass Strait, parts of Tasmania and southern Victoria.

There are 10 established breeding colonies of the Australian fur-seal that are restricted to islands in the Bass Strait; six occurring off the coast of Victoria and four off the coast of Tasmania (DCCEEW, 2024b The largest of the established colonies occur at Lady Julia Percy Island (26% of the breeding population and 471 km west of the activity area) and at Seal Rocks (25% of the breeding population and 198 km west of the activity area), in Victoria (DCCEEW, 2024b). These areas are not located

within the EMBA. Historically, Australian fur-seal breeding colonies were more widespread, but several islands have not been occupied since their populations were removed by early commercial sealing (DCCEEW, 2024b).

Their preferred habitat, especially for breeding, is a rocky island with boulder or pebble beaches and gradually sloping rocky ledges. Australian fur-seals are present in the region all year. Pups begin to forage in June/July and are generally weaned by September/October (Shaughnessy, 1999).

Australian fur-seals are also regularly seen resting and foraging on and around the petroleum production platforms off the Gippsland coast. Barton et al. (2012), Carlyon et al. (2011) and OSRA list the haul-out sites known in Bass Strait, however none of these sites occur in the EMBA.

During the summer months, Australian fur-seals travel between northern Bass Strait islands and southern Tasmania waters following the Tasmanian east coast, however, lactating female fur-seals and some territorial males are restricted to foraging ranges within Bass Strait waters. Lactating female

Male Australian fur-seals are bound to colonies during the breeding season from late October to late December, and outside of this they time forage further afield (up to several hundred kilometres) and are away for long periods, even up to nine days (Kirkwood et al., 2009; Hume et al., 2004).

There is no BIA for the Australian fur-seal in Bass Strait.

4.4.7 Reptiles

Three species of marine turtle are identified in the PMST as potentially occurring within the activity area and EMBA, all of which are listed as threatened under the EPBC Act. Robertson and Coventry (2014) note that known occurrences of turtles in Victorian waters are rare vagrants outside their usual range. No BIAs for marine turtles occur within Bass Strait. According to the Southern Australian Sea Turtle project (CIE, 2014), all species of sea turtle have been recorded in southern Australian waters (i.e., waters off South Australia, Victoria, and Tasmania) except the Kemp's ridley sea turtle. Leatherback turtles have the highest occurrence, appearing to be sighted more often during summer and autumn than the rest of the year.

4.4.7.1 Loggerhead turtle

The loggerhead turtle (Caretta caretta) is listed as endangered and migratory under the EPBC Act. The loggerhead turtle is globally distributed in sub-tropical waters (Limpus, 2008a) including eastern, northern and western Australia (CoA, 2017) and is rarely sighted off the Victorian coast. No loggerhead foraging areas have been identified in Victoria waters (CoA, 2017).

The CIE (2014) noted that the loggerhead turtle had been recorded seven times in Victoria, the closest sighting to the EMBA area was recorded in the northeast region of Wilson's Promontory (approximately 62 km west of the EMBA). Given the lack of sightings of the loggerhead turtle in eastern Victoria and an absence of foraging areas, it is highly unlikely the species will be present within the activity area or EMBA.

4.4.7.2 Green turtle

The green turtle (Chelonia mydas) is listed as vulnerable and migratory under the EPBC Act. The green turtle is distributed in sub-tropical and tropical waters around the world (Limpus, 2008b; CoA, 2017). In Australia, they nest, forage, and migrate across tropical northern Australia. There are no known nesting or foraging grounds for green turtles in Victoria and they occur only as rare vagrants (CoA, 2017). The CoA (2017) maps the green turtle as having a 'known' or 'likely' range within Bass Strait.

Similarly, the green turtle was recorded in Victoria only five times. The closest sightings of the green turtle were recorded in the northern region of Wilsons Promontory (approximately 91 km southwest of the EMBA) and within Corner Inlet (approximately 71 km west of the EMBA). Given the lack of

sightings of the green turtle in eastern Victoria and an absence of foraging areas, it is highly unlikely the species will be present within the activity area or EMBA.

4.4.7.3 Leatherback turtle

The leatherback turtle (Dermochelys coriacea) is listed as endangered and migratory under the EPBC Act. The leatherback is widely distributed throughout tropical, sub-tropical and temperate waters of Australia (CoA, 2017) including oceanic waters and continental shelf waters along the coast of southern Australia (Limpus, 2009). Unlike other marine turtles, the leatherback turtle utilises cold water foraging areas with reported foraging along the coastal waters of central Australia (southern Queensland to central NSW), southeast Australia (Tasmania, Victoria and eastern South Australia) and southern WA (Limpus, 2009). No major nesting has been recorded in Australia, with isolated nesting recorded in the Northern Territory, Queensland and northern NSW (CoA, 2017). This species nests only in the tropics. The CoA (2017) maps the leatherback turtles as having a known or likely range within Bass Strait.

Unlike the loggerhead and green turtle, the CIE (2014) noted 28 records of the leatherback turtle in Victoria. The closest sightings to the EMBA are in the southwest part of Wilsons Promontory (approximately 95 km southwest of the EMBA) and around the waters surrounding Manns Beach (approximately 34 km northwest of the EMBA). Despite the leatherback turtle being recorded the most within Victoria, it is still considered unlikely that the species will be encountered in the EMBA due to a lack of nesting sites.

4.4.8 Avifauna

Birds in the marine environment can include both seabirds and shorebirds:

- Seabirds refers to those species whose normal habitat and food sources are derived from the ocean (both coastal and pelagic); seabirds include such species as albatrosses, petrels, pelicans, gannets and cormorants.
- Shorebirds (sometimes referred to as wading birds) refers to those species commonly found along sandy or rocky shorelines, mudflats, and shallow waters; shorebirds include such species as plovers and sandpipers.

Fifty-eight (58) seabirds and shorebirds are listed under the EPBC Act as potentially occurring in the activity area and EMBA. The majority of these are listed as migratory and marine species.

The VBA database recorded an additional 12 seabirds and 22 shorebirds in the EMBA with over 100 terrestrial birds also recorded.

A search of the BirdData database was conducted for both the activity area and EMBA in 2024. The BirdData database identified seven birds (two gulls, one gannet, one currawong, one silvereye, one greater crested tern and one blackbird) within the activity area, all species were detected once, except for the greater crested tern which was detected twice. The BirdData database identified 232 species of birds.

Albatross and Petrels

The PMST report detected 15 albatross and five petrel species that have the potential to occur within the EMBA.

Albatrosses and petrels are mostly surface capturing, pelagic predators that feed on live and dying prey. Their ability to dive varies across species and involves either surface plunge dives or shallow dives to catch prey (generally less than 15 m deep). Both species are wide-ranging, opportunistic predators.

Albatrosses and petrels have a tendency to follow fishing vessels. Competition for fishers discards and baited hooks can be intense with smaller birds subject to secondary attacks by other larger birds (CoA, 2022). None of the remote offshore islands listed in the National Recovery Plan for albatrosses

and petrels (CoA, 2022) that should be regarded as habitat that is potentially critical to the survival of albatrosses and petrels in Australia are within the activity area or EMBA or in close proximity.

Due to their extensive ranges and the presence of several BIAs, it is likely that albatross and petrel species will be encountered in the EMBA.

Shearwaters

Six species of shearwaters were detected by the PMST. Shearwaters represent the most abundant seabird in Australia they are typically pelagic, except during breeding seasons where they are found on remote islands or coastal headlands. Shearwaters are medium-size long-winged seabirds that are most common in temperate and cold waters. They spend most of their time foraging in the ocean and return to coastal cliffs and offshore islands only to breed.

Shearwaters feed by pursuit-plunging, surface plunging or surface-seizing (DCCEEW, 2024b). One species of shearwater has a BIA within the activity area and EMBA.

Due to their expansive ranges, it is likely that shearwaters may overfly or forage in the EMBA.

Little penguins

The Little penguin (*Eudyptula minor*) was not detected by the PMST, however, the VBA recorded four sightings of the species in 2021.

Nest building (in sand dunes or in rock crevices) occurs from June to December, breeding occurs from August to October, egg laying occurs from August to December, chick raising occurs from August to March and moulting occurs between February and April (during which time they must remain on land). During winter, penguins spend most of their time at sea, returning to the burrows to rest and attend to their burrows (PFPI, 2017). Based on OSRA (2015) mapping, little penguin colonies in the Gippsland region all occur outside the activity area and EMBA.

The nearest BIA for little penguins occurs at Curtis Island (south of Wilson's Promontory, 138 km southwest of the activity area), around Flinders Island (150 km south) and at Phillip Island (180 km west) (all located outside the EMBA). Little penguins may forage within the activity area and EMBA.

Other seabirds

Other seabirds listed in the PMST that may occur within the activity area and EMBA are listed here:

- The southern fairy prion (*Pachyptila turtur subantarctica*);
- The white-bellied sea eagle (*Haliaeetus leucogaster*); and
- The osprey (*Pandion haliaetus*).

4.4.8.1 Shorebirds and Coastal Species

Shorebirds and coastal species listed in the PMST that may occur within the activity area and EMBA are listed here:

- Terns - three species of tern (the little tern, Australian fairy tern & white-fronted tern) were detected by the PMST as potentially occurring within the EMBA;
- Plovers - seven plovers may occur within the EMBA (double-banded, pacific, grey, greater sand, red-capped, hooded and eastern plover) The double-banded, red-capped and hooded plovers are also listed under the VBA as occurring within the EMBA, with the latter listed as vulnerable under the FFG Act;
- Sandpipers - five sandpiper species may occur within the EMBA (marsh, curlew, common, sharp-tailed, pectoral). Low numbers of four of these sandpipers are recorded in the VBA for the EMBA.

- Snipes - there are four snipe species that may occur within the EMBA (Latham's, Swinhoe's, pin-tailed and Australian painted). Latham's snipe is also recorded from the EMBA in the VBA, and is not listed as threatened under the FFG Act. Snipes may be present within the EMBA during the activity.
- Godwits - There are two species of godwit that may occur within the EMBA (bar-tailed and Nunivak bar-tailed). Godwits may be present within the EMBA during the activity.
- Red knot - The red knot is the only EPBC Act-listed species of knot that may occur within the activity area and EMBA (and is recorded in the VBA). Knots may be present within the EMBA during the activity.
- Swift parrot - The swift parrot (*Lathamus discolour*) is a small parrot that has rapid, agile flight. The entire population migrates from Tasmania to the mainland for winter. On the mainland it disperses widely and forages on flowers and psyllid lerps in eucalypts. Given its habitat preferences, this species is unlikely to occur within the EMBA.
- Orange-bellied parrot - The orange-bellied parrot (*Neophema chrysogaster*) migrates across Bass Strait in autumn and over-winters on the mainland of Australia. In Victoria, they mostly occur in sheltered coastal habitats, such as bays, lagoons and estuaries, or, rarely, saltworks. Orange-bellied habitat may occur around the Gippsland Lakes area. The EMBA overlaps with the species infrequent non-breeding range. The orange-bellied parrot may to be present within the coastal areas of the EMBA in low numbers during winter.

