REFERRAL OF A PROJECT FOR A DECISION ON THE NEED FOR ASSESSMENT UNDER THE *ENVIRONMENT EFFECTS ACT 1978*

REFERRAL FORM

The *Environment Effects Act 1978* provides that where proposed works may have a significant effect on the environment, either a proponent or a decision-maker may refer these works (or project) to the Minister for Planning for advice as to whether an Environment Effects Statement (EES) is required.

This Referral Form is designed to assist in the provision of relevant information in accordance with the *Ministerial Guidelines for assessment of environmental effects under the Environment Effects Act 1978* (Seventh Edition, 2006). Where a decision-maker is referring a project, they should complete a Referral Form to the best of their ability, recognising that further information may need to be obtained from the proponent.

It will generally be useful for a proponent to discuss the preparation of a Referral with the Impact Assessment Unit (IAU) at the Department of Environment, Land, Water and Planning (DELWP) before submitting the Referral.

If a proponent believes that effective measures to address environmental risks are available, sufficient information could be provided in the Referral to substantiate this view. In contrast, if a proponent considers that further detailed environmental studies will be needed as part of project investigations, a more general description of potential effects and possible mitigation measures in the Referral may suffice.

In completing a Referral Form, the following should occur:

- Mark relevant boxes by changing the font colour of the 'cross' to black and provide additional information and explanation where requested.
- As a minimum, a brief response should be provided for each item in the Referral Form, with a more detailed response provided where the item is of particular relevance. Cross-references to sections or pages in supporting documents should also be provided. Information need only be provided once in the Referral Form, although relevant cross-referencing should be included.
- Responses should honestly reflect the potential for adverse environmental effects. A Referral will only be accepted for processing once IAU is satisfied that it has been completed appropriately.
- Potentially significant effects should be described in sufficient detail for a reasonable conclusion to be drawn on whether the project could pose a significant risk to environmental assets. Responses should include:
    - a brief description of potential changes or risks to environmental assets resulting from the project;
    - available information on the likelihood and significance of such changes;
    - the sources and accuracy of this information, and associated uncertainties.

- Any attachments, maps and supporting reports should be provided in a secure folder with the Referral Form.
- A USB copy of all documents will be needed, especially if the size of electronic documents may cause email difficulties. **Individual documents should not exceed 10MB as they will be published on the Department's website.**
- A completed form would normally be between 15 and 30 pages in length. Responses should not be constrained by the size of the text boxes provided. Text boxes should be extended to allow for an appropriate level of detail.
- The form should be completed in MS Word and not handwritten.

The party referring a project should submit a covering letter to the Minister for Planning together with a completed Referral Form, attaching supporting reports and other information that may be relevant. This should be sent to:

Postal address

Minister for Planning
PO Box 500
EAST MELBOURNE VIC 8002

Couriers

Minister for Planning
Level 16, 8 Nicholson Street
EAST MELBOURNE VIC 3002

In addition to the submission of the hardcopy to the Minister, separate submission of an electronic copy of the Referral via email to ees.referrals@delwp.vic.gov.au is required. This will assist the timely processing of a referral.

PART 1 PROPONENT DETAILS, PROJECT DESCRIPTION & LOCATION

1. Information on proponent and person making Referral

Name of Proponent:	**Qube Energy Pty Ltd**
Authorised person for proponent: **Position:** **Postal address:** **Email address** **Phone number:** **Facsimile number:**	Leatrice Treharne General Manager, Projects & Development Level 27, 45 Clarence Street, Sydney NSW 2000 Leatrice.Treharne@qube.com.au +61 3 8327 8307 N/A
Person who prepared Referral: **Position:** **Organisation:** **Postal address:** **Email address:** **Phone number:** **Facsimile number:**	Barton Napier Senior Principal Coffey Services Australia Pty Ltd Level 1, 436 Johnston Street, Abbotsford VIC 3067 Barton.Napier@coffey.com +61 3 9290 7000 N/A
Available industry & environmental expertise: (areas of 'in-house' expertise & consultancy firms engaged for project)	**Qube Energy Pty Ltd – Proponent** Qube is Australia's largest integrated provider of import and export logistics services. Qube is a specialist integrated port services provider, providing bulk and general handling facilities in over 40 Australian, New Zealand and South East Asian ports. Qube Energy is the operator Barry Beach Marine Terminal, which is the main supply depot for Esso Australia's Bass Strait oil and gas operations, as well as providing port facilities to third-party businesses. **Coffey Services Australia Pty Ltd** Coffey has more than 40 years' experience providing technical and advisory services including environmental and social impact assessment (ESIA), stakeholder engagement and management through the project life cycle.

2. Project – brief outline

Project title:

Gippsland Regional Port Project

Project location: (describe location with AMG coordinates and attach A4/A3 map(s) showing project site or investigation area, as well as its regional and local context)

The project is located at the existing Barry Beach Marine Terminal (BBMT) located approximately 160 km southeast of Melbourne in South Gippsland (Figure 1). The project area includes:

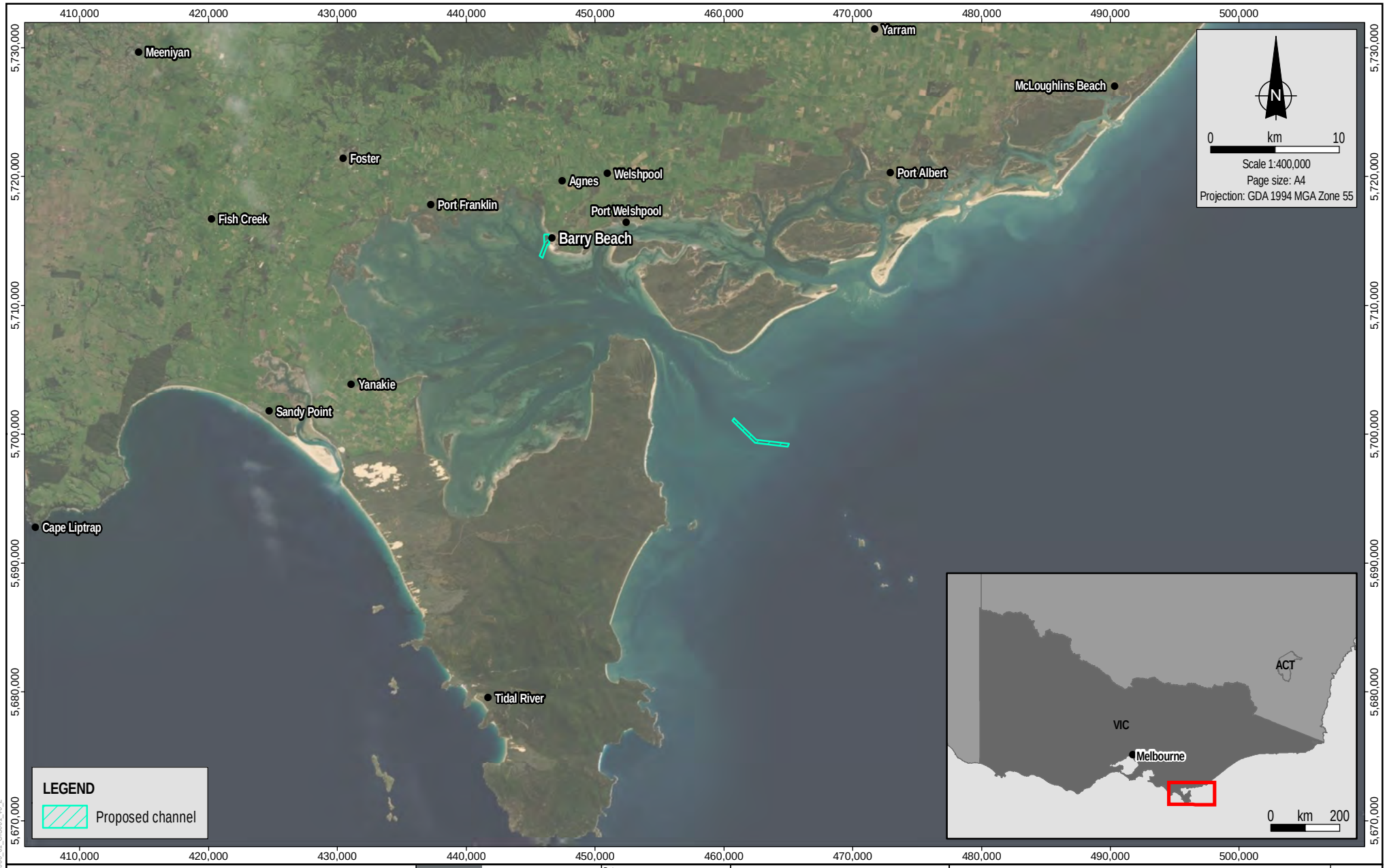
- **Landside component**: redevelopment of BBMT which includes construction of new port facilities (e.g., warehouses, hardstands) and a new wharf.
- **Waterside component**:
    - Deepening and widening the existing berth pockets, swing basin and Barry Beach Channel at BBMT.
    - Creating a channel through the existing sand bar that is situated approximately 3 km offshore from the Corner Inlet entrance.
    - Dredged material placement area.

The location of the dredged material placement area is subject to site options analysis to be completed as part of future environmental assessment and approvals. This will involve consultation with environment and fisheries organisations, local fishers, recreational divers and other relevant organisations. It will also be supported by hydrodynamic modelling and surveys of marine biota at the placement site/s. Locations being investigated are adjacent to BBMT, near Singapore Deep and near the Corner Inlet entrance in Bass Strait. The preferred location for offshore placement is close to Corner Inlet entrance in order to minimise transport time, effort and costs. An area within Victorian Waters to the east of Wilsons Promontory off Rabbit Island has been identified as a potential placement area. Alternative sites are the former dredged material placement area adjacent to Singapore Deep in Corner Inlet and onshore/offshore placement adjacent to BBMT in and adjacent to former placement areas.

Short project description (few sentences)**:**

The Gippsland Regional Port Project is a proposal to develop a regional port at Barry Beach to provide port access for a range of Gippsland businesses and to overcome a lack of facilities within the Gippsland region that are provided at the major ports at Melbourne, Geelong and Hastings. The port will develop bulk and break-bulk trade, in addition to expanding Oil & Gas to third party users, and opportunities for the Gippsland Regional Port to support clean energy projects. The port will be capable of handling niche cargos not able to be efficiently managed at the other ports.

The redevelopment will include replacement of the existing wharf and construction of port facilities, such as laydown areas, warehouses, hardstand, bulk handling facilities and operation and maintenance bases. The project will require deepening of the swing basin and berth pockets and creating a channel through the sand bar situated approximately 3 km offshore from the Corner Inlet entrance to enable cargo and special purpose vessels to use the port.



Source:
Proposed channels from Coffey.
Imagery from ESRI Online.

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Date: 20.03.2020
Project: 754-MELEN268900
File Name: 268900_01_F001_GIS

Gippsland Regional Port Project

Qube Energy Pty Ltd

Locality

Figure No: 1

MXD Reference: 268900_01_GIS001_v0_2

3. Project description

Aim/objectives of the project (what is its purpose / intended to achieve?):

Qube Energy Pty Ltd (Qube) proposes to develop a regional port at Barry Beach to provide port access for larger vessels thereby enabling greater import and export capabilities for the region. The port will handle bulk goods and break-bulk cargos. The port will be capable of handling niche cargos not able to be efficiently managed at the other ports. Deepening of the access channel, swing basin and berths is required to enable cargo and special purpose vessels to use the port.

Development of the project will:

- Provide ongoing support for the Gippsland Basin Joint Venture (Esso Australia Pty Ltd and its Affiliates are in an unincorporated joint venture in relation to the Gippsland Basin which is involved in the exploration, development and production of offshore petroleum resources in Bass Strait, Victoria (GBJV)).
- Support the construction and operation of the proposed offshore clean energy industry in Bass Strait, which will require the use of special purpose vessels.
- Facilitate regional sea freight.
- Replace ageing infrastructure thereby extending the life of BBMT.

Background/rationale of project (describe the context / basis for the proposal, eg. for siting):

Background

Corner Inlet supports a base for vessels engaged in coastal trade, the Bass Strait oil and gas fields and the fishing industry. After establishment of Port Albert in 1841, a commercial fishery was soon established to service the needs of the region and Melbourne. By the 1900s the region was, and remains one of Victoria's major commercial fisheries, with boats continuing to operate out of Port Albert, Port Welshpool, and Port Franklin. Harbour facilities within the area have been expanded in parallel with development of the region. In 1968, Esso built a terminal at Barry Beach to service the development of the Bass Strait oil and gas fields.

Barry Beach Marine Terminal (BBMT) is the main supply depot for Gippsland Basin Joint Venture's Bass Strait oil and gas operations. Each year it facilitates the warehousing and transport of thousands of tonnes of food, supplies, fuel and equipment to 23 offshore platforms and installations that serve as bases for drilling, oil and gas production and processing. It is a critical service for the 300 personnel and contractors who live and work on the offshore platforms.

The BBMT was established by Esso Australia Ltd to service Bass Strait oil and gas fields with supporting rail to Leongatha. Capital dredging to create BBMT and Barry Beach Channel was completed in 1968 using a cutter suction dredge. Dredge spoil was disposed onshore in the intertidal area to the southeast of port. The Barry Beach Channel, berths and swing basin were originally dredged to at least 6 m with a channel width of up to 100 m. It is estimated that approximately 1.5 to 2 million cubic metres of material were removed during dredging.

The historical survey data indicates that siltation at BBMT is an ongoing process. Siltation also occurs in the Barry Beach Channel connecting BBMT to the Toora Channel. Maintenance dredging campaigns have been completed since 1968, with recent dredging in 1990, 1994 and intermittently from 2003 to 2009. All dredging that has been completed at BBMT, has been by cutter suction dredges disposing of the dredged material onshore at and to the south of the marine terminal, with one exception where some side-casting dredging of the Barry Beach Channel in 1994.

At least 100,000 cubic metres was dredged in 1990 in order to restore the basin to its original dredged depth. Dredging of a similar magnitude was again repeated in 2010. Since this point there has been little change in the depths of the Barry Beach Channel.

BBMT is owned by Gippsland Basin Joint Venture and was operated by the joint venture until 2017. In July 2017, Qube was awarded an Operating Agreement for the provision of shore base terminal operational services and associated Supply Base and General Port Leases at BBMT on behalf of Gippsland Basin Joint Venture, as well as having the ability to offer port facilities to third-party businesses.

BBMT facilitates the transport of food, fuel, equipment, and supplies such as water, ethylene glycol, barites and cement to the various offshore platforms and installations that serve as bases for the oil and gas operations.

BBMT is a valuable asset to the Gippsland region and, with the ability to now provide a broader range of port and logistics services, it has the potential to create economic and employment growth opportunities for Victoria into the future.

Rationale for the project

Qube's vision is to redevelop BBMT into a world class, multi-user port facility that will benefit local trade, project logistics and local communities. Through this project, Gippsland Regional Port will provide further regional employment opportunities, and other direct benefits to local businesses and communities.

Qube's vision for the port is to:

- continue servicing existing Bass Strait oil and gas operations and other third-party offshore oil and gas exploration projects and developments including:
    - offshore oil and gas platform supply logistics
    - offshore exploration logistics
    - warehousing (spare parts) and bulk materials storage (e.g., glycol)
    - drill rig maintenance
- support construction and operation of clean energy projects through provision of a clean energy logistics hub including:
    - manufacturing, assembly and storage of project components
    - construction logistics
    - operation and maintenance base facilities
- enable direct import/export of high value bulk materials including for example:
    - bulk fertilisers for use in the Gippsland region
    - logs from Gippsland region plantations and forests
- enable direct import/export of break-bulk cargos
- support regional shipping services to and from Tasmania, other coastal ports in Australia, and ports in Oceania and Southeast Asia.

Qube is Australia's largest integrated provider of import and export logistics services, with strong customer partnerships and relationships with many of the leading companies around the world. As such the project will provide connectivity to Qube's road, rail and coastal shipping networks to benefit local industries. Value-added benefits that may be realised include the use of Qube's patented Rotabox™ technology and "environmental" hoppers and grabs that eliminate spillages.

The port will provide regional port facilities between deep water ports at Hastings and Eden, shortening sailing times to NSW, Queensland, regional ports in Oceania and Southeast Asia, and proposed and future clean energy projects in Gippsland.

Main components of the project (nature, siting & approx. dimensions; attach A4/A3 plan(s) of site layout if available):

The main components of the project are:

- deepening and widening the existing berth pockets, swing basin and access channels to accommodate larger, deeper draught vessels
- reconstructing the existing wharf
- constructing a marina to support offshore clean energy project operation and maintenance activities
- constructing warehouses, cargo handling facilities and marine operations and maintenance bases.

Deepening and widening existing berth pockets, swing basin and access channels

The port will accommodate and support Gippsland Basin Joint Venture's existing operations (BBMT), construction and operation facilities required to support the proposed Star of the South Energy Project and other port users including areas for bulk goods, break bulk cargos and storage.

To enable safe passage and docking of larger vessels the project will deepen and widened the existing berth pockets, swing basin, Barry Beach Channel and Corner Inlet entrance by capital dredging. Maintenance dredging is required to keep open navigable areas that silt up over time.

Barry Beach Channel is approximately 100 m wide at the top and 60 m wide at the base. The berth pockets and swing basin are approximately 500 m long and 150 m wide. Water depths in the swing basin, berth pocket and access channel range from 5.5 m to 6.5 m (based on current information from Gippsland Ports Authority) (Figure 2). Corner Inlet entrance channel is approximately 300 m wide, with shallow waters extending approximately 4,000 m. Water depths at the entrance range from 7 m to 8.5 m (Figure 3).

The berth pockets, swing basin, access channel and entrance channel will be deepened to accept larger vessels with draughts up to 9.5 m. Allowing for safe under-keel clearance, a water depth of 10.6 m at all tides is required in the Barry Beach Channel, swing basin and berth pockets. A water depth of 12.5 m is required at the Corner Inlet entrance to allow for swell.

The access and entrance channels, and swing basin will be widened to accept larger and special purpose vessels, with beams up to 50 m. Typical cargo vessels will be handysize (up to 32,000 DWT). Special purpose vessels may include offshore clean energy project construction vessels and offshore cable laying vessels. The swing basin will be widened by approximately 200 m to accommodate these larger vessels. The access channel will be widened by approximately 100 m, with clear water approximately 200 m wide required at the entrance (see Figure 2).

These specifications necessitate dredging approximately 8.7 million cubic metres of in-situ material, predominantly comprising silt and sandy substrate. Approximately 3.6 million cubic metres will be dredged to increase the swing basin and widen and deepen the Barry Beach Channel. Approximately 5.1 million cubic metres will be dredged to create a navigable channel

through the Corner Inlet entrance. Assuming a bulking factor of 1.6, this equates to approximately 14 million cubic metres of dredged material to be placed in suitable onshore and offshore sites.

Dredged material has previously been placed adjacent to the existing swing basin, adjacent to Singapore Deep and onshore. Onshore and offshore disposal will be investigated with onshore disposal of potentially contaminated sediments (possible in the existing berth pockets). The dredged material placement area/s will be selected to avoid sensitive benthic communities including seagrass beds, remobilisation of dredged material into the channels, impacts on coastal processes and creating navigational obstacles. Benthic surveys, hydrodynamic modelling and stakeholder engagement with port operators, commercial and recreational fishers and relevant government departments and agencies will inform site selection. Seabed sediment sampling and analysis in accordance with the *National Assessment Guidelines for Dredging 2009* (DEWHA, 2009) will inform the feasibility of onshore or offshore disposal. Potential dredged material placement investigation areas are shown in Figure 4.

The dredged material placement area will be sized to support maintenance dredging campaigns.

Wharf reconstruction

The existing BBMT wharf is ageing and requires replacement as it is not suitable in its current condition for heavy loads. This will involve staged construction of the new wharf and removal of the existing wharf to enable existing port operations to continue due to their essential support role for Bass Strait oil and gas operations.

Marina

To support operations and maintenance activities for proposed and potential offshore clean energy projects a marina is required for berthing crew transfer vessels. The marina will be integrated with or built separate to the reconstructed wharf. The location of the marina and ultimate configuration will be determined in detailed design of new facilities and infrastructure at the regional port. The marina will not be available for public use.

Landside infrastructure

Landside infrastructure will be progressively developed to accommodate port user requirements. Gippsland Basin Joint Venture's existing facilities will be retained and continue to operate under 'business as usual'. The southern part of BBMT has been identified as a potential location for infrastructure required to support the construction and operation of clean energy projects. This project proposal includes development of that site. Development will include warehouses, fabrication workshops, marine operations and maintenance base, and storage and laydown areas.

Source:
Proposed channels and placement areas from Coffey.
Channel bathymetry from Gippsland Ports.
Roads and cadastre from VICMAP (Jan 2020).
Imagery from ESRI Online.

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Date: 21.04.2020
Project: 754-MELEN268900
File Name: 268900_01_F002_GIS

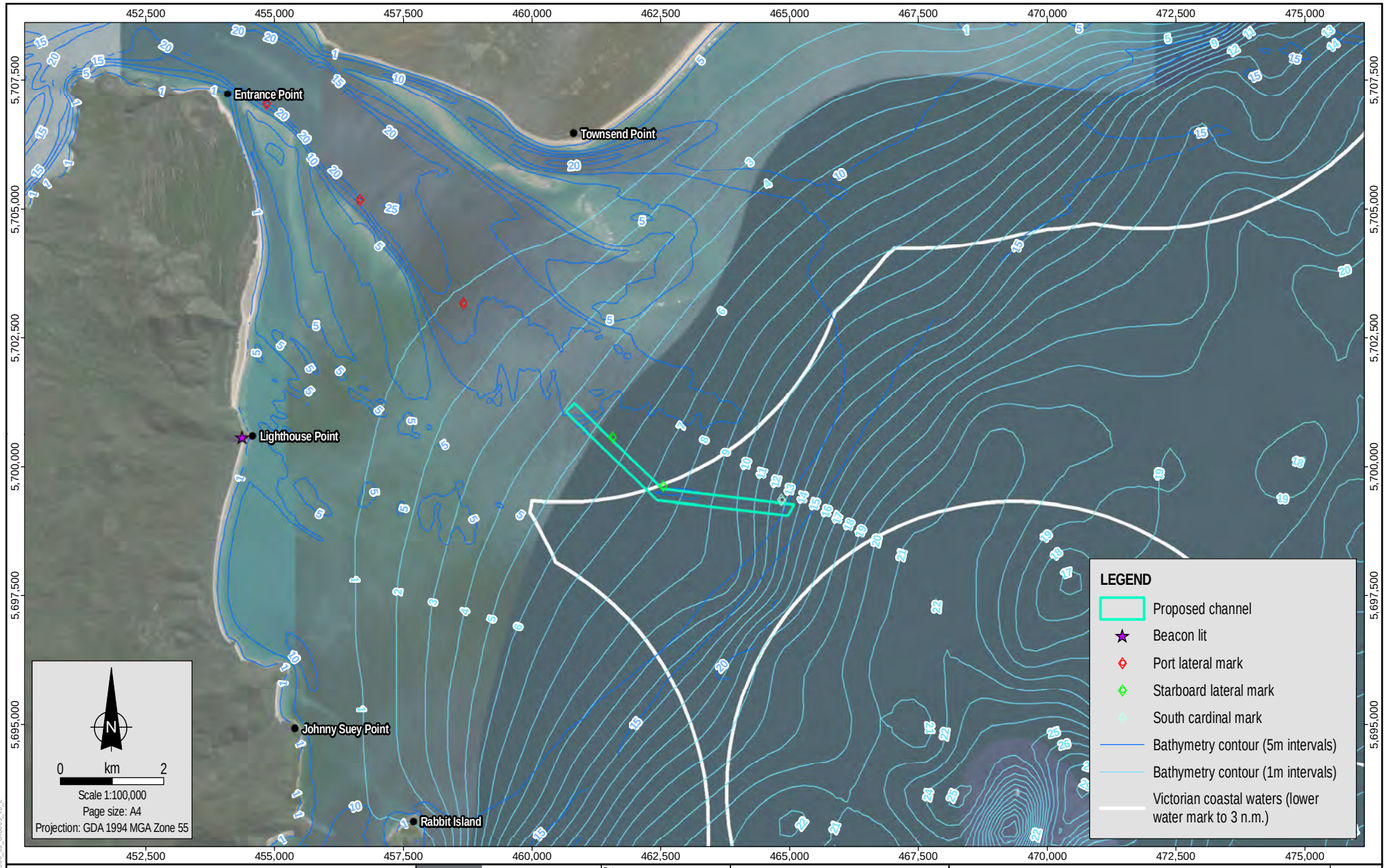
Gippsland Regional Port Project

Qube Energy Pty Ltd

Barry Beach and Barry Beach Channel

Figure No: 2

MXD Reference: 268900_01_GIS006_v0_4



Source:
Proposed channels from Coffey.
Marine marks from Gippsland Port.
Bathymetry from DELWP (1m) and IMAS (5m)
3NM limit from Geoscience Australia AMB.
Imagery from ESRI Online.

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Date: 20.03.2020
Project: 754-MELEN268900
File Name: 268900_01_F003_GIS

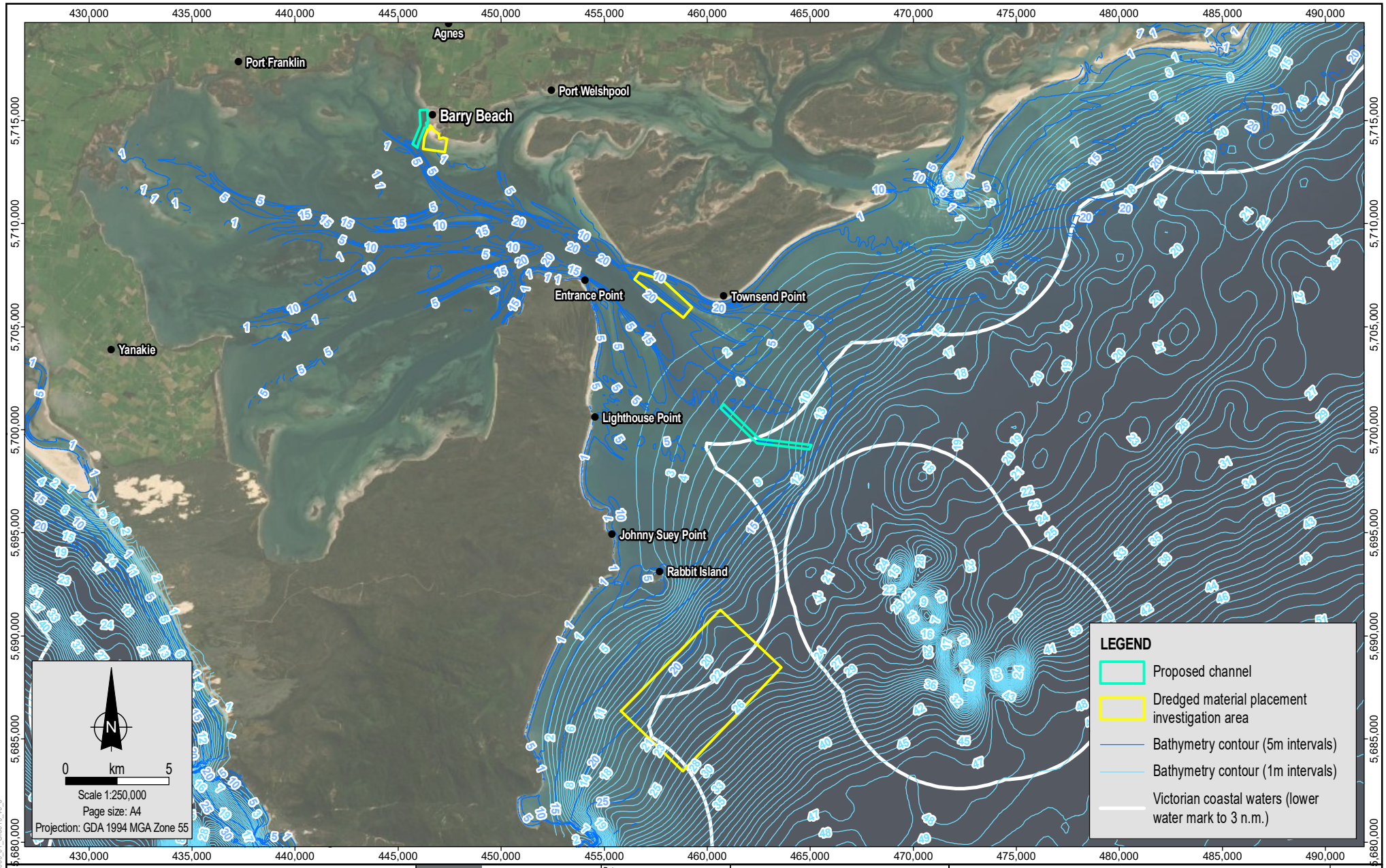
Gippsland Regional Port Project

Qube Energy Pty Ltd

Corner Inlet entrance

Figure No: **3**

MXD Reference: 268900_01_GIS009_v0_2



MXD Reference: 268900_01_GIS010_v0_3

Source:
Proposed channels and placement areas from Coffey.
Bathymetry from DELWP (1m) and IMAS (5m)
3NM limit from Geoscience Australia AMB.
Imagery from ESRI Online.