4.4.9 Marine Pests

Marine pests known to occur in South Gippsland, according to ParksVic (2015) and Barton et al. (2012) include:

- Pacific oyster (*Crassostrea gigas*);
- Northern pacific seastar (*Asterias amurensis*);
- New Zealand screw shell (*Maoricolpus roseus*); and
- European shore crab (*Carcinus maenas*).

The Marine Pests Interactive Map (DAFF, 2019) indicates that the Port of Melbourne is known to harbour the following species:

- Northern pacific seastar;
- European shore crab;
- European fan worms (*Sabella spallanzannii* and *Euchone* sp);
- Japanese kelp (*Undaria pinnatifida*);
- Asian date mussel (*Musculista senhousia*); and
- Asian shore crab (*Hemigrapsus sanguineus*).

These species have the potential to be picked up in the ballast water and transferred to the activity area. Two of these species (Pacific oyster and European green crab) are also known to occur in the Gippsland Lakes (Hirst & Bott, 2016).

4.5 Cultural Heritage Values

4.5.1 Underwater cultural heritage

4.5.1.1 First Nations Underwater Cultural heritage

First Nations Underwater Cultural Heritage (FNUCH) is defined as any trace of human existence that has a cultural, historical, or archaeological character, is located underwater, and relates to the Aboriginal or Torres Strait Islander occupation of Australia. DCCEEW (2023d) notes that intangible underwater cultural heritage that lacks a physical component cannot be protected under the Underwater Cultural Heritage Act 2018. However, DCCEEW (2023d) supports the notion that understanding intangible FNUCH can support impact assessment.

Smyth and Isherwood (2016) describe Sea Country as all estuaries, beaches, bays, and marine areas collectively, within a traditional estate. Sea Country contains evidence of the ancient mystical events by which all geographic features, animals, plants, and people were created. The activity area and the coastal areas of the EMBA overlap with the proposed Sea Country Indigenous Protected Areas (IPA). The proposed IPA is located within the coastal waters of the Gippsland region, comprising of numerous marine and coastal parks and includes the Ramsar listed Gippsland Lakes and Raymond Island, a highly significant cultural site. The activity area and the coastal areas of the EMBA overlap with the proposed Sea Country IPA area.

4.5.1.2 Maritime Archaeological Heritage

There are no shipwrecks mapped as occurring in the activity area with the closest being the *Colleen Bawn* located 500 m south of the activity area.

Shipwrecks within the EMBA are as follows:

- *Pretty Jane (1882);*
- *Julius (1892)* – located on the shoreline;
- *Norfolk (1914)* – located on the shoreline;
- *Colleen Bawn (1913);*
- *Magnolia (1887); and*
- *PS Paynesville (1881)* – located on shoreline.

Of the 650 shipwrecks in Victoria, nine have been placed within protected zones (a no-entry zone of 500-m radius [78.5 ha] around a particularly significant and/or fragile shipwreck). Five of these are located within Port Phillip Bay, and two along the west Gippsland coast, these being the *PS Clonmel* (just outside Corner Inlet) and the *SS Glenelg* (35 km southwest of the activity area).

4.5.2 Native Title

A search of the NNTT database identifies that there is registered Native Title determination over much of the coastline adjacent to the EMBA and activity area, this being for the Gunai/Kurnai People (VCD2010/001). There are no Native Title Claims over the activity area or adjacent coastline (NNTT, 2024).

The Gunaikurnai and Icon Energy (VI2013/008) Indigenous Land Use Agreement (ILUA) exists along the coastline adjacent to the activity area and EMBA (NNTT, 2024). An ILUA is a voluntary agreement between Native Title parties and other people or bodies about the use and management of areas of land and/or waters.

4.6 Socio-economic Environment

4.6.1 Coastal Settlements

The coastline adjacent to the activity area is sparsely populated, with the adjoining townships of Golden Beach and Paradise Beach being the closest. These towns are located within the Shire of Wellington.

The towns of Seaspray and The Honeysuckles are located further southwest on the coastline adjacent to the activity area. Similar to Golden Beach and Paradise Beach, these are essentially tourism-focused towns.

4.6.2 Commercial Fishing

4.6.2.1 Commonwealth-managed Fisheries

Commonwealth commercial fisheries with jurisdictions to fish the EMBA are the:

- Bass Strait Central Zone Scallop Fishery (BSCZSF);
- Eastern Tune and Billfish Fishery (ETBF);
- Eastern Skipjack Tuna Fishery (ESTF);
- Southern Bluefin Tuna Fishery (SBTF);
- Small Pelagic Fishery (SPF);
- Southern Squid Jig Fishery (SSJF; and
- Southern and Eastern Scalefish and Shark Fishery (SESSF), incorporating:
    - Gillnet and Shark Hook sector.
    - Commonwealth Trawl sector (CTS).
    - Scalefish Hook sector (SHS).

4.6.2.2 Victorian-managed Fisheries

Victorian-managed commercial fisheries with access licences that authorise harvest in the waters of the activity area and the EMBA include the following (noting that not all operate in the activity area):

- Victorian Scallop;
- Rock Lobster (eastern zone);
- Abalone (central zone);
- Wrasse;
- Banded Morwong;
- Pipi;
- Octopus (eastern zone);
- Ocean general;
- Trawl inshore;
- Purse seine;
- Sea urchin;
- Giant crab; and
- Eel.

4.6.3 Recreational Fishing

Recreational fishing and boating are largely confined to the Gippsland Lakes and nearshore coastal waters, though surf fishing does occur along the beaches adjacent to Golden Beach.

There are no boat ramps adjacent to the activity area.

4.6.4 Tourism

Marine-based tourism and recreation in the Bass Strait is primarily associated with recreational fishing and boating (see previous section). The Gippsland Lakes (comprising Lake Victoria, Lake King, and Lake Wellington, together with other smaller lakes, marshes and lagoons) are the primary tourist attraction in the region. The communities adjacent to this network of lakes are popular tourist towns for their boating and fishing activities, along with bushwalking, bird watching and other nature-focused activities. Towns including Lakes Entrance, Metung, Loch Sport, Golden Beach and Lake Tyers are especially popular in summer.

4.6.5 Offshore Energy Exploration and Production

4.6.5.1 Petroleum

The activity area is located in proximity to several gas pipelines, these being:

- TasGas pipeline (Tasmanian Gas Pipeline Pty Ltd) – located 21 km west of the activity area;
- Seaspray to Dolphin to Perch pipeline (EARPL) – located 20 km southwest of the activity area;
- Bream A to shore pipeline (EARPL) – 5 km east of the activity area; and
- Barracouta to shore pipeline (EARPL) – 6.5 km east of the activity area.

4.6.5.1 Electricity

The western extent of the EMBA intersects with a very small portion of Basslink Interconnector that allowed the trade of electricity between Tasmania (hydropower) and the National Electricity Market of the mainland. Basslink runs from Loy Yang in Gippsland, Victoria, across Bass Strait to Bell Bay in Northern Tasmania.

4.6.5.1 Renewable Energy

The EMBA intersects Australia's first offshore area declared available for renewable energy projects (OEI-01-2022 Part 1). The activity area is located about 7 km from the declaration area. The closest site that has been granted a feasibility license is the Gippsland Dawn offshore wind activity area, located 12 km east of the project area and the Blue Mackerel North offshore wind project area located 27 km southwest of the activity area.

4.6.6 Commercial Shipping

The South-east Marine Region (which includes Bass Strait) is one of the busiest shipping regions in Australia (CoA, 2015a). Lakes Entrance is an important fishing port for the region (CoA, 2015a).

The activity area is located entirely within the Bass Strait ATBA. This area is a routing measure that ships in excess of 200 gross tonnes should avoid due to the high concentration of offshore petroleum infrastructure (oil and gas platforms and pipelines) that can provide a navigational hazard Operators of vessels greater than 200 gross tonnes must apply to NOPSEMA to enter and be present within the ATBA (Australian Border Force, 2017).

4.6.7 Defence Activities

The activity area is located beneath Defence Restricted Airspace R258D. The interactive DoD database (DoD, 2023) indicates that the activity area lies within the '393 Seaspray' and '392 Bass Strait' UXO sites. The EMBA also overlaps both sites.

4.6.8 Other Infrastructure

Other infrastructure present within the activity area (pipeline route investigation portion) includes the ROS ocean outfall at Delray Beach. This outfall is operated by Gippsland Water and disposes large volumes of secondary treated wastewater from central Gippsland highly saline treated wastewater (ParksVic, 2006).

There are no submarine cable protection zones in the vicinity of the activity area. The nearest telecommunications cables, which connect Tasmania to the Australian mainland, occur to the west of Wilsons Promontory and are far outside the EMBA.

5 Impact and Risk Assessment Methodology

5.1 Risk Assessment Approach

GB Energy uses a risk management methodology that is compliant with the Australian New Zealand Risk Management Standard ISO31000:2009 (*Risk management-Principles and guidelines*). In planning and designing its approach to risk management, GB Energy has sought to embed risk management into the project's day-to-day processes so that risk management is relevant, effective, efficient and sustained.

The risk management framework is illustrated in Figure 5.1.