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Date: 20.04.2020
Project: 754-MELEN268900
File Name: 268900_01_F004_GIS

Gippsland Regional Port Project

Qube Energy Pty Ltd

Dredged material placement investigation areas

Figure No: **4**

Ancillary components of the project (eg. upgraded access roads, new high-pressure gas pipeline; off-site resource processing):

BBMT is well serviced due to its development to support construction and operation and maintenance of the Bass Strait oil and gas fields. The port has electricity and water services. Port access is from South Gippsland Highway and Barry Road, dual lane sealed roads. These roads are Vicroads approved oversize/overmass routes.

Key construction activities:

Construction of landside components and dredging is expected to take up to 19 months commencing in October 2022.

Waterside activities

Waterside activities will include:

- Dredging to deepen and widen the existing access channels, swing basin and berth pockets.
- Disposal of dredged material either in a suitably located offshore location on onshore, if shown to contain contaminants.
- Construction of the new wharf.
- Construction of a marina.

Dredging will most likely be undertaken using a trailing hopper or cutter suction dredge. The choice of dredge will depend on the size of the area to be dredged, the depth of water, the substrate at that location and distance to dredged material ground. Dredgers are able to operate 24 hours per day, 7 days a week. Crews are typically accommodated on board vessels. The dredge workforce will be between 20 and 40 (including those on tug boats and barges) depending on the dredging method chosen.

The dredging program will be coordinated with the operation and maintenance activities of the existing port users.

Trailing suction hopper dredgers and cutter suction dredgers are described in more detail below.

A trailing suction hopper dredger consists of a ship with a large hopper. Suction pipes are lowered to the seabed and used to pump a slurry of sediment and water into the hopper. Dredged material settles in the hopper and water drains off through a controllable hopper overflow system. The ship transports the dredged material to the dredged material ground where it deposits the contents of the hopper through doors or valves in the bottom of the ship. This type of dredger has been used for maintenance dredging in Port Phillip Bay and Western Port Bay shipping channels.

A cutter suction dredger uses a rotating cutter head to disaggregate the material to be dredged. The rotating cutter is mounted at the lower end of a ‘ladder’ used to support the cutter drive and suction pipe. The rotating action of the cutter dislodges seabed material. The loosened material (and water) enters a suction pipe and is pumped into a delivery pipeline. Cutter suction dredgers operate by swinging about a central working spud. A spud is a large pole that anchors a ship while allowing a rotating movement around the point of anchorage. Anchor wires connect the lower end of the ladder to anchors either side of the ship and allow the dredger to clear an arc of cut by pulling on alternate sides using a system of winches. The dredger is able to move forward by pushing against the working spud, using a spud carriage. The dredged material is then

pumped to hopper barges or directly to the dredged material ground (if close) via a submerged or floating delivery pipeline.

The size and specifications for the dredgers will depend on the strength of the seabed material, volume to be dredged and distance to the dredged material ground.

The new wharf will be constructed waterside of the existing wharf. Sheet piles will be driven into the seabed outside the existing sheet-pile wall. The existing wharf will be removed and engineered fill placed behind the sheet-pile wall to create the wharf apron. The apron will be engineered to take mobile and potentially fixed cranes for loading and unloading cargos and components.

The marina will be a floating pontoon or pier arrangement providing up to six berths for high speed offshore clean energy project crew transfer and support vessels.

Landside construction activities

Landside construction activities will include:

- Construction of crane facilities (integrated with the wharf redevelopment), warehouses, workshops, hardstand and laydown areas, and administration buildings and amenities.
- If required, construction of a containment cell to store any contaminated material encountered.

Landside construction activities will include typical civil construction methods including excavation of foundations and services trenches, erection of buildings, installation of underground services and stormwater management systems, electrical and mechanical fit out, and development of roads, aprons, carparks and laydown areas.

Contaminated soil will be treated and disposed on site in cells designed and constructed in accordance with relevant standards.

Key operational activities:

BBMT currently supports production and drilling vessels for Bass Strait oil and gas field operations and maintenance from berths 1 and 2. Servicing up to five vessels for offshore drilling programs per week, with generally one day per week where there are two vessels alongside at berths 1 and 2.

Regional trade is expected to generate about one to two vessel movements per month.

Vessel movements required to support development of clean energy projects will be assessed as part of separate environmental and planning processes for those projects.

Key decommissioning activities (if applicable):

The existing wharf will be decommissioned and removed. Recyclable sheet piles will to sold as scrap metal. Contaminated soils will be treated and reused or treated and disposed on site in cells designed in accordance with applicable guidelines and standards.

Is the project an element or stage in a larger project?

☒ No ☐ Yes If yes, please describe: the overall project strategy for delivery of all stages and components; the concept design for the overall project; and the intended scheduling of the design and development of project stages).

Separately from the project, Star of the South Wind Farm Pty Ltd (SOTS) is proposing the development of an offshore clean energy project located in Commonwealth waters, off the southwest coast of Gippsland in eastern Victoria. Barry Beach has been identified as a potential site for the construction and operation and maintenance port due to its proximity to the offshore clean energy project. The planned upgrades to accommodate handymax cargo vessels used for regional trade will accommodate SOTS' requirements.

That proposal has been referred under the EE Act as Star of the South Offshore Wind Farm Project, referral number 2020-R06.

Is the project related to any other past, current or mooted proposals in the region?

☒ No ☐ Yes If yes, please identify related proposals.

What is the estimated capital expenditure for development of the project?

In the order of AUD250 to AUD300 million.

4. Project alternatives

Brief description of key alternatives considered to date (eg. locational, scale or design alternatives. If relevant, attach A4/A3 plans):

Project alternative

No regional port facilities exist between Hastings, Victoria and Eden, NSW necessitating trade through those and other commercial ports. The only alternative to the project is to continue with the status quo i.e., no regional port and business as usual through Melbourne, Geelong and Hastings. That is, BBMT will continue to operate and service the Bass Strait oil and gas offshore operations.

Project siting and design alternatives

Port user requirements are yet to be determined. Available land within BBMT includes hardstands and patches of remnant vegetation. Remnant vegetation condition varies from degraded to relatively intact. Where possible new buildings and structures such as warehouses, hardstands and the engineered cell for contaminated dredge material will be located in previously disturbed areas, with the aim of avoiding any patches of high-quality native vegetation.

Dredging methods will be informed by proposed sediment sampling and analysis (not part of this referral). The type of substrate, volumes and distance to dredged material placement areas will inform the choice of dredger/s.

Three potential areas for dredged material placement have been identified including previous maintenance dredging placement areas and a new placement area.

The dredged material placement area/s will be selected to avoid:

- areas of sensitive habitat such as reef, sponge beds and seagrass meadows,
- sensitive benthic communities,
- remobilisation of dredged material into the channels,
- impacts on coastal processes
- creating navigational obstacles.

Brief description of key alternatives to be further investigated (if known)**:**

The key alternatives to be investigated are type of dredger and dredged material placement area/s. We will consider beneficial use of dredged material including backfill for the new wharf and development of new hardstand areas. Dredged material placement area/s will include investigation of onshore, offshore and inlet sites, with offshore preferred.

5. Proposed exclusions

Statement of reasons for the proposed exclusion of any ancillary activities or further project stages from the scope of the project for assessment:

The project excludes BBMT 'business as usual' operations including site management. BBMT operates under existing approvals, licences and permits.

This proposal only includes existing port areas to be redeveloped for general port operations including support for clean energy projects.

The impact of vessel movements and navigational issues associated with development of clean energy projects will be assessed separately by those proponents and are subject to separate referrals.

Activities related to proposed geotechnical investigations and seabed sediment sampling are excluded from the project. Approvals for these low-impact activities are being sought through a permit under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) and consent under the *Marine and Coastal Act 2018* (Vic). These activities will not contribute to a cumulative impact.

6. Project implementation

Implementing organisation (ultimately responsible for project, ie. not contractor)**:**

Qube Energy Pty Ltd
Level 27, 45 Clarence Street
Sydney NSW 2000
ABN: 33 006 430 039

Implementation timeframe:

Qube proposes the following timeframe:
Commence construction – October 2022
Construction – October 2022 to April 2024
Operations phase – 2024 to 2057
Nominal decommissioning and closure phase – 2057 to 2062 if port operation ceases

Proposed staging (if applicable):

Not applicable

7. Description of proposed site or area of investigation

Has a preferred site for the project been selected?

☐ No ☒ Yes If no, please describe area for investigation.

If yes, please describe the preferred site in the next items (if practicable).

General description of preferred site, (including aspects such as topography/landform, soil types/degradation, drainage/ waterways, native/exotic vegetation cover, physical features, built structures, road frontages; attach ground-level photographs of site, as well as A4/A3 aerial/satellite image(s) and/or map(s) of site & surrounds, showing project footprint):

The project is located at the existing Barry Beach Marine Terminal (BBMT) and within the Corner Inlet Ramsar site. BBMT is located approximately 160 km southeast of Melbourne in South Gippsland.

Landside component

Topography/landform

The topography of the onshore component of the project is very flat and low-lying, with elevations between 0 to 10 m above sea level. Relict sand dunes are the prominent landform.

Soils and existing contamination

Soils at the port have been mapped as predominantly arenic rudosols (Sargeant and Imhof, 2003). Rudosols are young soils that show little development. They occur on geologically recent sand dunes where there has been insufficient time for a soil profile to develop. Arenic rudosols have an upper layer of at least 0.5 m, with a sandy texture generally with less than 10% being gravelly (i.e., >2 mm particle size).

Drainage and waterways

The project is located within the Shady Creek and Nine Mile Creek catchment and falls within the West Gippsland Catchment Management Authority boundary. No major waterways pass through the site or its surrounds, however a number of un-named creeks have been identified immediately adjacent to the east of BBMT, and the area east of the site also includes several farm dams. There are no natural inland waterbodies in the vicinity of the project site that may be impacted (excluding the Ramsar site).

Existing vegetation

Approximately 23 ha of vegetation covers the eastern part of the site and is a mix of native and exotic species. Native vegetation is mapped as the Lowland Forest (Ecological Vegetation Community (EVC 0016) and the Heathy Woodland (EVC0048), roughly in equal proportions. Observations during a preliminary site walk-over noted historical disturbances and the presence of invasive species including pampas grass (*Cortaderia selloana*). Consequently, much of the existing vegetation is likely to be in poor condition.

Physical features

There are no notable physical features within the project area that are not otherwise described in other sections. With the area being flat with relict sand dunes the only landform features.

Built structures

BBMT is the main supply base for Bass Strait oil and gas operations. Ancillary infrastructure that supports port operations includes the security gatehouse, administration building, warehouses,

hazardous materials storage facilities (e.g,, glycol, diesel), perimeter fencing, site access roads, laydowns, topsoil stockpiles and water management infrastructure. Over 10,000 m^2 of warehouse space already exists and can be extended for third party use. The majority of the warehousing and storage facilities have spare capacity to be used by other third party users.

Esso has further undertaken a number of recent capital improvement projects, including for:

- Storm water system upgrade
- Fire main restoration
- Multi-user warehouse project
- Bunded area upgrade

Wharf

The wharf is approximately 425 m in length with four berth pockets. The depth alongside the wharf of 5 to 8 m at mean low tide. The wharf includes:

- Pedestal crane (110-tonne capacity) located at northern end of wharf with access to two berths
- Berths adjacent to pedestal crane have direct transfer of bulks via underground piping, dedicated lines for water, diesel, glycol, mud and brine

Turning Basin and BBMT Channel

The BBMT channel is situated from the approach from the Toora channel to the BBMT wharf. Esso holds 120 acre dredging lease over land adjacent to wharf up until to the Toora Channel that is administrated by the Gippsland Port Authority. Major maintenance dredging completed over the channel and wharf around in 2010.

Road frontages

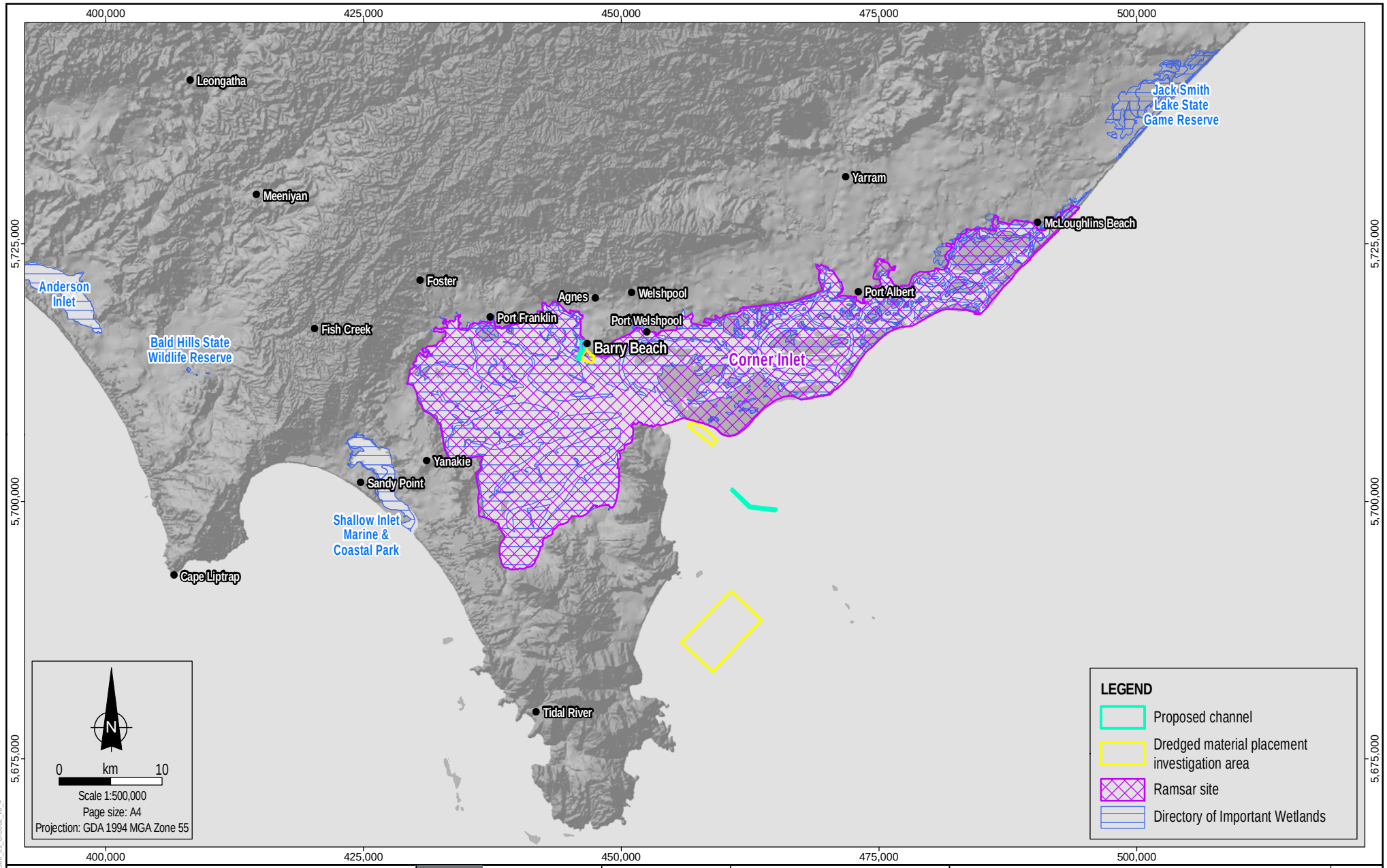
The project area is adjacent to and accessible from a public road, Barry Road. BBMT is well connected to the regional and metropolitan road networks, with the South Gippsland Highway acting as the major corridor connecting this region to Melbourne and beyond. The majority of the road network which connects BBMT to the Melbourne metropolitan area are approved for B-Doubles access.

Waterside component

Corner Inlet Ramsar site

BBMT and its associated shipping channels, Barry Beach Channel and Toora Channel, are located within the Corner Inlet Ramsar site. The Corner Inlet Ramsar site is a large tidal embayment that covers an area of 67,186 ha (Figure 5). The inlet consists of a submerged plain covered by sand or mud flats with well-developed seagrass beds, and large sand islands. A radiating system of deeper channels supports efficient tidal exchange over the flats and the areas between the islands.

Corner Inlet supports abundant flora and fauna, including internationally significant populations of a number of aquatic and semi-aquatic species. This is primarily due to its large geographical area, the wetland types present and the diversity of aquatic and semi-aquatic habitats. The inlet was listed as a Wetland of International Importance under the Ramsar Convention in 1982. It is one of twelve Ramsar sites in Victoria.



Source:
Proposed channels and placement areas from Coffey.
Directory of Important Wetlands from DIWA.
Ramsar sites and DTM from VICMAP (20m).

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Corner Inlet Ramsar site and Directory of Important Wetlands

Figure No: **5**

MXD Reference: 268900_01_GIS002_v0_4

The geomorphology of the inlet controls the extent and types of habitat. Key geomorphological features of the inlet include sand barrier island and associated delta system, extensive tidal channel network, and mud and sandflats. Several key wetland types present in Corner Inlet include: seagrass; intertidal sand or mud flats; mangroves; saltmarshes; and permanent shallow marine water.

Areas within Corner Inlet and its surrounds have been reserved for their environmental and social values. There are two Marine National parks (Corner Inlet and Wilsons Promontory), two Marine and Coastal parks (Corner Inlet and Nooramunga), and two coastal reserves (Port Franklin–Port Welshpool and Port Welshpool) (Figure 6).

The site supports recreation and tourism values (scenic values, boating, recreational fishing, camping, etc.) that have important flow-on economic effects for the region.

Corner Inlet channels

Barry Beach Channel is approximately 100 m wide at the top and 60 m wide at the base. Water depths in the swing basin, berth pocket and access channel range from 5.5 m to 6.5 m. Barry Beach Access Channel joins the Toora Channel where water depths increase, and water movements are greater. Depths continue to increase reaching a depth of 42 m (in the feature known as Singapore Deep) in a 3 km section between Entrance Point and Bentley Point. The turbulent environment assists sediment scouring of the channel to that depth. Corner Inlet entrance is approximately 300 m wide, with shallow waters extending approximately 4,000 m. Water depths at the entrance range from 7 m to 8.5 m.

MXD Reference: 268900_01_GIS003_v0_4

Source:
Proposed channels and placement areas from Coffey.
Parks and Reserves from VICMAP (Jan 2020).
Imagery from ESRI Online.

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Parks and reserves

Figure No: **6**

Site area (if known):

The project/site area comprises:

BBMT which is bounded by farmland to the north, Barry Road to the east, Port Anthony to the south and Corner Inlet to the west. The existing site is 84 ha. Up to 54 ha is available for redevelopment for other port users. The balance of the site is used by Gippsland Basin Joint Venture for its Bass Strait oil and gas operations.

Waterside infrastructure in Corner Inlet Ramsar site (enlarged swing basin, berth pockets and Barry Beach Channel) covering approximately 53 ha of which approximately 23 ha is occupied by the existing berth pockets, swing basin and channel.

Waterside infrastructure at Corner Inlet entrance (access channel) covering approximately 115 ha. The entrance channel straddles Victorian and Commonwealth waters and is outside Corner Inlet Ramsar site.

Dredged material placement area up to 450 ha, which includes areas available at Barry Point and Singapore Deep and being investigated off Rabbit Island, and allows for material placement from maintenance dredging campaigns.

Route length (for linear infrastructure) ……N/A……. (km) **and width** ……N/A……. (m)

No linear infrastructure is required to support the proposed development.

Current land use and development:

The current land use for the onshore component is port infrastructure/utilities (i.e., existing BBMT port facility).

The use for the waterside component is conservation reserve, commercial and recreational fishing and commercial shipping.

Description of local setting (eg. adjoining land uses, road access, infrastructure, proximity to residences & urban centres):

Adjacent to BBMT is Port Anthony. Port Anthony operates one berth for dry-bulk, project, unit and general cargo and includes a 200 m long wharf with crane pad, laydowns, receival and handling areas, indoor storage facilities with overhead gantry cranes.

Adjacent to BBMT and east of Barry Road is OEG Offshore's Barry Beach supply base, which can provide a range of shore base services and equipment to oil and gas operations.

Other land uses nearby the project area include nature conservation and grazing modified pastures.

The nearest towns are Welshpool and Toora, located approximately 6 km northeast and 9 km northwest, respectively.

The project and Port Anthony are accessed from Barry Road.

Planning context (eg. strategic planning, zoning & overlays, management plans):

Planning policies

Planning, management and sustainable use of the Corner Inlet marine and coastal environment is guided by a range of state and local government planning policies, strategies and plans.

The state-wide Marine and Coastal Policy (DELWP 2020) developed by the Victorian Government provides the overarching framework and sets out policies for planning and managing the marine and coastal environments in Victoria. The marine and coastal environments are defined as all private and public land and waters between the outer limit of Victorian coastal waters and five kilometres inland of the high-water mark, which includes Corner Inlet and the project area. The policy notes that new and improved buildings and structures, such as port facilities, are necessary to enable a diversity of uses in the marine and coastal environment and to accommodate increasing demand from population growth. The project will aim to support the intended outcomes of the policy including minimising adverse effects on the marine and coastal environments and their uses and values.

Sitting under the Marine and Coastal Policy is the Victorian Coastal Strategy 2014 (DEPI 2014) which was developed by the Victorian Coastal Council. The strategy sets a long-term vision and framework for planning and managing the Victorian coast and provides the basis for developing regional coastal plans and coastal management plans (e.g., Gippsland Regional Coastal Plan 2015-2020).

The project will consider the hierarchy of principles outlined in the Victorian Coastal Strategy 2014 to:

- Value and protect significant environment and cultural values of the coast.
- Plan and act in an integrated manner with consideration of coastal hazards and processes, coastal settlements, other ports, research and knowledge sharing and community participation.
- Sustainably use natural coastal resources where the demand for development is evident and is located within existing, modified and resilient environments.

A key intended outcome of the strategy is for the planning, development and management of Victoria's ports to take into account the character, amenity and sustainability of the coast and their region.

The Victorian Coastal Strategy 2014 provides the basis for the Gippsland Regional Coastal Plan 2015-2020 (DELWP 2015) which was developed by the Gippsland Lakes and Coast Regional Coastal Board. The regional coastal plan provides the regional framework for managing and protecting Gippsland's coastal values and aims to provide landowners and the community with an understanding of how they can contribute to the regional priorities outlined in the plan.
The South Gippsland Coastal Strategy project is currently underway and is considering the impacts and opportunities for growth and development on the natural and built environment with the aim to provide strategic direction for the planning of South Gippsland’s coastal areas, in which the Gippsland Regional Port Project is located. It identifies climate change and sea level rise and extreme weather events such as floods and fires to be key issues faced by the coast. The Gippsland Regional Port Project will consider the strategic direction and objectives of the Draft Coastal Strategy once it is published.

Planning framework

The project is in South Gippsland Shire and is covered by the South Gippsland Planning Scheme. Corner Inlet entrance is outside South Gippsland Shire and not covered by the South Gippsland Planning Scheme.

State Planning Policy

Clause 12.02-1S of the South Gippsland Planning Scheme recognises the values of coastal areas and promotes their sustainable use.

Clause 10.03-1S supports the ongoing development of Melbourne, Geelong, Hastings and Portland ports recognising the need for these facilities to be effective, competitive and sustainable developments and operations.

Local Planning Policy

Clause 21.02-4 recognises Corner Inlet as an important feature noting challenges facing the municipality are loss of biodiversity, land and water degradation, sustainable land use and development, and managing environmental impacts of climate change.

Clause 21.15-15 promotes clustering development at existing developments to retain intact natural values of Corner Inlet.

Clause 21.03-8 promotes the development of a deep-water at Barry Beach to facilitate major economic development opportunities.

Zones

BBMT landside components are zoned Industrial 1 Zone (IN1Z) and Public Conservation and Resource Zone (PCRZ) in the South Gippsland Planning Scheme. The Public Conservation and Resource Zone includes the wharf and wharf apron. These zones adjoin the Special Use Zone Schedule 3 (Port Areas) covering part of the landside and waterside components of Port Anthony. Schedule 3 provides for the development of Barry Beach as a key area for interchange, storage and distribution of goods.

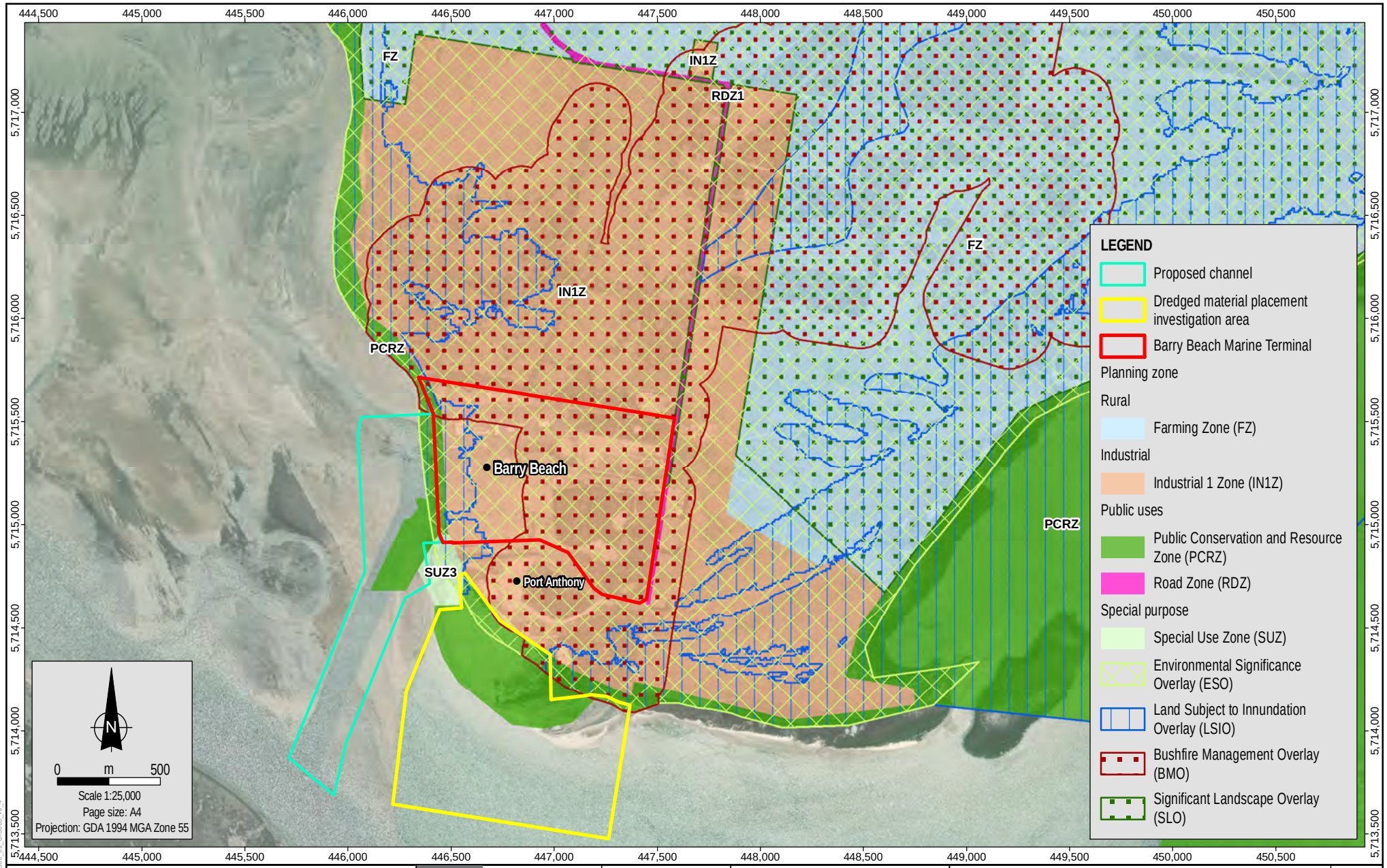
Overlays

Planning overlays covering and adjacent to the site are shown in Figure 7 and are:

- Bushfire Management Overlay (BMO), which extends over the eastern part of BBMT.
- Environmental Significance Overlay Schedule 3 Coastal settlements (ESO3), which extends. over the whole of BBMT and surrounding land.
- Land Subject to Inundation Overlay (LSIO) which extends over the wharf apron and adjacent land; extending approximately 150 m inland.
- Significant Landscape Overlay Schedule 3 Corner Inlet Amphitheatre (SLO3) which extends over farmland to the north and east of BBMT and Barry Road to BBMT access road.

Local government area(s):

South Gippsland Local Government Area (LGA)



Source:
Proposed channels and placement areas from Coffey.
Planning from VICMAP (Jan 2020).
Imagery from ESRI Online.

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Gippsland Regional Port Project

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South Gippsland Planning Scheme
Zones and overlays

Figure No: 7

MXD Reference: 268900_01_GIS005_v0_4

8. Existing environment

Overview of key environmental assets/sensitivities in project area and vicinity
(cf. general description of project site/study area under section 7)**:**

Key environmental assets identified in the project area include:

- geomorphology
- geology and soils
- hydrology and water quality
- terrestrial and marine biodiversity
- aboriginal heritage
- non-aboriginal heritage
- groundwater
- surface water
- conservation areas/reserves.

Geomorphology

Corner Inlet Ramsar site has a 2,100 km^2 catchment area and water body area of approximately 600 km2 (CSIRO, 2005). The catchment of Corner Inlet is predominantly privately owned land. Since European settlement in the mid to late 1800's, most of the catchment has been cleared of forest vegetation, and is now mainly used for agricultural purposes, most notably for dairying and grazing (BMT WBM, 2011).

Corner Inlet is a large submerged plain covered by subtidal and intertidal sand and mud flats, which are intersected by a network of radiating channels. The channels range in depth from three to ten metres in the northern and western areas of the site, and up to 40 metres near the centre and inlet entrance (Plummer et al. 2003; CSIRO 2005). Flow rates in the channels are relatively high (>1 m/s) which facilitates a large exchange of seawater, although most of the inlet is shallow and drains and fills slowly (BMT WBM, 2011).

A group of low, predominantly sandy islands that are an extension of the Ninety Mile Beach and Gippsland Lakes region occurs east of Corner Inlet between Barry Beach and McLoughlins Beach. There are five major islands (Snake, Little Snake, Sunday, Saint Margaret and Clonmel Islands) and over 20 smaller islands, which are comprised of late Pleistocene and Holocene marine sediments (DPI 2007b). Shorelines and tidal flats that border the islands are typically sandy, with the ocean beaches consisting of medium to coarse sand and shells, while finer sands and occasionally mud are the dominant materials of the intertidal areas.

Geology and soils

Corner Inlet catchment area comprises three physiographic regions: the Southern Highlands that include the Strezlecki Ranges; Coastal Lowlands that include the plains from Yarram eastward to the Gippsland Lakes and; the coastal areas from Alberton around the inlet to Wilsons Promontory. Coastal area soils are varied with 27 soil units identified (CSIRO, 2005). Soils vary from deep sands in the coastal dunes to clay soils further inland. The underlying geology of the area is predominantly sediments that age from the Quaternary of Tertiary period (CSIRO, 2005).

Previous drilling activities at BBMT have identified the majority of the onshore project area to comprise unnamed Quaternary (Holocene) wetland/swamp and lake deposits consisting of paludal lagoon silts and clays. A small section of the site along the eastern site boundary is within an area mapped as unnamed Quaternary (Pleistocene) dune deposits, consisting of sand, clay

and calcareous sand. The Quaternary sediments are expected to reach up to 135 m thickness and overlie the Tertiary to late Cretaceous sediments and volcanic deposits of the Latrobe Valley and Strzelecki Groups. The Mesozoic basement is expected at a depth of approximately 170 m.

Corner Inlet contains soil types classified as acid sulphate prone, most notably tidal flats and recent marine sediments (CSIRO, 2005). The project area and surrounds have been mapped as prospective areas for coastal acid sulphate soils (DPI, 2010). This is consistent with other Victorian coastal areas which are prone to acid sulphate soils found within 2.5 m of current sea level due to the sea level change (DPI, 2003).

Groundwater

The project is located within the Seaspray groundwater catchment. This catchment can be broadly subdivided into three layers; the upper, middle and lower aquifers. The aquifer layers are generally separated from one another by aquitards. The Latrobe Group Aquifer lies underneath the Corner Inlet catchment and is used predominantly for irrigation around the town of Yarram, and offshore oil and gas production (WGCMA, 2013).

Groundwater monitoring activities at BBMT have determined that the Quaternary sediments represent the uppermost water-bearing unit and host an unconfined shallow aquifer with groundwater levels between approximately 0.4 and 2 m AHD across the site. Regionally the shallow aquifer may reach a thickness between 5 and 30 m. Groundwater flow beneath the site is generally towards the west.

Groundwater may contribute flows to the Corner Inlet Ramsar site either directly as discharge across the sea floor to the coastal ocean (i.e., submarine groundwater discharge), or indirectly via discharge to inflowing streams. Submarine groundwater discharge is primarily driven by hydraulic gradient (gravity) due to the difference in water level between the groundwater table and seawater level. Water Technology (2008) estimated that submarine groundwater discharge to Corner Inlet contributed about 10% of total annual modelled surface runoff. While the proportion of direct discharge is thought to be significantly lower than surface water inflows, groundwater contribution to stream flows may be significant during period of low surface water flows, and submarine groundwater discharge could be of localised importance in some areas (WGCMA, 2013).

Hydrology and water quality

Rainfall in the catchment varies significantly from north to south and to a lesser extent from east to west, ranging from 800 mm to 1250 mm per annum (WGCMA, 2013). Daily rainfall is highly variable in response to weather patterns include east coast lows and south-westerly fronts.

The hydrography of Corner Inlet and its surrounding catchment comprises a system of surface streams, tidal flows and channels, low swampy land areas, groundwater aquifers and seawater (DCLS, 1980).

Several rivers and creeks drain the southern foothills of the Strzelecki Ranges and discharge to Corner Inlet, including the Franklin, Agnes, Albert, Jack and Tarra rivers, and Bruthen Creek. Surface drains constructed to drain low-lying farmland also discharge into the Ramsar site, as well as many tributaries.

Flows within the catchment are seasonal, with high flows in winter-spring and low flows in summer (Water Technology, 2008). Flows are also ‘flashy’ i.e., respond rapidly to heavy rainfall due to their small catchment areas and relatively short river length (Alluvium 2008; Australian Government 2011). These large rapid flows often have higher concentrations of nutrients and sediments than normal baseline flows (DCLS, 1980). Generally, the main streams entering

Corner Inlet have been shown to be of good to moderate water quality, with many of the smaller streams exhibiting poor water quality (South Gippsland Water, 2002). The Corner Inlet Water Quality Improvement Plan 2013 developed by the West Gippsland Catchment Management Authority (WGCMA) outlines the water quality issues within the Corner Inlet catchment, particularly those related to sediment, nutrient and phosphorus.

An environmental audit of the Corner Inlet and Nooramunga embayment and their surrounding catchments concluded that the values of the Ramsar site were threatened by inflows of elevated nutrient and sediment in rural runoff (Malloy et.al., 2005). Overall dryland agriculture produces the greatest nutrient loads to Corner Inlet and Nooramunga due to its extent within the catchment (Water Technology, 2008). Production forests produce the highest sediment and substantially high NOx loads (Water Technology, 2008).

Hindell et al. (2007) completed an investigation into water quality in Corner Inlet and Nooramunga to monitor seagrass, and found:

- Phosphate concentrations were typically quite low.
- Nitrogen concentrations were elevated, particularly around Yanakie, Port Franklin, Foster and Welshpool.
- Metals and pesticides do not appear to be a significant issue in Corner Inlet or Nooramunga.

Wastewater from Toora is discharged to the shoreline of Corner Inlet. In 2017-18 this was approximately 27 ML per annum.

Estuarine and coastal dynamics

Corner Inlet consists of a sand barrier island and associated delta system, extensive branching tidal channel network. These channels extend into creeks and rivers through mangrove habitats, as well as drain from large mud and sandflat areas. The channels are generally bare silty sediments around the perimeter of the inlet with the main channels being sandy with depths of 2 to 20 m, which include Bennison Channel, Middle Channel, Franklin Channel and Toora Channel.

Within Corner Inlet, there is an amplified tidal range compared to the tidal range in Bass Strait. It is characterised by localised strong wind patterns that are influenced by the large Wilsons Promontory land mass adjacent to an open expanse of Bass Strait. The relatively high tidal range results in strong currents which are then modified by the influence of the wind. High tidal flows through the entrance are generally between 1 to 2 knots (0.5 to 1 m s^{-1}).

Coastal geomorphic processes in relation to lateral sand movement near Barry Point are thought to be driven largely by winds with tidal currents in the nearshore environment thought to contribute to a negligible extent of nearshore sand movement.

Sediment analysis within Corner Inlet and its' tributaries concluded that the deposition of clays and silts occurs mainly in the upper estuarine reaches of the tributaries, prior to entering the embayment, with fine sediment entering the embayment largely settling in backwater areas and not settling in the main channels and sandflats (McLean and Jones 2011). As such, Barry Beach Channel is a fairly stable environment with the exception of some minor siltation in the BBMT berths, swing basin and access channel.

Barry Beach Channel joins the Toora Channel where water depths increase, and the water movements are greater. Depths continue to increase reaching a depth of 42 m (known as Singapore Deep) in a 3 km section between Entrance Point and Bentley Point. Here, the highly turbulent environment maintains sediment scouring of the channel to that depth. These current

speeds mean the sediments in the channel are continuously being mobilised. The water quality is often turbid, especially during ebb tides where finer sediments are flushed from the inlet.

At Corner Inlet entrance, depths, although variable, are shallower in this more dynamic geomorphic environment. In this area, sand waves up to 2 m in height migrate laterally approximately 25 m per year along the coast in a northeasterly direction towards Ninety Mile Beach. Bathymetric surveys also show that the sand bank to the north of Corner Inlet Entrance Buoy No.3 is migrating in a southerly direction at approximately 6 m per annum.

Conservation areas/reserves
The Corner Inlet and Nooramunga Marine and Coastal Parks were primarily established in recognition of their high value for migratory waders and other shorebirds (CSIRO, 2005).

Marine National Parks in the area include Corner Inlet and Wilsons Promontory. The Corner Inlet Marine National Park was established in 2002 and covers 1,500 ha on the southeastern coast of Corner Inlet. Recreational and commercial fishing are excluded from the park.

Barry Beach and its shipping channels (Barry Beach, Toora and Corner Inlet Entrance) are outside the marine and coastal parks and marine national parks.

Areas of coastline around coastal townships in South Gippsland are typically retained as coastal reserves. Two coastal reserves are in the vicinity of the project, Port Franklin – Port Welshpool located to the south of the BBMT and covering 317 ha, and Port Welshpool, located northeast and covering 234 ha.

Biodiversity
The project area spans the terrestrial, intertidal nearshore, shallow estuaries and beach and deeper marine ecosystems. As such a range biodiversity from ecological niches occur within the region.

Onshore environment
The project lies within the Gippsland Plain bioregion. Gippsland Plain includes lowland coastal and alluvial plains characterised by generally flat to gently undulating terrain, and surrounds the Strzelecki Ranges bioregion. Coastal areas include sandy beaches backed by dunes and cliffs to shallow inlets with extensive sand and mud flats. Substantial clearing of all vegetation types particularly those on deeper more fertile soils has occurred. Remnant vegetation consists of lowland foothill forests, heath and grassy woodlands, coastal scrub and grasslands.

A total of 17 EVCs occur within the Corner Inlet and Nooramunga Marine and Coastal Parks, ranging from woodland to fringing saltmarsh and intertidal mangrove scrubland. Many of these are rare or threatened in the Gippsland Plain bioregion.

Within the project area (which includes a 5 km buffer) five EVCs have been mapped including: Lowland Forest (EVC0016; Vulnerable), Heathy Woodland (EVC0048; Least Concern), Coastal Saltmarsh (EVC0009; Least Concern), Swamp Scrub (EVC0053; Endangered), and Estuarine Wetland (EVC0010; Least Concern). Two EVCs are mapped inside BBMT boundary fence. They are:

- Lowland Forest (EVC0016) (estimated to be approximately 10 ha located in the eastern part of the site). Bioregional conservation status: Vulnerable. Described as Eucalypt forest to 20 m tall on relatively fertile, moderately well-drained soils in areas of relatively high rainfall.

Characterised by the diversity of life forms and species in the understorey including a range of shrubs, grasses and herbs.

- Heathy Woodland (EVC0048) (estimated to be approximately 10 ha located in the eastern part of the site). Bioregional conservation status: Least Concern. Described as Eucalypt-dominated low woodland to 10 m tall lacking a secondary tree layer and generally supporting a diverse array of narrow or ericoid-leaved shrubs except where frequent fire has reduced this to a dense cover of bracken.

A range of threatened fauna species that primarily occur in the terrestrial environment have the potential to occur in the Corner Inlet, which contains areas of Wilsons Promontory and Snake Island, based on historical records (i.e., VBA and Birdata) and predicted spatial distributions (EPBC PMST). However, most of these species are unlikely to occur within the project area, which comprises partially isolated fragments within a largely cleared environment with industrial land use.

In addition to the resident terrestrial species listed above, there are a group of birds that are migratory and while nesting in the terrestrial environment, they migrate over the marine environment. These species breed elsewhere but have the potential to occur in the Corner Inlet during the non-breeding season. Further information on the types of migratory birds that have potential to use Corner Inlet for nesting, breeding or foraging is provided below in the description of coastal wetlands and marine environment.

Coastal wetlands and marine environment

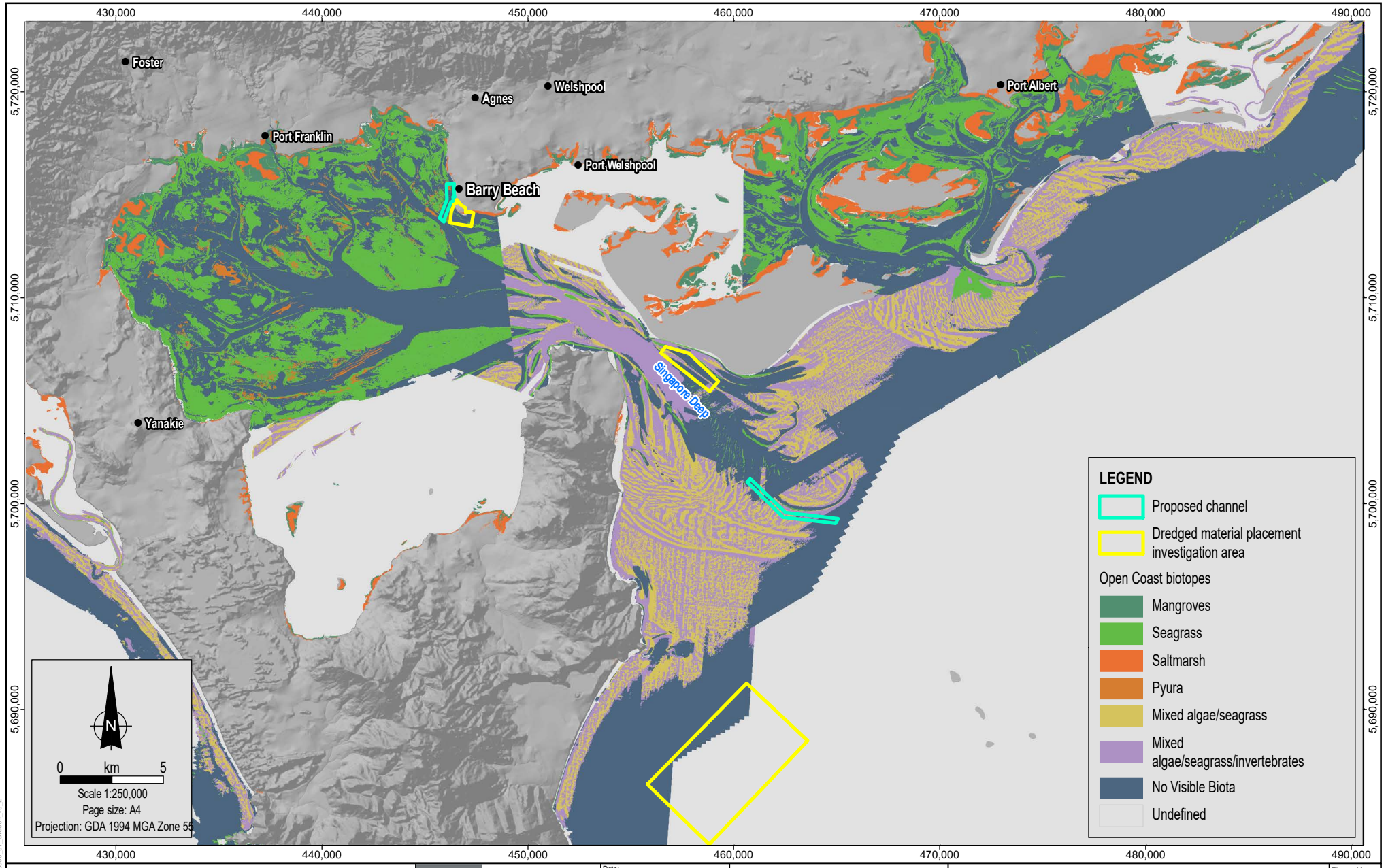
Broad-scale variables such as tidal range, substrate type, exposure and dominant flora shape the major habitat types in Victorian coastal waters.

Corner Inlet exhibits a diversity of marine, estuarine and freshwater wetland habitats, most of which are presented in a near-natural condition. There are several habitat types within the embayment, including:

- saltmarsh
- mangroves
- sea
- broad leaf seagrass (*Posidonia australis*)
- eelgrass (*Zostera* sp. / *Heterozostera* sp.)
- subtidal soft substrates.

Mapping of main marine habitats is shown on Figure 8.

Mangroves and saltmarsh are dominated by plants adapted for saline and waterlogged environments. The mangrove species present in Corner Inlet is white mangroves (*Avicennia marina*). The mangroves fringe the seaward edge of saltmarshes and are also found along drainage channels or tidal creeks. Mangroves protect low lying areas against tidal and storm surge and trap and stabilise sediments. The other main shrubland community of the saltmarsh is the shrubby and grey glasswort community These shrubs carry a large number of epiphytes, including lichens and mosses.



Source:
Proposed channels and placement areas from Coffey.
Biotopes from Seamap Australia.
DTM from VICMAP (20m).

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Gippsland Regional Port Project

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Open Coast biotopes

Figure No: 8

MXD Reference: 268900_01_GIS004_v0_2

Seagrasses are flowering plants adapted to grow in intertidal and subtidal zones of bays, inlets and estuaries where they bind sandy and muddy sediments. Many epiphytic organisms (hydroids, red algae, bryozoans) live on the stems and leaves of seagrasses (VEAC, 2019). Seagrass beds support a rich infauna and epifauna and form a key nursery habitat for many commercially and recreationally important fishes. Corner Inlet has the largest broadleaf seagrass beds in Victoria (Morgan, 1986). Three other seagrass species are also present in Corner Inlet, the short eelgrass (*Zostera muelleri*), long seagrass (*Heterozostera tasmanica*) and southern paddleweed (*Halophila australis*).

The short eelgrass forms dense mats around the fringes of inlet and frequently lies exposed at low tide. The long eelgrass prefers slightly deeper water and is common on the top and around the base of submerged banks. Broad-leaf seagrass is the dominant seagrass on the submerged banks, and is a keystone species that provides shelter and food for fauna. Southern paddleweed occurs sparsely around broad-leaf seagrass beds or across sandy patches, although it can be locally common.

Within Corner Inlet, there are extensive intertidal and shallow subtidal sediment flats, ranging from sandy beaches, mudflats and sand beds. These habitats are common and well replicated throughout the inlet and are likely to support a diversity of sediment microalgae and infauna. Intertidal flats have few macroalgae or vascular plants because of the sediment instability in sand and silt flats that offers little opportunity for them to establish (VEAC, 2019). The sediment in mudflats is more stable and supports a higher biomass of microalgae and fine macroalgae. Common species include soldier crabs, gastropod molluscs, bivalve molluscs, polychaetes and crustaceans, depending on sediment type (VEAC, 2019).

Subtidal soft substrates vary according to sediment type and generally coarse sediments have higher biodiversity than muddy sediments. Dominant fauna include polychaetes, molluscs and crustaceans. Muddy substrates usually occur in sheltered embayments, estuaries, or deep offshore waters.

Biological communities typically within channels (such as the Barry Beach Channel) typically have very low biomass, density of individuals and diversity of species compared to more stable sediment habitats. The sides of the deeper channels provide habitat for aggregations of filter feeding brittle stars, including *Amphiura elandiformis* and *Ophiocentrus pilosa*. The floor of the deeper channels have biogenic reefs consisting of sea-squirt clumps *Pyura stolonifera* that are rooted into the sediments. These clumps provide surfaces for the attachment of a variety of seaweeds and sessile invertebrates, including sponges, soft corals, bryozoans, hydroids and anemones (O'Hara et al. 2002).

Corner Inlet provides important habitats, feeding areas, dispersal and migratory pathways, and spawning sites for numerous fish species of direct and indirect fisheries significance. Key species for commercial and recreational fisheries include king george whiting (*Sillaginodes punctatus*), blueweed whiting (*Haletta semifasciata*), Australian salmon (*Arripis* spp.), greenback flounder (*Rhombosolea tapirina*), southern garfish (*Hyporhamphus melanochir*), yelloweye mullet (*Aldrichetta forsteri*), silver trevally (*Pseudocaranx dentex*), black bream (*Acanthopagrus butcheri*), sand flathead (*Platycephalus bassensis*), dusky flathead (*Platycephalus fuscus*), rock flathead (*Leviprora laevigatus*), leatherjackets (Carangidae; several species), snook (*Sphyraena novaehollandiae*) and gummy shark (*Mustelus antarcticus*). Typically, these species are not found exclusively in any one habitat type during any part of their life-cycle, but rather occur in a variety of habitat types. Many species spend their juvenile stages in shallow protected waters, particularly around seagrass and mangroves, whereas most species tend to spawn in coastal and marine waters.

Known marine pests in Corner Inlet include rice grass (*Spartina* sp.), broccoli weed (*Codium fragile* ssp *tomentosoides*) and European shore crab (*Carcinus maenus*).

A key feature of the biodiversity of Corner Inlet is the diversity of birds that forage in the intertidal nearshore marine and shallow estuary habitat. These include both resident species and migratory species that visit the area each year. The latter group includes 26 species of palaearctic migratory shorebirds. The extensive mudflats and intertidal marshes provide both feeding and high tide roost sites for these species.

Beyond the Corner Inlet entrance, Bass Strait marine habitats consisting of beaches, rocky shores and deeper marine ecosystems occur. The marine seabed habitats beyond the Corner Inlet entrance consist of sandy seabeds. These habitats support benthic fauna that includes:

- Sessile fauna including sparse small bushy sponges and the occasional large finger sponge in regions of unconsolidated sediments of quartzose sand.
- Small bryozoa, solitary ascidians and anemones occurring on the flat sandy seabed. Mobile fauna observed in this habitat included hermit crabs and octopus.
- Infauna including amphipods, callianassid shrimps, bivalves, tubeworms, small crustaceans, nematodes, nemerteans, seapens and polychaetes occur in areas of finer-grained mud habitats.

The Museum of Victoria conducted an extensive survey of benthic invertebrates in Bass Strait from 1979 to 1983 (Poore et al., 1985; Wilson & Poore, 1987). In general, a highly diverse array of invertebrate groups was found, with several polychaete families, pycnogonids, pericarid crustaceans, opisthobranch molluscs, bryozoans and brachiopods being the most species rich.

Bass Strait islands are nesting sites for many seabird species, many of which migrate to these islands each year. Colonies of seabirds occur to the west of the project area in Corner Inlet and on the islands around Wilsons Promontory. Species that nest and breed on these islands include the little penguin (*Eudyptula minor*), short-tailed shearwater (*Puffinus tenuirostris*), fairy prion (*Pachyptila turtur*), common diving petrel (*Pelecanoides urinatrix*), black-faced cormorants (*Phalacrocorax fuscescens*) and the pacific gull (*Larus pacificus*). Corner Inlet also has the potential to provide foraging habitat fourteen albatross, seven terns, seven plovers, three shearwaters, two gulls as well as the great skua (*Stercorarius skua*), osprey (*Pandion cristatus*), and white-bellied sea-eagle (*Haliaeetus leucogaster*).

A large number of fish species occur in Bass Strait, including a number of species of importance to commercial and recreational fisheries. Eastern Bass Strait is known for populations of salmon (*Arripis* spp.), flathead (*Platycephalus bassensis*), snapper (*Pagrus auratus*) and tailor (*Pomatomus saltatrix*), which sometimes move inshore during the day. Schools of pelagic fish like pike (*Dinolestes lewini*), school whiting (*Sillago flindersi*) and snapper (*Pagrus auratus*) are also common.

Higher trophic levels within this area include:

- Three marine reptiles – the loggerhead turtle (*Caretta caretta*), green turtle (*Chelonia mydas*), and leatherback turtle (*Dermochelys coriacea*) – that occur as migrants along the eastern shores of Bass Strait,
- Two Otariid seal species, the Australian fur seal (*Arctocephalus pusillus doriferus*) and the New Zealand fur seal (*A. forsteri*) have breeding colonies in Bass Strait and the leopard seal (*Hydrurga leptonyx*) is also known to visit the area occasionally.

- The great white shark (*Carcharodon carcharias*).
- Twelve cetacean species have distributions that overlap with the Corner Inlet and Bass Strait near the entrance to Corner Inlet with the southern right whale (*Eubalaena australis*), humpback whale (*Megaptera novaeangliae*), bottle-nosed dolphin (*Tursiops truncatus* s. str.) and common dolphin (*Delphinus delphis*) most commonly recorded.

Landscape and seascape values

The Corner Inlet Marine National Park Management Plan (Parks Victoria, 2005) identifies notable landscape and seascape values within the Corner Inlet Ramsar site. They include:

- a backdrop of granite and peaks within Wilsons Promontory National Park
- extensive intertidal flats exposed at low tide
- granite and benisons islands
- low marshy shorelines
- sandy beaches set between granite headlands
- change in seascape as the tide rises and falls.

European heritage

Corner Inlet catchment was colonised by Europeans around 1797, mostly by sealers and whalers. Ports within the embayment were used to service the mining industry of central Gippsland during the 1850s. Other industries were also established including forestry and timber production, cattle and sheep grazing, dairy and commercial fishing.

European settlement, including the history of trade and ship building is illustrated by the number of shipwrecks in the area. DNRE (2002) estimates that 31 shipwrecks occur in the Cornet Inlet Ramsar site, 23 of which occur around Port Albert. Historic coastal port townships of Port Albert and Port Welshpool are also key heritage features of the area DNRE (2002).

The Victorian Heritage Database identifies the nearest heritage site to BBMT to be the Port Welshpool Jetty, located approximately 6 km northeast of the project area.

Aboriginal heritage

Coastal wetlands were typically highly productive areas for hunter-gatherer people due to the variety of habitats and species. DNRE (2002) states that “the Brataulong Clan of the Gunai/Kurnai Tribe has strong cultural traditions and practices associated with the area”. The Brataulong people travelled the waterways and estuaries of Corner Inlet in canoes to collect fish and shellfish and the eggs of waterbirds (WGCMA 2013). Numerous sites have been recorded in the Corner Inlet area including scarred trees, burial sites, artefact scatters, camps and shell middens (BMT WBM 2011).