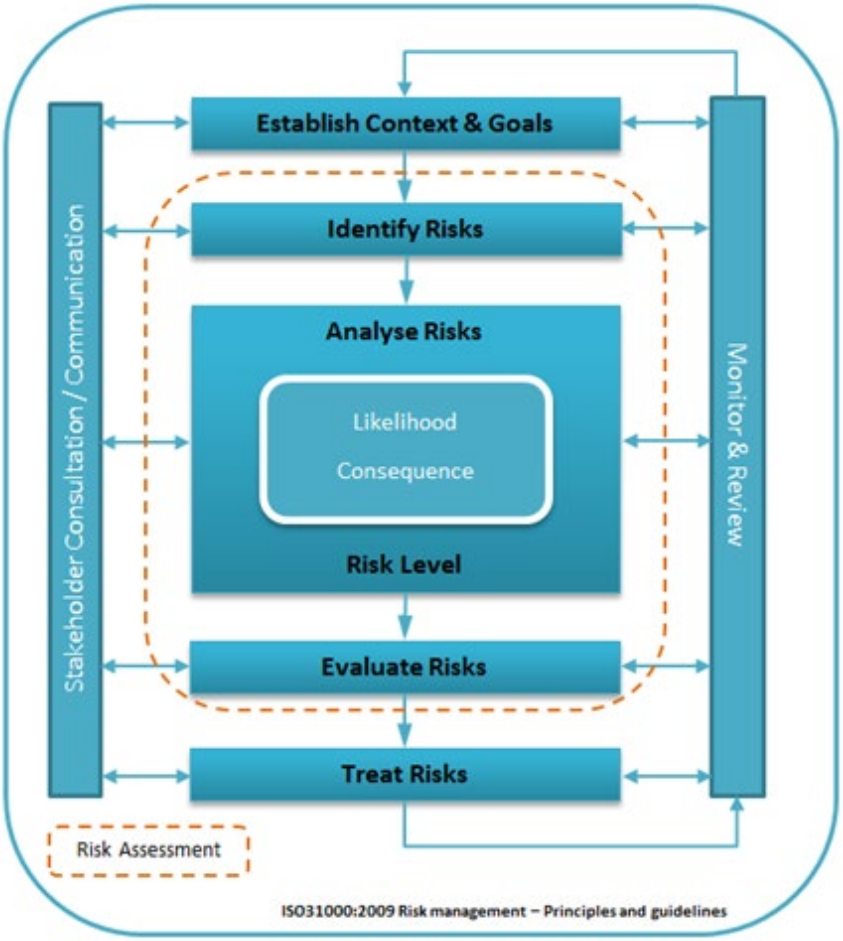


Figure 5.1. Risk management framework

5.2 Risk Management Process

GB Energy's environmental risk management methodology follows the ISO 31000 Risk Management Principles, which consists of the following steps:

- **Identifying** the environmental aspects of the activity (including stakeholders that may be affected by the activity);
- **Analysing** the environmental impacts and risks of the activity;
- **Evaluating** those impacts and risks;

- **Identifying** the treatments that can be incorporated into the activity to ensure the impacts and risks are managed to be ALARP and acceptable;
- **Ensuring** the environmental management system (EMS) is robust enough to achieve the objectives in place to manage the impacts and risks of the activity.

5.2.1 Stakeholder Identification

Stakeholder engagement and cooperation is an essential part of GB Energy's corporate sustainability strategy. Stakeholder consultation is an important part of GB Energy's environmental risk management process because it assists in determining the significance of impacts its activities may have.

5.2.2 Risk Identification

GB Energy reviewed and revised the environmental identification risk register, first developed in November 2018 for the G&G investigations, in March 2024. The results of this review form the basis for the EIA and ERA which is summarised in Chapter 6.

5.2.3 Risk Analysis

The OPGGS Regulations 15(4) requires that the EP detail and evaluate the environmental impacts and risks for an activity, including control measures used to reduce the impacts and risks of the activity to ALARP and an acceptable level.

Environmental impact and risk are defined as:

- *Impact: any change to the environment, whether adverse or beneficial, that wholly or partially results from an activity*.
- *Risk: the likelihood of a specific undesired event occurring within a specific period or in specified circumstances and with specified consequences*.

5.2.4 Determining risk consequence

GB Energy defines consequence as:

> *The nature of the outcome of an event.*

The consequence definitions are provided in Table 5-1.

Table 5-1. Consequence definitions

	Safety *(impact to GB Energy or contracting personnel)*	**Environment** *(impact to the physical and ecological environment and cultural heritage)*	**Financial** *(loss of revenue, business interruption, commodity trading, asset loss)*	**Reputation and social** *(services and community interruption)*	**Regulation** *(Occupational Health and Safety, environment, industrial relations, trade practices, industry acts)*
5. Catastrophic	Multiple fatalities or serious irreversible disability (>30%) to multiple persons	• Effects at the landscape level (hundreds or thousands of square kilometres or hectares). • A very large group of plants or animals affected. Entire habitat type or species population. Several populations of one or more threatened species or habitats experiences mortalities. • Permanent impact (e.g., >50 years) and irreversible. Rehabilitation is unlikely to be successful. Habitat or species is highly unlikely to recolonise. • An extensive hydrocarbon spill (e.g., over 100,000 litres) that requires clean up over weeks or months. • Permanent loss of item/place of international or national cultural heritage significance.	EBIT • Impact, loss or deterioration from expectation greater than $30m. CASH FLOW • Severe cash flow crisis. • Difficult to source funds. • Probable credit rating downgrade.	• Community outrage, conflict between neighbours/towns over months to years. • Irreparable damage of highly valued items or structures of great cultural significance • State-wide or national interest/outrage beyond the area of operations. • Business or residency is no longer viable. Permanent exclusion from operations or nuisance that cannot be mitigated.	• Very significant fines and prosecutions. • Prolonged multiple litigations and fines.
4. Major	Single fatality or major permanent injury/ illness or moderate irreversible disability (<30%) to one or more persons.	• Extensive area of effect (hundreds of square kilometres or hectares). • Large group of plants or animals affected. Nearly an entire habitat type or species population affected. One or more populations of a threatened species or habitat experiences injuries or mortalities. • Long-term duration of impact (e.g., 20-50 years), wholly or partially reversible damage. Active rehabilitation required	EBIT • Impact, loss or deterioration from expectation >$3m but <$30m. CASH FLOW • Loss of flexibility and/or increase in cost to source funds.	• Very large community affected (e.g., multiple suburbs/towns or city, entire fishery). • High increased cost of living or business operations (e.g., hundreds of thousands of dollars), high-level/long-term nuisance. Business or residency unlikely to	• Major breach of regulation and significant prosecution including class actions.

	Safety *(impact to GB Energy or contracting personnel)*	**Environment** *(impact to the physical and ecological environment and cultural heritage)*	**Financial** *(loss of revenue, business interruption, commodity trading, asset loss)*	**Reputation and social** *(services and community interruption)*	**Regulation** *(Occupational Health and Safety, environment, industrial relations, trade practices, industry acts)*
		over many years. Habitat or species is unlikely to recolonise. • A very large hydrocarbon spill (e.g., up to 100,000 litres) that requires clean up over weeks. • Damage to item/place of international or national cultural heritage significance that is very difficult to repair or may result in permanent scarring. Permanent impact.		remain viable. Long-term (e.g., months) exclusion from operations. • Community outrage, conflict between neighbours/towns.	
3. Serious	Serious reversible / temporary injury / illness (e.g., lost time >3 days or hospitalisation or Alternate/Restricted Duties >1 month).	• Localised to extensive effect (tens of square kilometres or hectares). • Large group of plants or animals affected. Partial habitat or population loss. A small population of a threatened species is affected. • Long-term duration of impacts (e.g., 10-20 years), reversible damage. Active rehabilitation required over years. Habitat or species is likely to recolonise. • A large hydrocarbon spill (e.g., up to 10,000 litres) that takes several days to clean up. • Serious (e.g., extensive) but repairable damage to item/place of international or national cultural heritage significance. Repair/restoration may take months or years.	EBIT • Impact, loss or deterioration from expectation >$300k but <$3m. CASH FLOW • Material impact to cash flow.	• Large community affected (e.g., town/s of several thousand people, dozens of fisheries licencees). • Moderate increased cost of living or business operations (e.g., tens of thousands of dollars), high-level nuisance. Business or residency may not remain viable. Long-term (e.g., weeks to one month) exclusion from operations. • Noticeable community unrest/tension.	• Serious breach of law/regulation with investigation or report to authority and possible prosecution. • Performance Infringement Notice.
2. Moderate	Reversible temporary injury/illness (e.g.,	• Moderately localised extent of effect (<10 square kilometres or hectares).	EBIT	• Small number of people or small community affected	• Breach of law/regulation or non-compliance.

	Safety *(impact to GB Energy or contracting personnel)*	**Environment** *(impact to the physical and ecological environment and cultural heritage)*	**Financial** *(loss of revenue, business interruption, commodity trading, asset loss)*	**Reputation and social** *(services and community interruption)*	**Regulation** *(Occupational Health and Safety, environment, industrial relations, trade practices, industry acts)*
	lost time or hospitalisation or Alternate/Restricted Duties <1 month).	• Minor impact on a small to medium sized group of plants or animals. A small number of individuals of a threatened species is affected. • Medium-term duration of impact (e.g., 5-10 years), reversible damage. Active rehabilitation may be required over weeks to months. Habitat or species is highly likely to recolonise. • A medium-sized hydrocarbon spill (e.g., up to 1,000 litres) that requires clean up over several days. • Repairable damage to item/place of state or national cultural heritage significance. Repair/restoration may take weeks or months.	• Impact or loss >$30k but <$300k. CASH FLOW • Impact to project or business unit cash flow.	(e.g., town of several hundred people, <20 fisheries licencees). • Minor increased cost of living or business operations (e.g., thousands of dollars), medium-level nuisance. Short-term (up to several days) exclusion from normal operations. • Some community unrest/tension, some locally-based complaints.	• Minor legal issues. • Litigation possible.
1. Minor	Injury/illness not requiring Medical Treatment (no lost time, no Alternate/ Restricted Duties). - First Aid - Report Only.	• Localised effect (<1 square kilometre or hectare). • Little or no effect on small number of plants or animals or habitat. No threatened species are affected. • Short to medium-term duration of impact (e.g., several months to 5 years), reversible damage. No active rehabilitation likely. Habitat or species will recolonise. • A small hydrocarbon spill (e.g., less than 100 litres) that requires no active clean up. • No visible damage to item/place of local, state, national or international cultural heritage significance.	EBIT • Impact or loss >$3k but <$30k. CASH FLOW • No significant impact.	• Up to several individuals affected (e.g., multiple landholders, <5 fishing licencees). • Minor increased cost of living or business operations (e.g., hundreds of dollars), low-level nuisance, minimal or no exclusion from normal operations. • No community unrest or negative media.	• Local investigation. • Minor breach of regulation. • On the spot fine or technical non-compliance. • Prosecution unlikely.

5.2.5 Determining risk likelihood

GB Energy defines likelihood as:

The chance of occurrence (sometimes per unit in time).

The definitions of likelihood are provided in Table 5-2.

Table 5-2. Consequence definitions

Frequency		Description	Probability
E	Almost certain	Impact is occurring now. Could occur within days to weeks.	99% chance of occurring within the next year.
D	Likely	Balance of probability will occur. Could occur within weeks to months	>50% chance of occurring within the next year.
C	Possible	May occur shortly but a distinct probability it won't. Could occur within months to years.	>10% chance of occurring within the next year.
B	Unlikely	May occur but is not anticipated. Could occur in years to decades.	>1% chance of occurring within the next year.
A	Remote	Occurrence requires exceptional circumstances. Exceptionally unlikely event in the long-term future.	<1% chance of occurring within the next year.

5.2.6 Risk Evaluation

The risk is evaluated by 'multiplying' likelihood and consequence, as per Table 5-3. The recommended form of action, escalation and monitoring for each risk level is provided in Table 5-4.

Chapter 6 presents the 'inherent' rating (pre-treatment) and 'residual' risk rating (with controls adopted) for each risk (unplanned events).

Table 5-3. Qualitative risk analysis matrix

		Consequence				
		1	2	3	4	5
Frequency		**Minor**	**Moderate**	**Serious**	**Major**	**Catastrophic**
E	**Almost certain**	Medium	High	High	Extreme	Extreme
D	**Likely**	Low	Medium	High	High	Extreme
C	**Possible**	Low	Medium	Medium	High	High
B	**Unlikely**	Low	Low	Medium	Medium	High
A	**Remote**	Low	Low	Low	Low	Medium

Table 5-4. Risk treatment action

Risk ranking	Treatment action
EXTREME The risk is intolerable	• Modify the threat, the frequency or consequence so that the risk is reduced to 'high' or lower. • For an operational activity, the risk shall be reduced as soon as possible, typically within a timescale of not more than a few weeks. • For commercial risks, review the risks and where practicable reduce by additional mitigation measures such as hedging, insurance, etc.
HIGH The risk is tolerable if ALARP	• Repeat threat identification and risk evaluation processes to verify and, where possible, quantify the risk estimation; determine the accuracy and uncertainty of the estimation. • Where the risk ranking is confirmed to be 'high', if practicable, modify the threat, the frequency or consequence to reduce the risk ranking to 'medium' or 'low'. • Where the risk ranking cannot be reduced to 'medium' or 'low', to demonstrate ALARP it is necessary to review if it is reasonably practicable to remove threats, reduce frequencies and/or reduce the severity of consequences, and if it is reasonably practicable, these risk treatment actions shall be applied. If it is not reasonably practicable, no further action is required and ALARP is demonstrated. • For an operational activity, the reduction to 'medium' or 'low' or demonstration of ALARP shall be completed as soon as possible; typically within a timescale of not more than a few months.
MEDIUM The risk is tolerable	• Determine the management plan for the threat to prevent occurrence and to monitor changes that could affect the classification. • Management responsibility must be specified – monitor to determine if risk changes and needs to be reassessed.
LOW The risk is tolerable	• Review at the next review interval. • Manage by routine procedures – reassess at next review.

5.2.7 Risk Treatment

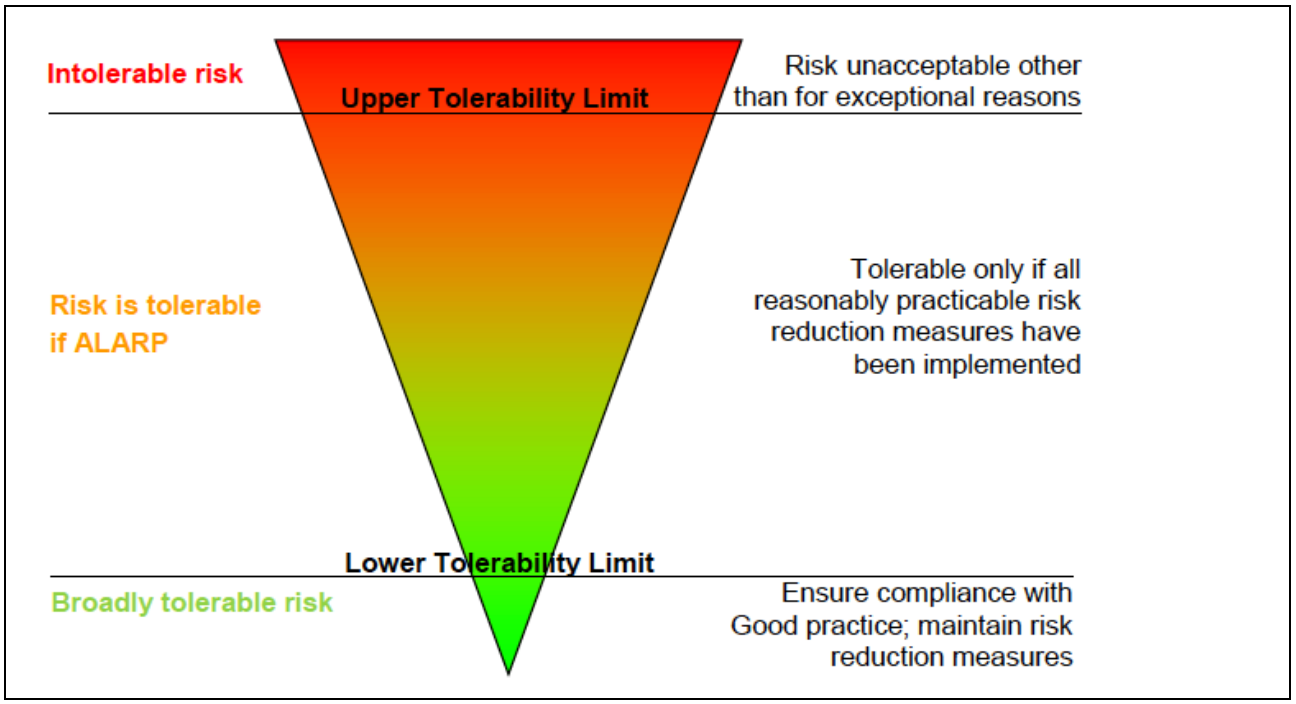
Each of the impacts and risks identified and evaluated in Chapter 6 have associated control measures. The following sections describe how ALARP and acceptability are defined and assessed.

5.2.8 Demonstration of ALARP

The ALARP principle is defined as:

> *The demonstration that the cost of further risk reduction measures is grossly disproportionate to the benefit gained.*

The ALARP principle arises from the fact that infinite time, effort and money could be spent attempting to reduce a risk or impact to zero. This principle is also illustrated in Figure 5.2.



Source: CER (2015).

Figure 5.2. The ALARP principle

There is no universally accepted guidance to applying the ALARP principle to environmental assessments. For the EP, the guidance provided in NOPSEMA's EP decision making guideline has been applied and augmented where deemed necessary (as outlined in GB Energy's Risk Management Procedure).

The level of ALARP assessment is dependent upon the:

1. Residual impact and risk level (high versus low); and
2. The degree of uncertainty associated with the assessed impact or risk.

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.

5.2.9 Demonstration of Acceptability

In addition to determining whether environmental risks are ALARP, GB Energy undertakes an assessment of all environmental hazards to determine whether they will be of an acceptable level. GB Energy considers a range of factors when evaluating the acceptability of environmental impacts associated with its activities, as outlined in Table 5-5.

Table 5-5. Acceptability test

Test	Question
Internal context	
Policy compliance	Is the proposed management of the risk or impact aligned with the GB Energy's HSE Policy?
Management System Compliance	Is the proposed management of the risk or impact aligned with the GB Energy's HSE Management System or supporting procedures?
Stakeholder engagement	

Test	Question
Social acceptability	Have stakeholders raised any concerns about activity impacts or risks, and if so, are measures in place to manage those concerns?
Legislation, industry standards and best practice	
Laws and standards	Is the risk or impact being managed in accordance with existing Australian or international laws or standards such as MARPOL, Flag State Marine Orders (MOs), API standards, etc?
Industry practice	Is the impact or risk being managed in line with industry practice, such as OSPAR OCNS, Industry Codes of Environmental Practice, etc?
Environmental context	Is the impact or risk being managed pursuant to the nature of the receiving environment (e.g., sensitive or unique environmental features generally require more management measures to protect them than environments widely represented in a region)?
Environmentally Sustainable Development (ESD) Principles	Does the proposed risk or impact comply with the accepted industry principles of conduct that ESD principles be integrated into company decision-making?
ALARP	Are there any further reasonable and practicable controls that can be implemented to further reduce the risk or impact?

5.3 Risk Monitoring and Review

To support the risk management system, it is necessary to have a process of monitoring and review. Ongoing review is required to ensure that risks and treatment plans remain relevant. Factors impacting upon risk assessments and control practices can be identified through regular monitoring.

Priority should be given to monitoring risks that are rated as ‘high’ or above (as defined in Table 5-4). The monitoring and review process is undertaken to support the reporting process and is an opportunity to identify emerging risks that have arisen, that need to be analysed and addressed, if required.

Monitoring and review aspects are described in the Implementation Strategy (Chapter 7) of this EP Summary.

6 Environmental Impact and Risk Assessment

This section presents the EIA and ERA for the environmental impacts and risks identified for the activity using the methodology described in Chapter 5.

A summary of the impact and risk ratings for each impact and risk identified and assessed in this chapter is presented in Table 6-1.

Table 6-1. Environmental impact and risk rating summary

Hazard		Inherent	Residual
Impacts (planned events)		Consequence rating	
1	Generation of underwater sound	Minor	Minor
	– Biological Receptors	Minor	Minor
	- Commercial fisheries	Minor	Minor
2	Displacement of Other Marine Users	Minor	Minor
3	Seabed disturbance	Minor	Minor
4	Atmospheric emissions	Minor	Minor
5	Light emissions – Environment	Minor	Minor
	– Community	Minor	Minor
6	Discharge of sewage and grey water	Minor	Minor
7	Discharge of cooling and brine water	Minor	Minor
8	Discharge of bilge water and deck drainage	Minor	Minor
Risks (unplanned events)		Risk rating	
1	Accidental overboard release of waste	Low	Low
2	Introduction of IMS	Medium	Low
3	Interference with Other Marine Users	Low	Low
4	Vessel Strike or Entanglement with Megafauna	Low	Low
5	Marine diesel oil spill	Medium	Low
6	Oil Spill Response - Surveillance and Tracking	Low	Low
7	Oil Spill Response Methods - Deflection and protection booms	Low	Low

Table 6-2 presents a summary of the environmental hazards associated with the activity, the impacts and risks of these hazards, the impact and risk ratings and the environmental performance standards (EPS) required to manage the identified impacts and risks. An EPS is defined as a statement of the performance required of a control measure.