Corner Inlet and its coastline has significant cultural value to the Traditional Land Owners, the Gunaikurnai, Bunurong and Boon Wurrung people (WGCMA 2013). The appointed Registered Aboriginal Party is the Gunaikurnai Land and Waters Aboriginal Corporation.

9. Land availability and control

Is the proposal on, or partly on, Crown land?

☐ No ☒ Yes If yes, please provide details.

Current land tenure (provide plan, if practicable):

Barry Beach Marine Terminal comprises freehold interests and Crown leases and licences including:

- Lot 2 on Plan of Subdivision 501722S (84 ha), which is owned by the Gippsland Basin Joint Venture partners and leased to Qube Energy Pty Ltd.
- Crown lease 1508738 over Crown allotment 45B Section C Parish of Toora (3.28 ha), which is held by the Gippsland Basin Joint Venture partners. The lease is for the 40-m-wide strip of land between Lot 2 and the western boundary of the Port Franklin–Port Welshpool Coastal Reserve which extends over Lot 2. The Crown lease is 'for the construction and operation of a marine operations terminal including boat servicing, quays, storage and construction facilities, warehouse and office buildings and other purposes associated therewith'. The lease is for a period of 50 years from 1 February 1977.
- Crown licence 2017569 over Crown allotment 45E Section C Parish of Toora (approximately 109 ha), which is held by the Gippsland Basin Joint Venture partners. The licence for reserved and unreserved Crown land covers coastal waters adjacent to Barry Beach Marine Terminal and part of the Port Franklin–Port Welshpool Coastal Reserve at Barry Point. The annual licence authorises the joint venture partners to dredge and reclaim the area designated in the licence.

Port Franklin–Port Welshpool Coastal Reserve extends over part of BBMT landside.

The berth pockets, swing basin and Barry Beach Channel are unreserved Crown land.

Corner Inlet entrance straddles Victorian waters and Commonwealth waters (see Figure 3).

The dredged material investigation area/s are in freehold (onshore placement), unreserved Crown land (former dredged material placement area in Singapore Deep) and Victorian/Commonwealth waters (offshore placement)(see Figure 4).

Intended land tenure (tenure over or access to project land):

No change in land tenure is proposed.

Other interests in affected land (eg. easements, native title claims):

The Gunaikurnai peoples' native title claim (VI2010/003) has been determined and gives the Gunaikurnai certain rights over listed Crown land parcels. Their rights are set out in the Gunaikurnai Settlement ILUA registered under the *Traditional Owner Settlement Act 2010.* The Gunaikurnai's rights extend over Crown land occupied by BBMT berth pockets, swing basin and Barry Beach Channel.

For aspects relating to the Barry Beach Access Channel, there is an existing a consultative process through the Esso operational access agreement.

Corner Inlet Marine and Coastal Park, and Corner Inlet Marine National Park are managed by Parks Victoria under the provisions of the *National Parks Act 1975* and National Parks Act Regulations 2013.

Land areas above high water mark on Doughboy Island, Bennison Island, Granite Island, Long Island and Corner Island, together with the intertidal area in the southern section of Corner Inlet, form part of Wilsons Promontory National Park. The park is managed by Parks Victoria under the provisions of the *National Parks Act 1975* and National Parks Act Regulations 2013.

The barrier islands are part of the Nooramunga Wildlife Reserve managed by Parks Victoria under the *Wildlife Act 1975* but will be incorporated into Nooramunga Marine and Coastal Park when the park is permanently reserved. Other mainland areas of Crown Land will also be incorporated into the park when it is permanently reserved.

10. Required approvals

State and Commonwealth approvals required for project components (if known):

Table 1 summarises the regulatory decisions understood to be required for the Project and to which Qube will be responsible.

Table 1: Summary of legislative assessments / permitting

Legislation	Agency	Approval / Permit / Licence	Reason
Commonwealth			
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Department of Agriculture, Water and the Environment (DAWE)	Referral, and if deemed a controlled action, assessment and approval under the EPBC Act	Potential impacts to matters of National Environmental Significance. • Dredging within the Corner Inlet Ramsar site • Potential presence of EPBC listed migratory species • Potential presence of EPBC listed threatened species and ecological communities • Potential impacts on Commonwealth waters. • Assessment under the EPBC Act, if required by the Minister for the Environment.
Underwater Cultural Heritage Act 2018 (Underwater Heritage Act)	Department of Agriculture, Water and the Environment (DAWE)	If underwater heritage is discovered, notification required.	Potential for unknown shipwreck to occur.
State			
Aboriginal Heritage Act 2006	Registered Aboriginal Party	Cultural Heritage Management Plan	Project is partially located within an area of cultural heritage sensitivity (Corner Inlet Ramsar site). However, the onshore component of the project has been subject to significant land disturbance.

Environment Protection Act 1970	EPA	Licence to discharge Works Approval and Licence	BBMT is currently licensed to accept and store up to 300 m^3 of prescribed industrial waste including waste containing natural occurring radioactive materials (NORM). An amendment will be required for the upgrade of onsite bulk storage of diesel fuel. The project will require a works approval and licence to discharge wastewater from site. Any discharge to water associated with the construction and operation of the Project will be subject to the State Environment Protection Policy (Waters).
Environment Effects Act 1978	Department of Environment, Land, Water and Planning (DELWP)	Referral, and if applicable, Environment Effects Statement (EES)	Assessment under the *Environment Effects Act 1978*, if required by the Minister for Planning.
Planning and Environment Act 1987 South Gippsland Planning Scheme	South Gippsland Shire Council	Planning permit and/or planning scheme amendment	A planning permit may be required to undertake works within the Public Conservation and Resource Use Zone which is located over the existing wharf area. The proponent may apply for a planning scheme amendment to rezone this area to industrial.
Marine and Coastal Act 2018	Marine and Coastal Council	Consent under section 70	Consent is required as the project involves development and works on marine and coastal Crown land (i.e., dredging and offshore dredged material placement).

Have any applications for approval been lodged?

X No ☐ Yes If yes, please provide details.

Approval agency consultation (agencies with whom the proposal has been discussed):

Department of Agriculture, Water and the Environment (DAWE)
Department of Environment, Land, Water and Planning (DELWP)

Other agencies consulted:

Gippsland Ports
South Gippsland Shire

PART 2 POTENTIAL ENVIRONMENTAL EFFECTS

11. Potentially significant environmental effects

Overview of potentially significant environmental effects (identify key potential effects and comment on their significance and likelihood, as well as key uncertainties):

As described in Section 3, construction of the project will involve landside redevelopment of BBMT (an existing and operational port) as well as further dredging to deepen the existing berth pockets, swing basin and the Barry Beach Channel and Corner Inlet Entrance to enable larger deeper draught vessels to use the port.

During construction, the project will involve the following landside activities:

- **Physical land disturbance –** redevelopment of the BBMT will involve decommissioning and removal of existing wharf infrastructure, excavation and backfilling of the wharf area. Any contaminated material identified in the onshore disturbance footprint and marine sediments deemed to be contaminated will be placed within engineered cells designed in accordance with relevant standards. Reclamation and redevelopment of land for construction of warehouses and manufacturing and assembly workshops.
- **Construction of new onshore infrastructure –** this will include new warehouses, manufacturing and assembly workshops, hardstands for storage and laydown areas.
- **Increased road traffic –** construction of the new port infrastructure will require materials and employees to be transported to the site via the existing road network. This is predicted to consist of up to 20 additional truck movements per day and 150 light vehicle movements per day.
- **Requirement for an expanded workforce** – the project will require a construction workforce of up to 100 persons who will be drawn from local communities and be housed in temporary accommodation in the region.

During construction, the project will involve the following waterside activities:

- **Dredging and subsequent disposal of dredged material –** to enable safe passage and docking of larger deeper draught vessels the project will deepen the existing berth pockets, swing basin, and the Barry Beach Channel and Corner Inlet Entrance. Sediments (sand, clay and calcareous sand) from dredging that are determined to be uncontaminated will be placed within selected offshore disposal areas subject to geotechnical parameters and planned physical and environmental investigations. Any contaminated material to be dredged (potentially in the existing berth pockets) will be stored in an engineered storage cell designed in accordance with relevant standards.
- **Sheet piling –** to enable construction of a new wharf. This will generate noise within the terrestrial and marine environment.
- **Increased vessel movements –** construction of the new port infrastructure will require increased vessel movements to support construction activities in addition with continued operational vessel movements.

In terms of onshore operational activities, the project will involve:

- Expanded port operations.
- Increased traffic to bring and take cargoes from the port.

- An expanded workforce.
- Increased vessel movements.

Key potential effects

Onshore potential effects

The project will require decommissioning of the existing wharf and associated infrastructure and construction of a new wharf. As an existing and operational port (zoned for industrial use), most of the site is already cleared, with native vegetation remaining in the eastern part of the site. Vegetation clearance is expected to accommodate the proposed redevelopment. Approximately 23 ha of vegetation clearing may be needed to accommodate increased warehouse, workshop and hardstand storage space. Ecological surveys are planned to inform the siting of project infrastructure with intent of avoiding any areas of high ecological values.

Construction will involve excavation of an operational industrial site where hazardous materials have been stored and handled for over four decades. As such there is the possibility to encounter areas of existing contamination from historical activities. This has the potential to present an environmental hazard requiring management. Disturbance of existing contamination has the potential to lead to pollution of lands and waters if not adequately managed.

This risk is acknowledged and to better understand this risk the project will undertake further contaminated land assessment involving review of desktop information followed by targeted field sampling of areas proposed for excavation and/or redevelopment.

Construction of the project will require an increased construction workforce and this will temporarily increase traffic volumes on local roads. The predicted significance of these aspects to the social environment is predicted to be low based on the following considerations:

- The magnitude of change is predicted to be largely accommodated within the existing social context. For example, accommodating the construction workforce and increased traffic will be temporary and something that the region has been exposed to in the past through offshore exploration drilling programs and major oil and gas platform maintenance activities, and as a result is not expected to create significant social impacts. The construction workforce is estimated to be up to 100 personnel.
- Changes to traffic volumes are predicted to be temporary and intermittent across the anticipated construction period of 19 months, after which traffic conditions are largely expected to return to the existing state. The operation workforce and traffic will be higher than the current conditions increasing as new customers and port users are identified. The operations workforce will initially comprise up to 30 personnel.
- Measures will be developed to increase local positive benefits resulting from the project and to minimise potential negative effects. These measures include the preferential use of local businesses and services where possible and providing employment and training opportunities for members of local communities.

Marine effects

To enable safe passage and docking of larger deeper draught vessels, the project will dredge the seabed to deepen the existing berth pockets, deepen and widen the swing basin, and deepen and widen the access and entrance channels. Dredge spoil will be disposed to land or seabed in accordance with applicable regulations. The project will involve demolition of the existing wharf and construction of a new sheet-pile wharf and wharf apron. The project will involve disturbance of the seabed (at the dredge sites and disposal areas and around the wharf), increased vessel movements (some of which will be larger deeper draught vessels than currently use the port), and

generation of underwater noise during construction. The potential effects from these key marine activities are detailed below.

Dredging

The key project activity that has the potential to result in significant environmental effects is dredging to deepen and widen the existing swing basin and access and entrance channels. Maintenance dredging to maintain water depth in the berth pockets, swing basin and Barry Beach Channel is ongoing and conducted periodically.

The environmental effects of dredging are usually most pronounced at the site of the dredging and where the dredged material is deposited. At these locations, benthic habitat and infauna communities (if present) are lost or smothered. In addition, the water column and seabed adjacent to the dredging and spoil disposal areas can be affected by re-suspended sediments caused by the seabed disturbance and spoil disposal. An increase in suspended sediments is associated with increased turbidity, which can reduce light penetration through the water column - a particular issue for photosynthesising flora species but also marine fauna that require relatively clear water for orientation. Usually, increased suspended sediments and turbidity are more pronounced where finer sediments are disturbed and are more susceptible to remaining suspended and transported by marine currents.

Increased suspended sediments in the water column can also adhere to the surfaces of, or be ingested by, marine organisms and clog the gills of fish. When the dredged sediments contain toxicants, the suspended solids can result in ecotoxicity to exposed fauna in the water column as well as benthic communities where the sediments deposit.

The magnitude of adverse environmental impacts caused by dredging and disposal depends on the location of dredging and the dredged material placement area (e.g., water depth, water currents, sediment type and composition, and presence of sensitive or valued habitats, species or communities or economically important areas), quantity of material dredged, duration and timing of dredging, type of dredging method used, and degree of existing contamination of the dredged material. The magnitude of effects will also be influenced by the background water quality, especially natural variations of suspended sediment concentrations and turbidity levels.

Qube plans to scope, commission and conduct a range of environmental and social technical investigations to reduce uncertainty about potential impacts of dredging and dredged material disposal to meet the requirements of both Victorian and Commonwealth regulators. These investigations are outlined in Section 20.

The following assessment summary is based primarily on available desktop information as well as experience gained on similar projects and of the existing BBMT.

Potential impacts from dredging include:

- Changes to benthic community structures and habitats due to sediment removal and placement of dredged material. This includes removal, partial smothering or burial of sessile and motile organisms that are unable to burrow up through the deposited layer.
- Temporary decreases in water transparency associated with increased concentrations of suspended sediments. This has the potential to impact light sensitive organisms or those that require clear water to navigate.
- Reduced vitality or death of sessile benthic fauna through clogging of feeding mechanisms or smothering (especially filter-feeding organisms and sensitive habitats).
- Behavioural changes of marine fauna due to generation of noise in the marine environment.

Dredging can change current velocities and wave conditions affecting sediment transport within the system either through accretion or erosion. Hydrodynamic modelling will be conducted to understand the existing conditions and potential impacts of deepening and widening channels, noting that signs of enhanced erosion have not been observed following previous dredging campaigns. Siltation of the berth pockets, swing basin and Barry Beach Channel occurs over time necessitating periodic maintenance dredging.

These potential impacts are described in more detail below.

Direct habitat loss and smothering

Physical removal of substratum and associated plants and animals from the seabed, and burial due to subsequent deposition of material are the most likely direct effects of dredging.

Dredging directly impacts the site of dredging disturbance by removing the surface lay material and associated sessile biota. There are also direct smothering/burial impacts where spoil is disposed and ultimately settles as few benthic organisms survive beneath freshly deposited spoil (Maurer et al. 1982). The magnitude of smothering/burial impacts are highest in the primary sediment deposition area (i.e., obliterative zone) with the extent of smothering and burial decreasing at the margins of the deposited material (i.e., semi-obliterative zone) where the thickness of deposited material is lower. In the semi-obliterative zones it is expected that some level of infauna survival and/or recolonisation would occur depending on the thickness of the deposited material and the adaptability of the benthic organisms. Finer particles may settle some distance from the disturbance/disposal sites in a non-obliterative impact zone. Here, fine layers of silts and fine sands may cover the seabed.

In the semi- and non-obliterative zones, changes to the particle size distribution of the benthic sediments as a result of dredging disturbance and spoil deposition may negatively affect seabed habitat for marine benthos. For example, this can occur where deposition of finer particles block the interstitial spaces within which infauna live. In addition, coarser sediments such as sands may take longer to disperse with the currents and may result in longer term changes to the sediment structure.

Sediment deposition in the vicinity of dredging and the dredged material placement area may affect adjacent plant and animal communities. High sediment loads may cover plants or directly impact marine fauna via clogging of feeding mechanisms (i.e., filter-feeding organisms) or complete smothering. The rate of plume deposition to the seafloor is greatest at the dredge location and gradually reduces with distance. Water currents driven by the tidal cycle influence the location at which plumes settle to the seafloor. The relatively high deposition rates in proximity to dredging locations are due to the coarse sand and gravel fraction of the plume material rapidly settling to the seafloor.

At the dredged material placement site, upon release, most dredged material will sink directly to the seabed or form a dense layer of suspended sediment just above it. Generally, this material will settle within hours or days, although if fine and of high water content, it is liable to be resuspended and could be dispersed by currents or waves. In high energy environments, such as those typically found in south-eastern Australia, even sand-sized material will be moved by current and wave action if deposited in water shallower than 60 metres (DEWHA, 2009). However, some of the fines in the dredged material will remain in suspension for days and weeks and may be carried long distances by currents before being dispersed and settling.

Over the medium to longer term, recolonisation of benthic organisms is likely to occur particularly if the physical properties of the dredged material are similar to properties of the disposal site seabed (EPA, 2001). Recolonisation of benthic organisms in dredged or disposal sites is known to differ based on seafloor substrate, depth and degree of disturbance channels. Recovery tends to commence within months, but generally will take years to fully recover (e.g., Nichols et al. 1990).

Dredging is expected to impact channel seabed habitat that consists of sand, silt and gravel. Smaller areas of intertidal flats are also expected be directly disturbed to increase the width of existing channels (Figure 9). These are predicted to include:

- Approximately 94 ha of seabed areas with no visible biota that are typically sandy or muddy seabed substrates as based on Seamap Australia open coast biotopes mapping. This would be expected to result in a localised loss of sandy habitats and seabed fauna and the meiofauna, macroinvertebrates, and other fauna that inhabit these areas.
- Approximately 46 ha of undifferentiated algae and seagrass and undifferentiated invertebrates and approximately 16 ha of undifferentiated algae and seagrass as mapped by Seamap Australia biotypes. These areas are largely located beyond the Corner Inlet entrance in Bass Strait. Given the dynamic nature of shifting sands in these areas the accuracy of these categories may be variable.
- Approximately 6 ha of unconsolidated sandy habitats supporting colonies of pyura sessile ascidians (filter feeding sea squirts) based on Seamap Australia biotype mapping.
- Approximately 5 ha of fragments of seagrass beds and associated undifferentiated algae. These losses are based on Seamap Australia biotype mapping and represent 0.04% of seagrass area mapped in Corner Inlet embayment of the Ramsar wetland.

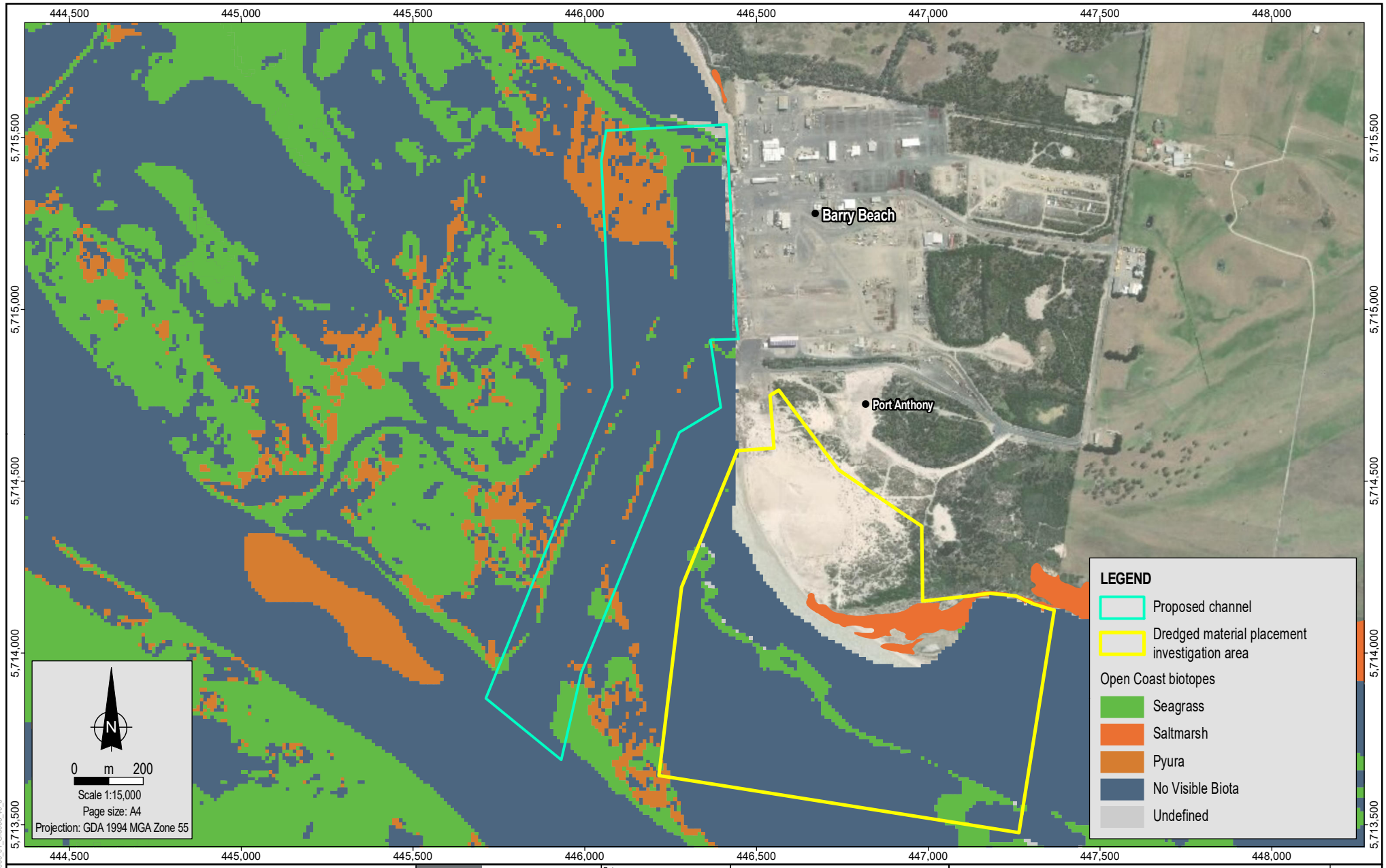
Overall, seabed and benthic community impacts are anticipated to be low. This is because the areas to be dredged are largely within existing channels that have been subject to dredging in the past. It is therefore likely that these areas of seabed have relatively higher existing levels of disturbance and/or resilience of benthic communities (i.e., the communities that have colonised these areas are those subject to previous dredging disturbance).

Dredged material placement will require approximately 450 ha. Marine and terrestrial studies will be conducted to identify suitable locations for dredged material placement. Dredged material placement areas will be selected to avoid areas of sensitive habitat such as reef, sponge beds and seagrass meadows. Potential sites at Barry Point, Singapore Deep and off Rabbit Island have small mapped areas of isolated patches of coastal salt marsh, pyura, seagrass and undifferentiated algae, seagrass and invertebrates.

While the magnitude of impacts on isolated patches of seagrass habitat is expected to be small, it is acknowledged that the sensitivity and importance of this habitat is high given their importance in ecosystem function and role in controlling coastal erosion. Overall, the impact to seagrass patches is expected to be low in the overall context of the inlet and its entrance.

Turbidity and increased suspended sediment

Increased suspended sediments and associated turbidity within the water column will occur as a result of dredging. Turbidity, or decreased transparency of water, occurs near the dredging activities and also during the marine disposal of dredged material (i.e., at the disposal site). Increased turbidity and subsequent reduction of light penetration is a secondary potential effect of dredging with the potential to block sunlight to light sensitive organisms such as seagrasses and phytoplankton.



MXD Reference: 268900_01_GIS008_v0_3

Source:
Proposed channel from Coffey.
Biotopes from Seamap Australia.
Imagery from ESRI Online.

QUBE

coffey
A TETRA TECH COMPANY

Date: 20.04.2020
Project: 754-MELEN268900
File Name: 268900_01_F009_GIS

Barry Beach Regional Port

Qube Energy Pty Ltd

Nominal project footprint in relation to mapped benthic habitats

Figure No: **9**

The extent to which the turbidity effect is propagated into the surrounding environment depends on the:

- amount of seabed disturbance and dredge material handled/disposed.
- dredging method and scheduling.
- physical properties of dredged sediments.
- existing water quality of the receiving environment.
- hydrodynamic conditions including waves, tides and currents.

Previous research has established that turbidity caused by dredging is a temporary effect (Manap and Voulvoulis, 2015). Typically, during dredging, suspended sediment concentrations build up over the first few weeks of dredging and then reach a dynamic equilibrium when sediment plumes are governed by the tidal cycle. Maximum total suspended solids (TSS) concentrations are generally high (greater than 100 mg/L) at the dredge site and decrease with distance from these locations. Also, concentrations are typically higher during neap tides when the potential for plume dispersion from water currents is lowest.

Turbidity changes induced by dredging only result in adverse environmental effects when the turbidity generated is significantly larger than the natural variation of turbidity and sedimentation rates in the area (Orpin et al., 2004). Such natural variability can be substantial and may be caused by factors such as storms, wind-induced wave action and river discharges. High turbidity reduces photosynthesis and as a result may reduce plant growth. Prolonged and high levels of turbidity may lead to plant mortality particularly of sensitive species such as seagrass. Seagrass requires higher light levels than most algae, and they often occur in fine sediments which cause more persistent turbidity when dredged.

Research on sedimentation effects of dredging (e.g., Engler et al. 1991) has shown lethal concentrations of suspended sediment need to be an order of magnitude or greater than observed in the field during dredging operations. Generally, fauna have some tolerance to temporary spikes in turbidity and associated sedimentation. EPA (2001) states that most animals are resilient to moderate increases in turbidity/suspended sediment levels, such as those generated during storms, and are able to withstand temporary elevated turbidity/suspended sediment levels caused by dredging.

The greatest potential impact of turbidity occurs in areas of sensitive plants where light is reduced for an extended period. For example, a study found that a month of higher turbidity caused significant seagrass loss in Chesapeake Bay (Moore et al. 1997). Seagrasses are particularly vulnerable to increases in turbidity as they require a much higher percentage of incident light than required by most other groups of marine plants (Dennison et al. 1993).

Erftemeijer and Lewis (2006) concluded that the effect of turbidity on seagrass ecosystems is twofold. Light attenuation by suspended material affects the amount of light available to the seagrass plants and associated epiphytes, microphytobenthos and macroalgae. Depending on the depth at which these organisms occur, high turbidity can cause a significant reduction in light availability leading to sub-lethal effects or death. High levels of suspended material can lead to reduced vitality or death in benthic fauna associated with the seagrass beds through clogging of their feeding mechanisms (cilia and siphons) and smothering, especially in filter-feeding organisms such as mussels, oysters and other bivalves.

While the direct area of dredging is largely expected to be unconsolidated sands and silts, areas of *Zosteraceae* and *Posidonia* seagrasses and areas of *Pyura* habitats (sessile ascidians) are

located adjacent to the dredge areas. High turbidity at these habitats has the potential to reduce photosynthesis, and depending on the severity and duration may cause stress or loss of patches of seagrass. However, given that dredging will be temporary, it is expected that resultant turbidity will cause a transient and temporary blocking of sunlight to patches of seagrass as the more concentrated turbidity plumes disperse with the strong currents in Corner Inlet, gradually becoming less turbid with distance.

Increased suspended sediment concentrations may also affect trophic interactions in plankton and change the feeding behaviour of fish for example avoidance of turbid waters (Barrett et al., 1992). For example, one of the most commonly observed behaviours by fish to elevated suspended sediments is the avoidance of turbid waters (Wenger et al. 2017). This avoidance can be triggered at very low levels of suspended sediment, but ceases once the disturbance is removed or when the fish become acclimatised. Increased turbidity has also produced long-term shifts in local abundance and community composition.

Ecological changes caused by turbidity are only likely to be significant when turbidity is elevated over a large area for an extended period (EPA, 2001). In their review of impacts of turbidity from dredging, Engler et al. (1991) concluded that in many situations the main effect of dredging-related turbidity is its aesthetic impact. Nonetheless, the potential direct and indirect impacts associated with turbidity and increased suspended sediments as a result of the project remain a key issue to be investigated during detailed investigations proposed (see Section 20). It is planned to conduct water quality monitoring prior to dredging to establish the background turbidity and TSS range and then model the expected TSS concentrations caused by dredging, with respect to background conditions and water quality criteria. Due to the deposition of clays and silts entering Corner Inlet from tributaries, there are at times periods of natural turbidity due to inflows of fine sediments.

Release of contaminants

Disturbance of seabed sediments has the potential to release particulate and dissolved contaminants (e.g., heavy metals and organics) and nutrients into the water column, with consequential toxicity effects on marine fauna.

Where sediments contain contaminants, there is potential for release into the environment as a consequence of dredging and during pile driving. As the sediments are disturbed and mix throughout the water column, adsorbed chemicals can desorb and be released into the water column where they may become bioavailable. As a mature operational port that has a long history of handling hazardous materials, seabed sediments have potentially been exposed to contamination from spillages from the port facilities and the vessels that use them, and historical use of anti-fouling paints.