Table 6-2 Environmental impact and risk assessment for geotechnical surveys

Hazard	Potential impacts and risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk
Impacts (planned events)			

Generation of underwater sound	Physiological or pathological impacts to local populations of marine fauna and avifauna.	• Engines and thrusters are maintained in accordance with manufacturer's instructions via the Planned Maintenance System (PMS) to ensure they are operating efficiently.
		• Support vessel crew will implement EPBC Regulations 2000 (Part 8, Division 8.1), embodied in The Australian National Guidelines for Whale and Dolphin Watching (DoEE, 2017b), which means maintaining watch for cetaceans such that:
		  ○ Caution zone (300 m either side of observed whales and 150 m either side of observed dolphins) – vessels must operate at speeds <6 knots within this zone
		  ○ No approach zone (100 m either side of observed whales and 50 m either side of observed dolphins) – vessels must operate at speeds <6 knots within this zone and should not enter this zone and should not wait in front of the direction of travel or an animal or pod/group.
		  ○ Do not encourage bow riding.
		  ○ If animals are bow riding, do not change course or speed suddenly.
		  ○ If there is a need to stop, reduce speed gradually.
		• Selected vessel crews have completed an environmental induction covering the above-listed requirements.
		• Activities will not be undertaken concurrently with recreational fishing competitions (Australia Day & Easter long weekend).
		• GB Energy has a noise monitoring consultant on standby to investigate noise and vibration complaints. Received complaints will be investigated in line with the specialist's advice.
			Minor

Displacement of other marine users	Temporary exclusion for fisheries, locals, tourism and shipping.	• GB Energy has undertaken pre-activity consultation with fishing stakeholders to ensure that commercial fishers are aware of the activity operations, timing, and caution zone requirements. • A notification is issued to fisheries stakeholders who operate in the activity area at least four weeks prior to the activity commencing. • Notifications are provided to residents (i.e., Golden Beach, Paradise Beach) at least four weeks prior to the start of the activity. • The AHO/TSV will be notified of the activity no less than four weeks prior to the activity commencing to enable the promulgation of NTM and AusCoast navigational warnings. • GB Energy will use SETFIA short message service (SMS) service to notify fishers of the activity, timing and caution zone at least 2 weeks prior to the activity commencing. • The activity will not be undertaken during times of high boating usage and recreational fishing activity by local communities (i.e., Australia Day long weekend, Easter long weekend).	Minor
Seabed disturbance	Removal of and disturbance to seabed sediments.	• The contractor ensures that only PLONOR, 'D'/'E' (non-CHARM) or 'Gold'/'Silver' (CHARM) OCNS-rated base fluids and additives are used in the geotechnical drilling fluid system to minimise ecotoxicity impacts to marine fauna. • Where for technical reasons an additive is required that has not been registered with CEFAS (and therefore does not have a rating), GB Energy will apply the CHARM, or in the case of non-	Minor

Hazard	Potential impacts and risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk
	Turbidity of the water column at the seabed.	CHARM able products, the OCNS process (https://www.cefas.co.uk/cefas-data-hub/offshore-chemicalnotification-scheme/hazardassessment-process/) to calculate the CHARM rating or OCNS grouping. ○ Only additives with a hazard quotient of <30 (silver/gold ranking) or an OCNS grouping of D/E will be used. • The rocky reef within the activity area and the nearby shipwreck the *Colleen Bawn* will be plotted in the vessel navigation systems so that the moorings for the geotechnical vessel avoid them. • Only vessels suitable for work in shallow waters (e.g., fitted with depth sounders) will be contracted. • The geotechnical vessel's anchor and chains are deployed in accordance with the vessel contractor's procedures. • The geotechnical vessel's anchors and chains are deployed such that the rocky reef site located within the activity area and the *Colleen Bawn* shipwreck located 500 m south of the activity area is avoided, in line with the bathymetric mapping. • A drop camera will be deployed at each sample location to confirm the seabed is free from sensitive environmental features (e.g., rocky reef). • Large bulky items are securely fastened to or stored on the deck to prevent loss to sea. • The crane/A-frame handling and transfer procedure is in place and implemented by crane operators (and others, such as dogmen) to prevent dropped objects. • Visual inspection of lifting gear is undertaken every quarter by a qualified competent person (e.g., maritime officer) and lifting gear is tested regularly in line with the vessel PMS. • A drop-down camera is deployed to search for non-buoyant dropped objects so that they can be marked with geographic coordinates (and for later retrieval, where possible). • If an ROV is deployed to retrieve a dropped object, the ROV will be maintained according to its PMS. • Dropped objects left behind at the end of the geotechnical investigation (that cannot be retrieved) will be reported to DEECA (ERR). In the event that an underwater cultural (UCH) site or feature is identified, implement the following unexpected finds procedure: • All activities with the potential to impact the suspected UCH must cease immediately. Records of the potential UCH including any images, description and location will be retained. • Person who discovers the heritage object must inform the GB Energy Onboard Representative, who will notify the GB Energy Environment Specialist. • GB Energy Environment Specialist must notify Heritage Victoria. • GB Energy will specify an appropriate buffer around the potential UCH, taking into consideration the nature and scale of the potential UCH and the activities to be managed. • No seabed disturbance may occur within the buffer area around the potential UCH until approved by GB Energy's Environment Specialist, after taking advice from Heritage Victoria. • GB Energy's Environment Specialist must provide all available documentation of the potential UCH to Heritage Victoria.	

Hazard	Potential impacts and risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk

		• If the potential UCH appears to be Aboriginal, GB Energy's Environment Specialist will report it to the First Peoples - State Relations (https://www.firstpeoplesrelations.vic.gov.au/report-and-protect-possible-aboriginal-place-or-object).
		• If the potential UCH appears to be a shipwreck or aircraft that has been wrecked for more than 75 years or is otherwise reportable under the *Heritage Act 2017*, GB Energy's Environment Specialist must notify Heritage Victoria (https://www.heritage.vic.gov.au/protecting-our-heritage/report-maritime-heritage).
		• If the suspected heritage object includes human remains, GB Energy's Environment Specialist must also notify:
		  ○ The Victorian Police (phone: 131 444) and the Coroner's Court of Victoria (phone: 1300 309 519).
		  ○ In line with the First Peoples - State Relations requirements, if there are reasonable grounds to believe that the remains are Aboriginal, the Coronial Admissions and Enquiries hotline will be contacted (phone: 1300 888 544).
		• Work must not recommence in the vicinity of the heritage object until GB Energy's Environment Specialist provides written approval, which is only after agreed management measures are implemented consistent with approvals and legislation or where the potential UCH is confirmed to not be UCH.
		• Vessel crews are made aware of the requirements of the unexpected finds procedure.	

Atmospheric emissions	Decrease in air quality due to gaseous emissions and particulates from MDO combustion and contribution to the incremental build-up of GHG in the atmosphere (influencing climate change).	• Only low-sulphur (<0.5% m/m) marine-grade diesel will be used in order to minimise SOx emissions. • All combustion equipment is maintained in accordance with the PMS (or equivalent). • If the vessel has a gross tonnage of >400 tonnes it must possess equipment, systems, fittings, arrangements, and materials that comply with the applicable requirements of MARPOL Annex VI. • If the vessel is >400 gross tonnes and involved in an international voyage, it must implement their Ship Energy Efficiency Management Plan (SEEMP) to monitor and reduce air emissions. • If the vessel is >400 gross tonnes must ensure that firefighting and refrigeration systems are managed to minimise ODS. • Oil and other noxious substances will not be incinerated. • Fuel use will be measured, recorded and reported for abnormal consumption, and in the event of abnormal fuel use, corrective action is taken to minimise air pollution.	Minor

Light emissions	Light glow may act as an attractant to light-sensitive species (e.g., seabirds, fish, migratory and non-migratory birds, sea turtles and zooplankton), in turn affecting predator-	• Light glow is minimised by managing external vessel lighting in accordance with:
		  ○ AMSA MOs Part 30 (Prevention of Collisions).
		  ○ AMSA MOs Part 59 (Offshore Support Vessel Operations).
		• Lighting is directed to working areas (rather than overboard) to minimise light spill to the ocean.
		• Lighting directed overboard can be manually over-ridden (with a local switch were possible) such that it is only switched on as required (e.g., man overboard).
		• GB Energy Offshore Representative will report grounded or injured birds on the vessel to the GB Energy Environmental Specialist.
			Minor

Hazard	Potential impacts and risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk

	prey and population dynamics (due to attraction to or disorientation from light).	• All crew are informed of their reporting responsibilities for grounded or injured birds during the environmental induction.
		• Incidents of grounded or injured birds on the vessel will be handled in accordance with the grounded or injured bird procedure below:
		  ○ At least one experienced seabird subject matter expert (SME) handler will be on call to provide advice and support to the GB Energy Offshore Representative.
		  ○ If required, the seabird SME handler will travel to the vessel and provide advice and training to the GB Energy Offshore Representative (and other personnel on board the vessel, as necessary) regarding handling of grounded birds.
		  ○ At least two containers will be available on board the vessel to house grounded birds and transport them to shore as required.
		  ○ If additional containers are required, they will be mobilised to the vessel on advice from the SME.
		  ○ Recovered birds held in containers should be located in a dark, cool (25-27°C) and quiet environment.
		  ○ The seabird handler is responsible for welfare of recovered birds while in containers and is the decision maker regarding treatment or release of grounded birds.
		  ○ If a bird requires treatment, it will be transported onshore for professional treatment.
		  ○ Release of birds will occur at least two hours before sunset to prevent re attraction to light on the vessel.	

Discharge of sewage and greywater	Temporary and localised increase in nutrient content of surface waters around the vessels.	• Sewage and grey water are treated in a MARPOL-compliant STP prior to overboard discharge. • The STP is maintained in accordance with the PMS. • In the event of a STP malfunction, untreated sewage will only be discharged when the vessel is >12 nm from shore. • Treated sewage and grey water is not discharged within 500 m of the shoreline.	Minor
Discharge of cooling and brine water	Increased sea surface temperature and salinity around the discharge point. Potential toxicity impacts to marine fauna from residual biocide and scale inhibitors.	• Engines and associated equipment that require cooling by water will be maintained in accordance with the vessel PMS so that they are operating within accepted parameters. • Only ONCS ‘Gold’/’Silver’ (CHARM) or ‘D’/’E’ (non-CHARM)-rated chemicals are used in the cooling and brine water systems. • Biocide dosing is kept to a minimum in accordance with the equipment manufacturer’s specifications. • Freshwater generation will be limited to volumes necessary for operational requirements. • Plant and equipment that requires cooling by water is maintained in good working order in accordance with the vessels’ PMS.	Minor
Discharge of bilge water and deck drainage	Reduction of surface water quality around the discharge point. Acute toxicity to marine fauna through ingestion of, or	• Hydrocarbon and chemical storage areas (process areas) are bunded and drain to the bilge tank (or equivalent). • Portable bunds and/or drip trays are used to collect spills or leaks from equipment that is not contained within a permanently bunded area (non-process areas). • All bilge water passes through a MARPOL-compliant OWS set to limit OIW to <15 ppm prior to overboard discharge.	Minor

Hazard	Potential impacts and risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk		
	contact with, heavily contaminated water (in the event of malfunction of the OWS or an uncontrolled spill on an un-bunded deck).	• The OWS is maintained in accordance with the vessel PMS. • The OWS is calibrated in accordance with the PMS to ensure the 15 ppm OIW limit is met. • The residual oil from the OWS is pumped to tanks and disposed of onshore (no whole residual bilge oil is discharged overboard). • In the event of OWS malfunction, all oily water is retained onboard for transfer to shore or discharged in waters >12 nm from the shore. • Through regular training, the vessel crews are competent in spill response and have appropriate response resources in order to prevent or minimise hydrocarbon or chemical spills discharging overboard. • Fully stocked SMPEP response kits and scupper plugs or equivalent drainage control measures are readily available to the crew and used in the event of a spill to deck to prevent or minimise discharge overboard. • Deck cleaning detergents are biodegradable. • Housekeeping of the decks is maintained to a high standard to ensure open drains do not carry residual hydrocarbons and chemicals to sea. • The vessel-specific SMPEP is implemented in the event of a large spill of hydrocarbons or chemicals overboard.			
Risks (unplanned events)			Residual risk assessment		
			C	L	RR