Typically, finer sediments have a greater capacity to adsorb metals and other potential toxicants due to the higher surface area per unit weight of the sediment particles. These finer silts and fine sands are also more likely to remain suspended for longer periods after disturbance and be ingested by marine fauna.

There are several means of reducing the environmental impact of contaminated seabed. Dredged material may be treated to remove contaminants. Dredged material may be disposed of in special enclosed facilities on land, or it may be disposed of in containment facilities by burial in the seabed or by covering it on the seabed. Another management option is that it may be mixed with less contaminated material and disposed of to a dredged material placement area (EPA, 2001). Of these methods onshore disposal is proposed for the project.

Sediment quality investigations will be carried out to understand the potential risk of mobilising sediment contaminants due to dredging. This will involve sampling and analysis of contaminants in sediments to be dredged, sediments where the dredged material will be placed, and sediments from reference locations and comparison of the analysis results to the screening criteria in the Australian National Assessment Guidelines for Dredging 2009 (the dredging assessment guidelines)(DEWHA, 2009). Depending on the concentrations of potential contaminants in the sediments, additional investigations (e.g., elutriate testing) may be undertaken to further investigate the risk of contaminant mobilisation upon mixing with seawater, or even ecotoxicity testing, in line with the dredging assessment guidelines. Based on the outcomes of the laboratory investigations, measures will be developed for how to handle the material. Such measures may include some form of treatment or mixing with other material prior to disposal.

Previous sampling of sediments for maintenance dredging of the Barry Beach Marine Terminal did not identify significant contamination. However, further testing is planned to confirm the presence or absence of contaminants of concern.

Hydrodynamics

Dredging has the potential to result in localised changes to seabed bathymetry which has the potential to result in altered current velocities and wave conditions. Changes in the hydrodynamics of an estuary or inlet can affect physical characteristics including the tidal amplitude, salinity distribution, stratification, and sediment transport (Jensen and Mogensen, 2000). Altered physical processes can also impact estuarine ecosystems, for example, by changing residence times and nutrient retention, or altering wetland inundation (Jay et al., 2015).

Corner Inlet is characterised by complex hydrodynamics, with a tidal regime (tidal variation is 2.1 m for spring tides and 1 m for neap tides), morphological features (sand banks, islands and beaches) and a network of channels resulting in significant water flow in and out of the system on each tidal cycle, potentially mobilizing sediments. Mangrove and saltmarsh communities in Corner Inlet assist in stabilising sediments and protecting the shoreline from erosion.

Isolating the effects of dredging on estuarine processes is challenging because individual dredging campaigns increase depths by a small percentage and the morphological and ecological response time scales can be years to decades. Depth increases change estuarine hydrodynamics, where shear stress at the bed is the major source of friction and is the source of turbulence and associated vertical mixing. Increases in water depth reduce the effects of bottom friction and reduce turbulent mixing of salinity or temperature stratification, potentially leading to changes in tidal processes, response to storm surge, the length of the salinity intrusion, and exchange with the coastal ocean. For tidal dynamics, a reduction in the effective drag due to deepening often corresponds with an increase in tidal amplitude and a change in phase with increased wave speed.

Based on experience of the behaviour of Corner Inlet following construction of BBMT, and subsequent maintenance dredging, the predicted impacts on inlet hydrodynamics is assessed as low. This is based on the following:

- Most of the dredging will occur in the immediate vicinity of the shore, largely within previously dredged areas and not disturb the existing natural drainage channel network. Dredging is unlikely to influence broader hydrodynamic processes. The channel proposed to be dredged through the existing sandbar approximately 3 km beyond the Corner Inlet entrance is unlikely to significantly influence hydrodynamic patterns within the inlet itself due to the natural variability in entrance water depths and limited dredging required (approximately 2 to 3 m).

- The dredging that was completed to construct BBMT had no noticeable impact on physical marine processes.

Technical studies are proposed to investigate the impacts to tidal hydrodynamics, wave conditions, and associated sediment transport regime as a result of the physical placement of port infrastructure. The studies will model and assess sediment dispersion and fate of sediments from the proposed dredging and offshore dredged material placement area. Sediment plume dispersion modelling is important to assess the potential impacts of the proposed development on marine values, particularly Ramsar site values in Corner Inlet including seagrass beds, wader foraging habitat and mangrove communities.

More specifically the objectives of the studies will be to:

- Predict the short and long-term dispersion of material generated during dredging and material being relocated to the dredged material placement area.
- Determine the potential individual and cumulative impacts upon coastal and hydrodynamic processes associated with development of the project in Corner Inlet and on Ninety Mile Beach coastal processes.
- Determine risks that need to be addressed through project design and information that is required to inform the environmental impact assessment processes.

Marine noise

As an operational port, there are already a range of noise sources, for example from offshore supply vessels and maintenance dredging campaigns.

Human-generated underwater sounds from activities such as pile driving have the potential to interfere with the behaviour of marine fauna, particularly marine mammals that communicate and navigate using sound. Other effects can include sensory damage to noise sensitive marine fauna and damage to swim bladders of some fish species.

The main sources of underwater noise arising from construction will be dredging activities and sheet-pile driving to construct the new wharf. These localised, temporary activities may cause marine fauna to avoid the worksite for the duration of the activities.

Marine noise from pile-driving activities will be managed by employing ‘soft start’ procedures (i.e., gradual increase from lower noise emissions to higher noise emissions) to minimise startling nearby marine fauna.

Overall, with management measures in place, it is expected that noise impacts to marine fauna will be low, with startle responses due to impulsive noise sources (such as pile driving) being the most likely effects. Some animals, such as dolphins, may be attracted to construction activities and vessel movements due to their inquisitive nature. The noisiest activities (i.e., pile driving) will be close to the port where whales are not expected to frequent due to the shallow waters.

It is unlikely that this noise will significantly affect marine fauna

Vessel movements

The project will increase the frequency and types of vessels using the port. The Barry Beach Channel and Corner Inlet Entrance channel will provide safe passage for one vessel at a time. No passing lanes are proposed. Existing port access procedures will apply ensuring the safety of all vessels using the port.

Construction vessels (e.g., for dredging) and operational vessels have the potential to spill or discharge oil, chemicals, sewage, grey or black water and ballast water; and generate litter or garbage.

Use of the port has the potential to introduce marine pests and invasive species from elsewhere if quarantine measures such as ballast water discharges and hull biofouling are not adequately implemented. Introduced and pest species have the potential to cause significant economic, environmental and social impacts. Most marine and estuarine introductions occur when organisms are transported in the ballast water of ships. The greatest risk of introducing invasive species would be movement of vessels into Corner Inlet directly from foreign ports.

Increased vessel movements for dredging for port access may result in some interruption to the Corner Inlet fishery and recreational fishers. Consultation with the fishery and the port will be crucial for understanding potential conflicts with project vessel activities and fishing vessels. There will need to be a temporary exclusion zone around project construction vessels to manage this risk. This will result in short term disruption to fishing vessel movements.

All vessels using the port would be required to comply with Gippsland Ports, EPA and AMSA requirements. These will include incident reporting requirements and vessel discharge regulations. Vessels will need to implement an environment management plan, outlining measures to avoid environmental impacts as well as to maintain safety. This will include complying with the regulations under the International Convention for the Prevention of Pollution from Ships (MARPOL). This includes complying with protocols for management of waste, oil, noxious liquids, harmful substances, sewage and garbage.

Overall, impacts due to vessel accidents, environmental incidents, or introduction of invasive pest species, are assessed as low. This is because, with the implementation of standard quarantine and safety measures, port operations have been shown to successfully avoid significant environmental and social incidents. It is expected that this will remain the case at Gippsland Regional Port. Further, interactions with fishing vessels will be managed by implementing a temporary exclusion zone around construction vessels so that collisions are avoided.

Historic heritage

While the likelihood is very low, it is possible redevelopment of the port and associated dredging will uncover or disturb features or sites of maritime archaeological or heritage value. BBMT is not a historic port. It was developed in the 1960s at a greenfield site. Construction of the port did not impact known shipwrecks or other heritage features. Proposed dredging at Barry Beach and the Corner Inlet entrance does not impact known shipwreck sites. It is possible that unrecorded shipwrecks or maritime archaeological material could occur in Corner Inlet and near the entrance.

Until geophysical surveys are undertaken and the data is reviewed by a qualified marine archaeologist, it will not be known whether there are maritime archaeological sites within the port development area and whether they might be impacted. Should seabed anomalies be identified that may be wrecks or other culturally significant features then they can be further inspected by diving or deploying an underwater camera. After assessing the significance of any such feature, specific management measures will be developed according to its significance.

Aboriginal heritage

The landside component of the project is in an area of Aboriginal cultural heritage sensitivity. Numerous sites have been recorded in the Corner Inlet area including scarred trees, burial sites,

artefact scatters, camps and shell middens (BMT WBM 2011). During construction, there is potential to uncover or disturb Aboriginal cultural heritage in the undeveloped part of BBMT and at Barry Point. Until cultural heritage surveys are undertaken it will not be known whether there are Aboriginal cultural heritage sites within the port development area and whether they might be impacted. A cultural heritage assessment is planned to be completed to characterise cultural heritage values and assess the cultural heritage significance of each value using internationally recognised criteria and insights from consultation with the Traditional Owners.

12. Native vegetation, flora and fauna

Native vegetation

Is any native vegetation likely to be cleared or otherwise affected by the project?

☐ NYD ☐ No ☒ Yes If yes, answer the following questions and attach details.

What investigation of native vegetation in the project area has been done? (briefly describe)

Ecological investigations of native vegetation to date have included:

- Review of mapped Ecological Vegetation Classes using NatureKit (DELWP, 2020).
- Reviewing available satellite imagery of the site.
- Completing a preliminary site walkover with visual observations of the extent and quality of native vegetation.

What is the maximum area of native vegetation that may need to be cleared?

☐ NYD Estimated area: Up to 23 ha of degraded vegetation (hectares)

How much of this clearing would be authorised under a Forest Management Plan or Fire Protection Plan?

☒ N/A …….. approx. percent (if applicable)

Which Ecological Vegetation Classes may be affected? (if not authorised as above)

☐ NYD ☒ Preliminary/detailed assessment completed. If assessed, please list.

The project area consists of a fenced land parcel 84 ha in size. Approximately 70% of the site has been previously cleared for the existing BBMT, particularly the western area adjacent to the coastline which consists of bituminised and gravelled laydown areas, roads, sheds and warehouses.

Approximately 23 ha of vegetation remains adjacent to the eastern and northern boundaries of the site and is a mix of native and exotic species. Native vegetation is mapped as the Lowland Forest (EVC0016) and the Heathy Woodland (EVC0048), roughly in equal proportions. Observations during a preliminary site walk-over noted historical disturbances and the presence of invasive species including pampas grass (*Cortaderia selloana*). Consequently, much of the existing vegetation is likely to be in poor condition.

If vegetation clearance is required for development of the BBMT, further ecological surveys will be conducted to assess the nature, extent and quality of native vegetation to allow an analysis of impacts in accordance with Victoria's native vegetation regulations and *Guidelines for the removal, destruction or lopping of native vegetation*. This will also include recording the location and nature of all canopy trees (scattered and in patches), which may be impacted by the proposed works in accordance with the guidelines; the extent and quality of habitat for significant flora and fauna within the study area; and recording native and introduced flora and fauna.

Have potential vegetation offsets been identified as yet?

☒ NYD ☐ Yes If yes, please briefly describe.

Other information/comments? (eg. accuracy of information)

Information described above is based available desktop information, vegetation mapping and a site walkover. It is considered to be of reasonable accuracy.

Flora and fauna

What investigations of flora and fauna in the project area have been done?
(provide overview here and attach details of method and results of any surveys for the project & describe their accuracy)

The following information was used to inform the assessment of flora and fauna for this referral:

- Victorian Biodiversity Atlas (VBA) Search (DELWP, 2020b) – a search of the VBA was conducted by Coffey in February 2020 to identify threatened or migratory species or listed communities previously recorded within 5 km of the project area.
- Protected Matters Search Tool (PMST) - completed by Coffey in February 2020 to identify matters of national environmental significance within a 5 km radius of the project area.
- Birdata (BirdLife Australia, 2020) within 5 km of the project area.
- Corner Inlet Ramsar Site Ecological Character Description and Ecological Character Description Addendum (BMT WBM, 2011; Hale, 2017).
- A range of published reports and scientific literature.
- A preliminary site walkover with visual observations of the extent and quality of native vegetation.

Have any threatened or migratory species or listed communities been recorded from the local area?

☐ NYD ☐ No ☒ Yes If yes, please:

- List species/communities recorded in recent surveys and/or past observations.
- Indicate which of these have been recorded from the project site or nearby.

Given the project area spans the terrestrial, intertidal nearshore, shallow estuaries and beach and deeper marine ecosystems, biodiversity from a range of ecological niches occur within the Corner Inlet.

Onshore habitats

A range of threatened fauna species that primarily occur in the terrestrial environment have the potential to occur in the study area, which contains areas of Wilsons Promontory and Snake Island, based on historical records (i.e., VBA and Birdata) and predicted spatial distributions (PMST). These include:

- Eight mammals including eastern pygmy-possum (*Cercartetus nanus*), greater glider (*Petauroides Volans*), grey-headed flying-fox (*Pteropus poliocephalus*), New Holland mouse (*Pseudomys novaehollandiae*), swamp antechinus (*Antechinus minimus maritimus*), long-nosed potoroo (*Potorous tridactylus tridactylus*), southern brown bandicoot (eastern) (*Isoodon obesulus obesulus*) and spot-tailed quoll (*Dasyurus maculatus maculatus*).
- Five birds including azure kingfisher (*Ceyx azureus*), chestnut-rumped heathwren (*Calamanthus pyrrhopygius parkeri*), emu (*Dromaius novaehollandiae*), regent honeyeater (*Anthochaera Phrygia*) and nankeen night-heron (*Nycticorax caledonicus*).
- Three reptiles glossy grass skink (*Pseudemoia rawlinsoni*), southern toadlet (*Pseudophryne semimarmorata*), and growling grass frog (*Litoria raniformis*).

The project site contains a number of fragments (totalling approximately 20 ha) of native vegetation mapped Lowland Forest and Heathy Woodland. Beyond the site boundary there are some adjoining fragments of vegetation, but the broader landscape has been primarily cleared for farming. As such it is unlikely that the site supports the threatened species listed above.

In addition to the resident terrestrial species listed above, there is a range of migratory birds that nest in the terrestrial environment and migrate over the marine environment. These species breed elsewhere but have the potential to occur in the study area during the non-breeding season. These migratory bird species include the orange-bellied parrot (*Neophema chrysogaster*), swift parrot (*Lathamus discolour*), white-throated needletail (*Hirundapus caudacutus*), rainbow bee-eater (*Merops ornatus*), rufous fantail (*Rhipidura rufifrons*), black-faced monarch (*Monarcha melanopsis*), fork-tailed swift (*Apus pacificus*), yellow wagtail (*Motacilla flava*), and satin flycatcher (*Myiagra cyanoleuca*). One or more of these species may pass through the project area from time to time.

A range of threatened or rare flora has been recorded within, or has the potential to occur within, 5 km of the project area. This includes 50 plants that are either listed under the *Flora and Fauna Guarantee Act 1988* or listed in the Victorian advisory list of threatened plants. Of these 12 (mostly orchids) are also listed as threatened under the EPBC Act.

Intertidal nearshore marine and shallow estuary habitat

Corner Inlet is a large submerged plain covered by subtidal and intertidal sand and mud flats, which are intersected by a network of radiating channels providing a diversity of marine, estuarine and freshwater wetland habitats, most of which are presented in a near-natural condition.

A key feature of the biodiversity of Corner Inlet is the diversity of birds that forage in the intertidal nearshore marine and shallow estuary habitat. These birds include both resident species and migratory species that visit the area each year. The latter group includes 26 species of palaearctic migratory shorebirds. The extensive mudflats and intertidal marshes provide both feeding and high-tide roost sites for these species. These migratory species include: the great knot (*Calidris tenuirostris*), bar-tailed godwit (*Limosa lapponica*), black-tailed godwit (*Limosa limosa*), common greenshank (*Tringa nebularia*), common sandpiper (*Actitis hypoleucos*), curlew sandpiper (*Calidris ferruginea*), double-banded plover (*Charadrius bicinctus*), eastern curlew (*Numenius madagascariensis*), grey-tailed tattler (*Tringa brevipes*), Latham's snipe (*Gallinago hardwickii*), lesser sand plover (*Charadrius mongolus*), little curlew (*Numenius minutus*), pectoral sandpiper (*Calidris melanotos*), pin-tailed snipe (*Gallinago stenura*), Red Knot (*Calidris canutus*), red-necked stint (*Calidris ruficollis*), ruddy turnstone (*Arenaria interpres*), ruff (Reeve) (*Philomachus pugnax*), marsh sandpiper (*Tringa stagnatilis*), sharp-tailed sandpiper (*Calidris acuminate*), sanderling (*Calidris alba*), Swinhoe's snipe (*Gallinago megala*), terek sandpiper (*Xenus cinereus*), wood sandpiper (*Tringa glareola*), and whimbrel (*Numenius phaeopus*). These species have various protections under Victorian and Commonwealth legislation and international agreements.

There is potential for marine species of conservation significance to transit through the study area or spend some time foraging in the study area. These include species that have conservation significance or listing under Victorian or Commonwealth legislation, and include: Australasian bittern (*Botaurus poiciloptilus*), painted snipe (*Rostratula australis*), royal spoonbill (*Platelea regia*), sooty oystercatcher (*Haematopus fuliginosus*), great egret (*Ardea modesta*), cattle egret (*Ardea ibis*), musk duck (*Biziura lobate*), Australasian shoveler (*Anas rhynchotis*), black-winged stilt (*Himantopus himantopus*), red-capped plover (*Charadrius ruficapillus*), and red-necked avocet (*Recurvirostra novaehollandiae*).

Australian grayling (*Prototroctes maraena)* has been recorded in the freshwater streams (Franklin, Agnes, Albert and Tarra rivers) that feed directly into Corner Inlet, and the species is almost certain to be present within Corner Inlet for periods of their life cycle (BMT WBM, 2011) for at least part of its life cycle. The pale mangrove goby (*Mugiligobius platynotus*) potentially occurs in Corner Inlet mangrove habitats, although there have been no surveys to establish this. The

dwarf galaxias (*Galaxiella pusilla*) has the potential to occur in freshwater tributaries of Corner Inlet, but is unlikely to in the inlet itself.

Up to 12 species of pipefish, seahorses and seadragons (from the *Syngnathidae* family) are likely to occur in Corner Inlet particularly in seagrass beds (Kuiter, 2000). Seagrass habitats in Corner Inlet and Nooramunga are known to, or likely to, provide habitat for pot-belly seahorse (*Hippocampus bleekeri*), short-headed seahorse (*H. breviceps*), brushtail pipefish (*Leptoichthys fistularius*), half-banded pipefish (*Mitotichthys semistriatus*), spotted pipefish (*Stigmatopora argus*), wide-bodied pipefish *(Stigmatopora nigra)*, hairy pipefish (*Urocampus carinirostris)* and longsnout pipefish (*Vanacampus poecilolaemus).* The deep body pipefish (*Kaupus costatus*) is known only from isolated populations in Corner Inlet, Flinders Island and several places in South Australia. It has very specific habitat preferences of quiet seagrass beds to 3 m depth in silty sediments but clear overlaying water (Kuiter, 2000).

Beach and deeper marine ecosystems

Beyond the Corner Inlet entrance, Bass Strait marine habitats consist of beaches, rocky shores and deeper marine ecosystems. This coastline and nearby granitic islands provide feeding and nesting habitats for many coastal and migratory bird species. Seabirds spend much of their lives at sea in search of prey only to return for a short time to breed and raise chicks. Most species tend to forage on their own, though large feeding flocks will gather at rich or passing food sources.

Bass Strait islands are nesting sites for many seabird species, many of which migrate to these islands each year. Colonies of seabirds occur to the west of the project area in Corner Inlet and on the islands around Wilsons Promontory. Species that nest and breed on these islands include the little penguin (*Eudyptula minor*), short-tailed shearwater (*Puffinus tenuirostris*), fairy prion (*Pachyptila turtur*), common diving petrel (*Pelecanoides urinatrix*), black-faced cormorants (*Phalacrocorax fuscescens*) and the pacific gull (*Larus pacificus*).

The study area also provides foraging habitat for fourteen albatross, seven terns, seven plovers, three shearwaters, two gulls as well as the great skua (*Stercorarius skua*), osprey (*Pandion cristatus*), and white-bellied sea-eagle (*Haliaeetus leucogaster*).

A range of other taxa also are known to occur within Bass Strait and have the potential to be present within the study area including:

- Three marine turtles – the loggerhead turtle (*Caretta caretta*), green turtle (*Chelonia mydas*), and leatherback turtle (*Dermochelys coriacea*) – that occur as migrants along the eastern shores of Bass Strait.
- Great white shark (*Carcharodon carcharias*).
- Two Otariid seal species, the Australian fur seal (*Arctocephalus pusillus doriferus*) and the New Zealand fur seal (*A. forsteri*) have breeding colonies in Bass Strait. Both species are listed under the EPBC Act and the leopard seal (*Hydrurga leptonyx*) is also known to visit the area occasionally.
- Eleven cetacean species have distributions that overlap with the study area with the southern right whale (*Eubalaena australis*), humpback whale (*Megaptera novaeangliae*), bottle-nosed dolphin (*Tursiops truncatus* s. str.) and common dolphin (*Delphinus delphis*) most commonly recorded.

Bass Strait contains key macroalgal habitat that supports a number of species of pipefishes (21), seahorses (3) and seadragons (2) that are listed under the EPBC Act. Generally, the pipefishes, and seadragons are associated with this vegetation in sheltered to moderately exposed reef

areas at a range of depths from 0 to 50 m, depending on the species (Edgar, 1997), but usually at depths of between 5 and 25 m.

The aforementioned species all have some level of conservation significance or listing.

If known, what threatening processes affecting these species or communities may be exacerbated by the project? (e.g., loss or fragmentation of habitats) Please describe briefly.

As noted in Section 8, the key environmental sensitivities in proximity to the project area are subtidal and intertidal sand and mud flats, and, in particular, seagrass beds that provide both feeding and high-tide roost sites to a diversity of resident and migratory bird species; the latter including 26 species of palaearctic migratory shorebirds. Seagrass beds, estuarine mudflats and mangroves are amongst the most vulnerable habitat types in Victoria as they require sheltered environments that are at increased risk from sediments, nutrients and contaminants transported by stormwater. Effects to these habitats may in turn impact migratory and threatened species that depend on these habitats for food and shelter.

The project has the potential to exacerbate a number of processes, including:

- Physical disturbance of seabed habitat resulting from:
    - direct physical disturbance due to dredging, dredged material placement and sheet piling, with consequential impacts on benthic fauna and infauna.
    - disturbance from lateral sedimentation from the dredge sites and settlement of dispersed turbidity plumes.
- Reduced water quality resulting from:
    - construction-derived turbidity plumes from seabed disturbance, with increases in total suspended solids and turbidity. This could result in reduced light penetration and water clarity through the water column with consequential impacts on photosynthetic processes and fauna within the water column.
    - release of particulate and dissolved chemicals, such as metals/metalloids, nutrients and organic compounds, from disturbed contaminated seabed sediments or seabed acid sulfate soils
- Changes to existing hydrodynamic patterns from deepening the Barry Beach Channel, swing basin, berth pockets and Corner Inlet entrance channel.
- Increased risk of introducing invasive species into the area through domestic and international vessel movements.
- Disturbance to marine fauna from construction activity noise including sheet piling and dredging.

The magnitude of these changes is unlikely to have a significant impact on native vegetation and fauna and flora species. Nonetheless a range of technical studies are planned to investigate these processes in detail to inform environmental impact assessment.

Are any threatened or migratory species, other species of conservation significance or listed communities potentially affected by the project?

☒ NYD ☒ No ☒ Yes If yes, please:

- List these species/communities:
- Indicate which species or communities could be subject to a major or extensive impact (including the loss of a genetically important population of a species listed or

nominated for listing) Comment on likelihood of effects and associated uncertainties, if practicable.

Impacts on threatened or migratory species of conservation significance may be caused by a variety of direct or indirect mechanisms, which can be grouped into three broad categories:

- Injury, death or displacement of individuals due to physical disturbance (e.g., vegetation clearing and dredging), collision with vehicles and vessels, and predation by exotic species or infection by introduced diseases.
- Changes to available habitat (including food sources, shelter and nesting or roosting sites) due to habitat loss and degradation.
- Increased disturbance, through project-related noise, disrupting the behaviour of fauna and potentially reducing reproductive success

Species or communities with restricted habitat and feeding requirements, small home ranges or limited mobility are most affected by localised disturbances. In this respect, most threatened species that have the potential to occur within the project area are mobile, widely distributed and are unlikely to be restricted to certain areas.

As presented above there are a range of threatened or migratory species of conservation significance that are either known to occur or have the potential to occur within 5 km of the project area.

Due to the limited area of available terrestrial habitat in the project area; considering its partially degraded, fragmented and isolated condition; the project area was assessed to be unlikely to support the primarily terrestrial-based threatened species. As such, it is unlikely that the project will affect the terrestrial threatened species that have the potential to occur, which consisted eight mammals, five birds and three reptiles.

It is possible that one or more migratory birds that nest, roost and forage in the terrestrial environment migrate over the marine environment. Of these the most significant are the orange-bellied parrot and swift parrot, which are both nationally threatened species (both listed as critically endangered under the EPBC act). During their stay in Victoria, orange-bellied parrots forage in coastal saltmarsh and adjacent weedy pastures, while swift parrots favour winter flowering eucalypts such as swamp mahogany (*Eucalyptus robusta*), spotted gum (*Corymbia maculate*), red bloodwood (*C. gummifera*), forest red gum (*E. tereticornis*). As the areas proposed to be disturbed by the project are not favoured foraging habitats for orange-bellied parrot or swift parrot, impacts due to loss of foraging habitat are not predicted. While the presence of this group of migratory species cannot be excluded, they are predicted to be unaffected by the project.

A number of threatened shorebird species either nest or forage on sandy beaches (or other coastal habitats such as rocky shores) within 5 km of the project. These include species such as red-capped plover, hooded plover, greater sand plover, Caspian tern and crested tern. These habitats are not predicted to be impacted by the project. During construction, there is the potential for some temporary disturbance of this group of fauna due to noise; however, these are predicted to be negligible in the context of the operating BBMT.

Corner Inlet is recognised as a key foraging habitat for wader bird species that feed on tidal and intertidal mudflats, sand flats and seagrass areas. This group of birds includes those that are resident (many of which are of conservation significance) and palaearctic (which are also of conservation significance) migratory species. Generally, the key threat to these species is loss or degradation of intertidal ecosystems either in Australia or at stopovers along international

migratory pathways. Many species' declines have also been linked to interactions with fisheries, loss or disturbance of nesting habitat, and pollution.

There are also a number of threatened fish species whose distributions overlap with the project area and have the potential to spend at least part of their life cycle in Corner Inlet and Nooramunga estuary systems. These include the Australian grayling and the dwarf galaxias; however, neither species has been recorded in the area to date and the project area is highly unlikely to support populations of these species. As such, impacts to these species are not predicted.

As discussed in Section 11, the project is predicted to directly impact 30 ha of shallow and intertidal habitat. These losses are predicted to represent an insignificant loss of the total potential habitat in the area. The generation of a turbidity plume and subsequent sedimentation has the potential to affect areas adjacent to dredge sites. The biological impacts of turbid sediment plumes include reduced light for photosynthesis by plants, clogging of biological structures and membranes and reduced visibility for animals. The degree to which impacts could affect higher trophic orders (e.g., wader birds) depends largely on the turbidity levels, the duration of the turbidity plume and its spatial extent. Based on experience from previous maintenance dredging, the dredge plume is predicted to be largely confined to the eastern side of the Barry Beach Channel, which has been mapped as sandy/silt seafloor habitat. As such disturbance of foraging habitats or food resources as a result of dredging is considered to be minimal and unlikely to affect populations the waders and threatened fish. During construction there is also the potential for some temporary disturbance of this group of fauna (e.g., from construction noise, vessel movements etc); however, these are predicted to be negligible in the context of the operating BBMT.