Accidental overboard release of hazardous and non-hazardous waste	Marine pollution (litter and a temporary and localised reduction in water quality), injury and entanglement of individual animals (such as seabirds and seals) and smothering or pollution of benthic habitats.	• A MARPOL Annex V-compliant GMP is in place for vessels >100 gross tonnes or certified to carry 15 persons or more that sets out the procedures for minimising, collecting, storing, processing and discharging garbage.
		• Waste is stored, handled and disposed of in accordance with the GMP. This will include measures such as:
		  ○ No discharge of general operational or maintenance wastes or plastics or plastic products of any kind.
		  ○ Waste containers are covered with secure lids to prevent solid wastes from blowing overboard.
		  ○ All solid wastes are stored in designated areas before being sent ashore for recycling, disposal or treatment.
		  ○ Any liquid waste storage on deck must have at least one barrier to minimise the risk of spills to deck entering the ocean. This can include containment lips on deck (primary bunding) and/or secondary containment measures (bunding, containment pallet, transport packs, absorbent pad barriers) in place.
		  ○ Correct segregation of solid and hazardous wastes.
		• Vessel crews are inducted into waste management procedures at the start of the drilling program to ensure they understand how to implement the GMP.
		• Crane transfers are undertaken in accordance with the vessel-specific lifting procedures.
		• The vessel crane and lifting equipment are maintained fit for use at all times in accordance with the PMS to minimise the risk of dropped objects.
			Minor	Unlikely	Low

Hazard	Potential impacts and risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk		
		• Solid waste that is accidentally discharged overboard is recovered if reasonably practicable. • No putrescible waste is discharged in the activity area (or state waters in general). All putrescible waste is transferred to shore for suitable disposal.			

Introduction of invasive marine species	Reduction in native marine species diversity and abundance, displacement of native marine species, socio-economic impacts on commercial fisheries and changes to conservation values of protected areas.	• The vessels are managed in accordance with the National Biofouling Management Guidance for the Petroleum Production and Exploration Industry (AQIS, 2009). This means:
		  ○ Conducting in-water inspection by divers or inspection in drydock if deemed necessary.
		  ○ Biofouling risk will be assessed, with cleaning of hull and internal seawater systems undertaken if deemed necessary.
		  ○ Anti-fouling coating status taken into account, with antifouling renewal undertaken if deemed necessary.
		• Vessels that are >400 gross tonnes carry a current IAFS Certificate that is complaint with and MO Part 98 (Anti-fouling Systems).
		• An IMS evaluation takes place for the vessels prior to mobilising to site based on the following:
		  ○ Inspecting the IAFS certificates to ensure they are current.
		  ○ Reviewing recent vessel inspection/audit reports to ensure that the risk of IMS introduction is low.
		  ○ Determining recent ports of call to determine the IMS risk of those ports.
		  ○ Determining the need for in-water cleaning and/or re-application of anti-fouling paint if neither has been done recently in line with anti-fouling and in-water cleaning guidelines and undertake such cleaning or re-application of anti-fouling coating as determined to be necessary.
		  ○ Implementing the guidance provided in the Australian Biofouling Management Requirements (Version 1, 2022).
		• Submersible equipment will be cleaned (e.g., biofouling is removed) prior to initial use for the project.
		• A vessel contractor pre-qualification is undertaken to ensure biofouling and ballast water controls meet project requirements.
		• Vessels will fulfil the requirements of the Australian Ballast Water Management Requirements (DAWE, 2020, v8). This includes requirements to:
		  ○ Carry a valid Ballast Water Management Plan (BWMP).
		  ○ Submit a Ballast Water Report (BWR) through the Maritime Arrivals Reporting System (MARS).
		  ○ If intending to discharge internationally sourced ballast water, submit BWR through MARS at least 12 hours prior to arrival.
		  ○ If intending to discharge Australian-sourced ballast water, seek a low-risk exemption through MARS.
		  ○ Hold a Ballast Water Management Certificate (BWMC).
		  ○ Ensure all ballast water exchange operations are recorded in a Ballast Water Record System (BWRS).
		• Non-compliant discharges of domestic ballast water are to be reported to EPA immediately.
			Mod-erate	Unlikely	Low

Hazard	Potential impacts and risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk		
Interference with other marine users	Collision with third-party vessels. Damage or loss of fishing equipment and/or loss of commercial fish catches.	• The geotechnical and support vessels use anti-collision monitoring equipment (24-hour radar watch, Global Maritime Distress Safety System [GMDSS] and AIS). • Visual and radar watch is maintained on the bridge of the support vessel and geotechnical vessel at all times. • The Vessel Masters and deck officers have valid SCTW certificates in accordance with AMSA Marine Order 70 (seafarer certification) (or equivalent) to operate radio equipment to warn of potential third-party spatial conflicts (e.g. International Convention on Standards of Training, Certification and Watch keeping for Sea-farers [STCW95], GDMSS proficiency). • The support vessel maintains communication with nearby vessels to ensure the caution zone is enforced. • The support vessel Vessel Masters issue warnings (e.g., radio warning, flares, lights/horns) to third-party vessels approaching the caution zone in order to prevent a collision with the geotechnical vessel. • The support vessel will remain close to the geotechnical vessel and will intercept approaching vessels that have not heeded radio advice about the presence of the geotechnical vessel. • The geotechnical vessel anchor moorings will have buoys attached to them, so that other marine users are made aware of subsea entanglement risk. • If the geotechnical vessel and support vessel are >200 tonnes, GB Energy will apply to NOPSEMA for a Bass Strait ATBA authorisation for the vessels to operate within the ATBA. • The support vessel Master will sound the general alarm, manoeuvre the vessel to minimise the effects of the collision on the geotechnical vessel and implement all other measures as outlined in the vessel or structure collision procedure (or equivalent). • Vessel collisions will be reported to TSV and AMSA if that collision has or is likely to affect the safety, operation or seaworthiness of the vessels or involves serious injury to personnel.	Minor	Remote	Low

Vessel strike or entanglement with megafauna	Injury or death of megafauna	• Support vessel crew will implement EPBC Regulations 2000 (Part 8, Division 8.1), embodied in The Australian Guidelines for Whale and Dolphin Watching (CoA, 2017) for sea-faring activities will be implemented, during the geotechnical program which means:
		  ○ Caution zone (300 m either side of whales and 150 m either side of dolphins) – vessels must operate at <6 knots within this zone.
		  ○ No approach zone (100 m either side of whales and 50 m either side of dolphins) – vessels must operate at speeds <6 knots within this zone and should not enter this zone and should not wait in front of the direction of travel or an animal or pod/group.
		  ○ Do not encourage bow riding.
		  ○ If animals are bow riding, do not change course or speed suddenly.
		  ○ If there is a need to stop, reduce speed gradually.
		• Vessel strike causing injury to or death of a cetacean is reported to the DCCEEW via the online National Ship Strike Database (https://data.marinemammals.gov.au/report/shipstrike) within 72 hours of the incident.
		• Entanglement of megafauna in vessel mooring is reported to the Whale and Dolphin Emergency Hotline on 1300 136 017 as soon as possible. No attempts to disentangle megafauna should be made by vessel crew.
			Mod-erate	Remote	Low

Hazard	Potential impacts and risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk		
Diesel spill	Pollution of sea surface, water column and shoreline. Injury or death of marine fauna, avifauna and macroalgae through ingestion or contact. Contamination of fish stocks and potential closure of fisheries.	• No refuelling will be undertaken at sea (this will be done in port). • The vessels have an approved SMPEP (or equivalent appropriate to class) that is implemented in the event of a fuel tank rupture and spill. • Vessel crews are inducted into spill response procedures. • Vessel crews are trained in spill response techniques in accordance with the SMPEP and vessel training matrix. • Prior to the vessel contractor(s) commencing the activity, a desktop diesel spill response exercise will be conducted to test interfaces between the SMPEP, OPEP, NatPlan and VicPlan. • GB Energy will report the spill to regulatory authorities within 2 hours of becoming aware of the spill. • The Vessel Master will authorise actions in accordance with the vessel-specific SMPEP (or equivalent according to class) and the activity-specific OPEP to limit the release of MDO.	Mod-erate	Unlikely	Low
Oil spill response activities					
Oil spill surveillance and tracking	Routine and non-routine impacts and risks associated with vessel operations. Noise disturbance to marine fauna and shoreline species by aerial flights.	• Access to operational response capabilities is maintained through GB Energy's contract with ORCA. • GB Energy undertakes a pre-activity desktop drill to test response capability. • GB Energy ensures that ORCA undertakes regular inspection and testing is undertaken for its oil spill response equipment. • Visual observations from the vessel is initiated immediately following a spill. • An Incident Action Plan (IAP) is prepared by the IMT Planning Officer within the first 24 hours after the spill starts, which is used to guide response activities. • Vectoring undertaken by an onsite spill assessor within 3 hours of spill report. • Real-time OSTM results are provided by RPS to GB Energy within 4 hours of notification of the spill. • Surveillance aircraft will ensure buffer distances of 500 m (helicopters) and 300 m (fixed wing) are maintained around cetaceans in accordance with EPBC Regulations 2000 (Part 8).	Minor	Possible	Low
Oil spill protection and deflection	Damage to nearshore habitats from inshore shallow draught vessel activities and boom anchoring. Damage to shoreline environments from vehicle, machinery and or/foot access and associated land use.	• Within 6 hrs of spill event notification, SCAT have mobilised to areas of predicted impact (daylight permitting) in consultation with East Gippsland Shire Council. SCAT information and the status of estuaries is provided to IMT for inclusion in operational NEBA. • An operational NEBA is prepared by the IMT to determine the net benefits of the booming strategy for the estuarine areas predicted to be contacted by MDO within 4 hours of receiving OSTM. • Personnel and equipment resources are deployed to site to undertake the protection and deflection activities within timeframes outlined in the IAP. • Booming operations continue until such time as no further sheen is visible on the sea surface, at the direction of the IMT Leader. • Environmental briefings are conducted prior to work commencing in order to identify risks and suitable controls. • Access to estuarine areas is via established tracks, non-native vegetation or via the ocean.	Minor	Unlikely	Low

Hazard	Potential impacts and risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk		
	Deeper mixing of hydrocarbons within beach sediments. Secondary contamination of the shoreline.	• Vessels do not anchor in and booms are not anchored to areas of OSRA-mapped or visible kelp forest, reef, sponge gardens or seagrass meadows. • Adequate monitoring personnel are in place at booming locations to maintain and attend to the operability of booms, including the release of fauna caught in booms (where safe to do so). • Vessel Masters maintain the following buffer distances around cetaceans (in accordance with the Australian Guidelines for Whale and Dolphin Watching for sea-faring activities): o 'Caution zone' (300 m either side of whales and 150 m either side of dolphins) – vessels must operate at no wake speed in this zone. o 'No approach zone' (100 m either side of whales and 50 m either side of dolphins) – vessels should not enter this zone and should not wait in front of the direction. • Waste storage tanks and hoses are located within a contained, impervious area. • Spill kits are available at oil recovery area and it is under supervision and secured from public access. • Collected waste is disposed in accordance with Victorian EPA waste disposal requirements.			
Shoreline Assessment and clean-up	Damage to foreshore and backshore environments from vehicle, machinery and/or foot access and associated land use (e.g., waste storage). Disturbance to Indigenous Cultural Heritage. Temporary exclusion of the public from amenity beaches. Increased demand for what may be limited resources in small coastal towns. Deeper mixing of hydrocarbons within beach sediments. Secondary contamination of foreshore and backshore areas from personnel and	• SCAT teams mobilised to site within 6-24 hours of the notification of the spill (daylight hours permitting). • SCAT information is provided to the IMT Leader for inclusion into the NEBA. An operational NEBA is undertaken to determine net benefits. • If an operational NEBA identifies that shoreline clean-up is required, the IAP includes this information to guide the response, with personnel and equipment deployed to relevant locations. • Shoreline clean-up resources are deployed to site within timeframes identified in the IAP. • Environmental briefings are conducted prior to clean-up commencing in order to identify risks and suitable controls. • Access to shoreline is via established tracks (with track edges fenced with bunting if required). Access outside of existing tracks and pathways is determined in consultation with local DEECA representatives. • Mobile equipment to be driven as close to the water's edge as possible to prevent impacts to shoreline birds. • Clean-up will keep to the inter-tidal zone as far as possible. • In consultation with local DEECA representatives, known occurrences of Aboriginal cultural heritage are flagged for avoidance. • Waste storage is located within a contained, impervious area. • Area is under supervision and secured from the public. • Oiled waste is transported in accordance with EPA waste disposal requirements. • All access points (personnel and equipment) will be controlled via designated access points through decontamination facilities.	Minor	Unlikely	Low

Hazard	Potential impacts and risks	Avoidance, management and mitigation measures (environmental performance standards)	Residual impact or risk		
	equipment movement.				
Oiled wildlife response	Disturbance, injury or death of fauna.	• DEECA personnel are mobilised to site within 12 hours of the notification from the SCAT team that fauna are at risk. • OWR kits are mobilised to site within 12 hours of the notification from the SCAT team that fauna are at risk. • An operational NEBA is undertaken to determine net benefits of undertaking OWR. • If an operational NEBA identifies that OWR is required, the IAP includes measures to guide the response, with personnel and equipment deployed to relevant locations. • Environmental briefings are conducted prior to clean-up commencing in order to identify risks and suitable controls. • Access to shoreline is via established tracks (with track edges fenced with bunting if required). Access outside of existing tracks and pathways is determined in consultation with local DEECA representatives. • Mobile equipment to be driven as close to the water's edge as possible to prevent impacts to shoreline birds. • Wildlife is only handled and treated by DEECA-trained or Phillip Island Nature Park wildlife clinic oiled wildlife responders.	Minor	Remote	Low

7 Implementation Strategy

GB Energy retains full and ultimate responsibility as the Titleholder of the activity and is responsible for ensuring that the mitigation measures outlined throughout Chapter 6 are implemented.

GB Energy has overall responsibility for the management of the activity to ensure that:

- Design and execution of the activities is in accordance with industry best practice and legislated standards;
- All regulatory approvals are obtained prior to activity commencement;
- Contractors have been pre-qualified by GB Energy as having appropriate equipment and resources to undertake the investigations and have appropriate systems in place to ensure that these activities are undertaken in accordance with all legislative requirements;
- The environmental impacts and risks of the activity are minimised and reduced to ALARP and environmental performance is monitored; and
- The day-to-day direction of work and the monitoring and auditing of work by contractors is undertaken in accordance with the accepted EP.

The vessel contractors will have the day-to-day control and management of the vessels through the respective Vessel Masters. The Vessel Master has over-riding authority and responsibility to make decisions with respect to environment protection and pollution prevention and to request assistance as may be necessary.

GB Energy has an agreement with ORCA Pty Ltd regarding oil spill response arrangements for the activity.

GB Energy and the vessel contractors will agree to undertake the activity as follows:

- GB Energy is the Titleholder for the permit, and is the Permit Operator and Project Manager;
- GB Energy has principal responsibility for the engineering design and project management of the activity, along with contracting services;
- The vessel contractors are responsible for operating the vessels while conducting the activity and interfacing with service contractors at the operations level on the vessels;
- The Vessel Masters are responsible for ensuring the safety of all personnel on board their respective vessels;
- The Vessel Masters are responsible for the implementing their SMPEPs;
- GB Energy is responsible for the onshore management of emergency incidents; and
- The GB Energy Onboard Representative will be the designated representative on the vessels and will have a direct interface with the Vessel Masters.

7.1 Roles and Responsibilities

The organisation structure for the activity consists of onshore and offshore GB Energy and contractor personnel. The organisation structure for the activity is illustrated in Figure 7.1.

Day-to-day implementation of the EP will occur on the relevant vessel under the leadership of the Vessel Master, Party Chief and the Onboard GB Energy Representative. The GB Energy Project Manager will have oversight of the performance of the activity against the EP and other project plans and will initiate reviews and audits as required.

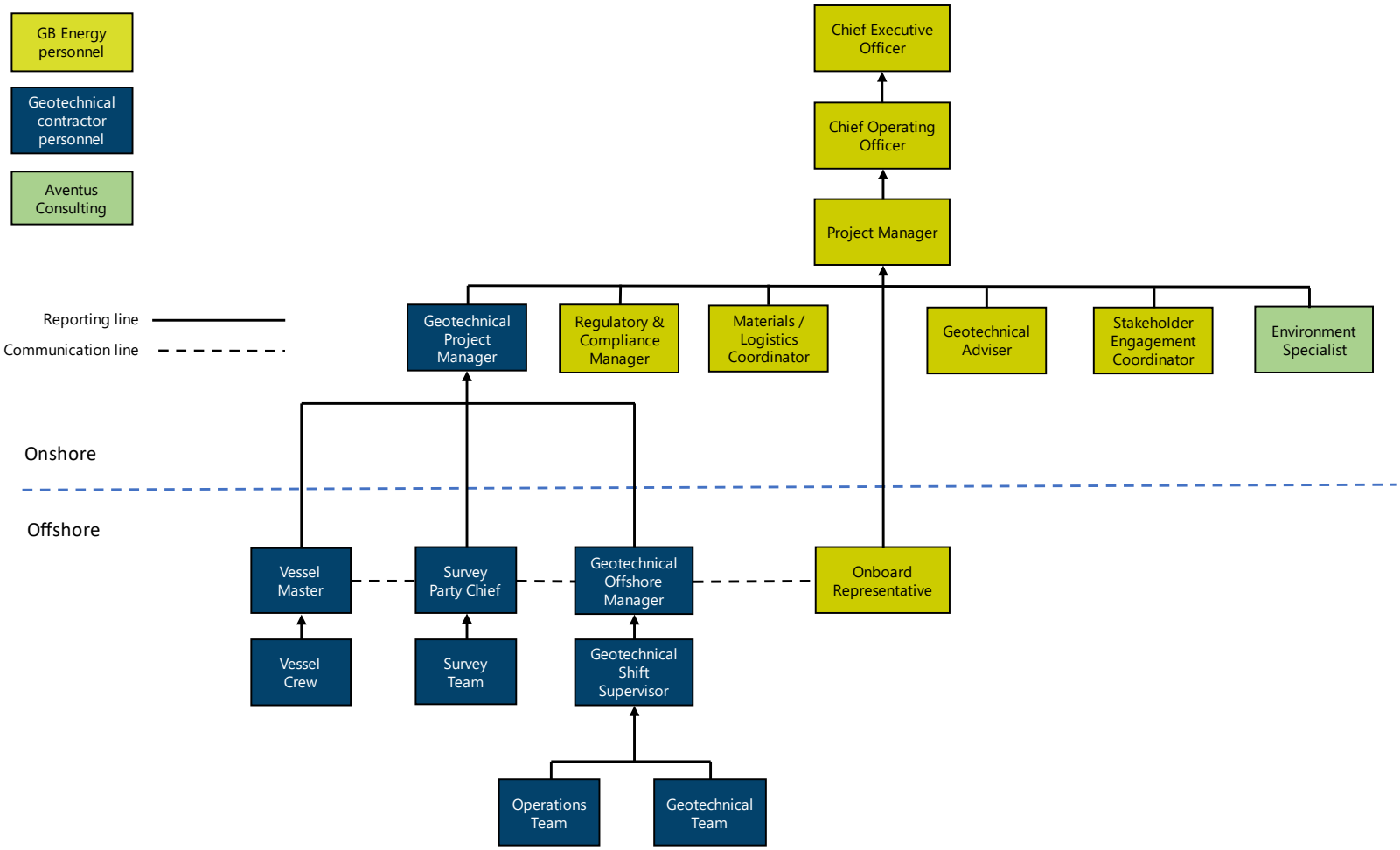


Figure 7.1. The organisation structure for the activity

7.2 Environmental Management Systems

7.2.1 GB Energy

GB Energy has in place a Health, Safety and Environmental Management System (HSEMS) that is aligned with ISO 14001:2015 (Environmental Management Systems – requirements with guidance for use).

The HSEMS contains 14 elements for identifying, managing and reducing the company's impact on health, safety and the environment, based on the principle of continual improvement and the 'plan, do, check, act' cycle in line with ISO14001.

7.2.2 Vessel Contractors

The vessel contractors used to conduct the activity will be required to have an HSEMS that meets the requirements of the GB Energy HSE Policy and HSEMS.

7.3 Training and Awareness

7.3.1 Recruitment and Training

During its contractor selection process, GB Energy will conduct a due diligence review to ensure that the chosen contractors have procedures in place to ensure the correct selection, placement, training and ongoing assessment of employees, with position descriptions (including a description of HSE responsibilities) for key personnel being readily available.

7.3.2 Environmental Induction

An activity-specific HSE induction for all personnel working on the activity will be undertaken prior its commencement. The GB Energy Onboard Representative is responsible for ensuring personnel receive this induction prior to the commencement of the activity. All personnel are required to sign an attendance sheet to confirm their participation in and understanding of the induction. The vessel contractors will conduct their own company and vessel-specific inductions independently of the activity-specific HSE induction.

7.3.3 Oil Spill Response Training

Quarterly training of vessel crews in SMPEP procedures is a MARPOL requirement for vessels over 400 GRT (Annex 1, Regulation 37).