As dredging is proposed beyond the Corner Inlet entrance, a range of threatened and migratory marine species have the potential to occur in the project area. These include marine seabirds (e.g., albatross, terns, shearwaters and gulls), marine turtles, fur seals, dolphins and whales. All of these species are widely distributed and are unlikely to be affected, other than some temporary disturbance at the proposed dredging site beyond the Corner Inlet entrance and the proposed dredged material placement area.

Collision with construction vessels for fauna is a possibility, but the likelihood of such an occurrence is considered to be low based on experiences of operation of the BBMT and periodic maintenance dredging.

Disturbance to fauna may occur as a result of construction noise such as sheet piling and dredging. While this is a known impact, the effect will be temporary and would be experienced in the form of startle response and altered behaviour (i.e., avoiding the construction area) rather than damage to the animals.

Use of the port has the potential to introduce marine pests and invasive species from elsewhere if quarantine measures such as ballast water exchange and hull biofouling are not adequately implemented. Introduced marine pest species can cause impacts to ecosystems through competition with existing native species for resources, alteration of localised gene pools and modification of physical environments, resulting in a loss of diversity. Most marine and estuarine introductions occur when organisms are transported in the ballast water of ships. The greatest risk of introducing invasive species would be movement of vessels into Corner Inlet directly from foreign ports.

Significant impacts due to introduced invasive pest marine species are unlikely with the implementation of standard quarantine management measures.

Is mitigation of potential effects on indigenous flora and fauna proposed?

☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

Mitigation and management of impacts to indigenous flora and fauna will include:

- Avoiding areas of high-quality terrestrial habitat.
- Scheduling of dredging and construction activities where practical to times of favourable tides and to avoid coinciding with sensitive life cycle stages of fauna.
- Implementing vessel quarantine and pollution management measures

Other information/comments? (eg. accuracy of information)

There has been significant scientific investigation of Corner Inlet over the last 50 years and therefore there is a sound understanding of the existing environment.

13. Water environments

Will the project require significant volumes of fresh water (eg. > 1 Gl/yr)?

☒ NYD ☒ No ☒ Yes If yes, indicate approximate volume and likely source.

Will the project discharge waste water or runoff to water environments?

☒ NYD ☒ No ☒ Yes If yes, specify types of discharges and which environments.

All site stormwater from hardstand under the BBMT lease that drains to Corner Inlet now drains through three interceptors. Routine stormwater monitoring consists of monitoring drainage locations during first flush from a rain event for contaminants that may be carried in the stormwater system from on-site activities

The water from bunds (diesel/glycol) is removed and treated as wastewater by a licensed contractor.

Are any waterways, wetlands, estuaries or marine environments likely to be affected?

☒ NYD ☒ No ☒ Yes If yes, specify which water environments, answer the following questions and attach any relevant details.

The project will involve landside redevelopment of the existing BBMT. The project will involve a range of decommissioning and construction activities, including construction of warehouses and a new wharf. The project will also deepen the existing pocket berths, deepen and widen the swing basin and Barry Beach Channel and deepen the Corner Inlet Entrance by dredging. As such, the project will directly disturb the marine environment within Corner Inlet with potential indirect effects that could extend beyond the immediate disturbance. For example, seabed disturbance could cause increased suspended sediments and construction activities and dredging could cause marine noise. As a consequence, the project will directly disturb the marine environment within Corner Inlet with potential indirect effects that could extend beyond the immediate disturbance for example causing increased suspended sediment concentrations and marine noise around dredging areas. Dredged material will be placed onshore and offshore in Corner Inlet and/or Bass Strait adjacent to Corner Inlet entrance. A range of potential effects relating to these activities area described in Section 11.

Marine habitats that will be directly affected by dredging and disposal of dredge material consist of sandy bottom marine habitats. While not likely to be directly disturbed, areas adjacent to proposed dredging areas have the potential to be affected. These include shallower areas of eelgrass (*Zostera* / *Heterozostera*), broad leaf seagrass (*Posidonia australis*), areas covered with sessile ascidians or sea squirts (marine invertebrate filter feeders) and intertidal sand or mud flats comprising alluvial deposits of sand and mud that accumulate on intertidal flats.

Are any of these water environments likely to support threatened or migratory species?

☒ NYD ☒ No ☒ Yes If yes, specify which water environments.

As described in Section 12, the broader Corner Inlet environment consists of a large submerged plain covered by subtidal and intertidal sand and mud flats, which are intersected by a network of radiating channels providing a diversity of marine, estuarine and freshwater wetland habitats, which are known to provide foraging habitat to a range palaearctic migratory shorebirds. These species include: the great knot, bar-tailed godwit, black-tailed godwit, common greenshank, common sandpiper, curlew sandpiper, double-banded plover, eastern curlew, grey-tailed tattler, Latham's snipe, lesser sand plover, little curlew, pectoral sandpiper, pin-tailed snipe, red knot,

red-necked stint, ruddy turnstone, ruff (Reeve), marsh sandpiper, sharp-tailed sandpiper, sanderling, Swinhoe's snipe, terek sandpiper, wood sandpiper, and whimbrel. These species have various protections under Victorian, Commonwealth and international agreements (e.g., JAMBA, CAMBA etc).

There are also a range of resident waterbird species conservation significance or listing under Victorian or Commonwealth legislation that use these marine habitats within Corner Inlet. These include: Australasian bittern, painted snipe, royal spoonbill, sooty oystercatcher, great egret, cattle egret, musk duck, Australasian shoveler, black-winged stilt, red-capped plover, and red-necked avocet.

The Australian grayling (*Prototroctes maraena),* listed on the EPBC Act, has been recorded in the freshwater streams (Franklin, Agnes, Albert and Tarra Rivers) that feed directly into Corner Inlet, and the species is almost certain to be present within the waters of Corner Inlet (BMT WBM, 2011) for at least part of its life cycle.

Since the project proposes to place dredged (non-contaminated) material in Corner Inlet and/or in Bass Strait outside of the Corner Inlet entrance, there are a range of additional marine species that have the potential to occur in these waters. These include a range of marine species including numerous albatross, terns, shearwaters, gulls, turtles, fur seals, dolphins and whales. These are described in Section 12.

Are any potentially affected wetlands listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia'?

☒ NYD ☒ No ☒ Yes If yes, please specify.

Components of the project will occur within and adjacent to Corner Inlet, which is a listed wetland of International Importance listed under the Ramsar Convention and protected under the EPBC Act.

Ecological character is the combination of the ecosystem components, processes and benefits/services that characterise the wetland at the time of designation as a Ramsar site. The Corner Inlet Ecological Character Description identifies the critical components, processes, benefits and services.

Corner Inlet meets six of the nine criteria for designation as a Ramsar site, as reviewed in the Corner Inlet Ramsar site Ecological Character Description by BMT WBM (2011). These criteria are considered below in relation to potential impacts of the project on the values described by these criteria.

Criterion 1: Representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region

Corner Inlet is a substantially unmodified site that is considered to represent an example of a near-natural wetland. Activities occurring within Corner Inlet and the surrounding catchment (port activity, catchment runoff, wastewater discharge and tourism) have potential to impact the condition of the inlet and do affect isolated areas of the site. However, these activities are small in scale, scope and area compared to the size of the inlet and do not prevent the inlet as a whole from continuing to function in an almost natural way (BMT WBM 2011).

The site has a complex range of estuarine habitats that are representative of those in the marine bioregion. Corner Inlet is considered a very good example of a wetland enclosed by barrier

islands, and represents the second largest back barrier system in the bioregion (NLWRA 2001). Corner Inlet also contains the most extensive intertidal flats and tidal sand banks in the bioregion. It also supports among the largest areas of seagrass beds in the IMCRA bioregion.

The project is unlikely to affect Corner Inlet's ability to meet Criterion 1 (i.e., natural or near-natural wetland). Based on the following:

- Effects are predicted to be localised and largely temporary focussed on deepening and widening existing shipping channels, the swing basin and berth pockets.
- The project will not involve any removal of mangroves or saltmarsh, have minor impacts on fragmented seagrass beds and result in minimal loss of intertidal flats.

Criterion 2: Supports vulnerable, endangered, or critically endangered species or threatened ecological communities

A number of nationally (EPBC Act) and/or globally (IUCN) endangered and vulnerable species have previously been recorded within Corner Inlet. These include:

- Subtropical and Temperate Coastal Saltmarsh – vulnerable ecological community.
- Bar-tailed godwit (*Limosa lapponica baueri*) - Vulnerable.
- Curlew sandpiper (*Calidris ferruginea*) – Critically endangered.
- Eastern curlew (*Numenius madagascariensis*) – Critically endangered.
- Great knot (*Calidris tenuirostris*) – Critically endangered.
- Greater sand plover (*Charadrius leschenaultii*) – Vulnerable.
- Hooded plover (*Thinornis rubricollis rubricollis*) – Vulnerable.
- Lesser sand plover (*Charadrius mongolus*) – Endangered.
- Red knot (*Calidris canutus*) – Endangered.
- Australian grayling (*Prototroctes maraena*) – Vulnerable.

Several other threatened species could potentially also occur within the site (primarily marine pelagic seabirds and non-wetland dependent species) based on species geographic distribution mapping.

The presence of threatened flora and fauna within the vicinity of the project along with potential effects on these populations as a result of the project is described in Section 11. The project is unlikely to affect Corner Inlet's ability to meet Criterion 2 (i.e., supporting vulnerable, endangered, or critically endangered species). Based on the following:

- There are unlikely to be material impacts to the terrestrial environment, which is already an operating port.
- The project is unlikely to directly impact vulnerable, endangered, or critically endangered species (e.g., injury or death), with affects likely to be limited to temporary disturbance (e.g., noise).
- Direct effects are predicted to be localised and largely temporary focussed on deepening and widening existing shipping channels, the swing basin and berth pockets.
- Given the existing port use, the scale of the proposed impacts associated with the project and the known information regarding use of the area by marine birds significant impacts to threatened and migratory marine birds are unlikely.
- The swift parrot, orange-bellied parrot, and growling grass frog are unlikely to occur in the project area.

Criterion 4: Supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions

The site provides breeding habitat for a variety of waterbirds, including several species listed as threatened and/or occurring in significant numbers. Over 35 waterbirds listed under international migratory agreements have been recorded within the Ramsar site (Hale 2017). This number includes species that, in Australia, are residents (e.g., eastern great egret) and vagrant seabirds for which the site does not provide significant habitat (e.g., albatross species). The extensive mudflats and intertidal marshes provide both feeding and high tide roost sites for palaearctic migratory shorebirds (26 species have been recorded, 16 of which are regularly supported by the Corner Inlet Ramsar site)(Hale 2017).

At least 20 species of wetland dependent bird species have also been recorded breeding within the site including: Australian pied oystercatcher (*Haematopus longirostris*), Australian fairy tern (*Sternula nereis nereis*), Caspian tern (*Hydroprogne caspia*), crested tern (*Thalasseus bergii*) and hooded plover (*Thinornis rubricollis*)(Hale 2017).

The project is unlikely to affect Corner Inlet's ability to meet Criterion 4 (i.e., supporting critical life history stage or refuge for plant and animal species). Based on the following:

- The project is not predicted to impact areas of seagrass, mangroves and coastal saltmarsh that provide critical foraging habitat for a wide range of species.
- The project footprint does not contain any identified roosting sites or primary foraging areas for waterbirds
- Construction works will be designed to limit disturbance to waterbirds.

Criterion 5: Regularly supports 20 000 or more waterbirds

Corner Inlet supports in excess of 40,000 shorebirds at times and counts of in excess of 20,000 shorebirds have been recorded every year since 1981 (excluding 2015).

The project is unlikely to affect Corner Inlet's ability to meet Criterion 5 (i.e., regularly supporting 20,000 or more waterbirds). Based on the following:

- The project is unlikely to directly impact water birds (e.g., injury or death), with effects likely to be limited to temporary disturbance (e.g., noise).
- The project is not predicted to impact areas of seagrass, mangroves and coastal saltmarsh that provide habitat that supports the highest values for these species
- Construction works will be designed to limit disturbance to waterbirds.
- The project will involve minimal direct physical disturbance of intertidal flats the key foraging habitat for waterbirds and in the context of similar available habitats in Corner Inlet these impacts represent a very small proportion (i.e., <0.04%) of the mapped seagrass area within the Corner Inlet embayment of the Ramsar wetland).

Criterion 6: Supports one per cent of the individuals in a population of one species or subspecies of waterbird

Corner Inlet supports eight species that regularly have at least 1% of the individuals in a population of one species (Hale, 2017). These include: the Australian fairy tern, Australian pied

oystercatcher, bar-tailed godwit, chestnut teal, curlew sandpiper, eastern curlew, red-necked stint, red knot and sooty oyster catcher.

The project is unlikely to affect Corner Inlet's ability to meet Criterion 6 (i.e., supports one per cent of the individuals in a population). Based on the following:

- The project is unlikely to directly impact water birds (e.g., injury or death), with effects likely to be limited to temporary disturbance (e.g., noise).
- The project is not predicted to impact areas of seagrass, mangroves and coastal saltmarsh that provide habitat that supports highest values for these species.
- Disturbance of foraging habitats or food resources as a result of dredging is considered to be minimal in the context of similar available habitats in Corner Inlet and unlikely to affect any of these populations.
- Construction works will be designed to limit disturbance to waterbirds (e.g., from construction noise, vessel movements etc).

Criterion 8: important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend

Corner Inlet provides important habitats, feeding areas, dispersal and migratory pathways, and spawning sites for numerous fish species of direct and indirect fisheries significance. These fish have important fisheries resource values both within and external to the site.

The site supports numerous species of direct fisheries importance including King George whiting (*Sillaginodes punctatus*), blueweed whiting (*Haletta semifasciata*), Australian salmon (*Arripis* spp.), greenback flounder (*Rhombosolea tapirina*), southern garfish (*Hyporhamphus melanochir*), yelloweye mullet (*Aldrichetta forsteri*), silver trevally (*Pseudocaranx dentex*), black bream (*Acanthopagrus butcheri*), sand flathead (*Platycephalus bassensis*), dusky flathead (*Platycephalus fuscus*), rock flathead (*Leviprora laevigatus*), leatherjackets (several species), snook (*Sphyraena novaehollandiae*), short-finned eel (*Anguilla australis*) and gummy shark (*Mustelus antarcticus*). Notable shellfish species include calamari and arrow squid.

All of the above species are either estuarine residents or depend on estuaries in some way during their life cycle. Many of the fish and crustacean species listed above spend their juvenile stages in shallow nearshore waters of the site, particularly around seagrass and intertidal habitats. These species also spawn in inshore waters, particularly near the surf zone and in sandy channels within the boundaries of Corner Inlet. The threatened Australian grayling (*Prototroctes maraena*), which has a marine juvenile life-history stage, would also use the site to complete its life-cycle.

The project is unlikely to affect Corner Inlet's ability to meet Criterion 8 (i.e., providing an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks). Based on the following:

- Disturbance of foraging habitats or food resources as a result of dredging is considered to be minimal in the context of similar available habitats in Corner Inlet and unlikely to affect any of these populations.
- Construction works will be designed to limit the extent of turbidity and subsequent sediment deposition caused by dredging (e.g., from construction noise, vessel movements etc).

- The inlet experiences pulses of elevated suspended sediment concentrations for example during storms and high rainfall events. Resident species have adapted to these natural fluctuations.
- The project is not predicted to impact areas of seagrass, mangroves and coastal saltmarsh that provide habitat that supports highest values for these species

Could the project affect streamflows?

☐ NYD ☒ No ☐ Yes If yes, briefly describe implications for streamflows.

There are no surface water features within the project area.

Could regional groundwater resources be affected by the project?

☐ NYD ☒ No ☐ Yes If yes, describe in what way.

Could environmental values (beneficial uses) of water environments be affected?

☐ NYD ☐ No ☒ Yes If yes, identify waterways/water bodies and beneficial uses (as recognised by State Environment Protection Policies)

Corner Inlet supports eight environmental values (beneficial uses) as identified in State Environment Protection Policy - SEPP (Waters), Schedule 2.
The beneficial uses for Corner Inlet, as prescribed in the SEPP are described below.

Water dependent ecosystems and species that are slightly to moderately modified
The Victorian SEPP (Waters) outlines environmental quality indicators and objectives for Corner Inlet. This includes target concentrations for nutrients (nitrogen and phosphorus), dissolved oxygen, chlorophyll, TSS, salinity and turbidity and pH. In addition to these key target concentrations, the SEPP outlines additional environmental quality objectives to manage nutrient and sediment loads in Corner Inlet, with an aim to reduce such loads annually until the year 2033 with the goal to meet prescribed targets at that time. These additional objectives are largely related to the management of potential effects to seagrass. The key objective pertains to maintaining nutrient and sediment levels at levels that support the maintenance or improvement of the existing cover, extent and condition of seagrasses within the bounds of natural variation. Also, the objectives include managing nutrient inputs into Corner Inlet so that increases in the frequency, duration or spatial extent of harmful algal blooms are avoided.

The project may affect water dependent ecosystems that are slightly to moderately modified within proximity to the port, dredge area and dredged material placement area/s due to temporary increases in suspended sediments and turbidity. Disturbance of seabed sediments also has the potential to release particulate and dissolved contaminants (e.g., heavy metals and organics and nutrients) into the water column, with consequential toxicity effects on marine fauna.

Management measures will be employed during construction to limit the extent of turbidity and subsequent sediment deposition caused by dredging. As a consequence, construction impacts are predicted to be temporary. Detailed sampling is planned to investigate the presence and extent of any existing contamination around BBMT. If contaminants are recorded dredged material may be disposed of in special enclosed facilities on land, or it may be disposed of in containment facilities by burial in the seabed or by covering it on the seabed. Of these methods onshore disposal is proposed for the project.

Human consumption of aquatic food

The Corner Inlet fishery started around 1840 and is Victoria's largest bay and inlet fishery, providing fresh seafood annually, most of which is transported to markets in Melbourne. Key species targeted include King George whiting, garfish, flathead, Australian salmon, silver trevally and southern calamari. Methods comprise seine and mesh netting. The inlet system is highly tidal with deep channels and large shallow banks that allow the growth of seagrass, which provides important habitat for the many fish species that occur. The area is a multi-use marine park with fisheries activity managed through measures including limited numbers of licenses, gear type, area closures, limited days of fishing, legal size limits and enforced reporting requirements.

Dredging for port access at Barry Beach may result in some interruption to the Corner Inlet fishery and placement of dredged material may introduce suspended sediments and contaminants into their fishing grounds.

The Corner Inlet fishery will be consulted in relation to potential impacts, and a range of investigations are proposed to inform this consultation. In particular, the project will consult with the fishery to determine the location of the dredged material placement area in relation to the key fish habitat and fishing areas. There will likely need to be a temporary exclusion zone in place around dredging vessels to ensure there are no collisions with fishing vessels. As such, there is the potential for some interruption to fishing practices.

The above issues and impacts will also need to be addressed for recreational anglers who fish Corner Inlet channels.

Industrial and commercial

BBMT is zoned for industrial use and landside redevelopment of the port will be accommodated within the current footprint. Construction of the project will facilitate port access for larger deeper draught vessels and provide increased opportunities for import and export directly to the Gippsland region. Redevelopment of the port will facilitate new industrial and commercial uses of the port including logistics support for proposed and potential clean energy projects.

Also refer to the information above related to potential fishery issues, which not only pertains to the beneficial use of aquatic food consumption but also industrial/commercial use.

Water suitable for primary contact recreation and secondary contact recreation

The Corner Inlet Marine National Park is used for boating with a number of tour operators offering tours in the area. Canoeing, kayaking and swimming are all activities undertaken in the park. Boat-based recreational fishing is undertaken in the inlet, with anglers targeting King George whiting, flathead, silver trevally, gummy shark, Australian salmon and southern calamari.

As outlined in the sections above, significant impacts to water quality are not predicted, as the increases in turbidity and suspended solids will be transient and temporary, before dispersing to low levels with prevailing currents. Temporary interruption of recreational vessel movements may occur during construction and dredging.

Water suitable for aesthetic enjoyment

Corner Inlet is a large sheltered inlet with the waters being enjoyed for the recreational activities outlined above. The SEPP (Waters) prescribes short term aesthetic indicators and objectives for water-based recreation as waters being free from visible materials that may form objectionable deposits; floating debris, oil, scum and other matter; substances producing objectionable colour, odour, taste or turbidity; and substances and conditions that produce undesirable aquatic life.

The key potential effects to aesthetic properties of the water will be due to temporary turbidity plumes during sheet piling and dredging. However, as these effects will be temporary and confined to around the existing port and channels (where aesthetic enjoyment is currently largely not experienced), impacts to aesthetic beneficial uses are expected to be negligible. Sewage discharge from vessels will be conducted in port at approved facilities, and as such will not impact on aesthetic value of the water.

Traditional Owner cultural values
Corner Inlet has significant cultural value to the Traditional Land Owners, the Gunaikurnai, Bunurong and Boon Wurrung peoples. Qube will consult with relevant Traditional Owner interests in the project to ensure that impacts to those interests are avoided and/or managed. Impacts to Traditional Owner cultural values are not expected; however, this will be further assessed as part of future environmental assessment and approvals.

Cultural and spiritual values
As mentioned above, Corner Inlet area has significant cultural value to the Traditional Land Owners, the Gunaikurnai, Bunurong and Boon Wurrung peoples.

Cultural heritage surveys will be undertaken to support future environmental assessment and approvals (see Section 20) where previously undisturbed land is developed. The cultural heritage assessment will determine whether the project requires a Cultural Heritage Management Plan to be developed.

While the likelihood is very low, it is possible redevelopment of the port and associated dredging will uncover or disturb features or sites of maritime archaeological or heritage value. BBMT is not a historic port. It was developed in the 1960s at a greenfield site. Construction of the port did not impact known shipwrecks or other heritage features. Proposed dredging at Barry Beach and the Corner Inlet entrance does not impact known shipwreck sites. It is possible that unrecorded shipwrecks or maritime archaeological material could occur in Corner Inlet and near the entrance.

Until geophysical surveys are undertaken and the data is reviewed by a qualified marine archaeologist, it will not be known whether there are maritime archaeological sites within the port development area and whether they might be impacted. Should seabed anomalies be identified that may be wrecks or other culturally significant features then they can be further inspected by diving or deploying an underwater camera. After assessing the significance of any such feature, specific management measures will be developed according to its significance

Navigation and shipping
The project will positively influence navigation and shipping within Corner Inlet by increasing the depth and width of the Barry Beach Channel, swing basin and berth pockets. It will also create an access channel through the existing sand bar beyond the Corner Inlet entrance further improving shipping access to Corner Inlet.

Dredging, wharf reconstruction and landside construction activities will be scheduled to avoid disruption of Gippsland Basin Joint Venture's Bass Strait oil and gas operations. Given the port upgrade area and dredging locations are away from main east coast shipping lanes, interruptions to navigation and commercial shipping are not expected.

Could aquatic, estuarine or marine ecosystems be affected by the project?

☒ NYD ☒ No ☒ Yes If yes, describe in what way.

As discussed in Section 11, an area of aquatic, estuarine or marine ecosystems could be affected by the project; however, the effects are predicted to be localised and temporary in duration and of low severity given the existing port uses in the area. Consequently, impacts are unlikely to be significant within the context of the surrounding environment.

The key potential impact pathways and marine ecosystem effects associated with the project are:

- Direct disturbance of the seabed due to dredging and disposal of dredged material.
- Increased temporary turbidity and sedimentation in areas adjacent to the dredge sites and dredged material placement site.
- Potential toxicity effects of mobilised contaminants from sediments (this will require sampling and assessment to better understand this risk)
- Generation of underwater marine noise
- Increased frequency of vessel movements and the potential for collision with fauna, as well as potential introduction of invasive marine pest species.

While not predicted to cause significant environmental effects, investigating the potential changes to hydrodynamic patterns of Corner Inlet, due to dredging, has been identified as a key issue requiring further investigation.

Is there a potential for extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems over the long-term?

☒ No ☐ Yes If yes, please describe. Comment on likelihood of effects and associated uncertainties, if practicable.

As outlined in Sections 11 and 13, the potential for impact has been evaluated in terms of intensity, geographic area and persistence and determined there is no potential for extensive or major effects on the health or biodiversity of aquatic or marine ecosystems for any of these criteria over the long-term.

Is mitigation of potential effects on water environments proposed?

☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

As described above, a range of technical investigations are proposed to both characterise the existing physical and biological environment, and to assess potential impacts of the project. These studies will inform the development of detailed mitigation and management measures.

Detailed mitigation measures will likely concentrate on the following aspects:

- Minimising potential exposures to contaminated land (e.g., by completing detailed sampling and analysis of seabed sediments and contaminated land assessment).
- Managing the handling and disposal of any contaminated material encountered to ensure environmental hazards are minimised.
- Scheduling dredging to minimise potential impacts to the environment and other commercial and recreational vessels, and fishing activities.
- Selecting appropriate dredging methods to limit the lateral extent of turbidity plumes and subsequent dispersion and sedimentation.
- Selecting dredged material placement areas that minimise potential environmental impacts.
- Limit the generation of noise on sensitive receptors.

• Minimise the risk of introducing and spreading invasive marine species.
Other information/comments? (eg. accuracy of information) Corner Inlet and its ecosystems have been extensively studied and reported. This referral has used that information to identify potential impacts. The severity of potential impacts has been informed by previous capital and maintenance dredging experience, the effects of which have been studied and reported in reviews of the ecological character and health of the inlet. The predicted significance of potential impacts will be confirmed through technical studies undertaken in support of future environmental assessment and approvals.

14. Landscape and soils

Landscape

Has a preliminary landscape assessment been prepared?

☒ No ☐ Yes If yes, please attach.

Is the project to be located either within or near an area that is:

- **Subject to a Landscape Significance Overlay or Environmental Significance Overlay?**

  ☐ NYD ☐ No ☒ Yes If yes, provide plan showing footprint relative to overlay.

The coastal areas surrounding Corner Inlet, including the onshore component of the project at BBMT, are subject to Environmental Significance Overlay Schedule 3 Coastal settlements (ESO3) (see Figure 7). Significant Landscape Overlay Schedule 3 Corner Inlet Amphitheatre (SLO3) covers land to the north and east of BBMT and Barry Road to BBMT access road (see Figure 7).

- **Identified as of regional or State significance in a reputable study of landscape values?**

  ☐ NYD ☐ No ☒ Yes If yes, please specify.

The Corner Inlet amphitheatre has been determined to have regional significance by a Coastal Spaces Landscape Assessment Study: South Gippsland Municipal Reference Document (Planisphere 2006). The area is visually significant as a collection of landscape features. Mount Hoddle and the Welshpool Hills provide an amphitheatre setting for Corner Inlet and Wilsons Promontory. The area is characterised by extensive views across the coastal plains to Wilsons Promontory and is valued by the community due to its migratory bird habitat values, plant life and historically significant relics of Aboriginal occupation (Planisphere 2006).

Coastal areas around the inlet are subject to a Significant Landscape Overlay Schedule 3 Corner Inlet Amphitheatre (SLO3). This overlay has been applied to protect the landscape values.

The onshore component of the project (i.e., BBMT) is located in an industrial zone, is not subject to the Significant Landscape Overlay and is outside coastal settlements.

- **Within or adjoining land reserved under the *National Parks Act 1975* ?**

  ☐ NYD ☐ No ☒ Yes If yes, please specify.

The project area is outside but adjacent to:

- Corner Inlet Marine & Coastal Park
- Corner Inlet Marine National Park
- Nooramunga Marine & Coastal Park
- Wilsons Promontory National Park
- Wilsons Promontory Marine Park

- **Within or adjoining other public land used for conservation or recreational purposes?**

  ☐ NYD ☐ No ☒ Yes If yes, please specify.

Port Franklin–Port Welshpool Coastal Reserve protects the Corner Inlet shoreline in vicinity of Barry Beach. The reserve covers part of BBMT. The Public Conservation and Resource Zone of the South Gippsland Planning Scheme covers part of the coastal reserve and BBMT. The reserve and zone cover approximately 1.6 ha of BBMT. This part of the reserve is a restricted port area and closed to the public.