During its contractor audit process, GB Energy will assess the vessel contractors' implementation of their SMPEPs (or equivalent, relevant to class).

An office-based desktop spill response exercise of the activity-specific OPEP will be conducted by GB Energy and ORCA prior to the mobilisation of the vessels to the area of operations and no earlier than within four weeks of the activity commencing.

7.3.4 Toolbox Talks and HSE Meetings

Environmental matters will be included in daily toolbox talks as required by the specific task being risk assessed. The GB Energy Onboard Representative and Vessel Masters will discuss HSE matters that have arisen in the previous week, and issues to consider for the following week. Records associated with activity-specific training, environmental training, inductions and attendance at toolbox meetings will be recorded and maintained on board the vessel.

7.3.5 Communications

The Vessel Masters and GB Energy Onboard Representative are jointly responsible for keeping the vessel crews informed about HSE issues, acting as a focal point for personnel to raise issues and concerns.

7.4 Environmental Emergencies and Preparedness

In the event of an emergency of any type, the Vessel Master will assume overall onsite command and act as the Emergency Response Coordinator (ERC). All persons aboard the vessels will be required to act under the ERC's directions. The GB Energy Onboard Representative will maintain communications with GB Energy Regulatory & Compliance Manager who will become the overall IMT Leader and will also coordinate with GB Energy's Oil Spill Response Team (OSRT) in the event of an emergency involving an oil spill. Oil spill emergency response support will be provided by ORCA.

7.4.1 Adverse Weather Protocols

It is the duty of the Vessel Master to act as the focal point for all actions and communications with regards to any emergency, including response to adverse weather or sea state, to safeguard their vessel, all personnel onboard and environment. The Vessel Contractors will use the in-vessel Very High Frequency (VHF) Marine Radio Weather Services and/or obtain daily weather forecasting from the Bureau of Meteorology to monitor weather within the activity area in the lead up to and for the duration of the activity.

7.4.2 Vessel Emergencies and MDO Spills

Vessel-specific emergency response procedures will be included in the vessel contractors' ERPs. The ERPs will contain instructions for vessel emergency, medical emergency, search and rescue, reportable incidents, incident notification and emergency contact information. Given the various vessel types and vessel operating companies that exist, by necessity these ERPs must be vessel-specific.

Prior to the conduct of the activity, GB Energy will review the vessel ERPs to ensure that appropriate emergency procedures considered in those plans have been put into place for all relevant environmental emergency events (including the assignment of emergency management roles for particular events). Environmental emergencies that will be considered will include (but not be limited to):

- Introduction of animal diseases into aquaculture;
- MDO spill (addressed in the full EP);
- IMS incursions (addressed in the full EP);
- Cetacean stranding and vessel strike (addressed in the full EP);
- Maritime casualties requiring salvage and intervention, emergency towage and requests for a place of refuge;
- Marine pollution from floating or sunken containers of hazardous materials;
- Debris originating from a maritime casualty;
- Physical damage caused by vessels;
- Fire or explosion on the vessel;
- Hijack/terrorism; and
- Adverse weather.

SMPEPs and ERPs typically include vessel-specific procedures for the following:

- Fire and explosion;
- Incidents – collision, grounding, hull damage, man overboard, equipment failure;
- Waste management;
- Hazardous materials and handling; and
- Hydrocarbon and chemical spills.

The support vessel Masters will ensure that their crews are fully aware of the vessel-specific requirements and that exercises for vessel-related incidents are conducted.

7.4.3 Emergency Response Training

The readiness and competency of GB Energy (and its oil spill response contractor ORCA) and the vessel contractors to respond to incidents and emergencies was tested by conducting a desktop emergency response exercise, which was completed on 15th October 2024. The scenario combined an emergency with risk to human life (injured diver) and risk to the environment (large hydrocarbon spill and presence of species under MNES). Several plans (i.e., the ERP and OPEP) were tested simultaneously. Learnings, findings or recommendations identified as part of the testing exercise were incorporated into the relevant ERPs and procedures to ensure they remain effective.

7.5 Simultaneous Operations

The activity area overlaps the GHG Assessment Permit GGAP006386(V), operated by the CarbonNet Project on behalf of the Crown in right of Victoria. As part of the stakeholder consultation process, GB Energy has informed the CarbonNet Project of the activity location and timing. GB Energy remains in contact with the CarbonNet Project so that SIMOPS issues can be addressed if and as required.

7.6 Recording and Reporting - Internally

7.6.1 Routine Recording and Reporting

Routine internal recording and reporting of activity HSE matters will encompass the following:

- Daily teleconferences – held between the Vessel Master and GB Energy personnel each morning for an update on progress from the previous day and the forward plan, including any HSE matters that have arisen.
- Daily reports – the GB Energy Onboard Representative will prepare a daily report, including data on activities conducted for the day and any HSE issues arising and distributed to the extended project team.
- HSE reporting – the Regulatory & Compliance Manager will collate key HSE performance statistics on a daily basis and report those to the wider project team during daily teleconferences.
- Monthly environmental report – GB Energy will prepare and submit a monthly environmental report not later than 15 days after the end of the calendar month that details all recordable incidents (in accordance with OPGGS Regulation 31(3)).
- EP performance report – the Regulatory & Compliance Manager or Environmental Specialist will prepare an end-of-activity performance report that reports on the outcomes of each EPS in the EP. This will be submitted to DEECA ERR within 3 months of completion of the activity.

7.6.2 Incident Recording and Reporting

All environmental near-misses and incidents, including non-compliances with the EP, EPO and EPS, must be communicated immediately to the GB Energy Onboard Representative who will then report

to the Regulatory & Compliance Manager. This expectation will be reinforced at inductions, daily toolbox meetings and weekly HSE meetings.

The Vessel Master will lead an investigation into the cause, effects and learnings of the incident as per the contractor's investigation procedures. Where circumstances warrant it, this investigation will be conducted jointly with the GB Energy Regulatory & Compliance Manager and GB Energy Onboard Representative. Following an investigation, the vessel contractor and GB Energy will develop remedial actions and communicate these to the team (and wider organisations, as appropriate) to prevent recurrence.

Regulation 6 of the OPGGS defines the following incident types:

- **Recordable incident** – a breach of an EPO or EPS in the EP that applies to the activity that is not a reportable incident.
- **Reportable incident** – an incident relating to the activity, whether or not described in the EP in force for the activity, that has caused, or has the potential to cause, moderate to catastrophic environmental consequences and a breach of or non-compliance with the Act or the EPO, which is outlined in the full EP.

In accordance with the regulations, GB Energy will report any reportable incidents to ERR within 2 hours of becoming aware of the incident, and recordable incidents will be reported to ERR no later than 15 days after the end of the calendar month.

7.7 Record Keeping

In accordance with Regulations 32 and 33 of the OPGGS, GB Energy will store and maintain the documents or records relevant to the EP implementation (including the accepted EP itself) for a period of 5 years in a way that makes retrieval reasonably practicable. These records will be stored on GB Energy's document management system and will be made available to DEECA ERR in electronic or printed form upon written request.

7.8 Management of Change

GB Energy's MoC procedure (GB-GN-PM-PRO-001) will be used as the over-arching document that will guide the MoC process for the activity. An MoC Form must be completed by the person identifying that a change is required. This is then reviewed by relevant specialists to determine the impact of the change. An internal review will take place by the relevant manager. The results of the review will inform the change to all those who may be affected by it.

7.9 Monitoring

7.9.1 Field Environmental Monitoring

GB Energy will maintain a quantitative record of emissions and discharges, and other environmental matters generated on location during the activity.

7.9.2 Auditing, Assurance and Inspections

Environmental performance of the activity will be reviewed in a number of ways. These reviews are undertaken to ensure that:

- EPS to achieve the EPO are being implemented;
- Potential non-compliances and opportunities for improvement are identified; and
- All environmental monitoring requirements have been met before completing the activity.

The following arrangements will be established to ensure environmental performance is in line with the EP:

Onboard Environmental Audit

GB Energy will undertake an EP compliance audit onboard the geotechnical vessel immediately prior to mobilisation and/or during geotechnical operations to assess compliance with the EPS in this EP. The scope and timing of the audit, along with details of the suitably qualified person undertaking the auditor, will be provided by GB Energy to DEECA (ERR) for their approval prior to the audit.

Onboard Inspections

The GB Energy Onboard Representative will continuously supervise the activity, ensuring adherence to the EPS specified in this EP. This will be facilitated by completing an environmental inspection checklist developed by the Environmental Specialist. A completed checklist will be provided to the Environmental Specialist on a weekly basis so that environmental compliance is continuously monitored. The findings and recommendations of inspections and audits will be documented and distributed to relevant personnel for comments. Any non-compliances or opportunities for improvement will be communicated to the vessel Masters and Project Manager at the time of the inspection or audit to ensure there is adequate time to implement corrective actions. Results will be summarised in the EP performance report submitted to DEECA after the completion of the activity.

7.9.3 Contractor Monitoring and Review

GB Energy will have in place commitments registers to assist in monitoring against contractors' plans. Learnings from this monitoring will inform continued operations and the development of EPs for future phases of the Golden Beach Gas Project.

7.10 Environment Plan Review

GB Energy may determine that an internal review of the EP is necessary based on any one or all of the following factors:

- Changes to hazards and/or controls identified in the review of the EP;
- Implementation of corrective actions to address internal or external inspection or audit findings;
- An environmental incident and subsequent investigation identifies issues in the EP that require review and/or updating;
- A modification of the activity is proposed that is not significant but needs to be documented in the EP;
- Changes identified through the MoC process, such as hazards or controls, organisational changes affecting personnel in safety critical roles; and
- Changes to any of the relevant legislation.

7.10.1 Revisions Triggering EP re-submission

GB Energy will revise and re-submit the EP for assessment as required by the OPGGS(E) regulations listed in Table 7-2.

Table 7-1. OPGGS EP revision requirements

Regulation requirement	OPGGS Regulation
Submission of a revised EP before the commencement of a **new activity.**	20(1)
Submission of a revised EP when any **significant modification** or **new stage** of the activity that is not provided for in the EP is proposed.	20(2)
Submission of a revised EP before, or as soon as practicable after, the **occurrence of any significant new or significant increase in environmental** impact or risk not provided for in the EP.	20(3)

Regulation requirement	OPGGS Regulation
Submission of a revised EP if a **change in Titleholder** will result in a change in the manner in which the environmental impacts and risks of an activity are managed.	20(4)
At least **14 days before the end of each period of 5 years** commencing on the day in which the original and subsequent revisions of the EP is accepted.	20(1)

7.10.2 Minor EP Revisions

Minor revisions to this EP that do not require resubmission to DEECA will be made where:

- Minor administrative changes are identified that do not impact on the environment (e.g., document references, contact details, etc.).
- A review of the activity and the environmental risks and impacts of the activity do not trigger a requirement for a revision, as outlined in Table 7-2.

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