Is any clearing vegetation or alteration of landforms likely to affect landscape values?

☒ NYD ☐ No ☐ Yes If yes, please briefly describe.

The Corner Inlet Marine National Park Management Plan (Parks Victoria 2005) suggests that the notable landscape and seascape values within the Corner Inlet Ramsar site include:

- a backdrop of granite and peaks within Wilsons Promontory National Park
- extensive intertidal flats exposed at low tide
- granite and benisons islands
- low marshy shorelines
- sandy beaches set between granite headlands
- change in seascape as the tide rises and falls.

The landside component of the project is located within an industrial setting. Limited clearing of vegetation is expected at BBMT. The significance of this vegetation loss to landscape values is considered to be negligible considering the magnitude (estimated to be up to 23 ha) and zoning of the port area for industrial activities.

Deepening and widening of the existing berth pockets, swing basin, and port access channels will not detract from landscape values or change terrestrial landforms. New buildings at BBMT will be consistent with existing infrastructure. Larger vessels using the port will change the appearance of the facility in the landscape. Special purpose vessels (for example, offshore clean energy project construction vessels) will be temporary users of the port.

Is there a potential for effects on landscape values of regional or State importance?

☒ NYD ☐ No ☐ Yes Please briefly explain response.

As mentioned above, the Corner Inlet amphitheatre has been determined to have regional landscape significance (Planisphere 2006). The regional significance classification is limited to the Coastal Landscapes Assessment study area, which considers coastal areas and not seascapes. The wetlands within Corner Inlet are not formally classified as regionally or State significant with regard to visual landscape values, however they do hold notable values.

Is mitigation of potential landscape effects proposed?

☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

Potential landscape effects include new buildings and infrastructure at Barry Beach and potentially additional or relocated navigation aids in the port access channels.

Building materials and colours sympathetic to the coastal setting will be used to reduce the impact of new buildings and infrastructure at Barry Beach.

Navigation aids along the port access channels will be consistent with existing installations and are not expected to significantly change night-time light spill.

Other information/comments? (eg. accuracy of information)

Not applicable.

Note: A preliminary landscape assessment is a specific requirement for a referral of a wind energy facility. This should provide a description of:

- The landscape character of the site and surrounding areas including landform, vegetation types and coverage, water features, any other notable features and current land use;
- The location of nearby dwellings, townships, recreation areas, major roads, above-ground utilities, tourist routes and walking tracks;
- Views to the site and to the proposed location of wind turbines from key vantage points (including views showing existing nearby dwellings and views from major roads, walking tracks and tourist routes) sufficient to give a sense of the overall site in its setting.

Soils

Is there a potential for effects on land stability, acid sulphate soils or highly erodible soils?

☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

As detailed in Section 8, Corner Inlet contains soil types classified as potentially acid forming , most notably tidal flats and recent marine sediments (CSIRO, 2005). The project area and surrounds have been mapped by the former Department of Primary Industries (DPI) and Department of Sustainability and Environment (DSE) as prospective areas for coastal acid sulfate soils (DPI, 2010). This is consistent with other Victorian coastal areas which are prone to acid sulfate soils found within 2.5 m of current sea level due to the sea level change (DPI, 2003). A Construction Environmental Management Plan will be developed and implemented and will include appropriate mitigation measures for acid sulphate soils. Management strategies that will be investigated include avoidance, minimisation of disturbance, neutralisation, hydraulic separation and strategic reburial, as recommended by the Queensland Acid Sulfate Soil Technical Manual – Soil Management Guidelines (Dear et al., 2014) and Victorian Coastal Acid Sulfate Soils Strategy (DSE, 2009).

The project area is not within an erosion management overlay and there is no evidence of highly erodible soils or land stability issues at BBMT.

Are there geotechnical hazards that may either affect the project or be affected by it?

☐ NYD ☒ No ☐ Yes If yes, please briefly describe.

There are no known geotechnical hazards within the project area or its surrounding which would affect the project or be affected by it.

Geotechnical investigations will be undertaken by technical specialists to support project design and siting. The strength, density and potential for settlement across the project area will be assessed as part of detailed design.

Other information/comments? (eg. accuracy of information)

Previous investigations at BBMT have identified contaminated sediments, particularly within the southern berth pockets. The contamination included tributylin, a banned anti-fouling paint applied to the hulls of ocean vessels. Contaminated sediment from maintenance dredging has been placed onshore.

A sampling and analysis program of seabed sediments to inform dredging and contaminated land assessment involving review of desktop information followed by targeted field sampling of areas proposed for excavation will be conducted by technical specialist to support project design and future environmental assessment and approvals.

15. Social environments

Is the project likely to generate significant volumes of road traffic, during construction or operation?

☐ NYD ☒ No ☐ Yes If yes, provide estimate of traffic volume(s) if practicable.

Significant volumes of road traffic are not expected during construction and operation of Gippsland Regional Port as:

- BBMT periodically provides logistics support to offshore exploration programs and offshore oil and gas platform major maintenance activities. These programs and activities increase heavy and light vehicle traffic to the site. Approximately 10 to 15 trucks per day support Gippsland Basin Joint Venture's business as usual operations, with a peak of around 30 trucks per day during major offshore drilling programs. Experience shows this increased traffic has not had a significant impact on local traffic or the road network. Construction activities are expected to generate similar traffic on the South Gippsland Highway and Barry Road.
- Qube's BBMT operation workforce and traffic will increase as new port users are identified. These increases are expected to be gradual over time as the port transitions from predominantly supporting offshore oil and gas operations to niche bulk and break-bulk cargo logistics.

Is there a potential for significant effects on the amenity of residents, due to emissions of dust or odours or changes in visual, noise or traffic conditions?

☐ NYD ☒ No ☐ Yes If yes, briefly describe the nature of the changes in amenity conditions and the possible areas affected.

No significant effects on the amenity of residents (during construction or operation) are expected due to emissions of dust or odours or changes in visual, noise or traffic conditions.

Six residences are located within 2 km of BBMT. The nearest residence is immediately adjacent to the northeastern corner of BBMT.

The project is located in an operational port where there is existing port infrastructure and maritime and industrial activities associated with BBMT. The industrial zoning of the site supports industrial development. The activities proposed by Qube are appropriate and contextual within their environment.

Dust

Construction activities at the BBMT such as vegetation clearance and excavations to enable construction of laydown areas, hardstands and warehouses, and vehicle movements on unsealed roads, may generate dust emissions. During operations dust emissions are expected to be negligible and limited to dust generated by operational traffic movements on unsealed roads. The magnitude of impact to the amenity of residents due to emissions of dust is unlikely to be significant.

An air quality, greenhouse gas and climate change assessment will be undertaken as part of the proposed work program for future environmental assessment and approvals in accordance with the State Environment Protection Policy (Air Quality Management) and EPA guidelines for the use of the regulatory model 'AERMOD' (see Section 20). This assessment will model potential project-related dust emissions and identify appropriate mitigation and management measures. Dust generating construction activities will be conducted under a Construction Environmental Management Plan which will contain control measures for dust emissions.

Odours
No odour emissions are expected during construction or operation of the project.

Visual
Residences surrounding BBMT do not have a view of the site due to a vegetation screen around the perimeter of the site. They will not have a view of construction or operation activities. Visual impact receptors will be limited to transient boats within Corner Inlet, including recreational fishers and other recreational users. Visual impacts will be minimal and are not expected to significantly affect the amenity of adjacent residents.

Noise
During the construction period, sheet piling to enable construction of a new wharf will generate temporary noise emissions. These emissions will be additional to noise generated by the normal operations of the port. Construction activities will be limited to construction working hours set out in relevant noise guidelines.

No change to the current operational noise levels is expected during the operations phase.

A noise assessment will be undertaken as part of the proposed work program for future environmental assessment and approvals (see Section 20). Noise criteria for construction and operation will be determined in accordance with EPA Noise Control Guidelines (Publication 1254) and Noise from Industry in Regional Victoria (NIRV) (Publication 1411). This assessment will model potential project-related noise emissions and identify appropriate mitigation and management measures. Work will be conducted under a Construction Environmental Management Plan which will contain control measures for noise emissions.

Traffic
As described above, traffic volumes associated with the construction workforce are within the context of the existing traffic conditions at BBMT. A traffic and transport assessment will be undertaken as part of the proposed work program for future environmental assessment and approvals (see Section 20). This assessment will model potential project-related traffic movements and identify appropriate mitigation and management measures Traffic management will be governed by a traffic management plan.

Is there a potential for exposure of a human community to health or safety hazards, due to emissions to air or water or noise or chemical hazards or associated transport?

☐ NYD ☒ No ☐ Yes If yes, briefly describe the hazards and possible implications.

Redevelopment of BBMT to create Gippsland Regional Port does not expose residents or communities to hazards not already associated with operation of the port.

Is there a potential for displacement of residences or severance of residential access to community resources due to the proposed development?

☐ NYD ☒ No ☐ Yes If yes, briefly describe potential effects.

Gippsland Regional Port is a redevelopment of BBMT. Except for dredging required to increase berth pocket depth, swing basin depth and width and access channel depth and width all activities are contained with the current site.

Are non-residential land use activities likely to be displaced as a result of the project?

☐ NYD ☐ No ☒ Yes If yes, briefly describe the likely effects.

The landside component of the project will not displace any land use activities.

The waterside component of the project, specifically deepening of the existing berth pockets, deepening and widening of the swing basin and deepening and widening of the access channels and placement of dredged material has the potential to temporarily displace commercial and recreational fishing activities inside Corner Inlet and Bass Strait near the Corner Inlet entrance.

Impacts to commercial and recreational fishers will be limited to temporary exclusions during periods of capital and maintenance dredging, and a small permanent exclusion within the Corner Inlet resulting from the extension of the existing swing basin (approximately 15 ha).

Corner Inlet fisheries

The Corner Inlet – Noormunga Fishery is a small-scale community-based fishery managed by the Victorian Fishery Authority in accordance with the Victorian *Fisheries Act 1995* and Fisheries Regulations 2009. It operates within a large (approximately 600 km^2) area. The fishery is controlled primarily by input (effort) and output controls including limited licenses (18 available), gear, bag and size limits and time and area closures. Recreational fishing is managed using bag, size and gear limits. The fishery primarily targets King George whiting (*Sillaginodes punctatus*), rock flathead (*Platycephalus laevigatus*), southern sea garfish (*Hyporhamphus melanochir*) and southern calamari (*Sepioteuthis australis*), which constitute approximately 60% of total catch (DoEE, 2017). The fishery is divided into five commercial fishing reporting areas. Project-related dredging will occur in zones 2 and 3 and may temporarily exclude potential fishing areas while dredging is occurring.

Bass Strait fisheries

The main commercial fisheries that operate in eastern Bass Strait include:

- Bass Strait scallop fishery.
- Southern and eastern scalefish and shark fishery.
- Southern squid jig fishery.
- Eastern skipjack (tuna) fishery.
- Small pelagic fisheries.
- Victorian abalone fishery.

Clean dredge spoil from the deepening of existing berth pockets, deepening and widening of the swing basin and access channels will be placed at sea. The location of the dredged material placement areas is subject to hydrodynamic modelling and site options analysis to completed as part of future environmental assessment and approvals (see Section 20). This will involve consultation with environment and fisheries organisations, local fishers, divers and other relevant organisations. It will also be supported by, surveys of marine biota at the placement areas. A preferred location is close to the inlet entrance in order to minimise transport time, effort and costs. An area within Victorian Waters to the east of Wilsons Promontory has been identified as a potential placement area (see Figure 4) and will be investigated further.

Dredged material placement will temporarily exclude fishing activities in and near those areas during dredging campaigns. These campaigns will occur during construction of the project and intermittently during operations for maintenance dredging. The extent and frequency of maintenance dredging required will be determined by hydrodynamic modelling and safe navigation assessments.

Do any expected changes in non-residential land use activities have a potential to cause adverse effects on local residents/communities, social groups or industries?

☐ NYD ☐ No ☒ Yes If yes, briefly describe the potential effects.

The onshore component of the project is situated on land owned by the joint venture between Esso Australia Resources Pty Ltd and BHP Billiton (Bass Strait) Ltd (collectively known as "GBJV"), in an industrial zone and is an existing operational port facility. The onshore operations will not change land use activities and will not cause adverse effects on local residents/communities, social groups or industries.

As described in the previous section, capital and maintenance dredging will likely result in temporary exclusions to potential fishing areas used by commercial and recreational fishers. The deepening and widening of the existing swing basin to accommodate larger deeper draught shipping vessels will result in a small permanent exclusion (approximately 20 ha). Given the small area and temporary nature of most of the exclusions, the magnitude of the effect on commercial and recreational fishers is expected to be minimal. A fisheries and marine resource use study and socioeconomic impact assessment will be undertaken as part of the proposed work program for future environmental assessment and approvals (see Section 20). These studies will investigate the potential effects on social and industry receptors, including local residents and communities, social groups and industries, such as commercial fishing, and identify appropriate mitigation and management measures.

Is mitigation of potential social effects proposed?

☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

Only minor social effects are expected, due to:

- The industrialised nature of the site.
- Lack of onshore visual receptors and transient nature of offshore visual receptors (e.g., fishing and recreational boats).
- Small area of fishing exclusions.
- Temporary nature of dredging effects.

Further studies to be completed during future environmental assessment and approvals, such as hydrodynamic modelling, fisheries and marine resource use and socioeconomic impact assessment will inform Qube's mitigation of social effects. Key measures will likely include:

- Ongoing community and stakeholder engagement (see Section 20).
- Employing local construction contractors and operational staff, where practicable.
- Construction environmental management plan with control measures related to workforce, vehicle movements, parking etc.

Other information/comments? (eg. accuracy of information)

Not applicable.

Cultural heritage

Have relevant Indigenous organisations been consulted on the occurrence of Aboriginal cultural heritage within the project area?

☒ No If no, list any organisations that it is proposed to consult.

☐ Yes If yes, list the organisations so far consulted.

The appointed Registered Aboriginal Party is the Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC). The Gunaikurnai's native title determination (VC2010/003) extends over Corner Inlet waters within which components of the project are located. Qube will engage with the Gunaikurnai people to understand their issues and concerns with the project during future environmental assessment and approvals (see Section 20).

What investigations of cultural heritage in the project area have been done?
(attach details of method and results of any surveys for the project & describe their accuracy)

No cultural heritage assessments have been completed to date. Investigations will be conducted as part of future environmental assessment and approvals (see Section 20) where undisturbed ground is to be developed.

There are no places within or in proximity to the project area on the Commonwealth Heritage List, the National Heritage List or the World Heritage List.

Is any Aboriginal cultural heritage known from the project area?

☒ NYD ☒ No ☒ Yes If yes, briefly describe:

- Any sites listed on the AAV Site Register
- Sites or areas of sensitivity recorded in recent surveys from the project site or nearby
- Sites or areas of sensitivity identified by representatives of Indigenous organisations

No Aboriginal cultural heritage sites or areas are known within the landside component of the project at the BBMT.

Corner Inlet area has significant cultural value to the Traditional Land Owners, the Gunaikurnai, Bunurong and Boon Wurrung people (WGCMA 2013). Numerous sites have been recorded in the Corner Inlet area including scarred trees, burial sites, artefact scatters, camps and shell middens (BMT WBM 2011).

Cultural heritage surveys will be undertaken to support future environmental assessment and approvals (see Section 20). The cultural heritage assessment will determine whether the project requires a Cultural Heritage Management Plan to be developed.

Are there any cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the *Heritage Act 1995* within the project area?

☒ NYD ☒ No ☒ Yes If yes, please list.

There are no cultural heritage places listed on the Victorian Heritage Register within the project area. The nearest heritage site to BBMT is the Port Welshpool Jetty, located approximately 6 km northeast.

While the likelihood is very low, it is possible redevelopment of the port and associated dredging will uncover or disturb features or sites of maritime archaeological or heritage value. BBMT is not a historic port. It was developed in the 1960s at a greenfield site. Construction of the port did not impact known shipwrecks or other heritage features. Proposed dredging at Barry Beach and the Corner Inlet entrance does not impact known shipwreck sites. It is possible that unrecorded shipwrecks or maritime archaeological material could occur in Corner Inlet and near the entrance.

Until geophysical surveys are undertaken and the data is reviewed by a qualified marine archaeologist, it will not be known whether there are maritime archaeological sites within the port development area and whether they might be impacted. Should seabed anomalies be identified that may be wrecks or other culturally significant features then they can be further inspected by diving or deploying an underwater camera. After assessing the significance of any such feature, specific management measures will be developed according to its significance.

Is mitigation of potential cultural heritage effects proposed?

☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

As detailed above, mitigation of potential cultural heritage effects will be determined through Aboriginal and maritime cultural heritage assessments of the project area and surrounds. Where possible, sites and areas of cultural heritage significance will be avoided and disturbance minimised.

Other information/comments? (eg. accuracy of information)

Not applicable.

16. Energy, wastes & greenhouse gas emissions

What are the main sources of energy that the project facility would consume/generate?

- ☒ Electricity network. If possible, estimate power requirement/output …….
- ☒ Natural gas network. If possible, estimate gas requirement/output ……...
- ☒ Generated on-site. If possible, estimate power capacity/output …….
- ☒ Other. Please describe.

Please add any relevant additional information.

Electricity and diesel used on the site are purchased from third parties. Usage is monitored by site administration staff and data is recorded, reported and analysed as required.

The project is not expected to require upgrade of existing electricity supply lines servicing BBMT. An upgrade of onsite bulk storage of diesel may be required to cater for increased vessel movements.

What are the main forms of waste that would be generated by the project facility?

- ☒ Wastewater. Describe briefly.
- ☒ Solid chemical wastes. Describe briefly.
- ☒ Excavated material. Describe briefly.
- ☒ Other. Describe briefly.

Please provide relevant further information, including proposed management of wastes.

As the site to be dredged is within the Victorian coastal area a *Marine and Coastal Act 2018* (Vic) consent is required. While the *Environment Protection (Sea Dumping) Act 1981* (Cwth) does not apply to Victorian waters, there remains a requirement for approval under the *Environmental Protection and Biodiversity Conservation Act 1999* (Cwth) for dredging and dumping activities that are likely to have a significant impact on a matter of national environment significance. As a result the Commonwealth National Assessment Guidelines for Dredging (DEWHA, 2009) will also be considered.

In accordance with these guidelines Qube will:

- Consider alternatives to ocean disposal and consult relevant stakeholders.
- Develop and implement a sampling and analysis plan and compare results to screening levels and/or background levels. Classification of dredge material may also require elutriate and bioavailability testing and toxicity and bioaccumulation testing depending on the preliminary findings.
- Develop and implement an environment improvement / management plan.

Consideration of alternatives and stakeholder consultation

Qube will evaluate alternatives to ocean disposal with consideration to the environmental, social and economic impacts of each disposal option. Dredged material has potential value for engineering uses (land reclamation, beach nourishment, offshore berms and capping material), agriculture and product uses (aquaculture, construction material, liners) and environmental enhancement (restoration and establishment of wetlands and nesting islands). The beneficial uses of the dredged material is highly dependent on its waste classification, consultation with potentially affected stakeholders or potential users, transport logistics and cost.

A waste prevention approach will be employed to minimise costs of dredging and associated environmental impacts.

Sampling and analysis plan
Existing data on the site history, previous dredging activities and sediments proposed to be dredged will be reviewed as part of the sampling and analysis plan (see Section 20). Field sampling and laboratory analysis will be conducted as part of this assessment to characterise the sediments and identify the contaminants of concern.

A sampling and analysis plan will be developed which includes:

- Areas to be dredged, depths of dredging, types of sediments and volume of dredged material.
- Location of dredge and dredged material placement areas, and proposed sampling locations, including the length of cores and depth intervals to be sub-sampled from cores.
- Contaminants to be analysed.

DELWP, EPA and DAWE will be consulted during development of the sampling and analysis plan, which will need to be approved by DAWE prior to sampling.

Assessment against sediment and water quality guidelines
The contamination status of dredged material will be determined by comparing contaminant concentrations to screening levels found within Table 2 of the National Assessment Guidelines for Dredging 2009 (DEWHA, 2009).

Selection of dredged material placement method

Ocean disposal
Placement of clean dredged material at sea is common international practice. Dredged material from the deepening of existing berth pockets, deepening and widening of the swing basin and deepening and widening of access channels that is determined suitable for unconfined ocean disposal will be transported to the dredged material placement area, likely located outside Corner Inlet, east of Wilsons Promontory within Bass Strait. In accordance with the National Assessment Guidelines for Dredging 2009 (DEWHA, 2009), a detailed options assessment will be completed that assesses:

- Benthic and other marine communities at the disposal site.
- Physical properties (e.g., currents, bathymetry).
- Maritime archaeology.
- Commercial and recreational fishers.
- Beneficial uses of the area.

This will involve consultation with environment and fisheries organisations, local fishers, divers and other relevant organisations. It will also be supported by, surveys of marine biota at the dredged material placement area and hydrodynamic modelling of the Cornet Inlet.

Land disposal
Placement of dredged material onshore is the preferred method where the material is contaminated, and when fine sediments are likely to impact sensitive marine environments such as seagrass habitats. In seagrass habitats, onshore placement using a cutter suction dredge is usually the preferred option when there is an area of suitable land nearby. For this method to occur a dewatering site must be available that:

- Is within approximately 1 km of the dredging area, or within 3 km if a booster station is used.
- Sited so that discharge of seawater back to the sea can occur.
- Has little land value in the existing state.

- Appropriately sized.
- Be able to be secured so that quicksand-like properties of fines present no safety risks.
- Be acceptable to remain in a degraded state for up to 12 months if an extended period for drying is required.
- Is able to be drained.
- Is accessible to large vehicles if it is planned to empty the site prior to the next dredging.
- Is acceptable to the relevant stakeholders.

The turbidity of water discharged from land should be monitored and should generally be less than 25 NTU with a maximum of 50 NTU. This can be achieved by increasing the settlement time or using sedimental controls such as silt screens.

It is anticipated that some material disturbed during construction activities (i.e., dredging and replacement of the wharf) will contain contaminants such as tributylin, a banned anti-fouling paint applied to the hulls of ocean vessels. If spoil is classified as significantly contaminated (i.e., above the maximum screening levels) it will be placed on land in confined cells. The cells will be sited within the existing BBMT.

Environmental management plan

An environmental management plan will be developed that details how dredging activities will be conducted to minimise environmental impacts. The plan will also include contingency plans for unintended events. The management plan will consider the following:

- Minimising effects on water quality.
- Minimising effects of contaminated sediments.
- Sensitive benthic and marine communities.
- Land disposal.
- Controlling noise emissions.
- Monitoring program.

BBMT waste management

At BBMT waste disposal is managed to minimise the risks of personal injury, illness or adverse environmental impact and to comply with the relevant regulatory requirements. Qube manages waste generated at the facility by:

- Promoting reduction in waste generation and reuse/recycle materials where possible.
- Not reusing, recycling, using as a source of energy, storing, transporting, treating or reprocessing waste in any way or form that may result in an unfavourable environmental impact.
- Using a fenced compound for a selection of general waste skips (mostly timber and cardboard).
- Not establishing any waste/refuse dump or other solid or liquid waste disposal on site.
- Ensuring that all regulated waste transported from the site is done so in a licensed vehicle by an appropriately licensed waste transporter and disposed at a suitably authorised facility.
- Ensuring prescribed waste certificates are issued for all transport off site and are held by the site Waste Coordinator.

All waste arriving at BBMT or generated on site (including spill response material) must first be identified, classified and appropriately labelled (if applicable). The waste is transferred to the appropriate storage/transit area for disposal or recycling and the Site Waste Coordinator advised. The tables below outline the types of waste collected at the site and how they are managed.

Stormwater

Stormwater catchment area	Stormwater management
• Glycol storage tanks bund • Glycol truck bay and sump • Corrosion inhibitor bund • Diesel storage tanks bund • Waste oil bund and interceptor pit • Methanol transport tank bund • NORM holding tank bunds	All site stormwater from hardstand under the BBMT lease that drains to Corner Inlet now drains through three interceptors. Routine stormwater monitoring consists of monitoring drainage locations during first flush from a rain event for contaminants that may be carried in the stormwater system from on-site activities The water from bunds (Diesel/Glycol) is removed and treated as waste water by a licensed contractor
• Mechanics wash bay and sump • Old pipe shed and sub floor sump pit • Dangerous good class 3, 6, 8 and 9 stores • Transit waste store	Stormwater managed as required by Area Operators or Duty Supervisor. A licensed contractor (vacuum truck) removes wastewater for disposal.

Non-prescribed waste

Type	Waste management and disposal
All other non-prescribed waste (e.g., paper, plastic, metal, glass, timber, rags (non-oily), small amounts of scrap rubber, air and water filters, kitchen waste, dry paint residues, non-contaminated cement dust, non-contaminated concrete, styrofoam)	To rubbish storage bin area to await disposal off site, or if recyclable to the relevant waste storage area as designated by Transport Officer / Site Waste Coordinator (see table below).

Recyclable waste

Type	Waste management and disposal
Sufficient quantities of: • Cement dust in quantity (non-contaminated) • Concrete (non-contaminated) • Scrap metals • Scrap wire rope • Scrap rubber (e.g., hoses) • Timber scrap • Thread protectors • Clean drums (triple rinsed)	Transferred to the relevant waste storage area designated by Transport Officer / Site Waste Coordinator.
Used oil filters	Prescribed waste and drained of excess oil prior to recycling. Labelled as prescribed waste and relevant EPA certificates completed upon disposal.
Batteries Fluorescent lights	Labelled as prescribed waste and relevant EPA certificates completed upon disposal.
Tyres	Treated as recyclable waste.

Prescribed waste

Type	Waste management and disposal
Prescribed waste (e.g., waste oil and empty oil drums, asbestos or synthetic mineral fibre, used drilling mud etc.)	Warehouse personnel monitor levels of waste being held in the hazardous goods storage warehouse and arrange for disposal with the authorised and EPA licensed contractor. When contractors pick up waste chemicals, the following documentation is completed: • MDA • EPA certificate Part A and B • Waste register
Sewage sludge	Removed by vacuum truck to licensed disposal facility.

Spills and leaks

Spills and leaks are managed in accordance with BBMT-070-202 (N) Spill Response which requires personnel to:

- Shutdown all sources of ignition.
- Clear area of all personnel.
- Isolate/contain spill to immediate area using absorbents, etc and drain blocks where applicable.
- Inform Duty Supervisor of incident immediately.
- Obtain details of chemicals from MSDS.
- Mop up.

All waste from the spill/leak is disposed at an appropriate site in the local area (i.e., not at a landfill site) which is licenced to receive controlled waste substances.

Dredged material water

Seawater from dewatering of contaminated dredged material will be treated if necessary before discharge to sea.

What level of greenhouse gas emissions is expected to result directly from operation of the project facility?

- ☒ Less than 50,000 tonnes of CO_2 equivalent per annum
- ☐ Between 50,000 and 100,000 tonnes of CO_2 equivalent per annum
- ☐ Between 100,000 and 200,000 tonnes of CO_2 equivalent per annum
- ☐ More than 200,000 tonnes of CO_2 equivalent per annum

Please add any relevant additional information, including any identified mitigation options.

17. Other environmental issues

Are there any other environmental issues arising from the proposed project?

☒ No ☐ Yes If yes, briefly describe.

18. Environmental management

What measures are currently proposed to avoid, minimise or manage the main potential adverse environmental effects? (if not already described above)

☒ Siting: Please describe briefly

The landside component of the project is in an area designated for industrial activities at an existing operational port facility. Where possible new buildings and structures such as warehouses, hardstands and the engineered cell for contaminated dredge material will be located in previously disturbed areas, with the aim of avoiding any patches of high-quality native vegetation. Redevelopment of this site will require only minimal clearing of vegetation.

Dredged material from the deepening of existing berth pockets, deepening and widening of the swing basin and deepening and widening of the access channels that is determined suitable for unconfined ocean disposal will be transported to the dredged material placement area/s, likely located outside of Corner Inlet within Bass Strait. In accordance with the National Assessment Guidelines for Dredging 2009 (DEWHA, 2009), a detailed options assessment will be completed that assesses:

- Benthic and other marine communities at the disposal site.
- Physical properties (e.g., currents, bathymetry).
- Maritime archaeology.
- Commercial and recreational fishers.
- Beneficial uses of the area.

This will involve consultation with environment and fisheries organisations, local fishers, divers and other relevant organisations. It will also be supported by, surveys of marine biota at the disposal site and hydrodynamic modelling of the Cornet Inlet.

☒ Design: Please describe briefly

Any contaminated material to be dredged (possible in the existing berth pockets) will be stored in an engineered storage cell designed in accordance with relevant standards.

During construction of the new wharf, sheet piling will occur to the west of the existing sheet piles before the original structures are removed. This will ensure a retaining structure is always in place and will minimise disturbance to the surrounding environment.

Feasible dredging and dredged material placement methods will be assessed with consideration of environmental impacts to minimise disturbance to the marine environment.

☒ Environmental management: Please describe briefly.

The project will comply with the environmental management requirements and performance conditions of all approvals and consents.

The project will be undertaken in accordance with Qube's Safety, Health and Environment Policy. The Qube Safety, Health and Environment Policy is signed by Qube's Managing Director and is applicable to all Qube employees, contractors, products, services and Qube operational sites. The policy outlines Qube's commitment to "provide a safe and healthy workplace and protect the environment".

Qube has an Environmental Management System that is AS/NZS ISO 14001:2015 certified.

Under Qube's Environment Standard, Safety, Health and Environment (SHE) systems and behaviours are regularly reviewed and audited to ensure compliance with requirements and continuous improvement.

The BBMT Safety, Health and Environmental Management Plan identifies and assesses the potential environmental impacts associated with the operation and documents the appropriate control measures and systems that are in place to manage environmental risk. This environmental management plan will be updated during preparation of the EES to include all project specific mitigation and management measures resulting from the environmental impact assessment. A construction environmental management plan and activity-specific work method statements will be prepared prior to the commencement of works. This plan will include mitigation and management measures related to construction activity impacts.

Environmental monitoring is required to manage the effectiveness of the mitigation measures and to report performance to the regulatory authorities. The BBMT Environmental Monitoring Plan provides a delivery mechanism to address any adverse environmental impacts of Qube's operation at BBMT. It provides specific guidance on the monitoring activities required and undertaken to manage site environmental risks consistent with the Safety, Health and Environmental Management Plan, conditions of the current EPA licence (#10294) and in accordance with the licence assessment guidelines (EPA Publication 1321) and the licence management guidelines (EPA Publication 13222.4). The current monitoring plan covers the following:

- Annual safety, health, environmental and management audit, including corrective actions and where required review and update of site procedures.
- Odour monitoring and complaints management system.
- Waste monitoring.
- Stormwater monitoring.
- Bund water monitoring.
- Groundwater monitoring (levels and quality).
- Water and energy use.

The monitoring plan will be updated during future environmental assessment and approvals to include all monitoring requirements resulting from the impact assessment process.

☒ Other: Please describe briefly

Qube plans to undertake a range of environmental, socioeconomic and cultural heritage studies during future environmental assessment and approvals and detailed project design (see Section 20). An objective of these studies is to identify project-specific measures to avoid, minimise or manage the potential adverse environmental effects.

Add any relevant additional information.

Not applicable.

19. Other activities

Are there any other activities in the vicinity of the proposed project that have a potential for cumulative effects?

☐ NYD ☐ No ☒ Yes If yes, briefly describe.

A potential customer of Gippsland Regional Port is Star of the South (SOTS). SOTS is proposing an offshore clean energy project off the Ninety Mile Beach. If approved, Gippsland Regional Port may provide logistics support for construction and operation and maintenance of the project.

Cumulative impacts associated with the SOTS project and the Gippsland Regional Port Project have the potential to occur. These effects may include (but are not limited to) increasing local road traffic on Barry Road and around BBMT, increasing vessel movements in Bass Strait and Corner Inlet, and socioeconomic effects such as increased demand for local accommodation and goods and services from construction and operation workforces. Potential beneficial impacts include employment opportunities for local residents and local business opportunities through the provision of goods and services.

SOTS project construction impacts will be assessed as part of that project's environmental and planning approvals process. Gippsland Regional Port Project operation impacts will include SOTS project requirements, if SOTS identifies Barry Beach as its preferred operation and maintenance port.

20. Investigation program

Study program

Have any environmental studies not referred to above been conducted for the project?

☒ No ☐ Yes If yes, please list here and attach if relevant.

Has a program for future environmental studies been developed?

☐ No ☒ Yes If yes, briefly describe.

Qube plans to undertake the environmental, socioeconomic and cultural heritage studies listed in Table 2 to inform future environmental assessment and approvals and detailed project design.

Table 2: Proposed study program

Study	Dependency / linkage	Objective
Dredged material placement area options analysis	Dependent on the findings of: • Hydrodynamic modelling and coastal processes	• To assess the feasibility of a range of potential sites for clean dredge spoil disposal at sea through constraints and opportunities analysis.

	• Coastal wetland and marine characterisation • Fisheries and marine resource use • Maritime heritage	
Contaminated land assessment (landside aspects)	Study findings will inform: • Project design and siting	• Complete a Phase 1 assessment to identify potential for onshore contamination resulting from previous and existing land uses. • Advise on any requirements for subsequent intrusive investigation works to refine the assessment of contamination. • Identify mitigation measures to control risks that the project may pose to the surrounding environment because of land contamination, and mitigation of any risks to the project from existing contamination.
Sampling and analysis plan (sediment quality)	Study findings will inform: • Hydrodynamic modelling • Project design and siting • Coastal wetland and marine ecology assessment	• Develop and implement a sampling and analysis plan to characterise sediment quality and potential existing contamination within the berth pockets, swing basin and channels proposed to be dredged. This plan should include particle size distribution and specific gravity of sediments. • Identify options for dredge spoil management.
Land use and planning	Study findings will inform: • Socioeconomic assessment	• Characterise the existing land use conditions and land tenure and the interaction with neighbours. • Assess the potential project impact on physical infrastructure, open space, marine and coastal environment, community services, tourism, residential areas, agriculture, businesses, conservation areas, recreation and commercial fisheries.
Cultural heritage	Study findings will inform: • Project design	• Characterise cultural heritage values (Aboriginal and historic) within the onshore and offshore components of the project area and its surrounds, and assess the cultural heritage significance of each value using internationally recognised criteria and insights from consultation with the Traditional Owners (i.e., GLaWAC). • Assess the nature of and likely magnitude of actual and potential impacts to these values based on an assessment of the severity, geographical extent and duration of the potential impacts. • Determine the overall significance of these impacts on identified cultural heritage values, based on a consideration of the value's cultural heritage significance and the magnitude of the impact it is or is likely to experience.

		• Identify avoidance and management measures that, if implemented, should either avoid impacts to cultural heritage values altogether or reduce the significance of these impacts.
Maritime archaeology and heritage	Study findings will inform: • Project design	• Identify areas of potential submerged cultural heritage significance through desktop review (literature review, existing marine geophysical data, on-line databases and historical research) and potentially dive inspection, if required. • Identify suitable mitigation measures. • Assess the potential project impact based on conceptual designs.
Noise (onshore and underwater)	Study findings will inform: • Terrestrial ecology • Coastal wetland and marine ecology • Socioeconomic assessment	• Characterise the existing ('background') noise levels within the project area and surrounds • Conduct noise modelling to assess potential impacts of project construction activities on sensitive receptors (i.e., local residences and terrestrial and marine fauna). • Provide recommendations for potential noise impact mitigation measures, where appropriate
Air quality, greenhouse gas and climate change	Study findings will inform: • Project design • Socioeconomic assessment	**Air quality** • Characterise the existing ('background') air quality within the project area and surrounds • Conduct meteorological and dispersion modelling to assess potential impacts of the project on air quality, if significant emission sources identified. • Provide recommendations for potential air quality impact mitigation measures, where appropriate **Greenhouse gas** • Estimate GHG emissions associated with construction and operation of the project, as well the net emissions compared with a base case of non-renewable energy generation • Provide recommendations for potential GHG emission mitigation measures, where appropriate **Climate change** • Characterise climate change risk factors associated with landside and waterside components of the project, in particular the potential for sea level rise • Identify and assess climate change resilience measures to be incorporated into the design and delivery of the infrastructure
Traffic and transport (roads and vessels)	Study findings will inform: • Socioeconomic assessment	• Characterise the existing road network and shipping channels in vicinity of the project, including traffic safety and safe navigation of vessels, and capacity assessments at key locations.

	• Project design (i.e., channel widths and navigation aids)	• Assess the impacts of the project on existing road network and shipping channel operation and identify improvements required • Recommend appropriate mitigation or management measures, where applicable.
Terrestrial ecology (inc. shorebirds)	Dependent on the findings of: • Noise (onshore and underwater)	• Characterise the existing environment within the onshore project area including vegetation (native and exotic), terrestrial fauna habitat and species, and identify ecological values. • Assess potential impacts of the project on the identified ecological values. • Recommend project-specific management measures to avoid, minimise or offset impacts to high-risk values, including an offset strategy.
Marine water quality	Study findings will inform: • Hydrodynamic modelling and coastal processes • Coastal wetland and marine ecology	• Undertake marine water quality monitoring and analysis to describe baseline water quality conditions and the existing concentrations of chemical contaminants and suspended solids/turbidity in marine waters around the port.
Coastal wetland and marine ecology (inc. migratory birds, mangroves, benthic ecology, fish and invertebrates and marine mammals)	Dependent on the findings of: • Hydrodynamic modelling and coastal processes	• Characterise the existing environment within the waterside project area including wetland and other habitat values (e.g., mangroves, seagrasses), benthic ecology, fish and invertebrates, marine mammals and migratory birds. • Assess potential impacts to marine flora and fauna due to chemical, physical and biological (e.g., invasive marine species) sources. • Recommend project-specific management measures to avoid, minimise or offset impacts to high-risk values, including an offset strategy.
Hydrodynamic modelling and coastal processes (incl. hydrodynamic, sediment transport and dredged material dispersion modelling)	Study findings will inform: • Coastal wetland and marine ecology • Dredged material placement area options analysis • Fisheries and marine resource use	• Assess the impacts of proposed dredging works to tidal hydrodynamics, wave conditions, and associated sediment transport regime, and water quality.
Fisheries and marine resource use	Dependent on the findings of: • Hydrodynamic modelling • Dredged material placement area options analysis • Coastal wetland and marine ecology Study findings will inform:	• Identify the locations (e.g., haul seining, mesh net and longlining areas) targeted by fisheries and recreational fishers in relation to proposed dredging and spoil disposal areas. • Determine the importance of these locations to commercial and recreational fisheries. • Describe the predicted residual impacts to commercial and recreational fisheries after mitigation and management measures have been implemented.

	• Socioeconomic impact assessment	
Socioeconomic impact assessment	Dependent on the findings of: • Land use and planning • Fisheries and marine resource use • Traffic and transport • Air quality • Noise	• Provide a baseline characterisation of the social environment on which to assess project related impacts and benefits. • Assess the social impacts and benefits of the project on affected communities. • Provide recommendations for limiting social impacts and maximising social benefits of the project.

Consultation program

Has a consultation program conducted to date for the project?

☐ No ☒ Yes If yes, outline the consultation activities and the stakeholder groups or organisations consulted.

Qube has consulted with the following key stakeholders:

- Department of Agriculture, Water and the Environment (DAWE). A joint pre-referral meeting with DELWP was held on Wednesday 1 April 2020 to discuss the proposed action and anticipated level of environmental impact assessment.
- Department of Environment, Land, Water and Planning (DELWP). A joint pre-referral meeting with DAWE was held on Wednesday 1 April 2020 to discuss the proposed action and anticipated level of environmental impact assessment.
- Gippsland Ports. Qube has consulted widely with Gippsland Ports on the proposed redevelopment of Barry Beach Marine Terminal.
- South Gippsland Shire. Qube has briefed the Chief Executive Officer on the proposed redevelopment of Barry Beach Marine Terminal.
- Gippsland Basin Joint Venture. Gippsland Basin Joint Venture has been consulted extensively on the proposed redevelopment, as the joint venture owns Barry Beach Marine Terminal, a strategic asset for its Bass Strait oil and gas operations.
- Star of the South Wind Farm Pty Ltd. Qube has consulted with Star of the South Wind Farm Pty Ltd on its requirements for a construction and operation and maintenance port.

In 2018 Qube presented to the South East Australian Transport Strategy (SEATS) Conference on the plans to develop a regional port at Barry Beach to provide port access for a range of Gippsland businesses. Attendees at the conference included council members from the Gippsland region.

In terms of general community engagement, since 2017 Qube has engaged with the local community through participation in Esso's annual stakeholder/community liaison lunches. These sessions provide community members with an update on ExxonMobil's business activities which includes operations at BBMT. Attendees at these sessions include representatives of South Gippsland Shire Council and many organisations such as local schools, emergency services and health services.

Has a program for future consultation been developed?

☐ NYD ☒ No ☐ Yes If yes, briefly describe.

A project specific stakeholder engagement plan will be prepared as part of future environmental assessment and approvals. If an EES is required by the Minister for Planning, DELWP will publish an EES Consultation Plan on its website once it is satisfied the plan will provide for effective consultation throughout the EES process.

Authorised person for proponent:

I, ...Leatrice Treharne.....(full name),

..... General Manager, Projects & Development .....(position), confirm that the information contained in this form is, to my knowledge, true and not misleading.

Signature _____

Date 23/06/2020.

Person who prepared this referral:

I, ...Barton Napier.....(full name),

.....Senior Principal.....(position), confirm that the information contained in this form is, to my knowledge, true and not misleading.

Signature Barton Napier

Date 23/06/2020

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Attachment – Species reference list

Common Name	Scientific Name	Conservation Status		
		EPBC Act	FFG Act	Advisory List
Fauna				
Antipodean albatross	*Diomedea antipodensis*	Ma, Mi, VU		
Australian fur-seal	*Arctocephalus pusillus*	Ma		
Australian grayling	*Prototroctes maraena*	VU		
Australian gull-billed tern	*Gelochelidon nilotica*	Ma, Mi	L	En
Australian painted snipe	*Rostratula australis*	Ma, EN		
Australian pied oystercatcher	*Haematopus longirostris*			
Australian smooth pipefish	*Lissocampus causalis*	Ma		
Azure kingfisher	*Ceyx azureus*	EN		
Bar-tailed godwit	*Limosa lapponica*	Ma, Mi		
Bar-tailed godwit (bauera)	*Limosa lapponica baueri*	VU		
Big-Belly seahorse, potbelly seahorse	*Hippocampus abdominalis*	Ma		
Black-browed albatross	*Thalassarche melanophris*	Ma, Mi, VU		Vu
Black-faced cormorant	*Phalacrocorax fuscescens*	Ma		NT
Black-faced monarch	*Monarcha melanopsis*	Ma, Mi		
Black-tailed godwit	*Limosa limosa*	Ma, Mi		Vu
Blue whale	*Balaenoptera musculus*	C, EN		
Bottlenose dolphin	*Tursiops truncatus s. str.*	C		
Brushtail pipefish	*Leptoichthys fistularius*	Ma		
Bryde's whale	*Balaenoptera edeni*	C, Mi		
Buller's albatross	*Thalassarche bulleri*	Ma, Mi, VU	L	
Bullneck seahorse	*Hippocampus minotaur*	Ma		
Campbell albatross	*Thalassarche impavida*	Ma, Mi, VU		
Caspian tern	*Sterna caspia*	Ma, Mi	L	NT
Cattle egret	*Ardea ibis*	Ma		
Chestnut-rumped heathwren	*Calamanthus pyrrhopygius parkeri*	EN	L	Vu
Common diving-petrel	*Pelecanoides urinatrix*	Ma		NT
Common greenshank	*Tringa nebularia*	Ma, Mi		Vu
Common sandpiper	*Actitis hypoleucos*	Ma, Mi		Vu

Common Name	Scientific Name	Conservation Status		
		EPBC Act	FFG Act	Advisory List
Common seadragon, weedy seadragon	*Phyllopteryx taeniolatus*	Ma		
Crested pipefish	*Histiogamphelus briggsii*	Ma		
Crested tern	*Thalasseus bergii*	Ma, Mi		
Curlew sandpiper	*Calidris ferruginea*	CR, Ma, Mi	L	En
Deepbody pipefish	*Kaupus costatus*	Ma		
Double-banded plover	*Charadrius bicinctus*	Ma, Mi		
Dusky dolphin	*Lagenorhynchus obscurus*	C, Mi		
Eastern curlew	*Numenius madagascari-ensis*	CR, Ma, Mi	L	Vu
Eastern dwarf galaxias	*Galaxiella pusilla*	VU		
Eastern pygmy-possum	*Cercartetus nanus*			NT
Emu	*Dromaius novaehollandiae*			NT
Fairy prion	*Pachyptila turtur subantarc-tica*	VU		
Fairy tern	*Sternula nereis nereis*	VU	L	En
Flesh-footed shearwater	*Ardenna carneipes*	Ma, Mi		
Fork-tailed swift	*Apus pacificus*	Ma, Mi		
Gibson's albatross	*Diomedea antipodensis gibsoni*	Ma, Mi, VU		
Glossy grass skink	*Pseudemoia rawlinsoni*			Vu
Great egret	*Ardea modesta*	Ma	L	Vu
Great knot	*Calidris tenuirostris*	CR, Ma, Mi	L	En
Great skua	*Stercorarius skua*	Ma		
Great white shark	*Carcharodon carcharias*	Mi, VU	L	Vu
Greater glider	*Petauroides volans*	VU		Vu
Greater sand plover	*Charadrius leschenaultia*	Ma, Mi, VU		Cr
Green turtle	*Chelonia mydas*	Ma, Mi, VU		
Grey plover	*Pluvialis squatarola*	Ma, Mi		En
Grey-headed albatross	*Thalassarche chrysostoma*	Ma, Mi, EN	L	Vu
Grey-headed flying-fox	*Pteropus poliocephalus*	VU	L	Vu
Grey-tailed tattler	*Tringa brevipes*	Ma, Mi	L	Cr
Growling grass frog	*Litoria raniformis*	VU	L	En
Hairy pipefish	*Urocampus carinirostris*	Ma		
Halfbanded pipefish	*Mitotichthys semistriatus*	Ma		
Hooded plover	*Thinornis cucullatus cucul-latus*	Ma, VU		Vu
Humpback whale	*Megaptera novaeangliae*	C, Mi, VU	L	Vu
Indian Ocean bottle-nose dolphin	*Tursiops aduncus*	C		
Javeline pipefish	*Lissocampus runa*	Ma		
Knifesnout pipefish	*Hypselognathus rostratus*	Ma		

Common Name	Scientific Name	Conservation Status		
		EPBC Act	FFG Act	Advisory List
Latham's snipe	*Gallinago hardwickii*	Ma, Mi		NT
Leafy seadragon	*Phycodurus eques*	Ma		
Leatherback turtle	*Dermochelys coriacea*	Ma, Mi, EN	L	Cr
Leopard seal	*Hydrurga leptonyx*	Ma		
Lesser sand plover	*Charadrius mongolus*	EN, Ma, Mi		Cr
Little curlew	*Numenius minutus*	Ma, Mi		
Little penguin	*Eudyptula minor*	Ma		
Little tern	*Sternula albifrons*	Ma, Mi	L	Vu
Loggerhead turtle	*Caretta caretta*	Ma, Mi, EN		
Long-nosed potoroo	*Potorous tridactylus tridac-tylus*	VU	L	NT
Longsnout pipefish, Australian long-snout pipefish, long-snouted pipefish	*Vanacampus poecilolaemus*	Ma		
Marsh sandpiper	*Tringa stagnatilis*	Ma, Mi		Vu
Minke whale	*Balaenoptera acutorostrata*	C		
Mother-of-pearl pipefish	*Vanacampus margaritifer*	Ma		
Musk duck	*Biziura lobata*	Ma		Vu
Nankeen night-heron	*Nycticorax caledonicus*	Ma		NT
New Holland mouse	*Pseudomys novaehollan-diae*	VU	L	Vu
New Zealand fur-seal	*Arctocephalus forsteri*	Ma		Vu
Northern Buller's albatross, Pacific albatross	*Thalassarche bulleri platei*	VU		
Northern royal albatross	*Diomedea sanfordi*	Ma, Mi, EN		
Orange-bellied parrot	*Neophema chrysogaster*	CR, Ma	L	Cr
Orca	*Orcinus orca*	C, Mi		
Pacific golden plover	*Pluvialis fulva*	Ma, Mi		Vu
Pacific gull	*Larus pacificus*	Ma		NT
Pale mangrove goby	*Mugiligobius platynotus*		L	Vu
Eastern osprey	*Pandion haliaetus* *Pandion cristatus*	Ma, Mi		
Pectoral sandpiper	*Calidris melanotos*	Ma, Mi		NT
Pied Stilt, black-winged stilt	*Himantopus himantopus*	Ma		
Pin-tailed snipe	*Gallinago stenura*	Ma, Mi		
Pipefish, gulf pipefish, peacock pipefish	*Stigmatopora argus*	Ma		
Port Phillip pipefish	*Vanacampus phillipi*	Ma		
Pugnose pipefish, pug-nosed pipefish	*Pugnaso curtirostris*	Ma		
Pygmy right whale	*Caperea marginata*	C, Mi		
Rainbow bee-eater	*Merops ornatus*	Ma	L	Vu

Common Name	Scientific Name	Conservation Status		
		EPBC Act	FFG Act	Advisory List
Red knot	*Calidris canutus*	Ma, Mi, EN		En
Red pipefish	*Notiocampus ruber*	Ma		
Red-capped plover	*Charadrius ruficapillus*	Ma		
Red-necked avocet	*Recurvirostra novaehollan-diae*	Ma		
Red-necked stint	*Calidris ruficollis*	Ma, Mi		
Regent honeyeater	*Anthochaera Phrygia*	CR	L	Cr
Rhino pipefish	*Histiogamphelus cristatus*	Ma		
Ringback pipefish, ring-backed pipefish	*Stipecampus cristatus*	Ma		
Risso's dolphin	*Grampus griseus*	C		
Royal spoonbill	*Platelea regia*			NT
Ruddy turnstone	*Arenaria interpres*	Ma, Mi		Vu
Ruff (Reeve)	*Philomachus pugnax*	Ma, Mi		
Rufous fantail	*Rhipidura rufifrons*	Ma, Mi		
Salvin's albatross	*Thalassarche salvini*	Ma, Mi, VU		
Sanderling	*Calidris alba*	Ma, Mi		NT
Satin flycatcher	*Myiagra cyanoleuca*	Ma, Mi		
Sawtooth pipefish	*Maroubra perserata*	Ma		
Sharp-tailed sandpiper	*Calidris acuminate*	Ma, Mi		
Short-beaked common dolphin	*Delphinus delphis*	C		
Short-head seahorse	*Hippocampus breviceps*	Ma		
Short-tailed shearwater	*Ardenna tenuirostris*	Ma, Mi		
Shy albatross	*Thalassarche cauta*	Ma, Mi, VU	L	Vu
Silver gull	*Chroicocephalus novae-hollandiae*	Ma		
Sooty albatross	*Phoebetria fusca*	Ma, Mi, VU	L	
Sooty oyster catcher	*Haematopus fuliginosus*			NT
Sooty shearwater	*Ardenna grisea*	Ma, Mi		
Sooty tern	*Onychoprion fuscatus*	Ma		
Southern brown bandicoot (eastern)	*Isoodon obesulus obesu-lus*	EN	L	NT
Southern right whale	*Eubalaena australis*	C, Mi, EN	L	Cr
Southern royal albatross	*Diomedea epomophora*	Ma, Mi, VU	L	Vu
Southern toadlet	*Pseudophryne semimar-morata*			Vu
Spot-tailed quoll	*Dasyurus maculatus macu-latus*	EN	L	En
Spotted pipefish, gulf pipefish, peacock pipefish	*Stigmatopora argus*	Ma		
Swamp antechinus	*Antechinus minimus mariti-mus*	VU	L	Th
Swift parrot	*Lathamus discolour*	CR, Ma	L	Cr

Common Name	Scientific Name	Conservation Status		
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Swinhoe's snipe	*Gallinago megala*	Ma, Mi		
Terek sandpiper	*Xenus cinereus*	Ma, Mi	L	En
Trawl pipefish	*Kimblaeus bassensis*	Ma		
Tucker's pipefish	*Mitotichthys tuckeri*	Ma		
Upside-down pipefish	*Heraldia nocturna*	Ma		
Wandering albatross	*Diomedea exulans*	Ma, Mi, VU	L	En
Whimbrel	*Numenius phaeopus*	Ma, Mi		Vu
White-bellied sea-eagle	*Haliaeetus leucogaster*	Ma	L	Vu
White-capped albatross	*Thalassarche steadi*	Ma, Mi, VU		
White-throated needle-tail	*Hirundapus caudacutus*	Ma, Mi, VU	L	En
White-winged black tern	*Chlidonias leucopterus*	Ma, Mi		NT
Widebody pipefish, wide-bodied pipefish, black pipefish	*Stigmatopora nigra*	Ma		
Wood sandpiper	*Tringa glareola*	Ma, Mi		Vu
Yellow wagtail	*Motacilla flava*	Ma, Mi		
Ecological communities				
Natural Damp Grassland of the Victorian Coastal Plains		CE		
Subtropical and Temperate Coastal Saltmarsh		VU		
Flora				
Bassian pomaderris	*Pomaderris oraria subsp. oraria*			r
Bog gum	*Eucalyptus kitsoniana*			r
Broad-leaf prickly moses	*Acacia verticillata subsp. ruscifolia*			r
Bushy peppercress	*Lepidium desvauxii*			r
Coast boronia	*Boronia anemonifolia subsp. variabilis*			Vu
Coast colobanth	*Colobanthus apetalus var. apetalus*			r
Coast coral heath	*Epacris microphylla s.s.*			Vu
Coast lily	*Bulbine crassa*			r
Coastal greenhood	*Pterostylis alveata*			Vu
Creeping rush	*Juncus revolutus*			r
Crested water-milfoil	*Myriophyllum lophatum*			k
Crimson berry	*Leptecophylla juniperina subsp. oxycedrus*			Vu
Currant-wood	*Monotoca glauca*			r
Dense leek-orchid	*Prasophyllum spicatum*	VU		
Dune groundsel	*Senecio spathulatus var. latifructus*			r

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Dune poa	*Poa poiformis var. ramifer*			r
Eastern spider orchid	*Caladenia orientalis*	EN		
Fibre-ball weed	*Posidonia australis*			r
Green-striped greenhood	*Pterostylis chlorogramma*	VU		
Grey mangrove	*Avicennia marina subsp. australasica*			r
Hairpin banksia	*Banksia spinulosa var. cunninghamii*			N
Ivy flat-pea	*Platylobium triangulare*			k
Lacey river buttercup	*Ranunculus amplus*			r
Leafy greenhood	*Pterostylis cucullata subsp. Cucullate*	VU		
Leafy twig-sedge	*Cladium procerum*			r
Maroon leek-orchid	*Prasophyllum frenchii*	EN		
Parsley xanthosia	*Xanthosia leiophylla*			r
River swamp wallaby-grass	*Amphibromus fluitans*	VU		
Rough blown-grass	*Lachnagrostis rudis subsp. rudis*			r
Salt lawrencia	*Lawrencia spicata*			r
Sea bindweed	*Calystegia soldanella*			Vu
Shingle fireweed	*Senecio diaschides*			r
Shore spleenwort	*Asplenium obtusatum subsp. northlandicum*			Vu
Silver everlasting	*Argentipallium dealbatum*			r
Spiral sun-orchid	*Thelymitra matthewsii*	VU		
Swamp everlasting	*Xerochrysum palustre*	VU		
Swamp greenhood	*Pterostylis tenuissima*	VU		
Swamp fireweed	*Senecio psilocarpus*	VU		
Thick-lipped spider-orchid, daddy long-legs	*Caladenia tessellate*	VU		
Tiny arrowgrass	*Triglochin minutissima*			r
Velvet apple-berry	*Billardiera scandens s.s.*			r
Walsh's couch	*Zoysia macrantha subsp. walshii*			r
Water parsnip	*Berula erecta*			k
Water tassel	*Ruppia maritima s.s.*			k
Wedge guinea-flower	*Hibbertia diffusa*			r
Winged water-starwort	*Callitriche umbonata*			r X
Wiry bog-sedge	*Schoenus carsei*			r
Yellow sea-lavender	*Limonium australe var. australe*			r